# MAGNITUDE AND FREQUENCY OF HIGH FLOWS OF UNREGULATED STREAMS IN KANSAS

U.S. GEOLOGICAL SURVEY

Open-File Report 84-453

Prepared in cooperation with the

KANSAS WATER OFFICE

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By P. R. Jordan

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Lawrence, Kansas
1984

UNITED STATES DEPARTMENT OF THE INTERIOR

WILLIAM P. CLARK, Secretary

GEOLOGICAL SURVEY

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## CONVERSION FACTORS

Inch-pound units of measurement used in this report may be converted to the International System of Units (SI) using the following factors:

| Multiply inch-pound unit | By | To obtain SI unit |
|---|---|---|
| inch | [1]25.4 | millimeter |
| foot | 0.3048 | meter |
| mile | 1.609 | kilometer |
| square mile | 2.590 | square kilometer |
| foot per mile | 0.1894 | meter per kilometer |
| inch per hour | [1]25.4 | millimeter per hour |
| cubic foot per second ($ft^3/s$) | 0.02832 | cubic meter per second |

[1] Exact conversion factor.

# MAGNITUDE AND FREQUENCY OF HIGH FLOWS OF UNREGULATED STREAMS IN KANSAS

By

P. R. Jordan

## ABSTRACT

Information on high-flow magnitude and frequency is needed for hydrologic evaluation of such factors as flood-control storage and dam safety. High-flow information given in this report is for streamflows unaffected by major regulation, such as by large reservoirs. High-flow magnitude and frequency data are given for 91 streamflow-gaging stations throughout Kansas. Results of frequency calculations are given for durations of high flow of 1, 3, 7, 15, 30, 60, 90, 120, and 183 consecutive days. Accuracy of the magnitude-frequency values is influenced by the variability of flow, the number of years of flow record, and the recurrence interval calculated.

High-flow magnitude and frequency for ungaged sites can be estimated from regression equations using significant drainage-basin characteristics of contributing-drainage area; 50-year, 24-hour rainfall; and free-water-surface evaporation. Standard errors of estimate for ungaged sites on ungaged streams range from 31 to 49 percent, generally increasing with recurrence interval. If an ungaged site is near a gaging station having 10 or more years of record on the same stream, the data for the gaging station may be used to improve the regression estimates.

## INTRODUCTION

High-flow magnitude and frequency information is needed for design of future reservoirs and for safety evaluation of existing reservoirs. In design of new reservoirs, the information in this report will be particularly useful for small reservoirs whose small size cannot justify elaborate hydrologic modeling. Even for large reservoirs, this report's information may be superior to synthetic hydrographs based on estimated runoff relations and average storm patterns because it is based on adequate records of observed flows.

Inspection of existing reservoirs must include consideration of the volumes of flood water they can safely store or pass through. In addition, State regulations require certain classes of new reservoirs to provide flood-control storage equal to the inflow volume of specified frequency. This report can be used directly for that purpose.

This report applies only to high flows of 1-day and longer duration, unaffected by major regulation. For regulated flows, downstream from major reservoirs, the responsible agency in most cases has determined expected high-flow magnitudes by detailed site-specific studies that include consideration of inflow, storage, evaporation, and reservoir-operation plans. Flood-peak magnitude and frequency are covered in other reports, most recently in Technical Report 11 of the Kansas Water Resources Board (Jordan and Irza, 1975).

This study was conducted by the U.S. Geological Survey in cooperation with the Kansas Water Office. Streamflow data analyzed were from gaging stations operated by the U.S. Geological Survey in cooperation with several State and Federal agencies.

## Previous Studies

Results of the first comprehensive study of high flows (other than peak flows) in Kansas were reported by Furness and others (1964). The study was based on streamflow records through 1960 for which the smallest drainage area was 92 square miles. The report not only included high-flow probabilities and storage requirements at gaging stations but also a procedure for estimating storage requirements for ungaged sites with drainage areas of 150 to 7,500 square miles.

A series of working papers were prepared for the "Missouri River Basin Comprehensive Framework Study." High-flow magnitude and frequency for the Missouri River basin part of Kansas, based on streamflow records through 1963, were included in these papers, as described by the Missouri River Basin Inter-Agency Committee (1969).

Regression equations for estimating high-flow magnitude and frequency at ungaged sites were reported by Jordan and Hedman (1970) for selected recurrence intervals and durations of high flow. High-flow statistics, without frequency analysis, were given in two reports of streamflow statistics based on records through 1976 (Jordan, 1978, 1979).

# SELECTION OF DATA FOR ANALYSIS

This study is limited to streamflow that is not significantly affected by regulation. Data from gaging stations downstream from major flood-control reservoirs, therefore, were excluded from the study. Not excluded, however, were gaging stations having flows affected by diversions for water supplies, by return flows from municipal or industrial use or from irrigated fields, and by structures such as low dams. These influences were assumed to have small effects on the high flows analyzed in this report, although in some cases the effects on long-duration (for example, 183-day) flows could be significant. A few of the gaging-station records used in the analysis were affected by small reservoirs in watershed districts during the later part of their records. These reservoirs affected small parts of the drainage to the stations used and were judged not to have significant effects on the high-flow magnitude-frequency values determined for this report.

Many stations at sites that are now affected by significant regulation of high flows were in operation before the reservoirs were built. Records of the earlier, unregulated flows were analyzed to aid in determining relations to basin characteristics, but high-flow magnitudes at these stations are not tabulated in this report because they are not applicable to current (1983) conditions.

Stations having at least 10 years of record of unregulated streamflow through 1980 were used in this study where available and applicable. For a few stations, records through 1981 were used. Stream gaging in Kansas began in the 1890's, so a few stations have long records. However, many of the first stations were on streams, such as the Kansas River, that now have regulated flow. Other early stations had their records interrupted for a substantial number of years. The longest record available for this study was 58 years, and four stations had more than 50 years. For most small basins having less than 150 square miles of drainage area, 1964 was the earliest record available; 25 basins were this small, and the smallest was 2.06 square miles.

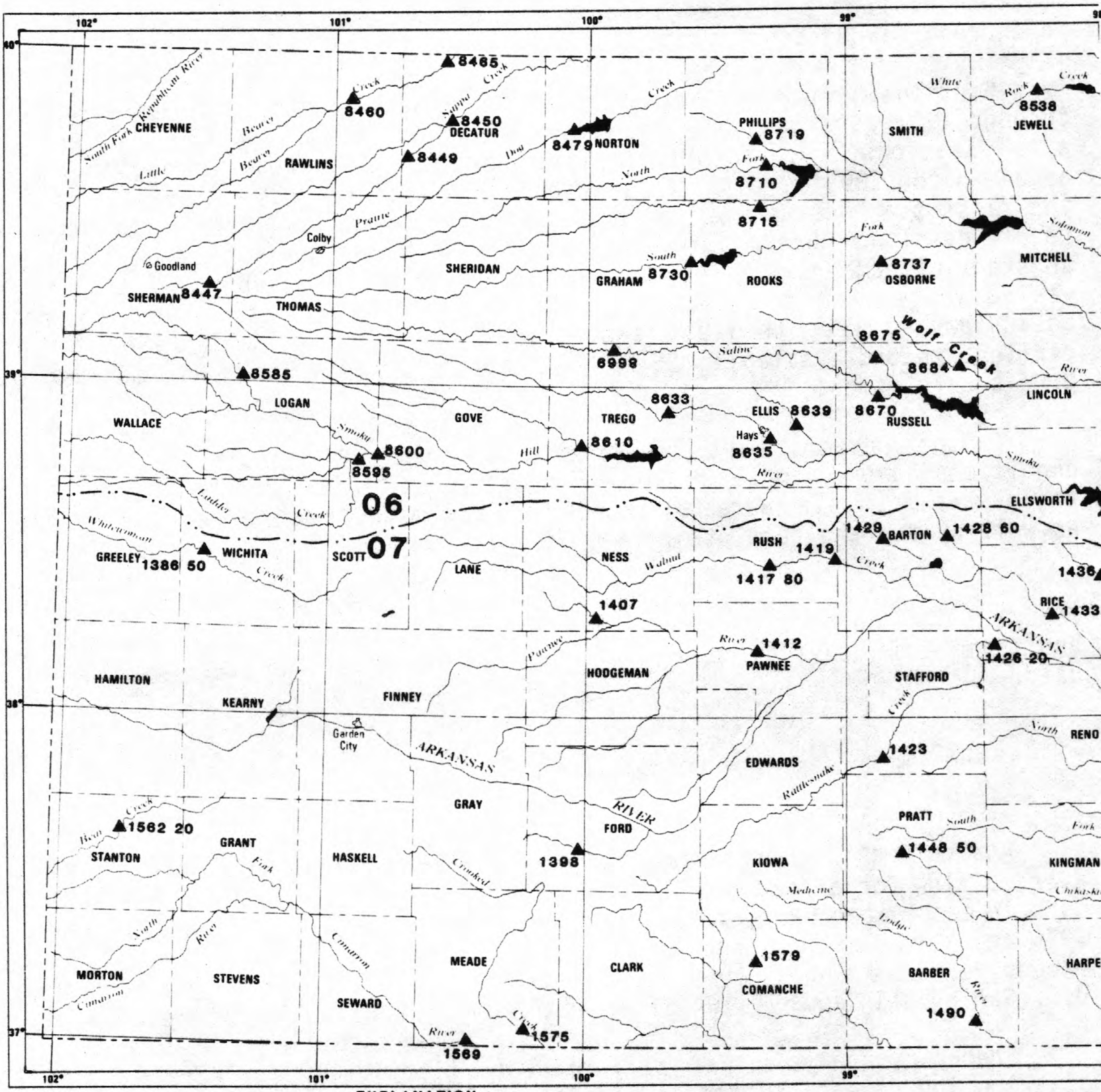
In the western part of Kansas (west of 99° longitude) streamflow conditions have changed markedly since about 1965 (Jordan, 1982). For these streams, data were analyzed for a limited recent period, 1966-80, as well as for the complete period of record.

The location of the gaging stations used in this study is shown in figure 1 for both those stations without significant regulation of flow and those now having regulation for which preregulation records were used.

## HIGH-FLOW FREQUENCY AT GAGING STATIONS

Analysis of high-flow data began with the determination of the highest average flow for periods of 1, 3, 7, 15, 30, 60, 90, 120, and 183 consecutive days in each water year, October 1 through September 30. These data through 1976 are reported by Jordan (1978, 1979). Highest average flows for more recent years were determined by the same method, a computer program in the U.S. Geological Survey's WATSTORE water-data storage and retrieval system.

Frequency analysis was performed by fitting a log-Pearson Type-III distribution to each series of high flows. The log-Pearson Type-III method has been adopted by the U.S. Water Resources Council (1967, 1981) for frequency analysis of peak flows. No problems were encountered in applying the method to high flows of 1-day to 183-days duration. A few stations had high flows of zero (less than 0.05) cubic feet per second for some years, and a standard conditional-probability adjustment was used for these stations. In contrast to peak-flow data for many stations where information is available on historic peak flows outside the period of systematic record and can be used to improve the frequency calculations, high-flow data for 1 day and longer are available only for the period of systematic record. As recommended by the U.S. Water Resources Council (1981), the skewness coefficient used in each frequency computation was the weighted average of the coefficient calculated from the station's data




EXPLANATION

**DRAINAGE BASINS**

**06** Missouri River basin

—— · · —— Basin boundary

**07** Arkansas River basin

**STREAMFLOW-GAGING STATIONS**

1407▲ Gaging station on unregulated stream

1795△ Gaging station on currently regulated stream, for which preregulation streamflow records were used

NOTE: Numbers shown are abbreviated versions of the complete 8-digit numbers

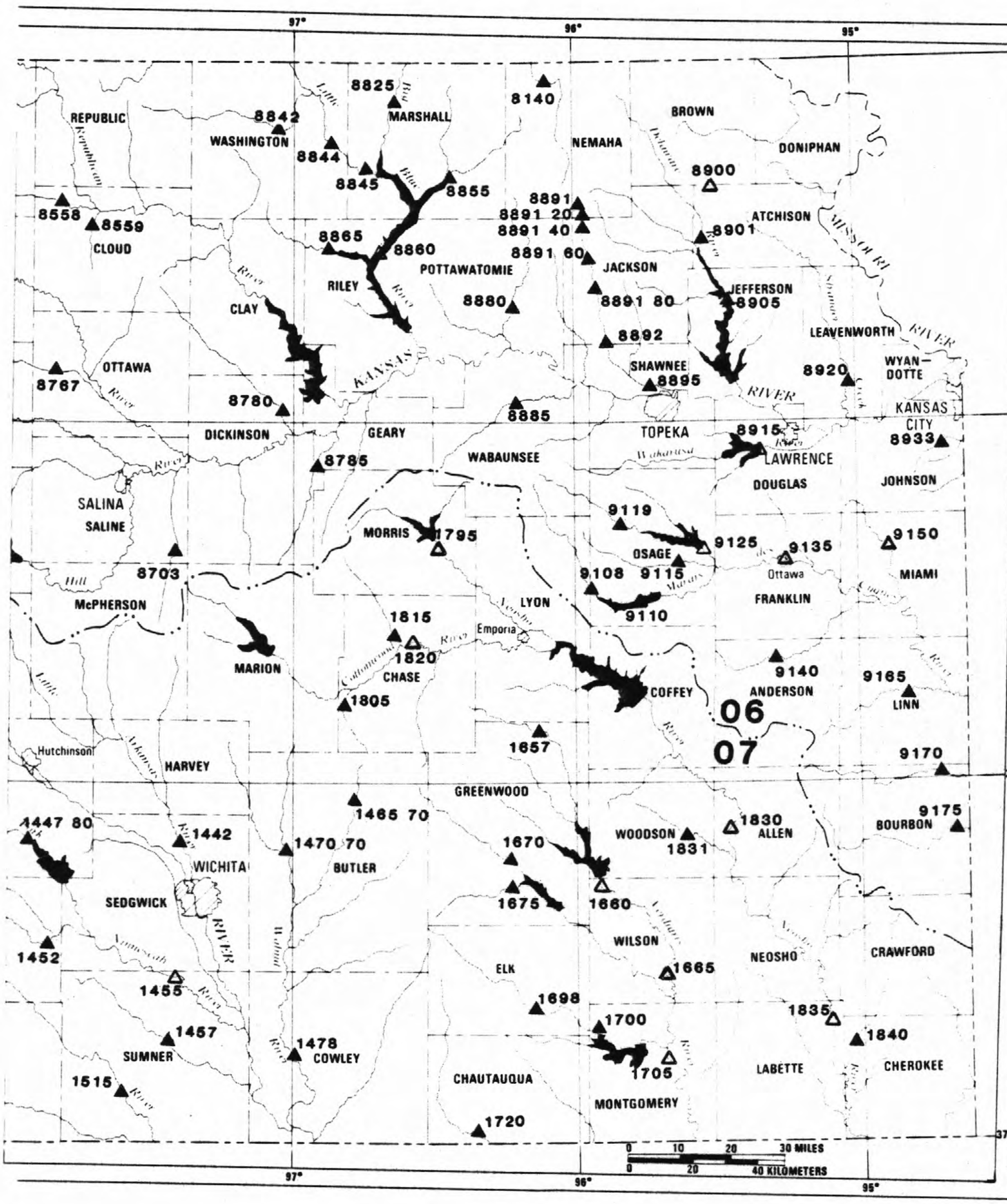



Figure 1.--Location of streamflow-gaging stations used in analysis of high-flow magnitude and frequency.

and the coefficient determined from a method of generalization. The methods of generalization and weighting used for this report are explained in the "Supplemental Information" section. An example of data used and the fitting of a log-Pearson Type-III distribution are shown in figure 2.

## Results of Analysis

Results of the frequency analyses for stations now having unregulated flow are given in table 6 at the end of this report. For streams in the western part of the State (west of 99° longitude), results from records for 1966-80 are shown in addition to those from the entire period of record. The 1966-80 results may be better estimates of high flows for current (1983) conditions than calculations using data prior to 1966. However, the short period of record since 1965 causes the results to be erratic; for example, some 1966-80 frequency values are higher than those for the full period of record. The drainage areas shown in table 6 are the areas that directly contribute to surface runoff. These direct contributing areas are more pertinent to analysis of high flows than the total drainage areas.

## Accuracy

The concept of the accuracy of frequency values is clearly stated by the Hydrology Committee of the U.S. Water Resources Council (1981, p. 9-1). The statement was written for peak flows but applies equally to high flows of 1-day or longer duration:

> The record of annual peak flows at a site is a random sample of the underlying population of annual peaks and can be used to estimate the frequency curve of that population. If the same size random sample could be selected from a different period of time, a different estimate of the underlying population frequency curve probably would result. Thus, an estimated flood frequency curve can be only an approximation to the true frequency curve of the underlying population of annual flood peaks. To gauge the accuracy of the approximation, one may construct an interval or range of hypothetical frequency curves that, with a high degree of confidence, contains the population frequency curve. Such intervals are called confidence intervals and their end points are called confidence limits.

As indicated by this statement, accuracy of the discharge-frequency values presented herein is best at the 2-year and poorest at the 100-year recurrence interval. Good accuracy is associated with long records and low variability of discharge. Upper and lower confidence limits for each discharge frequency can be calculated by a complex procedure presented by the Water Resources Council (1981, Appendix 9). However, for the purpose of this report a simpler approach is taken.

STATION NUMBER 06886500

HIGHEST MEAN VALUE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING SEPTEMBER 30

DISCHARGE-(CFS)
MEAN
FANCY C AT WINKLER, KS

| YEAR | 1 | 3 | 7 | 15 | 30 | 60 | 90 | 120 | 183 |
|---|---|---|---|---|---|---|---|---|---|
| 1955 | 190.00 16 | 128.00 15 | 67.00 15 | 35.00 15 | 19.00 17 | 11.00 17 | 7.50 17 | 6.40 16 | 5.80 16 |
| 1956 | 199.00 15 | 87.00 16 | 43.00 16 | 22.00 17 | 21.00 16 | 12.00 16 | 7.90 16 | 6.00 17 | 3.90 17 |
| 1957 | 420.00 14 | 217.00 14 | 96.00 14 | 53.00 14 | 27.00 14 | 26.00 14 | 22.00 14 | 18.00 15 | 12.00 15 |
| 1958 | 5680.00 5 | 2030.00 7 | 1030.00 5 | 510.00 7 | 336.00 7 | 182.00 7 | 155.00 7 | 124.00 7 | 89.00 7 |
| 1959 | 806.00 13 | 501.00 13 | 341.00 12 | 182.00 12 | 112.00 13 | 63.00 13 | 57.00 12 | 52.00 12 | 49.00 12 |
| 1960 | 3190.00 8 | 2420.00 4 | 1330.00 4 | 714.00 4 | 398.00 5 | 317.00 4 | 254.00 1 | 208.00 2 | 164.00 2 |
| 1961 | 2600.00 10 | 1320.00 10 | 672.00 10 | 381.00 11 | 274.00 10 | 176.00 8 | 131.00 9 | 109.00 9 | 87.00 8 |
| 1962 | 5920.00 3 | 2800.00 3 | 1620.00 2 | 985.00 1 | 594.00 1 | 346.00 1 | 246.00 2 | 210.00 1 | 175.00 1 |
| 1963 | 1970.00 11 | 705.00 12 | 319.00 13 | 162.00 13 | 113.00 12 | 67.00 12 | 51.00 13 | 42.00 13 | 33.00 13 |
| 1964 | 5800.00 4 | 2220.00 6 | 985.00 8 | 654.00 6 | 340.00 6 | 176.00 9 | 128.00 10 | 109.00 10 | 79.00 9 |
| 1965 | 3610.00 6 | 2230.00 5 | 994.00 7 | 486.00 8 | 256.00 11 | 134.00 11 | 132.00 8 | 110.00 8 | 77.00 10 |
| 1966 | 151.00 17 | 65.00 17 | 37.00 17 | 28.00 16 | 23.00 15 | 21.00 15 | 19.00 15 | 18.00 14 | 15.00 14 |
| 1967 | 1650.00 12 | 942.00 11 | 643.00 11 | 419.00 10 | 275.00 9 | 151.00 10 | 103.00 11 | 83.00 11 | 55.00 11 |
| 1968 | 3490.00 7 | 1370.00 9 | 1020.00 6 | 688.00 5 | 478.00 3 | 250.00 5 | 184.00 5 | 144.00 6 | 98.00 6 |
| 1969 | 2870.00 9 | 1970.00 8 | 955.00 9 | 471.00 9 | 289.00 8 | 184.00 6 | 166.00 6 | 145.00 5 | 142.00 3 |
| 1970 | 6390.00 1 | 3120.00 2 | 1430.00 3 | 793.00 3 | 441.00 4 | 320.00 3 | 220.00 4 | 169.00 4 | 115.00 5 |
| 1971 | 6060.00 2 | 3420.00 1 | 1660.00 1 | 963.00 2 | 566.00 2 | 321.00 2 | 228.00 3 | 177.00 3 | 131.00 4 |

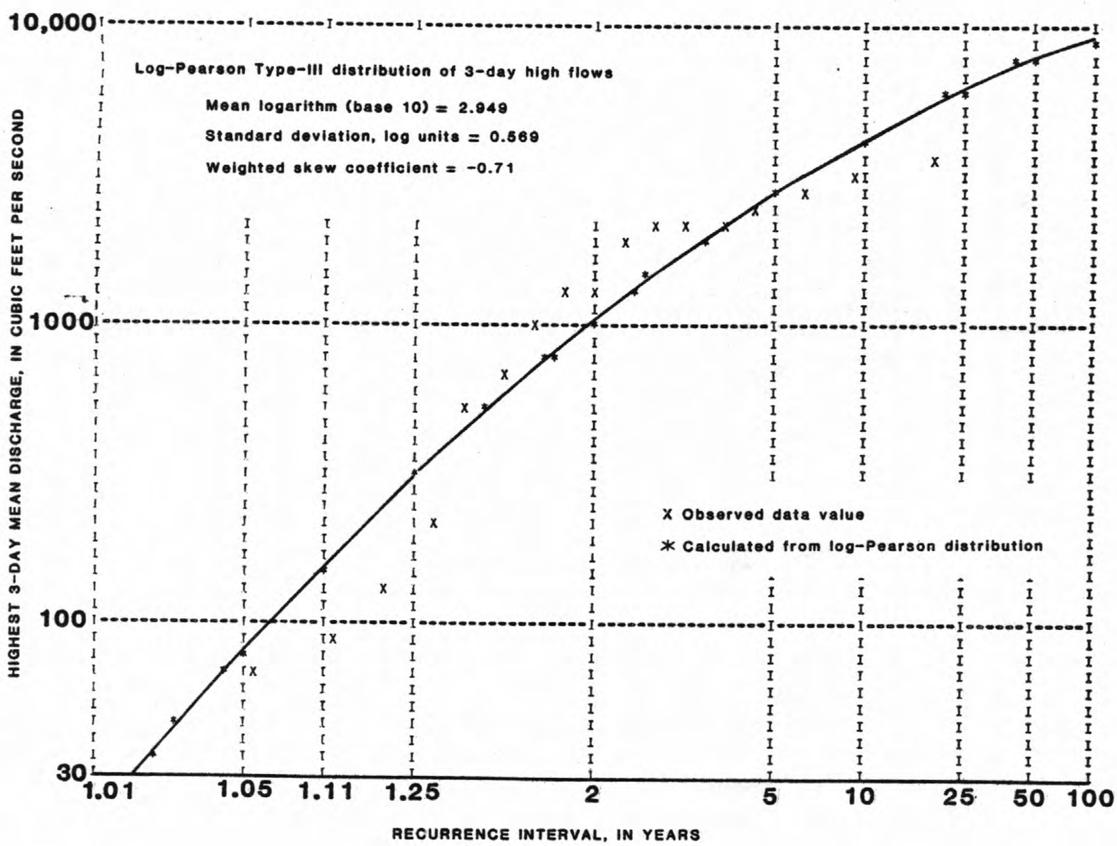



Figure 2.--Example of high-flow data and fitting of frequency distribution.

The standard error of an estimate, as explained in most textbooks on basic statistics, is a statistical measure of the accuracy of the estimate. In error distributions commonly encountered in a large group of similar calculations, about 68 percent of the calculated values are within one standard error of the true value. For this report, approximate standard errors were calculated by the method presented by Nash and Amorocho (1966). In table 6 (at the end of this report), a footnote on each of the four extremes for each station indicates the approximate percentage standard error. Since the calculations are from logarithmic data, the actual percentage standard errors are not equal in the positive and negative directions, but the average of the positive and negative values without regard to sign is shown. For the average of 20 percent, the directional standard errors are +22 and -18 percent; for the average of 50 percent, the directional standard errors are +62 and -38 percent.

## HIGH-FLOW FREQUENCY ESTIMATES AT UNGAGED SITES

High-flow magnitude-frequency information may be needed at innumerable sites other than the 91 gaging stations that are shown in table 6 (at the end of this report). In this section of the report, "ungaged sites" comprises all stream sites that are not in table 6 and that are not affected by major regulation of high flow. Such sites include gaging stations having short-term records of streamflow (less than 10 years) as well as sites never gaged. An "ungaged" site may be on the same stream as one of the stations in table 6. If close enough, data for that station will be useful in making an estimate. If far from a station in table 6 or for an ungaged stream, the estimate can be made by using relations to physical and climatic basin characteristics. The relations to physical and climatic characteristics will be described first, then the use of these relations together with data in table 6, where applicable, will be described.

### Relations of High-flow Frequency to Basin Characteristics

High-flow data used in this study were for the stations in table 6 plus stations on currently regulated streams for which preregulation records were used (fig. 1). For the basins west of 99° longitude, the frequency values for 1966-80 were used in order to represent current (1983) conditions. However, the 1966-80 period of only 15 years, together with the generally inconsistent nature of streamflows in western Kansas, reduces the reliability of the results for that region.

The high-flow frequency values can be identified by abbreviations in the form $\underline{d},\underline{Q}_T$, where $\underline{Q}$ is the average high flow for d consecutive days and T is the recurrence interval in years. For example, $15,\underline{Q}_{50}$ identifies the 15-day high flow for a 50-year recurrence interval.

Selection of physical and climatic characteristics for study was made after examining similar analyses, such as those by James (1968), Jordan and Hedman (1970), and Jordan and Irza (1975). The basin characteristics that were examined are defined as follows:

Contributing-drainage area (CDA), in square miles, is the drainage area that contributes surface runoff to the site. For most sites in Kansas, the contributing-drainage area is equal to the total drainage area. The method of determining the contributing-drainage area for sites where part of the total drainage does not contribute to surface runoff is explained in Technical Report 11 of the Kansas Water Office (formerly Kansas Water Resources Board) (Jordan and Irza, 1975, p. 25-27).

Main-channel length (L), in miles, is the length of the main low-water channel between the site and the drainage divide. The main channel is the one that drains the largest part of a basin.

Main-channel slope (S), in feet per mile, is the slope between points on the main channel that are 10 percent and 85 percent of the main-channel length from the site to the drainage divide.

50-year, 24-hour rainfall (I50), in inches, was determined for the centroid of each basin from a map shown in the report by Hershfield (1961). The I50 was used as the rainfall characteristic because it was found to be slightly more significant statistically than several other indices to the general rainfall magnitude and intensity. The distribution of 50-year, 24-hour rainfall (I50) is shown for Kansas in figure 3.

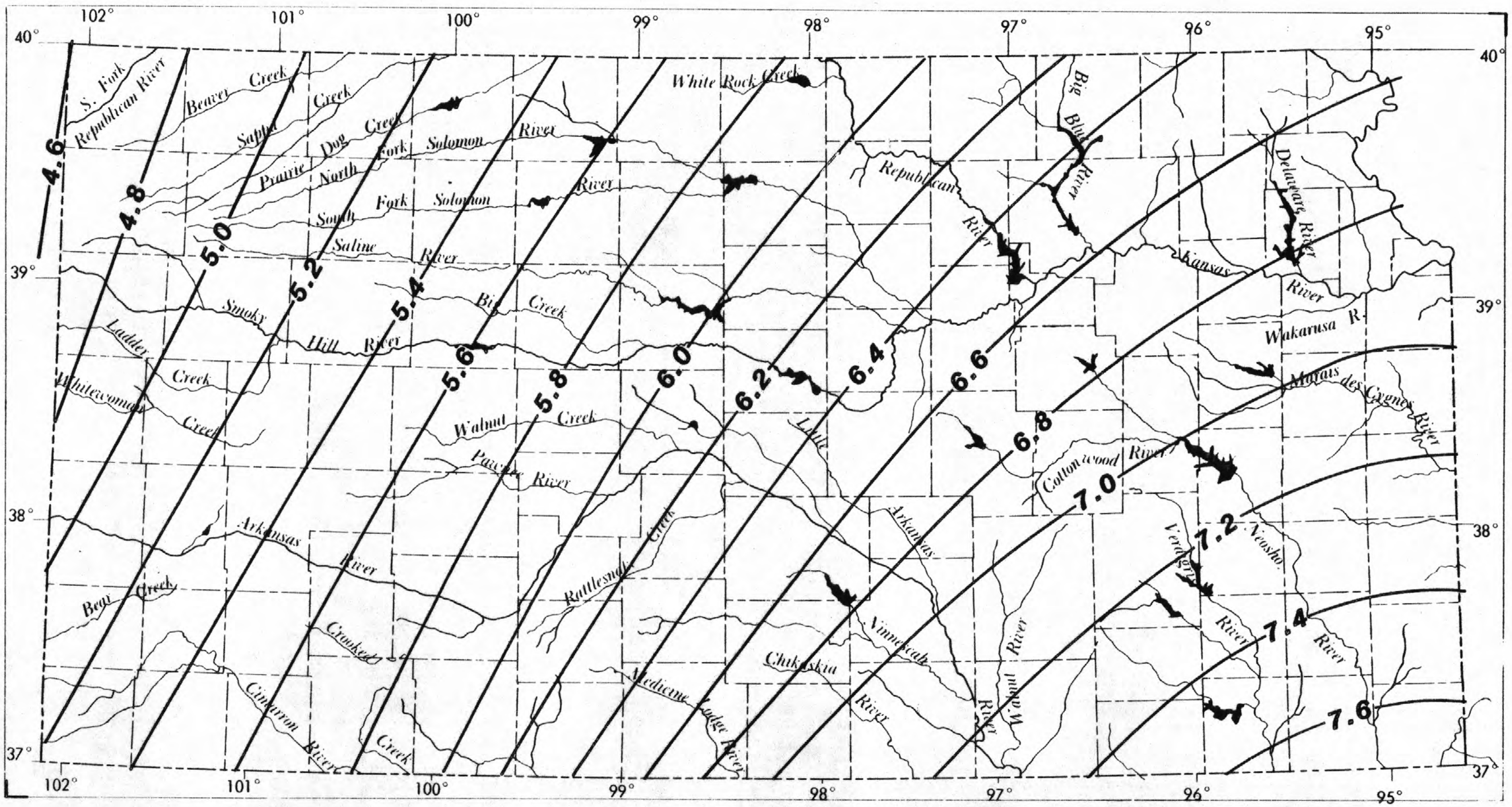
Free-water-surface evaporation (EV), in inches, is the average annual evaporation at the centroid of the drainage basin from map 3 of Farnsworth and others (1982). The Kansas part of the map is shown in figure 4.

Soil permeability (PS), in inches per hour, is determined from a generalized soil map (Jordan and Irza, 1975, fig. 9).

Pertinent statistical properties of the physical and climatic characteristics are shown in tables 1 and 2. A wide range of values for each characteristic used is desirable for detecting the relationship to the high flow. Low correlations between characteristics are desirable to prevent some relations from being obscured by random variation.

The standard least-squares multiple-regression technique was used in the statistical analysis. The technique, which is described in numerous textbooks, has been applied widely in hydrology, including studies of both peak flow and high flow (Benson, 1962, 1964; Jordan and Hedman, 1970; Thomas and Benson, 1970; Jordan and Irza, 1975). In order to achieve a nearly linear relationship between high flows and basin characteristics, all values were converted to their logarithmic equivalents. The resulting multiple linear regression model is of the general form:

$$\log Y = \log a + b_1 \log X_1 + b_2 \log X_2 + \ldots + b_k \log X_k, \qquad (1)$$



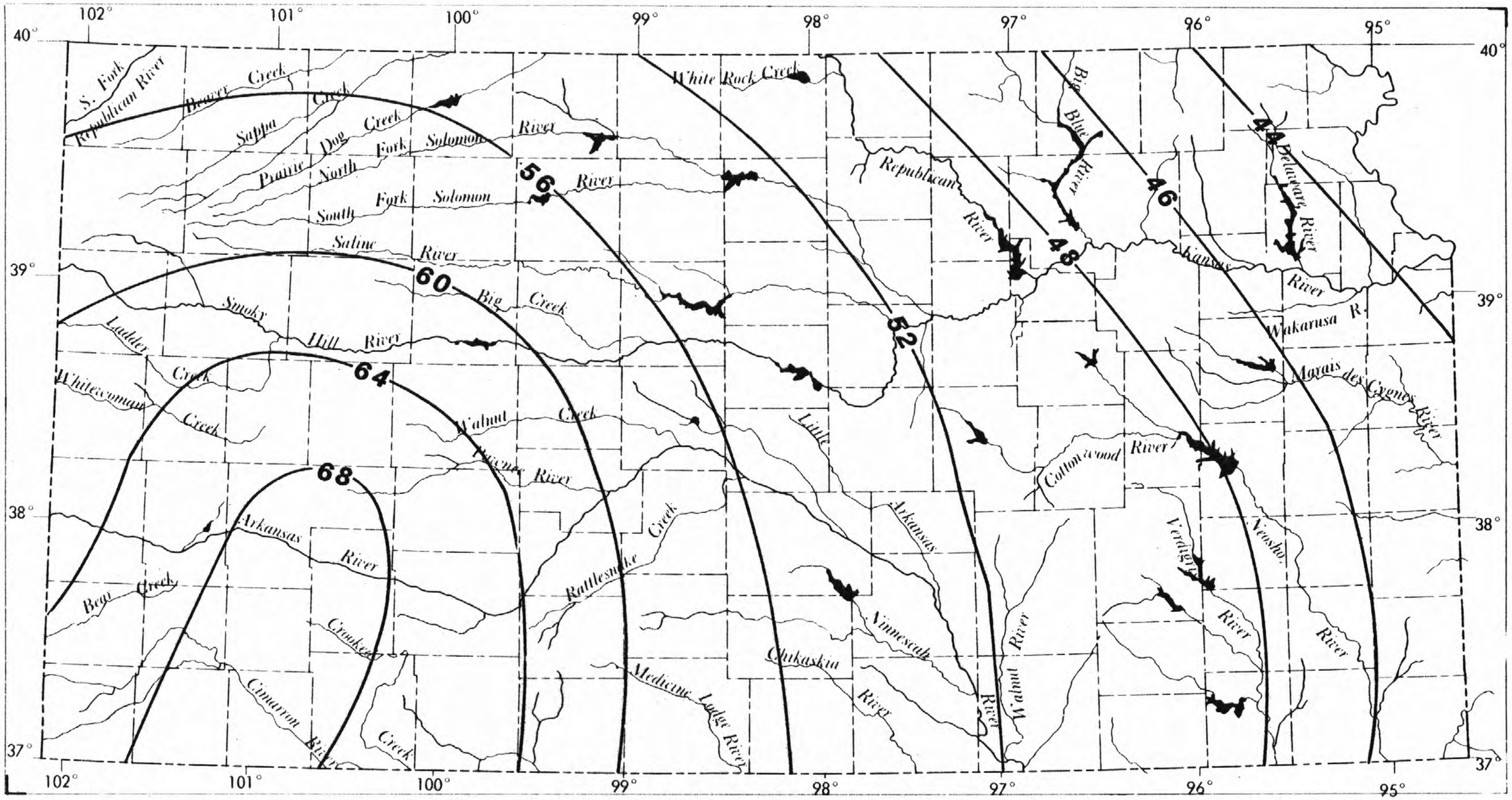

## EXPLANATION

**Interpolated from Hershfield (1961)**

**—4.6—** LINE OF EQUAL 50-YEAR, 24-HOUR RAINFALL (I50)--Interval 0.2 inch

**0 30 60 MILES**
**0 30 60 KILOMETERS**

Figure 3.--Geographic distribution of 24-hour rainfall for 50-year recurrence interval.




From Farnsworth and others, 1982

**EXPLANATION**

——68—— LINE OF AVERAGE ANNUAL EVAPORATION--
Interval 2 and 4 inches

0 30 60 MILES

0 30 60 KILOMETERS

Figure 4.--Average annual free-water-surface evaporation.

which is equivalent to

$$\underline{Y} = \underline{a}\, \underline{X}_1^{\underline{b}_1}\, \underline{X}_2^{\underline{b}_2} \cdot \cdot \cdot \underline{X}_k^{\underline{b}_k} , \tag{2}$$

in which

$\underline{Y}$ is the regression estimate of high-flow discharge (dependent variable); $\underline{a}$ is a constant determined by the statistical analysis; $\underline{X}_1, \underline{X}_2, \ldots \underline{X}_k$ are drainage-basin characteristics (independent variables);

and

$\underline{b}_1, \underline{b}_2, \ldots \underline{b}_k$ are exponents determined by the statistical analysis.

Table 1.--Pertinent statistical properties of physical and climatic basin characteristics used in regression calculations

[CDA, contributing-drainage area, in square miles; L, main-channel length, in miles; S, main-channel slope, in feet per mile; I50, 50-year, 24-hour rainfall, in inches; EV, free-water-surface evaporation, in inches; PS, soil permeability, in inches per hour]

| Characteristic | Mean | Standard deviation | Minimum | Maximum |
|---|---|---|---|---|
| CDA | 895 | 1,480 | 2.06 | 9,100 |
| L | 84.3 | 76.3 | 2.94 | 381 |
| S | 7.95 | 4.32 | 1.85 | 25.1 |
| I50 | 6.34 | 0.733 | 4.8 | 7.5 |
| EV | 52.6 | 6.65 | 44 | 68 |
| PS | 0.794 | 0.598 | 0.1 | 4.6 |

Table 2.--Matrix of correlation coefficients of physical and climatic basin characteristics used in regression calculations

[CDA, contributing-drainage area, in square miles; L, main-channel length, in miles; S, main-channel slope, in feet per mile; I50, 50-year, 24-hour rainfall, in inches; EV, free-water-surface evaporation, in inches; PS, soil permeability, in inches per hour]

| | log CDA | log L | log S | log(I50-4.0) | log (EV-20.0) | log PS |
|---|---|---|---|---|---|---|
| log CDA | 1.000 | 0.947 | -0.539 | -0.234 | 0.251 | 0.238 |
| log L | .947 | 1.000 | -.527 | -.326 | .338 | .333 |
| log S | -.539 | -.527 | 1.000 | -.382 | .205 | .085 |
| log (I50-4.0) | -.234 | -.326 | -.382 | 1.000 | -.673 | -.443 |
| log (EV-20) | .251 | .338 | .205 | -.673 | 1.000 | .550 |
| log PS | .238 | .333 | .085 | -.443 | .550 | 1.000 |

In order to use the linear model described above, after examination of the residuals as explained in the "Supplemental Information" section, the characteristic $\underline{I50}$ was used in the form ($\underline{I50}$-4.0), and $\underline{EV}$ was used in the form ($\underline{EV}$-20.0). These two characteristics and $\underline{CDA}$ were the only ones found to be significant enough statistically (5-percent level) to include in the regression equations. The resulting form of equation 2 is:

$$\underline{Y} = \underline{a}\ \underline{CDA}^{\underline{b}_1}\ (\underline{I50}-4.0)^{\underline{b}_2}\ (\underline{EV}-20.0)^{\underline{b}_3}\ . \qquad (3)$$

The constants ($\underline{a}$), exponents ($\underline{b}$), and standard errors of estimate determined for all high-flow magnitude-frequency values are given in table 3. The regression equations should be used only within the ranges of minimum and maximum values shown in table 1. Because of the unique character of the Cimarron River, its data were not used in developing the regression equations, and the equations are not applicable to it.

For an example of the application of a regression equation to estimate a high-flow magnitude-frequency value at an ungaged site, assume that an estimate of the 15-day, 10-year high flow is needed for a site on Wolf Creek near its mouth in Lincoln County, Kansas. A gaging station was in operation at the site during 1946-53 but has less than 10 years of record; so the site is considered "ungaged" for this purpose. From table 3, for the 15-day, 10-year high flow ($15,\underline{Q}_{10}$), the regression constant is 211, and the exponents are 0.871 for contributing-drainage area ($\underline{CDA}$), 2.747 for 50-year, 24-hour rainfall minus 4.0 ($\underline{I50}$-4.0), and -1.606 for evaporation minus 20.0 ($\underline{EV}$-20.0). Thus, the regression equation is

$$15,\underline{Q}_{10} = 211\ \underline{CDA}^{0.871}\ (\underline{I50}-4.0)^{2.747}\ (\underline{EV}-20.0)^{-1.606}\ . \qquad (4)$$

Measured from topographic maps, the contributing-drainage area is 261 square miles. From figures 3 and 4, at the centroid of the drainage basin, $\underline{I50}$ is 5.9 inches, and $\underline{EV}$ is 55 inches. The estimate of $15,\underline{Q}_{10}$ now can be calculated as:

$$15,\underline{Q}_{10} = 211\ (261)^{0.871}\ (5.9-4.0)^{2.747}\ (55-20.0)^{-1.606} \qquad (5)$$

$$= 519\ ft^3/s.$$

Accuracy of this estimate is indicated in table 3 by a standard error of estimate of 33 percent. This is the estimate that would be used if table 6 (at the end of this report) did not include data for a gaging station on the same stream.

## Ungaged Sites On Gaged Streams

If the ungaged site is near a gaging station listed in table 6 on the same stream, the data for the gaging station can be used to improve the estimates resulting from application of the regression equations. The

Table 3.--Constants and exponents for regression equation 3 for estimating high-flow magnitude and frequency at ungaged sites

| Period of consecutive days | Recurrence interval (years) | Constant $\underline{a}$ | Exponents $\underline{b_1}$ (for $\underline{\text{CDA}}$) | $\underline{b_2}$ (for $\underline{\text{I50-}}$ 4.0) | $\underline{b_3}$ (for $\underline{\text{EV-}}$ 20.0) | Standard error of estimate (percent) |
|---|---|---|---|---|---|---|
| 1 day | 2 | 3,300 | 0.731 | 2.936 | -2.071 | 36 |
| | 5 | 3,040 | .691 | 2.472 | -1.632 | 33 |
| | 10 | 2,700 | .676 | 2.215 | -1.401 | 35 |
| | 25 | 2,220 | .664 | 1.936 | -1.149 | 39 |
| | 50 | 1,890 | .659 | 1.752 | -.984 | 44 |
| | 100 | 1,630 | .656 | 1.580 | -.838 | 49 |
| 3 day | 2 | 1,010 | .829 | 3.111 | -2.087 | 36 |
| | 5 | 889 | .797 | 2.707 | -1.666 | 31 |
| | 10 | 794 | .785 | 2.467 | -1.447 | 32 |
| | 25 | 685 | .776 | 2.195 | -1.216 | 36 |
| | 50 | 609 | .771 | 2.008 | -1.065 | 40 |
| | 100 | 546 | .768 | 1.833 | -.930 | 44 |
| 7 day | 2 | 498 | .874 | 3.223 | -2.154 | 36 |
| | 5 | 406 | .852 | 2.864 | -1.741 | 31 |
| | 10 | 330 | .843 | 2.634 | -1.503 | 32 |
| | 25 | 237 | .835 | 2.365 | -1.226 | 35 |
| | 50 | 182 | .831 | 2.179 | -1.033 | 38 |
| | 100 | 140 | .828 | 2.000 | -.854 | 42 |
| 15 day | 2 | 361 | 0.901 | 3.293 | -2.276 | 36 |
| | 5 | 287 | .880 | 2.962 | -1.870 | 32 |
| | 10 | 211 | .871 | 2.747 | -1.606 | 33 |
| | 25 | 123 | .865 | 2.509 | -1.278 | 36 |
| | 50 | 81.3 | .861 | 2.335 | -1.047 | 39 |
| | 100 | 53.2 | .857 | 2.169 | -.824 | 43 |
| 30 day | 2 | 280 | .919 | 3.336 | -2.379 | 37 |
| | 5 | 280 | .904 | 3.027 | -2.056 | 32 |
| | 10 | 225 | .898 | 2.819 | -1.827 | 33 |
| | 25 | 138 | .892 | 2.578 | -1.512 | 36 |
| | 50 | 89.2 | .888 | 2.405 | -1.273 | 39 |
| | 100 | 56.6 | .885 | 2.233 | -1.039 | 42 |
| 60 day | 2 | 234 | .941 | 3.339 | -2.503 | 37 |
| | 5 | 215 | .926 | 3.061 | -2.166 | 33 |
| | 10 | 162 | .919 | 2.869 | -1.919 | 34 |
| | 25 | 90.8 | .913 | 2.651 | -1.585 | 38 |
| | 50 | 56.4 | .908 | 2.482 | -1.335 | 41 |
| | 100 | 35.6 | .903 | 2.309 | -1.095 | 45 |

Table 3.--Constants and exponents for regression equation 3 for estimating high-flow magnitude and frequency at ungaged sites--Continued

| Period of consecutive days | Recurrence interval (years) | Constant a | Exponents | | | Standard error of estimate (percent) |
|---|---|---|---|---|---|---|
| | | | $b_1$ (for CDA) | $b_2$ (for I50-4.0) | $b_3$ (for EV-20.0) | |
| 90 day | 2 | 185 | 0.953 | 3.372 | -2.535 | 37 |
| | 5 | 208 | .938 | 3.106 | -2.264 | 33 |
| | 10 | 160 | .934 | 2.927 | -2.037 | 34 |
| | 25 | 89.9 | .930 | 2.722 | -1.712 | 37 |
| | 50 | 55.9 | .927 | 2.564 | -1.469 | 41 |
| | 100 | 32.0 | .924 | 2.417 | -1.214 | 44 |
| 120 day | 2 | 152 | .954 | 3.367 | -2.528 | 39 |
| | 5 | 199 | .941 | 3.136 | -2.316 | 33 |
| | 10 | 145 | .938 | 3.001 | -2.087 | 34 |
| | 25 | 79.7 | .936 | 2.833 | -1.772 | 37 |
| | 50 | 47.5 | .935 | 2.705 | -1.528 | 40 |
| | 100 | 27.8 | .934 | 2.578 | -1.289 | 44 |
| 183 day | 2 | 124 | .968 | 3.385 | -2.571 | 40 |
| | 5 | 153 | .958 | 3.194 | -2.363 | 33 |
| | 10 | 108 | .952 | 3.074 | -2.127 | 34 |
| | 25 | 55.5 | .949 | 2.919 | -1.796 | 38 |
| | 50 | 33.0 | .947 | 2.794 | -1.553 | 41 |
| | 100 | 17.5 | .944 | 2.674 | -1.283 | 45 |

recommended procedure is to use a weighted estimate, $Q_{wu}$:

$$Q_{wu} = W_E \, Q_{Eu} + W_g \, R_g \, Q_{Eu} \, , \qquad (6)$$

in which

$W_E$ is the weighting factor (explained below) for $Q_{Eu}$;

$Q_{Eu}$ is the high-flow value from application of the regression equation at the ungaged site;

$W_g$ = 1.0 - $W_E$ and is the weighting factor for $R_g$; and

$R_g$ = $Q_{gg}/Q_{Eg}$ , a regression adjustment factor, where $Q_{gg}$ is the high-flow value determined from gaged data (table 6), and $Q_{Eg}$ is the high-flow value from application of the regression equation at the gaging station.

The recommendation for $W_E$ is to (arbitrarily) assume that the station data in table 6 provide the best estimate at the station and that the regression equation provides the best estimate where the area draining to the ungaged site ($A_u$) is less than one-half or more than double the area draining to the gaging station ($A_g$). Thus, where $A_u/A_g$ = 1.0, $W_E$ = 0.0;

where $A_u/A_g \leq 0.5$, $W_E = 1.0$; and where $A_u/A_g \geq 2.0$, $W_E = 1.0$. Between these points, a convenient interpolation formula can be used:

$$W_E = 0.5 - 0.5 \cos(4.53 \ln \frac{A_u}{A_g}) \qquad (7)$$

In using this formula, interpret the expression in parentheses as an angle in radians. The weighting factor $W_E$ also can be determined from figure 5, the graph of equation 7.

Basin characteristics used in the regression equations are shown in table 4 to facilitate calculation of $R_g$ for the gaging stations in table 6.

The "ungaged" site on Wolf Creek near its mouth will be used for an example of the method of improving a regression estimate. Figure 1 and table 6 show station 06868400 on Wolf Creek in Russell County. From table 6, station 06868400 has a contributing-drainage area of 163 square miles and a $15,\underline{Q}_{10}$ ($Q_{gg}$) of 487 ft$^3$/s. The ratio $A_u/A_g$ is 261/163 = 1.60, which is within the range where the method is applicable. The regression result at station 06868400 can be calculated using the basin-characteristics data in table 4, with the same regression constant and exponents that were previously used for the ungaged site:

$$Q_{Eg} = 211\ (163)^{0.871}\ (5.9-4.0)^{2.747}\ (55-20)^{-1.606} = 344 \text{ ft}^3/\text{s} . \qquad (8)$$

Thus, $R_g = Q_{gg}/Q_{Eg} = 487/344 = 1.42$.

From equation 7 or figure 5, $W_E = 0.765$.

$$W_g = 1.0 - W_E = 1.0 - 0.765 = 0.235.$$

$Q_{Eu}$ is the regression result for $15,\underline{Q}_{10}$ at the ungaged site, calculated previously as 519 ft$^3$/s. The weighted estimate $Q_{wu}$ is calculated as

$$\begin{aligned} Q_{wu} &= W_E\ Q_{Eu} + W_g\ R_g\ Q_{Eu} ; \\ &= 0.765\ (519) + 0.235\ (1.42)\ 519 ; \\ &= 570 \text{ ft}^3/\text{s, the improved estimate for } 15,\underline{Q}_{10} \text{ at the ungaged site.} \end{aligned}$$

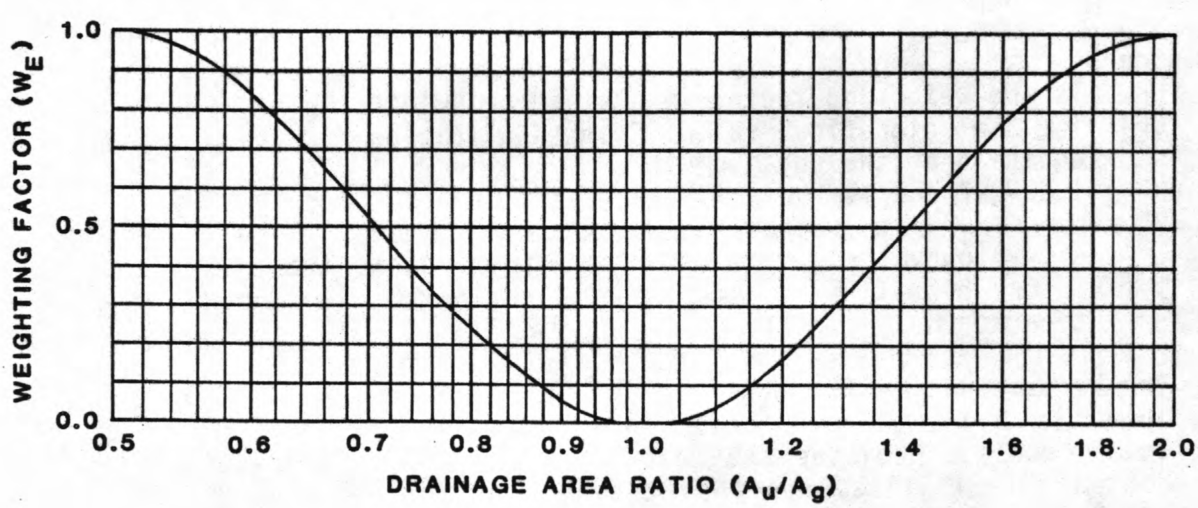



Figure 5.--Interpolation of weighting factor for ungaged site on gaged stream.

Table 4.--Gaging-station values of basin characteristics used in regression equations

[CDA, contributing-drainage area, in square miles; I50, 50-year 24-hour rainfall, in inches; EV, free-water-surface evaporation, in inches]

| Station number | CDA | I50 | EV |
|---|---|---|---|
| 06814000 | 276 | 6.5 | 45 |
| 06844700 | 74 | 4.8 | 58 |
| 06844900 | 378 | 4.9 | 58 |
| 06845000 | 900 | 4.9 | 57 |
| 06846000 | 1,117 | 4.8 | 57 |
| 06846500 | 1,324 | 4.9 | 56 |
| 06847900 | 590 | 5.1 | 57 |
| 68538000 | 227 | 5.8 | 51 |
| 06855800 | 330 | 5.9 | 51 |
| 06855900 | 56 | 6.1 | 51 |
| 06858500 | 650 | 4.7 | 59 |
| 06859500 | 1,460 | 5.0 | 63 |
| 06860000 | 3,390 | 4.9 | 61 |
| 06861000 | 5,220 | 5.0 | 62 |
| 06863300 | 297 | 5.5 | 61 |
| 06863500 | 594 | 5.6 | 61 |
| 06863900 | 54 | 5.8 | 58 |
| 06866900 | 696 | 5.2 | 59 |
| 06867000 | 1,502 | 5.5 | 59 |
| 06867500 | 212 | 5.8 | 56 |
| 06868400 | 163 | 5.9 | 55 |
| 06870300 | 120 | 6.5 | 52 |
| 06871000 | 849 | 5.3 | 57 |
| 06871500 | 341 | 5.4 | 58 |
| 06871900 | 65 | 5.4 | 55 |
| 06873000 | 1,040 | 5.4 | 59 |
| 06873700 | 52 | 5.8 | 55 |
| 06876700 | 384 | 6.1 | 53 |
| 06878000 | 300 | 6.3 | 50 |
| 06878500 | 230 | 6.6 | 50 |
| 06882500 | 4,540 | 6.2 | 45 |
| 06884200 | 344 | 6.1 | 47 |
| 06884500 | 3,440 | 5.8 | 47 |
| 06885500 | 410 | 6.4 | 45 |
| 06886500 | 174 | 6.3 | 48 |

Table 4.--Gaging-station values of basin characteristics used in regression equations--Continued

| Station number | CDA | I50 | EV |
|---|---|---|---|
| 06888000 | 243 | 6.5 | 46 |
| 06888500 | 316 | 6.7 | 48 |
| 06889100 | 2.1 | 6.5 | 45 |
| 06889120 | 10.5 | 6.5 | 45 |
| 06889140 | 16.9 | 6.6 | 45 |
| 06889160 | 49.3 | 6.6 | 45 |
| 06889180 | 80 | 6.6 | 45 |
| 06889200 | 157 | 6.7 | 45 |
| 06889500 | 290 | 6.7 | 46 |
| 06890100 | 431 | 6.7 | 44 |
| 06890500 | 922 | 6.6 | 45 |
| 06892000 | 406 | 6.8 | 44 |
| 06893300 | 26 | 6.9 | 44 |
| 06910800 | 177 | 7.0 | 48 |
| 06911500 | 111 | 6.9 | 47 |
| 06911900 | 114 | 6.8 | 45 |
| 06914000 | 334 | 7.2 | 47 |
| 06916500 | 198 | 7.2 | 46 |
| 06917000 | 295 | 7.3 | 45 |
| 06917500 | 408 | 7.4 | 45 |
| 07138650 | 750 | 4.9 | 62 |
| 07139800 | 73.8 | 5.8 | 68 |
| 07140700 | 58.2 | 5.7 | 65 |
| 07141200 | 2,010 | 5.7 | 66 |
| 07141780 | 1,152 | 5.6 | 64 |
| 07141900 | 1,306 | 5.7 | 68 |
| 07142300 | 356 | 6.1 | 62 |
| 07142620 | 598 | 6.2 | 61 |
| 07142860 | 43 | 6.1 | 56 |
| 07142900 | 61 | 6.0 | 58 |
| 07143300 | 499 | 6.2 | 61 |
| 07143600 | 71 | 6.4 | 55 |
| 07144200 | 1,250 | 6.6 | 53 |
| 07144780 | 550 | 6.5 | 56 |
| 07144850 | 21 | 6.4 | 59 |
| 07145200 | 543 | 6.6 | 57 |
| 07145700 | 154 | 7.1 | 54 |
| 07146570 | 30 | 7.0 | 51 |
| 07147070 | 426 | 6.9 | 52 |
| 07147800 | 1,872 | 7.1 | 51 |

Table 4.--Gaging-station values of basin characteristics used in regression equations--Continued

| Station number | CDA | I50 | EV |
|---|---|---|---|
| 07149000 | 903 | 6.5 | 59 |
| 07151500 | 794 | 6.9 | 56 |
| 07156220 | 835 | 5.2 | 66 |
| 07156900 | 4,220 | 1/ | 1/ |
| 07157500 | 813 | 5.8 | 68 |
| 07157900 | 39 | 6.2 | 63 |
| 07165700 | 181 | 7.1 | 49 |
| 07167000 | 307 | 7.1 | 50 |
| 07167500 | 129 | 7.2 | 50 |
| 07169800 | 220 | 7.3 | 50 |
| 07170000 | 575 | 7.3 | 53 |
| 07172000 | 445 | 7.4 | 50 |
| 07180500 | 110 | 6.9 | 51 |
| 07181500 | 92 | 6.8 | 51 |
| 07183100 | 177 | 7.3 | 48 |
| 07184000 | 197 | 7.5 | 45 |

1 Regression equations not applicable to Cimarron River.

## SUMMARY

High-flow magnitude and frequency data are given in this report for 91 streamflow-gaging stations where flow is unaffected by major regulation, such as by large reservoirs. Equations are given for estimating high-flow magnitude and frequency at ungaged sites. Data or estimates of high flow are needed for evaluation of such factors as flood-control storage and dam safety.

Results of frequency calculations are given for durations of high flow of 1, 3, 7, 15, 30, 60, 90, 120, and 183 consecutive days. The calculations were made by using the log-Pearson Type-III distribution with a weighted-average skew coefficient calculated from a regionalized value and a value from the station data for each gaging station. Because of changes in flow characteristics in western Kansas since about 1965, high-flow magnitude and frequency values for stations west of 99° longitude are given for 1966-80 as well as for the entire period of record. Accuracy of the magnitude-frequency values is indicated by standard errors that are less than 20 percent for stations where variability is low and records are long, and standard errors of more than 50 percent where variability is high and records are short.

Regression equations are given for estimating high-flow magnitude and frequency for ungaged sites or gaging stations that have less than 10 years of record. The drainage-basin characteristics used in the equations are contributing-drainage area, 50-year, 24-hour rainfall, and free-water-surface evaporation. Standard errors of estimate range from 31 to 49 percent, generally increasing with recurrence interval. If an ungaged site is near a gaging station having 10 or more years of record on the same stream, the gaging-station data may be used to improve the estimates.

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## SUPPLEMENTAL INFORMATION

### Explanation of Selected Statistical Terms

For purposes of hydrologic analysis and design of flood-control reservoirs, the degree of extremity of a high flow is expressed by its probability of exceedence. A very low probability indicates an extreme flow. A high flow that has a probability of 2 percent has a 2-percent chance of being exceeded in any 1 year. Another interpretation of the probability concept is that during a period of 1,000 years, if all conditions remain the same, about 20 of the years will have high flows exceeding the 2-percent probability flow.

Although the concept of probability is the most meaningful way of classifying and comparing extreme hydrologic events, the terminology in more common use is the recurrence interval, in years, which is 100 times the reciprocal of the probability when the probability is in percent. Thus, a 2-percent probability high flow has a recurrence interval of 50 years. A high-flow magnitude having a recurrence interval of $T$ years is expected to be exceeded an average of once in each period of $T$ years. That magnitude may be exceeded more than once in any particular period of $T$ years, or no flow exceeding that magnitude may occur during an equivalent period. The fact that a flow of given magnitude occurs in 1 year does not reduce the probability of a flow of equal or greater magnitude occurring during the next year.

Recurrence intervals in this report are based on the annual series of high flows. For this series, only the highest flow of each selected number of days for each year is used even though the second highest in 1 year may have exceeded the highest of some other year. Use of the annual series permits simple, straightforward computations and interpretation of recurrence intervals.

In the statistical calculation of a regression equation, the dependent variable is the variable whose magnitude is to be calculated from the values of the other variables. In this report, the dependent variable is always a high-flow magnitude, known for gaged sites and unknown for ungaged sites. The independent variables are the variables to be used in calculating an estimated value of the dependent variable. The values of the independent variables are known for gaged sites and are known or can be measured for ungaged sites. Independent variables are not required to be unrelated to each other, although some difficulties of interpretation and applicability can occur if they are closely related.

When a regression equation is developed, a residual is the amount by which an observed magnitude of the dependent variable differs from the magnitude calculated from the independent variables. Study of residuals is an important part of the use of the statistical regression technique. When residuals for each step of a stepwise regression are plotted against each independent variable, the plots can reveal any significant nonlinearities that may occur within the range of the data studied. Different transformations of the data then may be used to produce linear relationships and reduce the errors of the estimate. When residuals are plotted on a map, they may show the effect of some variable or variables that differ geographically but which are not included in the regression. The map, together with the hydrologist's knowledge of the region, may provide a clue to the missing variables.

In this report, standard error of estimate is the measure of the errors associated with the calculation of high-flow magnitude by a regression equation. Standard error of estimate, originally calculated in logarithmic units, can be interpreted to represent percentage errors. The percentages are unequal in the positive and negative directions. For example, a standard error of estimate of 0.17 logarithmic units represents errors of +48 percent and -32 percent; the average of the two percentages without regard to sign is 40 percent. In a large number of similar calculations, about two-thirds of the calculated high-flow magnitudes would be within the stated percentages of the true magnitudes.

Mean, standard deviation, and skewness coefficient are defined in standard textbooks on statistics, and their specific definitions are not repeated in this report. Their general meanings are that the mean is a measure of the central tendency of a group of data, standard deviation measures the variability, and skewness coefficient measures the degree and direction of departure from a symmetrical distribution.

## Regionalization of Skew Coefficients

Log-Pearson Type-III frequency tables for high flows are calculated from three parameters for each set of data--the mean, the standard deviation, and the skew coefficient. Because the mean is calculated from each data value to the first power, the standard deviation from data value to the second power, and the skew coefficient from each data value to the third power, the mean is the most stable (has the least variation between time samples) and the skew coefficient the least stable. In a typical time sample of 15 to 25 years the calculated skew coefficient can be drastically affected by a single extremely high or low discharge value in 1 year. Therefore, it is desirable to use information from a group of stations having long periods of record instead of a single station having a short-term record in determining the best value of skew coefficient to use for a particular frequency calculation.

## Selection of Records for Study

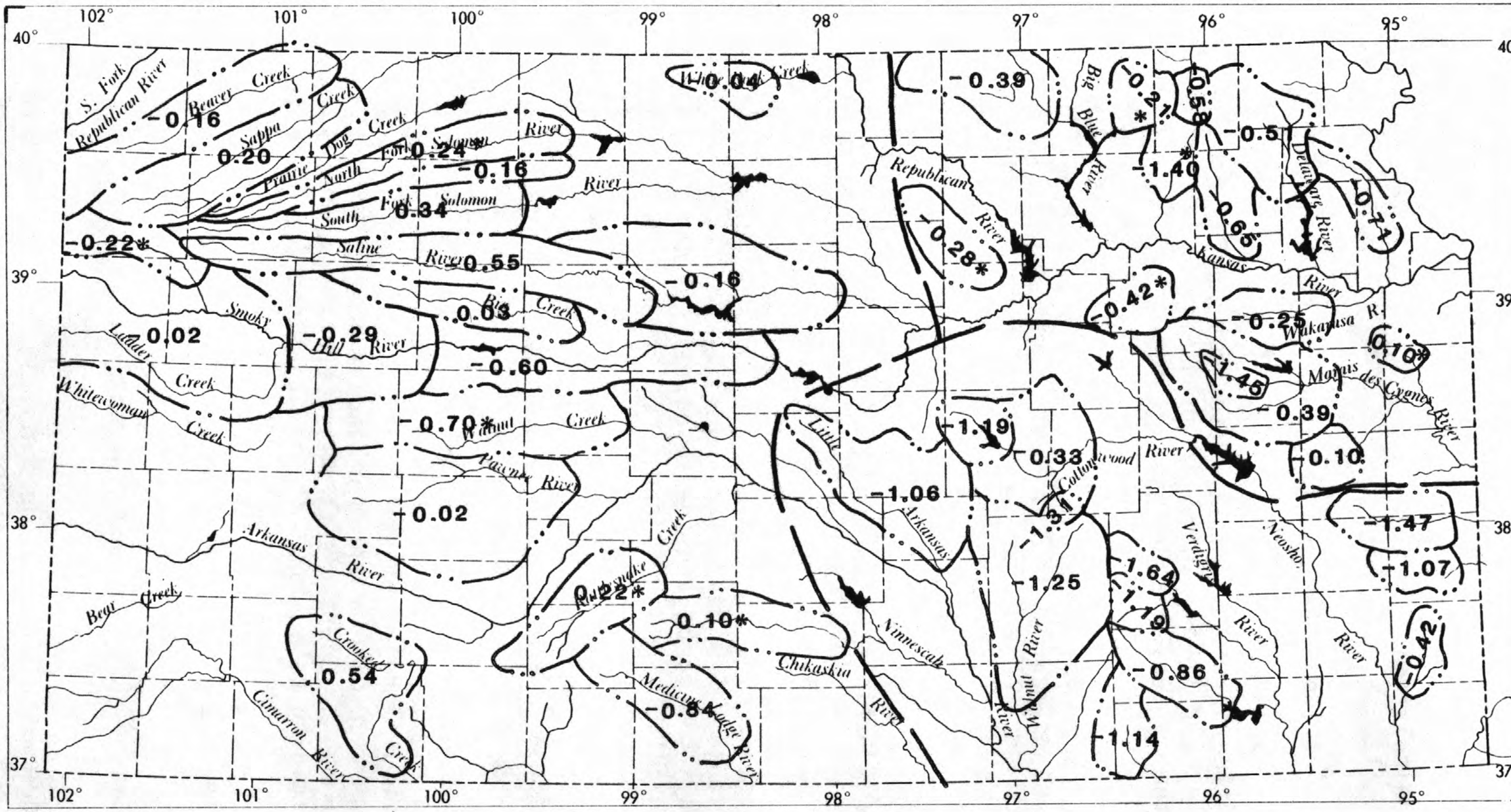
The Hydrology Committee of the U.S. Water Resources Council used records of 25 years and longer through 1973 in producing a map of the United States showing the regional variations of skew coefficients of peak flows. In Kansas there are now numerous stations that have records of 29 years or longer (through 1980) of unregulated high flow, including records of flow prior to reservoir construction. Therefore, the decision was made to use 29 years as the minimum record length for the final determination of regionalized values for skew coefficients. However, some 21-28 year records were used in the preliminary step of identifying regions.

## Relation of Skew Coefficient to Duration of High Flow and to Location

Because high-flow frequency distributions are calculated for nine different durations of consecutive days, the variation of skew coefficients with number of days had to be considered as well as the regional variation. The regional variation was examined first for a short duration (3 days) and for a long duration (120 days) by plotting the skew coefficients on a map of the State. The 3-day coefficients showed the most variation and were used in identifying the geographic trends. The geographical variation of these coefficients was such that it could not reasonably be described by contour lines. Instead, the coefficients showed a grouping in three distinct regions (fig. 6), although the western region exhibited large, apparently random variation. Next the variation of skew coefficient with number of days was examined within each of these regions. Variations in the northeast region are shown in figure 7. In each region the median coefficient for each number of days and for the peak was calculated. Coefficients for peak discharges were included for aid in determining relations. The regionalized coefficients to be used were determined by drawing a smooth curve averaging the median coefficients, then rounding the curve values to the nearest 0.1 skew unit. Table 5 shows the resulting regionalized skew coefficients.

## Weighting of Regional and Station Skew

The regionalized skew coefficient and the coefficient calculated from station data can be combined to give a better estimate of the skew coefficient for a given station (U.S. Water Resources Council, 1981, p. 12).




# EXPLANATION

0 30 60 MILES
0 30 60 KILOMETERS

-0.28 SKEW COEFFICIENT OF 3-DAY HIGH FLOWS FOR BASIN OUTLINE--*, based on 21-28 years; others, 29 or more

BOUNDARY OF REGION DEFINED BY SKEW COEFFECIENTS

BASIN BOUNDARY

Figure 6.--Geographic variation of skew coefficients and regions defined for analysis.

The regionalized and station skews are weighted in inverse proportion to their individual mean-square errors. The mean-square error of station skew is a function of record length and station skew and was determined from table 1 of the U.S. Water Resources Council report (1981). The mean-square error of the regionalized skew was calculated from the variation of the coefficients within each region for record lengths of 29 years and longer.

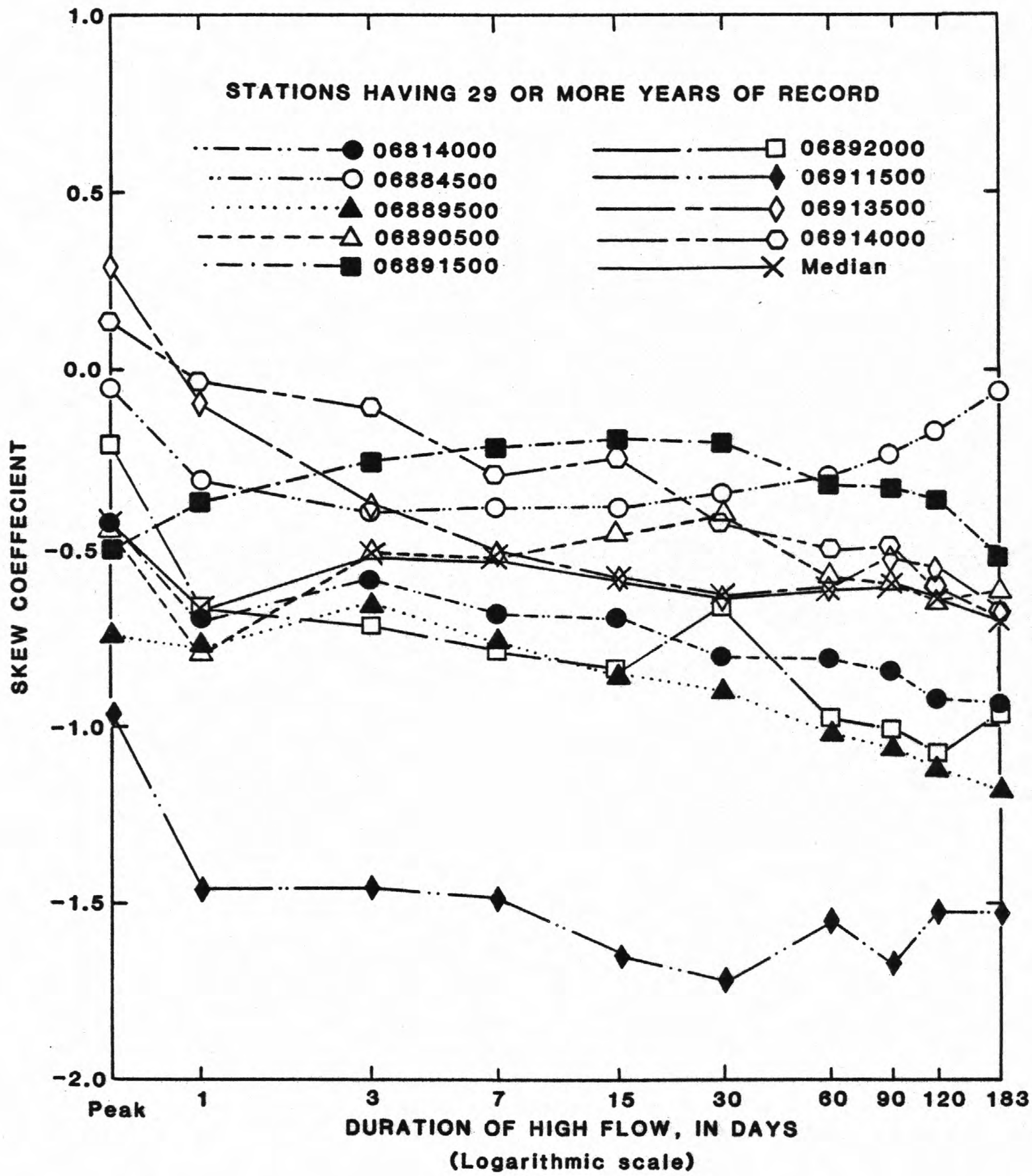



Figure 7.--Relation of skew coefficient to number of consecutive days of high flow in northeastern Kansas.

Table 5.--Regionalized skew coefficients for 1-day through 183-day high flows
[See figure 6 for region boundaries]

| Region | Skew coefficient for indicated duration of high flow | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 day | 3 day | 7 day | 15 day | 30 day | 60 day | 90 day | 120 day | 183 day |
| West | -0.1 | -0.1 | 0 | 0.1 | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 |
| Northeast | -.5 | -.5 | -.5 | -.6 | -.6 | -.6 | -.6 | -.6 | -.7 |
| Southeast | -1.1 | -1.1 | -1.1 | -1.1 | -1.0 | -1.0 | -1.0 | -1.0 | -1.0 |

Table 6.--Magnitude and frequency of high flows at streamflow-gaging stations having unregulated flow

| Station number, name, and location | Contri-buting-drain-age area (square miles) | Records analy-zed | Recur-rence interval (years) | Maximum average discharge, in cubic feet per second, for indicated period of consecutive days | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 day | 3 days | 7 days | 15 days | 30 days | 60 days | 90 days | 120 days | 183 days |
| 06 8140 00 Turkey Creek near Seneca | 276 | 1950-80 | 2 | 3680.0[a] | 2040.0 | 1100.0 | 647.0 | 427.0 | 261.0 | 231.0 | 197.0 | 154.0[a] |
| (Nemaha County, 2.0 miles down- | | | 5 | 8220.0 | 4660.0 | 2510.0 | 1440.0 | 964.0 | 633.0 | 514.0 | 435.0 | 336.0 |
| stream from Clear Creek, 5.0 | | | 10 | 11800.0 | 6810.0 | 3630.0 | 2050.0 | 1380.0 | 902.0 | 728.0 | 610.0 | 466.0 |
| miles upstream from Big Nemaha | | | 25 | 16600.0 | 9820.0 | 5170.0 | 2860.0 | 1920.0 | 1250.0 | 1010.0 | 830.0 | 625.0 |
| River, and 8.0 miles northwest | | | 50 | 20300.0 | 12200.0 | 6350.0 | 3470.0 | 2320.0 | 1510.0 | 1210.0 | 986.0 | 736.0 |
| of Seneca.) | | | 100 | 23900.0[b] | 14600.0 | 7540.0 | 4060.0 | 2700.0 | 1760.0 | 1400.0 | 1130.0 | 837.0[b] |
| 06 8447 00 South Fork Sappa Creek near Brewster | 74.0 | 1968-80 | 2 | 14.0[c] | 7.0 | 3.2 | 1.5 | 0.6 | 0.5 | 0.3 | 0.3 | 0.2[b] |
| (Sherman County, 9.0 miles south- | | | 5 | 109.0 | 38.0 | 17.0 | 8.2 | 4.0 | 2.5 | 1.7 | 1.4 | 0.9 |
| west of Brewster.) | | | 10 | 284.0 | 95.0 | 37.0 | 19.0 | 8.9 | 5.5 | 3.5 | 2.2 | 1.5 |
| | | | 25 | 717.0 | 185.0 | 81.0 | 41.0 | 20.0 | 11.0 | 6.9 | 3.3 | 2.5 |
| | | | 50 | 1270.0 | 304.0 | 133.0 | 69.0 | 33.0 | 18.0 | 11.0 | 4.1 | 3.3 |
| | | | 100 | 2100.0[c] | 477.0 | 210.0 | 111.0 | 54.0 | 29.0 | 16.0 | 5.0 | 4.4[c] |
| 06 8449 00 South Fork Sappa Creek near Achilles | 378 | 1960-80 | 2 | 116.0[b] | 81.0 | 42.0 | 22.0 | 13.0 | 7.9 | 5.7 | 4.6 | 3.2[b] |
| (Decatur County, 5.5 miles south- | | | 5 | 586.0 | 375.0 | 188.0 | 103.0 | 55.0 | 27.0 | 20.0 | 16.0 | 11.0 |
| east of Achilles, 14 miles south- | | | 10 | 1480.0 | 821.0 | 412.0 | 238.0 | 122.0 | 54.0 | 39.0 | 31.0 | 22.0 |
| west of Oberlin, and 18.5 miles | | | 25 | 4250.0 | 1870.0 | 956.0 | 585.0 | 287.0 | 114.0 | 83.0 | 67.0 | 47.0 |
| upstream from confluence with | | | 50 | 8710.0 | 3160.0 | 1650.0 | 1050.0 | 500.0 | 139.0 | 139.0 | 112.0 | 80.0 |
| North Fork.) | | | 100 | 17000.0[c] | 5040.0 | 2690.0 | 1790.0 | 826.0 | 304.0 | 225.0 | 181.0 | 131.0[c] |
| | | 1966-80 | 2 | 112.0[c] | 63.0 | 31.0 | 16.0 | 8.9 | 5.3 | 3.8 | 3.0 | 2.1[b] |
| | | | 5 | 530.0 | 292.0 | 139.0 | 73.0 | 39.0 | 19.0 | 13.0 | 10.0 | 7.0 |
| | | | 10 | 1100.0 | 596.0 | 286.0 | 150.0 | 81.0 | 37.0 | 26.0 | 20.0 | 14.0 |
| | | | 25 | 2250.0 | 1200.0 | 588.0 | 310.0 | 170.0 | 80.0 | 55.0 | 42.0 | 29.0 |
| | | | 50 | 3470.0 | 1820.0 | 916.0 | 481.0 | 271.0 | 133.0 | 91.0 | 69.0 | 47.0 |
| | | | 100 | 5010.0[c] | 2600.0 | 1340.0 | 701.0 | 408.0 | 217.0 | 148.0 | 111.0 | 76.0[c] |
| 06 8450 00 Sappa Creek near Oberlin | 900 | 1930-31, 1945-72 | 2 | 498.0[b] | 310.0 | 175.0 | 99.0 | 63.0 | 38.0 | 29.0 | 24.0 | 18.0[b] |
| (Decatur County, 0.3 mile down- | | | 5 | 1370.0 | 856.0 | 481.0 | 262.0 | 163.0 | 99.0 | 75.0 | 62.0 | 45.0 |
| stream from confluence of North | | | 10 | 2340.0 | 1470.0 | 824.0 | 440.0 | 271.0 | 168.0 | 127.0 | 105.0 | 73.0 |
| and South Forks and 3.5 miles south- | | | 25 | 4150.0 | 2650.0 | 1470.0 | 767.0 | 471.0 | 300.0 | 224.0 | 185.0 | 125.0 |
| west of Oberlin.) | | | 50 | 6040.0 | 3900.0 | 2150.0 | 1100.0 | 675.0 | 440.0 | 324.0 | 268.0 | 176.0 |
| | | | 100 | 8460.0[b] | 5530.0 | 3030.0 | 1530.0 | 936.0 | 625.0 | 454.0 | 377.0 | 239.0[b] |
| 06 8460 00 Beaver Creek at Ludell | 1,117 | 1930-31, 1946-53 | 2 | 307.0[b] | 179.0 | 110.0 | 75.0 | 50.0 | 34.0 | 28.0 | 24.0 | 20.0[b] |
| (Rawlins County, 0.5 mile south | | | 5 | 805.0 | 524.0 | 306.0 | 201.0 | 130.0 | 90.0 | 72.0 | 62.0 | 48.0 |
| of Ludell and 9.6 miles down- | | | 10 | 1290.0 | 899.0 | 517.0 | 338.0 | 222.0 | 155.0 | 125.0 | 106.0 | 79.0 |
| stream from Little Beaver Creek.) | | | 25 | 2100.0 | 1580.0 | 898.0 | 593.0 | 400.0 | 288.0 | 235.0 | 194.0 | 141.0 |
| | | | 50 | 2830.0 | 2250.0 | 1280.0 | 856.0 | 592.0 | 438.0 | 363.0 | 294.0 | 210.0 |
| | | | 100 | 3680.0[c] | 3070.0 | 1750.0 | 1200.0 | 849.0 | 647.0 | 544.0 | 433.0 | 303.0[c] |

Table 6.--Magnitude and frequency of high flows at streamflow-gaging stations having unregulated flow--Continued

| Station number, name, and location | Contri-buting-drain-age area (square miles) | Records analy-zed | Recur-rence interval (years) | Maximum average discharge, in cubic feet per second, for indicated period of consecutive days | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 day | 3 days | 7 days | 15 days | 30 days | 60 days | 90 days | 120 days | 183 days |
| 06 8465 00 Beaver Creek at Cedar Bluffs | 1,324 | 1947-80 | 2 | 347.0[a] | 221.0 | 128.0 | 78.0 | 50.0 | 32.0 | 24.0 | 19.0 | 13.0[b] |
| (Decatur County, at U.S. High- | | | 5 | 918.0 | 632.0 | 402.0 | 245.0 | 163.0 | 110.0 | 86.0 | 71.0 | 53.0 |
| way 83, 0.2 mile north of Cedar | | | 10 | 1520.0 | 1080.0 | 733.0 | 436.0 | 298.0 | 208.0 | 167.0 | 140.0 | 108.0 |
| Bluffs, and 1.0 mile south of | | | 25 | 2610.0 | 1880.0 | 1400.0 | 792.0 | 557.0 | 402.0 | 335.0 | 289.0 | 235.0 |
| Kansas-Nebraska State line.) | | | 50 | 3690.0 | 2670.0 | 2130.0 | 1160.0 | 827.0 | 612.0 | 524.0 | 461.0 | 389.0 |
| | | | 100 | 5040.0[b] | 3640.0 | 3100.0 | 1620.0 | 1170.0 | 888.0 | 781.0 | 700.0 | 615.0[c] |
| | | 1966-80 | 2 | 237.0[a] | 129.0 | 70.0 | 42.0 | 24.0 | 14.0 | 11.0 | 8.7 | 5.7[b] |
| | | | 5 | 389.0 | 255.0 | 154.0 | 99.0 | 61.0 | 36.0 | 28.0 | 22.0 | 16.0 |
| | | | 10 | 489.0 | 354.0 | 231.0 | 153.0 | 98.0 | 59.0 | 45.0 | 36.0 | 27.0 |
| | | | 25 | 612.0 | 495.0 | 351.0 | 240.0 | 160.0 | 99.0 | 74.0 | 59.0 | 46.0 |
| | | | 50 | 699.0 | 609.0 | 458.0 | 317.0 | 219.0 | 137.0 | 101.0 | 80.0 | 65.0 |
| | | | 100 | 782.0[b] | 728.0 | 580.0 | 406.0 | 290.0 | 183.0 | 133.0 | 104.0 | 88.0[c] |
| 06 8479 00 Prairie Dog Creek above Keith Sebelius Lake | 590 | 1963-80 | 2 | 488.0[b] | 288.0 | 142.0 | 76.0 | 46.0 | 27.0 | 22.0 | 18.0 | 14.0[b] |
| (Norton County, 4.0 miles east | | | 5 | 1300.0 | 738.0 | 355.0 | 184.0 | 108.0 | 62.0 | 46.0 | 38.0 | 28.0 |
| of Clayton.) | | | 10 | 2020.0 | 1130.0 | 546.0 | 282.0 | 166.0 | 98.0 | 69.0 | 58.0 | 41.0 |
| | | | 25 | 3050.0 | 1680.0 | 837.0 | 435.0 | 259.0 | 167.0 | 106.0 | 91.0 | 63.0 |
| | | | 50 | 3870.0 | 2130.0 | 1080.0 | 568.0 | 343.0 | 238.0 | 139.0 | 122.0 | 83.0 |
| | | | 100 | 4720.0[c] | 2580.0 | 1350.0 | 717.0 | 440.0 | 330.0 | 178.0 | 161.0 | 106.0[b] |
| | | 1966-80 | 2 | 412.0[b] | 244.0 | 122.0 | 67.0 | 41.0 | 26.0 | 20.0 | 17.0 | 13.0[b] |
| | | | 5 | 1150.0 | 639.0 | 309.0 | 162.0 | 95.0 | 57.0 | 41.0 | 33.0 | 24.0 |
| | | | 10 | 1830.0 | 991.0 | 479.0 | 252.0 | 145.0 | 84.0 | 60.0 | 47.0 | 34.0 |
| | | | 25 | 2860.0 | 1510.0 | 741.0 | 394.0 | 226.0 | 127.0 | 88.0 | 68.0 | 48.0 |
| | | | 50 | 3720.0 | 1930.0 | 965.0 | 520.0 | 298.0 | 165.0 | 113.0 | 86.0 | 60.0 |
| | | | 100 | 4630.0[c] | 2380.0 | 1210.0 | 663.0 | 381.0 | 209.0 | 141.0 | 106.0 | 74.0[b] |
| 06 8538 00 White Rock Creek near Burr Oak | 227 | 1958-80 | 2 | 1010.0[a] | 570.0 | 316.0 | 177.0 | 108.0 | 64.0 | 50.0 | 42.0 | 31.0[a] |
| (Jewell County, 3.5 miles north- | | | 5 | 2070.0 | 1190.0 | 651.0 | 366.0 | 229.0 | 130.0 | 101.0 | 84.0 | 63.0 |
| east of Burr Oak.) | | | 10 | 3010.0 | 1730.0 | 930.0 | 523.0 | 336.0 | 189.0 | 145.0 | 121.0 | 92.0 |
| | | | 25 | 4500.0 | 2590.0 | 1340.0 | 752.0 | 503.0 | 280.0 | 213.0 | 180.0 | 137.0 |
| | | | 50 | 5830.0 | 3350.0 | 1680.0 | 961.0 | 651.0 | 361.0 | 272.0 | 232.0 | 179.0 |
| | | | 100 | 7370.0[b] | 4210.0 | 2050.0 | 1140.0 | 819.0 | 454.0 | 338.0 | 292.0 | 227.0[b] |
| 06 8558 00 Buffalo Creek near Jamestown | 330 | 1960-80 | 2 | 1510.0[b] | 1160.0 | 727.0 | 416.0 | 271.0 | 168.0 | 131.0 | 110.0 | 84.0[a] |
| (Cloud County, 1.1 miles north | | | 5 | 3630.0 | 2710.0 | 1610.0 | 876.0 | 560.0 | 343.0 | 258.0 | 227.0 | 174.0 |
| of Jamestown.) | | | 10 | 6050.0 | 4360.0 | 2510.0 | 1330.0 | 835.0 | 509.0 | 374.0 | 335.0 | 256.0 |
| | | | 25 | 10800.0 | 7430.0 | 4080.0 | 2120.0 | 1300.0 | 764.0 | 561.0 | 514.0 | 392.0 |
| | | | 50 | 16100.0 | 10600.0 | 5640.0 | 2910.0 | 1740.0 | 1040.0 | 734.0 | 682.0 | 519.0 |
| | | | 100 | 23400.0[b] | 14800.0 | 7600.0 | 3890.0 | 2270.0 | 1360.0 | 937.0 | 882.0 | 671.0[b] |

Table 6.--Magnitude and frequency of high flows at streamflow-gaging stations having unregulated flow--Continued

| Station number, name, and location | Contri- buting- drain- age area (square miles) | Records analy- zed | Recur- rence interval (years) | Maximum average discharge, in cubic feet per second, for indicated period of consecutive days: 1 day | 3 days | 7 days | 15 days | 30 days | 60 days | 90 days | 120 days | 183 days |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 06 8559 00 Wolf Creek near Concordia | 56 | 1963-80 | 2 | 508.0[a] | 250.0 | 131.0 | 69.0 | 42.0 | 25.0 | 20.0 | 16.0 | 12.0[b] |
| (Cloud County, at State Highway | | | 5 | 1000.0 | 521.0 | 282.0 | 152.0 | 96.0 | 60.0 | 47.0 | 40.0 | 31.0 |
| 9, 3.8 miles southwest of | | | 10 | 1400.0 | 745.0 | 412.0 | 224.0 | 145.0 | 94.0 | 72.0 | 63.0 | 49.0 |
| Concordia.) | | | 25 | 1980.0 | 1070.0 | 606.0 | 335.0 | 222.0 | 149.0 | 113.0 | 100.0 | 78.0 |
| | | | 50 | 2450.0 | 1340.0 | 772.0 | 431.0 | 290.0 | 199.0 | 150.0 | 133.0 | 106.0 |
| | | | 100 | 2960.0[b] | 1630.0 | 953.0 | 539.0 | 367.0 | 257.0 | 192.0 | 171.0 | 137.0[c] |
| 06 8585 00 North Fork Smoky Hill | 650 | 1948-53, | 2 | 95.0[b] | 50.0 | 26.0 | 15.0 | 8.9 | 5.7 | 4.3 | 3.6 | 2.7[b] |
| River near McAllaster | | 1960-80 | 5 | 485.0 | 236.0 | 116.0 | 63.0 | 38.0 | 24.0 | 17.0 | 13.0 | 8.5 |
| (Logan County, at U.S. Highway | | | 10 | 1080.0 | 508.0 | 251.0 | 133.0 | 77.0 | 48.0 | 34.0 | 25.0 | 16.0 |
| 40, 3.0 miles east of | | | 25 | 2440.0 | 1120.0 | 565.0 | 293.0 | 162.0 | 100.0 | 71.0 | 52.0 | 32.0 |
| McAllaster.) | | | 50 | 4050.0 | 1830.0 | 950.0 | 486.0 | 258.0 | 160.0 | 113.0 | 82.0 | 52.0 |
| | | | 100 | 6300.0[c] | 2830.0 | 1510.0 | 763.0 | 388.0 | 242.0 | 172.0 | 127.0 | 80.0[c] |
| | | 1966-80 | 2 | 47.0[b] | 25.0 | 13.0 | 7.0 | 4.0 | 2.6 | 1.9 | 1.7 | 1.4[b] |
| | | | 5 | 192.0 | 93.0 | 43.0 | 23.0 | 14.0 | 9.3 | 6.4 | 5.1 | 3.4 |
| | | | 10 | 371.0 | 176.0 | 80.0 | 42.0 | 26.0 | 18.0 | 12.0 | 8.8 | 5.2 |
| | | | 25 | 712.0 | 334.0 | 150.0 | 76.0 | 47.0 | 34.0 | 23.0 | 15.0 | 8.0 |
| | | | 50 | 1050.0 | 495.0 | 224.0 | 111.0 | 69.0 | 51.0 | 34.0 | 22.0 | 11.0 |
| | | | 100 | 1470.0[c] | 695.0 | 318.0 | 155.0 | 96.0 | 74.0 | 48.0 | 30.0 | 14.0[c] |
| 06 8595 00 Ladder Creek below Chalk | 1,460 | 1952-79 | 2 | 157.0[b] | 93.0 | 52.0 | 29.0 | 19.0 | 13.0 | 10.0 | 8.9 | 7.4[a] |
| Creek near Scott City | | | 5 | 604.0 | 328.0 | 173.0 | 94.0 | 57.0 | 35.0 | 28.0 | 23.0 | 18.0 |
| (Logan County, 5.0 miles down- | | | 10 | 1250.0 | 645.0 | 332.0 | 189.0 | 105.0 | 63.0 | 49.0 | 40.0 | 29.0 |
| stream from Chalk Creek and | | | 25 | 2760.0 | 1350.0 | 684.0 | 418.0 | 210.0 | 123.0 | 95.0 | 77.0 | 54.0 |
| 23 miles northeast of Scott | | | 50 | 4660.0 | 2180.0 | 1100.0 | 720.0 | 337.0 | 195.0 | 151.0 | 121.0 | 82.0 |
| City.) | | | 100 | 7490.0[c] | 3380.0 | 1710.0 | 1200.0 | 525.0 | 301.0 | 234.0 | 185.0 | 123.0[b] |
| | | 1966-80 | 2 | 102.0[b] | 54.0 | 30.0 | 17.0 | 11.0 | 7.4 | 6.0 | 5.2 | 4.6[b] |
| | | | 5 | 447.0 | 219.0 | 111.0 | 56.0 | 32.0 | 19.0 | 14.0 | 12.0 | 10.0 |
| | | | 10 | 1090.0 | 515.0 | 249.0 | 121.0 | 65.0 | 36.0 | 26.0 | 21.0 | 16.0 |
| | | | 25 | 3120.0 | 1410.0 | 655.0 | 306.0 | 157.0 | 80.0 | 56.0 | 44.0 | 31.0 |
| | | | 50 | 6470.0 | 2840.0 | 1290.0 | 597.0 | 298.0 | 146.0 | 99.0 | 74.0 | 50.0 |
| | | | 100 | 13000.0[c] | 5530.0 | 2480.0 | 1130.0 | 555.0 | 260.0 | 174.0 | 125.0 | 80.0[b] |
| 06 8600 00 Smoky Hill River at | 3,390 | 1940-80 | 2 | 689.0[b] | 407.0 | 225.0 | 128.0 | 77.0 | 48.0 | 35.0 | 27.0 | 23.0[b] |
| Elkader | | | 5 | 2650.0 | 1560.0 | 847.0 | 483.0 | 283.0 | 172.0 | 125.0 | 94.0 | 73.0 |
| (Logan County, at U.S. Highway | | | 10 | 5270.0 | 3130.0 | 1700.0 | 987.0 | 578.0 | 352.0 | 267.0 | 210.0 | 139.0 |
| 83 at Elkader, 0.1 mile down- | | | 25 | 10800.0 | 6530.0 | 3590.0 | 2150.0 | 1270.0 | 796.0 | 647.0 | 551.0 | 291.0 |
| stream from Ladder Creek.) | | | 50 | 17100.0 | 10500.0 | 5830.0 | 3580.0 | 2150.0 | 1350.0 | 1190.0 | 1100.0 | 479.0 |
| | | | 100 | 25600.0[c] | 16000.0 | 9030.0 | 5700.0 | 3480.0 | 2220.0 | 2130.0 | 2130.0 | 762.0[b] |

Table 6.--Magnitude and frequency of high flows at streamflow-gaging stations having unregulated flow--Continued

| Station number, name, and location | Contri-buting-drain-age area (square miles) | Records analy-zed | Recur-rence interval (years) | Maximum average discharge, in cubic feet per second, for indicated period of consecutive days: 1 day | 3 days | 7 days | 15 days | 30 days | 60 days | 90 days | 120 days | 183 days |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (06 8600 00) --Continued | | 1966-80 | 2 | 353.0[b] | 177.0 | 91.5 | 50.5 | 29.6 | 17.9 | 14.1 | 11.7 | 8.8[b] |
| | | | 5 | 1060.0 | 521.0 | 260.0 | 135.0 | 75.8 | 42.5 | 31.7 | 25.1 | 18.1 |
| | | | 10 | 1900.0 | 928.0 | 461.0 | 234.0 | 130.0 | 70.4 | 50.8 | 39.4 | 27.8 |
| | | | 25 | 3530.0 | 1740.0 | 872.0 | 435.0 | 239.0 | 126.0 | 87.4 | 66.5 | 46.0 |
| | | | 50 | 5280.0 | 2620.0 | 1330.0 | 660.0 | 361.0 | 187.0 | 127.0 | 95.3 | 65.3 |
| | | | 100 | 7600.0[c] | 3810.0 | 1970.0 | 971.0 | 532.0 | 272.0 | 180.0 | 134.0 | 90.8[b] |
| 06 8610 00 Smoky Hill River near | 5,220 | 1951-80 | 2 | 1510.0[b] | 858.0 | 454.0 | 251.0 | 148.0 | 90.5 | 71.7 | 59.5 | 43.6[b] |
| Arnold | | | 5 | 4520.0 | 2630.0 | 1420.0 | 809.0 | 503.0 | 308.0 | 238.0 | 193.0 | 136.0 |
| (Trego County, 12 miles north | | | 10 | 7650.0 | 4600.0 | 2540.0 | 1490.0 | 974.0 | 604.0 | 460.0 | 367.0 | 258.0 |
| of Arnold.) | | | 25 | 13000.0 | 8190.0 | 4700.0 | 2861.0 | 2000.0 | 1270.0 | 952.0 | 746.0 | 532.0 |
| | | | 50 | 17900.0 | 11800.0 | 6970.0 | 4360.0 | 3210.0 | 2090.0 | 1540.0 | 1200.0 | 865.0 |
| | | | 100 | 23600.0[c] | 16200.0 | 9900.0 | 6360.0 | 4940.0 | 3290.0 | 2410.0 | 1840.0 | 1360.0[b] |
| | | 1966-80 | 2 | 1010.0[b] | 539.0 | 273.0 | 148.0 | 83.0 | 51.0 | 40.0 | 33.0 | 24.0[b] |
| | | | 5 | 2790.0 | 1390.0 | 694.0 | 383.0 | 220.0 | 127.0 | 97.0 | 77.0 | 54.0 |
| | | | 10 | 4550.0 | 2210.0 | 1110.0 | 619.0 | 363.0 | 202.0 | 151.0 | 120.0 | 82.0 |
| | | | 25 | 7470.0 | 3540.0 | 1810.0 | 1020.0 | 616.0 | 329.0 | 238.0 | 190.0 | 129.0 |
| | | | 50 | 10100.0 | 4760.0 | 2460.0 | 1400.0 | 862.0 | 450.0 | 319.0 | 254.0 | 174.0 |
| | | | 100 | 13200.0[c] | 6160.0 | 3230.0 | 1860.0 | 1170.0 | 594.0 | 412.0 | 328.0 | 227.0[b] |
| 06 8633 00 Big Creek near Ogallah | 297 | 1956-68 | 2 | 720.0[b] | 440.0 | 221.0 | 122.0 | 70.0 | 42.0 | 31.0 | 26.0 | 20.0[b] |
| (Trego County, at State Highway | | | 5 | 2550.0 | 1530.0 | 737.0 | 404.0 | 227.0 | 128.0 | 95.0 | 77.0 | 57.0 |
| 147, 5 miles south of Ogallah, | | | 10 | 4590.0 | 2720.0 | 1310.0 | 727.0 | 410.0 | 233.0 | 173.0 | 138.0 | 102.0 |
| 9.0 miles upstream from Ogallah | | | 25 | 8140.0 | 4770.0 | 2310.0 | 1320.0 | 760.0 | 441.0 | 332.0 | 257.0 | 194.0 |
| Creek, and 10 miles west of | | | 50 | 11500.0 | 6670.0 | 3260.0 | 1920.0 | 1120.0 | 669.0 | 508.0 | 388.0 | 298.0 |
| Ellis.) | | | 100 | 15300.0[c] | 8850.0 | 4370.0 | 2650.0 | 1580.0 | 976.0 | 748.0 | 563.0 | 442.0[c] |
| 06 8635 00 Big Creek near Hays | 594 | 1947-80 | 2 | 1060.0[a] | 612.0 | 336.0 | 183.0 | 114.0 | 71.7 | 55.2 | 46.6 | 35.9[a] |
| (Ellis County, 0.6 mile east of | | | 5 | 2540.0 | 1570.0 | 857.0 | 478.0 | 302.0 | 192.0 | 143.0 | 116.0 | 86.1 |
| Munjor, and 6.0 miles southeast | | | 10 | 3940.0 | 2570.0 | 1420.0 | 824.0 | 524.0 | 336.0 | 245.0 | 194.0 | 142.0 |
| of Hays.) | | | 25 | 6200.0 | 4350.0 | 2450.0 | 1520.0 | 979.0 | 630.0 | 450.0 | 349.0 | 249.0 |
| | | | 50 | 8250.0 | 6100.0 | 3500.0 | 2300.0 | 1490.0 | 963.0 | 679.0 | 519.0 | 364.0 |
| | | | 100 | 10600.0[b] | 8270.0 | 4850.0 | 3370.0 | 2220.0 | 1430.0 | 996.0 | 751.0 | 519.0[b] |
| | | 1966-80 | 2 | 831.0[b] | 469.0 | 255.0 | 139.0 | 63.0 | 53.0 | 42.0 | 36.0 | 28.0[a] |
| | | | 5 | 1690.0 | 970.0 | 437.0 | 256.0 | 151.0 | 99.0 | 77.0 | 61.0 | 47.0 |
| | | | 10 | 2330.0 | 1360.0 | 662.0 | 345.0 | 207.0 | 139.0 | 106.0 | 83.0 | 63.0 |
| | | | 25 | 3170.0 | 1890.0 | 897.0 | 469.0 | 288.0 | 200.0 | 151.0 | 115.0 | 87.0 |
| | | | 50 | 3810.0 | 2310.0 | 1080.0 | 568.0 | 357.0 | 254.0 | 191.0 | 143.0 | 108.0 |
| | | | 100 | 4430.0[b] | 2720.0 | 1260.0 | 671.0 | 432.0 | 316.0 | 236.0 | 174.0 | 131.0[b] |

Table 6.--Magnitude and frequency of high flows at streamflow-gaging stations having unregulated flow--Continued

| Station number, name, and location | Contri-buting-drain-age area (square miles) | Records analy-zed | Recur-rence interval (years) | Maximum average discharge, in cubic feet per second, for indicated period of consecutive days | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 day | 3 days | 7 days | 15 days | 30 days | 60 days | 90 days | 120 days | 183 days |
| 06 8639 00 North Fork Big Creek near Victoria | 54 | 1963-80 | 2 | 129.0[b] | 68.0 | 33.0 | 17.0 | 9.0 | 4.7 | 3.5 | 2.8 | 1.9[b] |
| (Ellis County, 3.5 miles north- | | | 5 | 652.0 | 310.0 | 144.0 | 75.0 | 41.0 | 22.0 | 16.0 | 12.0 | 8.6 |
| west of Victoria.) | | | 10 | 1520.0 | 675.0 | 312.0 | 166.0 | 91.0 | 51.0 | 36.0 | 28.0 | 20.0 |
| | | | 25 | 3730.0 | 1530.0 | 710.0 | 396.0 | 220.0 | 127.0 | 87.0 | 66.0 | 49.0 |
| | | | 50 | 6660.0 | 2570.0 | 1210.0 | 697.0 | 392.0 | 234.0 | 156.0 | 118.0 | 88.0 |
| | | | 100 | 11200.0[c] | 4080.0 | 1950.0 | 1170.0 | 664.0 | 407.0 | 267.0 | 200.0 | 152.0[c] |
| | | 1966-80 | 2 | 104.0[c] | 57.0 | 28.0 | 14.0 | 7.6 | 4.1 | 2.9 | 2.3 | 1.5[b] |
| | | | 5 | 537.0 | 271.0 | 125.0 | 63.0 | 34.0 | 19.0 | 13.0 | 10.0 | 7.2 |
| | | | 10 | 1270.0 | 607.0 | 275.0 | 141.0 | 77.0 | 44.0 | 30.0 | 23.0 | 17.0 |
| | | | 25 | 3210.0 | 1430.0 | 638.0 | 337.0 | 187.0 | 109.0 | 75.0 | 57.0 | 43.0 |
| | | | 50 | 5830.0 | 2480.0 | 1100.0 | 597.0 | 336.0 | 201.0 | 138.0 | 104.0 | 81.0 |
| | | | 100 | 9990.0[c] | 4060.0 | 1810.0 | 1010.0 | 573.0 | 353.0 | 242.0 | 181.0 | 144.0[c] |
| 06 8669 00 Saline River near WaKeeney | 696 | 1956-66 | 2 | 1700.0[b] | 945.0 | 475.0 | 245.0 | 142.0 | 92.0 | 71.0 | 61.0 | 45.0[b] |
| (Trego County, at U.S. Highway | | | 5 | 4980.0 | 2480.0 | 1250.0 | 682.0 | 385.0 | 243.0 | 187.0 | 153.0 | 106.0 |
| 283, 1 mile upstream from Trego | | | 10 | 8370.0 | 3920.0 | 1980.0 | 1120.0 | 635.0 | 402.0 | 307.0 | 245.0 | 167.0 |
| Creek and 5 miles north of | | | 25 | 14100.0 | 6140.0 | 3130.0 | 1860.0 | 1060.0 | 684.0 | 522.0 | 404.0 | 272.0 |
| WaKeeney). | | | 50 | 19500.0 | 8050.0 | 4140.0 | 2530.0 | 1470.0 | 961.0 | 734.0 | 555.0 | 374.0 |
| | | | 100 | 25900.0[c] | 10100.0 | 5260.0 | 3320.0 | 1960.0 | 1300.0 | 997.0 | 738.0 | 499.0[c] |
| 06 8670 00 Saline River near Russell | 1,502 | 1946-53, 1960-80 | 2 | 2090.0[a] | 1320.0 | 761.0 | 457.0 | 298.0 | 194.0 | 153.0 | 133.0 | 106.0[a] |
| (Russell County, at U.S. Highway | | | 5 | 4650.0 | 3010.0 | 1780.0 | 1070.0 | 711.0 | 458.0 | 354.0 | 301.0 | 228.0 |
| 281, 2.0 miles downstream from | | | 10 | 6730.0 | 4460.0 | 2750.0 | 1680.0 | 1140.0 | 744.0 | 572.0 | 480.0 | 354.0 |
| Salt Creek and 5.0 miles north | | | 25 | 9680.0 | 6600.0 | 4310.0 | 2750.0 | 1920.0 | 1290.0 | 982.0 | 815.0 | 586.0 |
| of Russell.) | | | 50 | 12000.0 | 8380.0 | 5740.0 | 3780.0 | 2710.0 | 1860.0 | 1420.0 | 1170.0 | 825.0 |
| | | | 100 | 14400.0[b] | 10300.0 | 7390.0 | 5060.0 | 3710.0 | 2630.0 | 2000.0 | 1640.0 | 1140.0[b] |
| | | 1966-80 | 2 | 1510.0[b] | 900.0 | 506.0 | 309.0 | 191.0 | 128.0 | 103.0 | 92.0 | 74.0[a] |
| | | | 5 | 3230.0 | 1880.0 | 1000.0 | 593.0 | 368.0 | 237.0 | 189.0 | 164.0 | 129.0 |
| | | | 10 | 4550.0 | 2620.0 | 1370.0 | 815.0 | 514.0 | 331.0 | 264.0 | 225.0 | 175.0 |
| | | | 25 | 6300.0 | 3610.0 | 1860.0 | 1120.0 | 729.0 | 478.0 | 383.0 | 321.0 | 246.0 |
| | | | 50 | 7610.0 | 4350.0 | 2230.0 | 1370.0 | 910.0 | 609.0 | 491.0 | 408.0 | 309.0 |
| | | | 100 | 8910.0[c] | 5080.0 | 2600.0 | 1630.0 | 1110.0 | 760.0 | 618.0 | 507.0 | 382.0[b] |
| 06 8675 00 Paradise Creek near Paradise | 212 | 1947-53, 1963-74 | 2 | 530.0[b] | 291.0 | 145.0 | 82.0 | 52.0 | 31.0 | 23.0 | 20.0 | 14.0[b] |
| (Russell County, at U.S. Highway | | | 5 | 1900.0 | 979.0 | 481.0 | 286.0 | 190.0 | 119.0 | 89.0 | 75.0 | 54.0 |
| 281, 4.5 miles southeast of Para- | | | 10 | 3500.0 | 1770.0 | 869.0 | 529.0 | 359.0 | 230.0 | 173.0 | 146.0 | 104.0 |
| dise.) | | | 25 | 6480.0 | 3240.0 | 1590.0 | 989.0 | 692.0 | 456.0 | 342.0 | 291.0 | 208.0 |
| | | | 50 | 9450.0 | 4700.0 | 2320.0 | 1460.0 | 1040.0 | 699.0 | 525.0 | 447.0 | 322.0 |
| | | | 100 | 13100.0[c] | 6520.0 | 3220.0 | 2040.0 | 1490.0 | 1020.0 | 764.0 | 653.0 | 474.0[c] |

Table 6.--Magnitude and frequency of high flows at streamflow-gaging stations having unregulated flow--Continued

| Station number, name, and location | Contri-buting-drain-age area (square miles) | Records analy-zed | Recur-rence interval (years) | Maximum average discharge, in cubic feet per second, for indicated period of consecutive days | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 day | 3 days | 7 days | 15 days | 30 days | 60 days | 90 days | 120 days | 183 days |
| 06 8684 00 Wolf Creek near Lucas | 163 | 1960-71 | 2 | 737.0[c] | 337.0 | 155.0 | 87.0 | 50.0 | 31.0 | 23.0 | 19.0 | 14.0[b] |
| (Russell County, 1.2 miles west | | | 5 | 2920.0 | 1230.0 | 550.0 | 277.0 | 151.0 | 98.0 | 70.0 | 57.0 | 40.0 |
| of Lucas and 4.0 miles upstream | | | 10 | 5200.0 | 2230.0 | 995.0 | 487.0 | 266.0 | 178.0 | 127.0 | 102.0 | 71.0 |
| from East Fork.) | | | 25 | 9350.0 | 3950.0 | 1790.0 | 861.0 | 481.0 | 334.0 | 240.0 | 192.0 | 132.0 |
| | | | 50 | 13200.0 | 5520.0 | 2540.0 | 1220.0 | 700.0 | 500.0 | 361.0 | 290.0 | 200.0 |
| | | | 100 | 17600.0[c] | 7320.0 | 3430.0 | 1660.0 | 977.0 | 718.0 | 524.0 | 423.0 | 292.0[c] |
| 06 8703 00 Gypsum Creek near Gypsum | 120 | 1955-71 | 2 | 1130.0[b] | 605.0 | 325.0 | 185.0 | 119.0 | 74.0 | 57.0 | 49.0 | 38.0[b] |
| (Saline County, 2.6 miles upstream | | | 5 | 2500.0 | 1310.0 | 731.0 | 408.0 | 262.0 | 164.0 | 126.0 | 110.0 | 84.0 |
| from Stag Creek and 3.5 miles south | | | 10 | 3340.0 | 1740.0 | 978.0 | 540.0 | 353.0 | 219.0 | 170.0 | 149.0 | 111.0 |
| of Gypsum.) | | | 25 | 4220.0 | 2160.0 | 1230.0 | 669.0 | 449.0 | 275.0 | 215.0 | 191.0 | 139.0 |
| | | | 50 | 4720.0 | 2390.0 | 1370.0 | 740.0 | 506.0 | 308.0 | 242.0 | 215.0 | 154.0 |
| | | | 100 | 5110.0[c] | 2570.0 | 1480.0 | 793.0 | 552.0 | 333.0 | 263.0 | 235.0 | 166.0[c] |
| 06 8710 00 North Fork Solomon River | 849 | 1953-80 | 2 | 973.0[b] | 507.0 | 272.0 | 157.0 | 104.0 | 70.0 | 55.0 | 49.0 | 39.0[a] |
| at Glade | | | 5 | 2810.0 | 1420.0 | 729.0 | 394.0 | 249.0 | 159.0 | 121.0 | 103.0 | 77.0 |
| (Phillips County, at U.S. High- | | | 10 | 4660.0 | 2390.0 | 1220.0 | 650.0 | 402.0 | 251.0 | 187.0 | 156.0 | 112.0 |
| way 183, 0.5 mile south of | | | 25 | 7710.0 | 4070.0 | 2130.0 | 1120.0 | 685.0 | 417.0 | 303.0 | 246.0 | 170.0 |
| Glade.) | | | 50 | 10500.0 | 5690.0 | 3050.0 | 1610.0 | 976.0 | 586.0 | 418.0 | 332.0 | 223.0 |
| | | | 100 | 13600.0[c] | 7640.0 | 4220.0 | 2230.0 | 1350.0 | 802.0 | 563.0 | 437.0 | 287.0[b] |
| | | 1966-80 | 2 | 539.0[b] | 306.0 | 174.0 | 107.0 | 71.0 | 51.0 | 41.0 | 36.0 | 30.0[a] |
| | | | 5 | 1780.0 | 926.0 | 497.0 | 272.0 | 168.0 | 110.0 | 85.0 | 72.0 | 57.0 |
| | | | 10 | 3280.0 | 1640.0 | 876.0 | 457.0 | 273.0 | 170.0 | 128.0 | 107.0 | 82.0 |
| | | | 25 | 6200.0 | 3020.0 | 1630.0 | 814.0 | 470.0 | 278.0 | 205.0 | 165.0 | 124.0 |
| | | | 50 | 9280.0 | 4460.0 | 2440.0 | 1200.0 | 679.0 | 388.0 | 282.0 | 221.0 | 163.0 |
| | | | 100 | 13300.0[b] | 6340.0 | 3540.0 | 1710.0 | 956.0 | 529.0 | 380.0 | 290.0 | 209.0[b] |
| 06 8715 00 Bow Creek near Stockton | 341 | 1952-80 | 2 | 470.0[b] | 257.0 | 136.0 | 74.0 | 47.0 | 31.0 | 24.0 | 21.0 | 18.0[a] |
| (Rooks County, at U.S. Highway | | | 5 | 1240.0 | 666.0 | 340.0 | 178.0 | 111.0 | 70.0 | 52.0 | 44.0 | 33.0 |
| 183, 8.5 miles north of Stock- | | | 10 | 1960.0 | 1080.0 | 554.0 | 289.0 | 181.0 | 112.0 | 80.0 | 65.0 | 48.0 |
| ton.) | | | 25 | 3110.0 | 1790.0 | 938.0 | 495.0 | 312.0 | 189.0 | 132.0 | 103.0 | 72.0 |
| | | | 50 | 4110.0 | 2460.0 | 1320.0 | 708.0 | 450.0 | 268.0 | 184.0 | 140.0 | 94.0 |
| | | | 100 | 5230.0[b] | 3260.0 | 1810.0 | 984.0 | 631.0 | 371.0 | 251.0 | 186.0 | 122.0[b] |
| | | 1966-80 | 2 | 418.0[b] | 231.0 | 121.0 | 66.0 | 39.0 | 25.0 | 20.0 | 19.0 | 16.0[a] |
| | | | 5 | 1420.0 | 702.0 | 344.0 | 171.0 | 95.0 | 57.0 | 43.0 | 37.0 | 29.0 |
| | | | 10 | 2580.0 | 1230.0 | 596.0 | 290.0 | 157.0 | 90.0 | 65.0 | 54.0 | 41.0 |
| | | | 25 | 4710.0 | 2190.0 | 1080.0 | 518.0 | 279.0 | 150.0 | 105.0 | 84.0 | 61.0 |
| | | | 50 | 6840.0 | 3150.0 | 1580.0 | 763.0 | 411.0 | 213.0 | 145.0 | 113.0 | 81.0 |
| | | | 100 | 9460.0[c] | 4350.0 | 2230.0 | 1090.0 | 589.0 | 296.0 | 197.0 | 149.0 | 104.0[b] |

Table 6.--Magnitude and frequency of high flows at streamflow-gaging stations having unregulated flow--Continued

| Station number, name, and location | Contri-buting-drain-age area (square miles) | Records analy-zed | Recur-rence interval (years) | Maximum average discharge, in cubic feet per second, for indicated period of consecutive days | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 day | 3 days | 7 days | 15 days | 30 days | 60 days | 90 days | 120 days | 183 days |
| 06 8719 00 Deer Creek near Phillipsburg | 65 | 1967-80 | 2 | 277.0[b] | 125.0 | 59.0 | 30.0 | 17.0 | 10.0 | 7.8 | 6.5 | 5.4[b] |
| (Phillips County, 5 miles west | | | 5 | 885.0 | 352.0 | 155.0 | 76.0 | 39.0 | 23.0 | 17.0 | 14.0 | 11.0 |
| of Phillipsburg.) | | | 10 | 1580.0 | 580.0 | 248.0 | 121.0 | 61.0 | 36.0 | 25.0 | 20.0 | 17.0 |
| | | | 25 | 2850.0 | 956.0 | 400.0 | 199.0 | 97.0 | 57.0 | 39.0 | 30.0 | 26.0 |
| | | | 50 | 4140.0 | 1300.0 | 537.0 | 271.0 | 132.0 | 78.0 | 53.0 | 40.0 | 34.0 |
| | | | 100 | 5730.0[c] | 1690.0 | 694.0 | 358.0 | 175.0 | 103.0 | 69.0 | 51.0 | 44.0[b] |
| 06 8730 00 South Fork Solomon River above Webster Reservoir | 1,040 | 1946-80 | 2 | 1740.0[b] | 836.0 | 479.0 | 272.0 | 175.0 | 115.0 | 91.2 | 79.4 | 62.3[a] |
| (Rooks County, 4 miles north of | | | 5 | 5450.0 | 2720.0 | 1440.0 | 778.0 | 503.0 | 318.0 | 241.0 | 200.0 | 148.0 |
| Damar, 7 miles downstream from | | | 10 | 10000.0 | 5020.0 | 2640.0 | 1400.0 | 921.0 | 573.0 | 423.0 | 342.0 | 246.0 |
| Wild Horse Creek, and 11 miles | | | 25 | 19400.0 | 9860.0 | 5170.0 | 2710.0 | 1830.0 | 1120.0 | 807.0 | 634.0 | 441.0 |
| upstream from Webster Dam.) | | | 50 | 29800.0 | 15400.0 | 8090.0 | 4220.0 | 2920.0 | 1780.0 | 1250.0 | 966.0 | 659.0 |
| | | | 100 | 44000.0[b] | 23300.0 | 12200.0 | 6350.0 | 4520.0 | 2730.0 | 1900.0 | 1440.0 | 960.0[b] |
| | | 1966-80 | 2 | 857.0[b] | 449.0 | 234.0 | 132.0 | 87.0 | 59.0 | 49.0 | 43.0 | 35.0[a] |
| | | | 5 | 2340.0 | 1160.0 | 598.0 | 315.0 | 190.0 | 117.0 | 90.0 | 77.0 | 60.0 |
| | | | 10 | 4080.0 | 1980.0 | 1020.0 | 524.0 | 300.0 | 176.0 | 131.0 | 110.0 | 82.0 |
| | | | 25 | 7540.0 | 3600.0 | 1890.0 | 938.0 | 510.0 | 283.0 | 200.0 | 164.0 | 120.0 |
| | | | 50 | 11400.0 | 5380.0 | 2860.0 | 1400.0 | 734.0 | 392.0 | 269.0 | 217.0 | 156.0 |
| | | | 100 | 16500.0[c] | 7800.0 | 4210.0 | 2030.0 | 1030.0 | 535.0 | 357.0 | 284.0 | 199.0[b] |
| 06 8737 00 Kill Creek near Blooming-ton | 52 | 1964-80 | 2 | 59.0[c] | 31.0 | 14.0 | 10.0 | 5.7 | 3.3 | 2.5 | 2.3 | 1.8[b] |
| (Osborne County, 9.0 miles south- | | | 5 | 314.0 | 147.0 | 63.0 | 33.0 | 18.0 | 11.0 | 7.8 | 6.6 | 5.0 |
| west of Bloomington.) | | | 10 | 697.0 | 305.0 | 143.0 | 60.0 | 33.0 | 20.0 | 14.0 | 12.0 | 8.9 |
| | | | 25 | 1530.0 | 623.0 | 347.0 | 109.0 | 61.0 | 39.0 | 28.0 | 23.0 | 16.0 |
| | | | 50 | 2500.0 | 967.0 | 629.0 | 162.0 | 91.0 | 61.0 | 44.0 | 36.0 | 25.0 |
| | | | 100 | 3850.0[c] | 1420.0 | 1100.0 | 232.0 | 134.0 | 94.0 | 67.0 | 55.0 | 38.0[c] |
| | | 1966-80 | 2 | 69.0[c] | 35.0 | 19.0 | 11.0 | 6.3 | 3.6 | 2.7 | 2.3 | 1.7[b] |
| | | | 5 | 342.0 | 163.0 | 72.0 | 35.0 | 20.0 | 12.0 | 8.6 | 7.0 | 5.4 |
| | | | 10 | 739.0 | 335.0 | 139.0 | 63.0 | 35.0 | 23.0 | 16.0 | 13.0 | 10.0 |
| | | | 25 | 1590.0 | 672.0 | 266.0 | 114.0 | 65.0 | 44.0 | 32.0 | 25.0 | 18.0 |
| | | | 50 | 2560.0 | 1030.0 | 402.0 | 168.0 | 98.0 | 69.0 | 50.0 | 40.0 | 28.0 |
| | | | 100 | 3910.0[c] | 1500.0 | 578.0 | 243.0 | 144.0 | 106.0 | 76.0 | 62.0 | 43.0[c] |
| 06 8767 00 Salt Creek near Ada | 384 | 1960-80 | 2 | 1200.0[b] | 844.0 | 544.0 | 294.0 | 178.0 | 109.0 | 86.0 | 71.0 | 55.0[b] |
| (Ottawa County, 3 miles south- | | | 5 | 3880.0 | 3040.0 | 1820.0 | 1000.0 | 589.0 | 345.0 | 260.0 | 210.0 | 158.0 |
| east of Ada.) | | | 10 | 6750.0 | 5900.0 | 3210.0 | 1820.0 | 1070.0 | 611.0 | 450.0 | 361.0 | 269.0 |
| | | | 25 | 11700.0 | 11900.0 | 5650.0 | 3330.0 | 1950.0 | 1100.0 | 791.0 | 634.0 | 470.0 |
| | | | 50 | 16300.0 | 18600.0 | 7950.0 | 4830.0 | 2840.0 | 1600.0 | 1130.0 | 902.0 | 670.0 |
| | | | 100 | 21600.0[c] | 27900.0 | 10600.0 | 6680.0 | 3950.0 | 2210.0 | 1530.0 | 1230.0 | 917.0[c] |

Table 6.--Magnitude and frequency of high flows at streamflow-gaging stations having unregulated flow--Continued

| Station number, name, and location | Contributing drainage area (square miles) | Records analyzed | Recurrence interval (years) | Maximum average discharge, in cubic feet per second, for indicated period of consecutive days | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 day | 3 days | 7 days | 15 days | 30 days | 60 days | 90 days | 120 days | 183 days |
| 06 8780 00 Chapman Creek near Chapman | 300 | 1955-80 | 2 | 3010.0[a] | 2000.0 | 1070.0 | 616.0 | 387.0 | 232.0 | 182.0 | 155.0 | 122.0[a] |
| (Dickinson County, at State | | | 5 | 5620.0 | 3910.0 | 2080.0 | 1160.0 | 721.0 | 426.0 | 335.0 | 286.0 | 221.0 |
| Highway 18, 5.0 miles northwest | | | 10 | 7630.0 | 5400.0 | 2830.0 | 1540.0 | 954.0 | 559.0 | 438.0 | 375.0 | 285.0 |
| of Chapman.) | | | 25 | 10400.0 | 7490.0 | 3820.0 | 2030.0 | 1250.0 | 722.0 | 560.0 | 482.0 | 361.0 |
| | | | 50 | 12600.0 | 9140.0 | 4580.0 | 2370.0 | 1460.0 | 837.0 | 645.0 | 557.0 | 411.0 |
| | | | 100 | 14900.0[b] | 10900.0 | 5330.0 | 2710.0 | 1660.0 | 946.0 | 722.0 | 628.0 | 457.0[b] |
| 06 8785 00 Lyon Creek near Woodbine | 230 | 1955-74 | 2 | 4770.0[b] | 2510.0 | 1340.0 | 607.0 | 473.0 | 296.0 | 235.0 | 199.0 | 150.0[b] |
| (Geary County, 2.0 miles down- | | | 5 | 10600.0 | 5380.0 | 2740.0 | 1520.0 | 974.0 | 593.0 | 464.0 | 386.0 | 286.0 |
| stream from Cary Creek and 7.0 | | | 10 | 14500.0 | 7170.0 | 3550.0 | 2460.0 | 1270.0 | 767.0 | 596.0 | 494.0 | 363.0 |
| miles north of Woodbine.) | | | 25 | 18600.0 | 9070.0 | 4350.0 | 4120.0 | 1570.0 | 942.0 | 728.0 | 602.0 | 439.0 |
| | | | 50 | 21500.0 | 10200.0 | 4800.0 | 5730.0 | 1740.0 | 1040.0 | 803.0 | 663.0 | 481.0 |
| | | | 100 | 23800.0[c] | 11100.0 | 5140.0 | 7720.0 | 1870.0 | 1120.0 | 860.0 | 712.0 | 513.0[b] |
| 06 8825 00 Big Blue River at Hull | 4,540 | 1920-24, | 2 | 7060.0[a] | 5290.0 | 3520.0 | 2200.0 | 1490.0 | 1060.0 | 881.0 | 777.0 | 655.0[a] |
| (Marshall County, a quarter of a | | 1929-40 | 5 | 11700.0 | 8670.0 | 6060.0 | 3850.0 | 2480.0 | 1760.0 | 1420.0 | 1230.0 | 969.0 |
| mile west of Hull and 2 miles up- | | | 10 | 14600.0 | 11200.0 | 7870.0 | 5040.0 | 3180.0 | 2220.0 | 1760.0 | 1510.0 | 1150.0 |
| stream from Deer Creek.) | | | 25 | 17800.0 | 14100.0 | 10200.0 | 6610.0 | 4100.0 | 2780.0 | 2150.0 | 1840.0 | 1350.0 |
| | | | 50 | 20000.0 | 16100.0 | 12000.0 | 7810.0 | 4790.0 | 3180.0 | 2420.0 | 2060.0 | 1470.0 |
| | | | 100 | 21900.0[b] | 17900.0 | 13700.0 | 9020.0 | 5500.0 | 3550.0 | 2660.0 | 2260.0 | 1580.0[b] |
| 06 8842 00 Mill Creek at Washington | 344 | 1960-80 | 2 | 3650.0[a] | 2340.0 | 1270.0 | 726.0 | 452.0 | 257.0 | 205.0 | 183.0 | 144.0[a] |
| (Washington County, at U.S. High- | | | 5 | 6770.0 | 4560.0 | 2480.0 | 1370.0 | 829.0 | 515.0 | 381.0 | 336.0 | 263.0 |
| way 36, 0.5 mile east of Washing- | | | 10 | 8830.0 | 6100.0 | 3320.0 | 1790.0 | 1070.0 | 730.0 | 498.0 | 436.0 | 339.0 |
| ton.) | | | 25 | 11300.0 | 7990.0 | 4340.0 | 2270.0 | 1330.0 | 1040.0 | 637.0 | 553.0 | 426.0 |
| | | | 50 | 12900.0 | 9310.0 | 5050.0 | 2590.0 | 1510.0 | 1310.0 | 732.0 | 631.0 | 483.0 |
| | | | 100 | 14500.0[b] | 10500.0 | 5720.0 | 2880.0 | 1660.0 | 1590.0 | 819.0 | 701.0 | 534.0[b] |
| 06 8845 00 Little Blue River at Waterville | 3,440 | 1923-24, | 2 | 10100.0[a] | 7790.0 | 5000.0 | 3280.0 | 2280.0 | 1530.0 | 1220.0 | 1050.0 | 844.0[a] |
| (Marshall County, 1 mile down- | | 1929-57, | 5 | 18700.0 | 14800.0 | 9840.0 | 6340.0 | 4330.0 | 2830.0 | 2220.0 | 1890.0 | 1460.0 |
| stream from Coon Creek and 0.3 | | 1959-80 | 10 | 25400.0 | 20200.0 | 13600.0 | 8620.0 | 5820.0 | 3750.0 | 2960.0 | 2500.0 | 1890.0 |
| mile north of Waterville.) In- | | | 25 | 34700.0 | 27500.0 | 18700.0 | 11600.0 | 7780.0 | 4940.0 | 3920.0 | 3300.0 | 2460.0 |
| cludes data from station | | | 50 | 42200.0 | 33200.0 | 22700.0 | 13900.0 | 9240.0 | 5820.0 | 4650.0 | 3900.0 | 2890.0 |
| 06884400 for 1959-80. | | | 100 | 50000.0[b] | 39200.0 | 26700.0 | 16200.0 | 10700.0 | 6670.0 | 5380.0 | 4510.0 | 3320.0[a] |
| 06 8855 00 Black Vermillion River near Frankfort | 410 | 1954-80 | 2 | 5330.0[a] | 3060.0 | 1710.0 | 1040.0 | 658.0 | 399.0 | 313.0 | 258.0 | 198.0[a] |
| (Marshall County, 0.2 mile down- | | | 5 | 11100.0 | 6030.0 | 3250.0 | 1910.0 | 1240.0 | 735.0 | 571.0 | 467.0 | 359.0 |
| stream from Robidoux Creek, and | | | 10 | 16200.0 | 8400.0 | 4380.0 | 2510.0 | 1640.0 | 963.0 | 743.0 | 604.0 | 464.0 |
| 2.2 miles southwest of Frankfort.) | | | 25 | 24100.0 | 11800.0 | 5880.0 | 3240.0 | 2120.0 | 1240.0 | 949.0 | 766.0 | 586.0 |
| | | | 50 | 31000.0 | 14500.0 | 7020.0 | 3760.0 | 2460.0 | 1430.0 | 1090.0 | 876.0 | 668.0 |
| | | | 100 | 38900.0[b] | 17400.0 | 8150.0 | 4250.0 | 2780.0 | 1620.0 | 1220.0 | 977.0 | 742.0[b] |

Table 6.--Magnitude and frequency of high flows at streamflow-gaging stations having unregulated flow--Continued

| Station number, name, and location | Contri-buting drain-age area (square miles) | Records analy-zed | Recur-rence interval (years) | Maximum average discharge, in cubic feet per second, for indicated period of consecutive days | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 day | 3 days | 7 days | 15 days | 30 days | 60 days | 90 days | 120 days | 183 days |
| 06 8865 00 Fancy Creek at Winkler | 174 | 1955-71 | 2 | 2040.0[b] | 1040.0 | 548.0 | 311.0 | 194.0 | 119.0 | 94.0 | 78.0 | 60.0[b] |
| (Riley County, 0.2 mile down- | | | 5 | 5410.0 | 2730.0 | 1430.0 | 806.0 | 479.0 | 283.0 | 219.0 | 181.0 | 138.0 |
| stream from Otter Creek, 0.4 | | | 10 | 8320.0 | 4180.0 | 2170.0 | 1220.0 | 710.0 | 411.0 | 315.0 | 260.0 | 196.0 |
| mile south of Winkler and 5.0 | | | 25 | 12500.0 | 6210.0 | 3190.0 | 1780.0 | 1020.0 | 582.0 | 438.0 | 360.0 | 267.0 |
| miles northwest of Randolph.) | | | 50 | 15700.0 | 7790.0 | 3970.0 | 2200.0 | 1250.0 | 709.0 | 527.0 | 432.0 | 316.0 |
| | | | 100 | 19000.0[c] | 9370.0 | 4750.0 | 2620.0 | 1480.0 | 832.0 | 611.0 | 500.0 | 362.0[c] |
| 06 8880 00 Vermillion Creek near | 243 | 1937-45, | 2 | 3230.0[b] | 1830.0 | 981.0 | 628.0 | 409.0 | 257.0 | 201.0 | 168.0 | 127.0[b] |
| Wamego | | 1955-71 | 5 | 6840.0 | 3850.0 | 1960.0 | 1280.0 | 838.0 | 523.0 | 410.0 | 340.0 | 260.0 |
| (Pottawatomie County, 1 mile up- | | | 10 | 9390.0 | 5230.0 | 2590.0 | 1690.0 | 1120.0 | 691.0 | 544.0 | 448.0 | 343.0 |
| stream from Indian Creek and 14 | | | 25 | 12500.0 | 6840.0 | 3290.0 | 2140.0 | 1440.0 | 876.0 | 692.0 | 566.0 | 431.0 |
| miles northeast of Wamego.) | | | 50 | 14600.0 | 7900.0 | 3740.0 | 2420.0 | 1640.0 | 990.0 | 784.0 | 640.0 | 483.0 |
| | | | 100 | 16600.0[b] | 8840.0 | 4130.0 | 2650.0 | 1820.0 | 1090.0 | 862.0 | 701.0 | 527.0[b] |
| 06 8885 00 Mill Creek near Paxico | 316 | 1955-80 | 2 | 5320.0[a] | 2560.0 | 1460.0 | 948.0 | 628.0 | 426.0 | 340.0 | 291.0 | 225.0[a] |
| (Wabaunsee County, at Inter- | | | 5 | 11000.0 | 5220.0 | 2980.0 | 1820.0 | 1170.0 | 759.0 | 609.0 | 517.0 | 399.0 |
| state Highway 70, 1.0 mile | | | 10 | 15400.0 | 7300.0 | 4150.0 | 2420.0 | 1510.0 | 956.0 | 766.0 | 649.0 | 498.0 |
| southwest of Paxico and 2.0 miles | | | 25 | 21200.0 | 10200.0 | 5770.0 | 3150.0 | 1890.0 | 1170.0 | 932.0 | 789.0 | 599.0 |
| downstream from Kuenzli Creek.) | | | 50 | 25600.0 | 12400.0 | 7040.0 | 3670.0 | 2130.0 | 1300.0 | 1030.0 | 874.0 | 658.0 |
| | | | 100 | 30000.0[b] | 14800.0 | 8330.0 | 4140.0 | 2340.0 | 1410.0 | 1110.0 | 945.0 | 706.0[b] |
| 06 8991 00 Soldier Creek near Goff | 2.06 | 1965-80 | 2 | 76.0[a] | 37.0 | 21.0 | 12.0 | 7.2 | 4.4 | 3.1 | 2.6 | 1.9[a] |
| (Nemaha County, 3.3 miles south- | | | 5 | 131.0 | 62.0 | 33.0 | 19.0 | 12.0 | 7.2 | 5.1 | 4.3 | 3.0 |
| west of Goff.) | | | 10 | 172.0 | 77.0 | 41.0 | 24.0 | 15.0 | 8.9 | 6.2 | 5.2 | 3.7 |
| | | | 25 | 225.0 | 96.0 | 49.0 | 28.0 | 18.0 | 11.0 | 7.4 | 6.3 | 4.4 |
| | | | 50 | 265.0 | 109.0 | 54.0 | 31.0 | 20.0 | 12.0 | 8.1 | 7.0 | 4.8 |
| | | | 100 | 306.0[b] | 122.0 | 58.0 | 33.0 | 21.0 | 13.0 | 8.7 | 7.5 | 5.1[b] |
| 06 8891 20 Soldier Creek near | 10.5 | 1965-80 | 2 | 308.0[a] | 156.0 | 88.0 | 54.0 | 34.0 | 20.0 | 15.0 | 12.0 | 9.1[a] |
| Bancroft | | | 5 | 478.0 | 251.0 | 142.0 | 90.0 | 57.0 | 33.0 | 25.0 | 22.0 | 15.0 |
| (Nemaha County, 4.0 miles west | | | 10 | 581.0 | 308.0 | 174.0 | 110.0 | 70.0 | 41.0 | 30.0 | 28.0 | 19.0 |
| of Bancroft.) | | | 25 | 696.0 | 372.0 | 207.0 | 131.0 | 84.0 | 49.0 | 36.0 | 34.0 | 22.0 |
| | | | 50 | 772.0 | 413.0 | 228.0 | 143.0 | 92.0 | 53.0 | 39.0 | 37.0 | 25.0 |
| | | | 100 | 839.0[b] | 450.0 | 245.0 | 153.0 | 98.0 | 57.0 | 41.0 | 40.0 | 26.0[b] |
| 06 8891 40 Soldier Creek near | 16.9 | 1965-80 | 2 | 452.0[a] | 236.0 | 131.0 | 78.0 | 48.0 | 29.0 | 23.0 | 19.0 | 14.0[a] |
| Soldier | | | 5 | 751.0 | 402.0 | 226.0 | 133.0 | 85.0 | 49.0 | 39.0 | 32.0 | 23.0 |
| (Jackson County, 2.0 miles north | | | 10 | 925.0 | 499.0 | 281.0 | 163.0 | 109.0 | 63.0 | 47.0 | 39.0 | 27.0 |
| of Soldier.) | | | 25 | 1110.0 | 603.0 | 339.0 | 193.0 | 138.0 | 78.0 | 56.0 | 46.0 | 32.0 |
| | | | 50 | 1220.0 | 668.0 | 375.0 | 211.0 | 157.0 | 88.0 | 62.0 | 51.0 | 35.0 |
| | | | 100 | 1320.0[b] | 723.0 | 405.0 | 225.0 | 175.0 | 98.0 | 66.0 | 54.0 | 37.0[b] |

Table 6.--Magnitude and frequency of high flows at streamflow-gaging stations having unregulated flow--Continued

| Station number, name, and location | Contributing drainage area (square miles) | Records analyzed | Recurrence interval (years) | Maximum average discharge, in cubic feet per second, for indicated period of consecutive days | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 day | 3 days | 7 days | 15 days | 30 days | 60 days | 90 days | 120 days | 183 days |
| 06 8891 60 Soldier Creek near | 49.3 | 1965-80 | 2 | 1320.0[a] | 752.0 | 398.0 | 241.0 | 158.0 | 98.0 | 75.0 | 63.0 | 46.0[a] |
| Circleville | | | 5 | 2080.0 | 1220.0 | 636.0 | 368.0 | 246.0 | 150.0 | 117.0 | 100.0 | 72.0 |
| (Jackson County, at State High- | | | 10 | 2490.0 | 1480.0 | 769.0 | 436.0 | 294.0 | 178.0 | 139.0 | 119.0 | 86.0 |
| way 16, 5.8 miles southwest of | | | 25 | 2920.0 | 1760.0 | 906.0 | 503.0 | 341.0 | 206.0 | 161.0 | 140.0 | 101.0 |
| Circleville.) | | | 50 | 3180.0 | 1940.0 | 989.0 | 543.0 | 369.0 | 222.0 | 175.0 | 152.0 | 110.0 |
| | | | 100 | 3400.0[b] | 2080.0 | 1060.0 | 575.0 | 391.0 | 235.0 | 185.0 | 162.0 | 118.0[b] |
| 06 8891 80 Soldier Creek near St. | 80 | 1965-80 | 2 | 2000.0[a] | 1070.0 | 562.0 | 357.0 | 237.0 | 150.0 | 119.0 | 101.0 | 75.0[a] |
| Clere | | | 5 | 3270.0 | 1790.0 | 932.0 | 572.0 | 382.0 | 237.0 | 188.0 | 160.0 | 117.0 |
| (Jackson County, 7.8 miles east | | | 10 | 4030.0 | 2260.0 | 1160.0 | 699.0 | 466.0 | 287.0 | 229.0 | 195.0 | 142.0 |
| of St. Clere.) | | | 25 | 4670.0 | 2800.0 | 1430.0 | 838.0 | 558.0 | 341.0 | 272.0 | 232.0 | 171.0 |
| | | | 50 | 5400.0 | 3170.0 | 1600.0 | 927.0 | 615.0 | 376.0 | 300.0 | 256.0 | 190.0 |
| | | | 100 | 5880.0[b] | 3510.0 | 1760.0 | 1000.0 | 665.0 | 406.0 | 323.0 | 276.0 | 207.0[b] |
| 06 8892 00 Soldier Creek near Delia | 157 | 1959-80 | 2 | 3100.0[a] | 1770.0 | 956.0 | 597.0 | 404.0 | 256.0 | 204.0 | 174.0 | 131.0[a] |
| (Shawnee County, 5.1 miles upstream | | | 5 | 4900.0 | 3080.0 | 1610.0 | 962.0 | 653.0 | 400.0 | 317.0 | 271.0 | 202.0 |
| from Walnut Creek and 5.5 miles | | | 10 | 5980.0 | 3980.0 | 2040.0 | 1220.0 | 801.0 | 485.0 | 381.0 | 329.0 | 245.0 |
| southwest of Delia.) | | | 25 | 7210.0 | 5100.0 | 2550.0 | 1500.0 | 964.0 | 578.0 | 449.0 | 392.0 | 294.0 |
| | | | 50 | 8010.0 | 5900.0 | 2900.0 | 1680.0 | 1070.0 | 637.0 | 492.0 | 432.0 | 328.0 |
| | | | 100 | 8740.0[b] | 6680.0 | 3240.0 | 1850.0 | 1160.0 | 690.0 | 528.0 | 468.0 | 358.0[b] |
| 06 8895 00 Soldier Creek near Topeka | 290 | 1930-32, | 2 | 4030.0[a] | 2340.0 | 1340.0 | 857.0 | 562.0 | 372.0 | 291.0 | 247.0 | 191.0[a] |
| (Shawnee County, 1.5 miles up- | | 1936, | 5 | 8030.0 | 5020.0 | 2810.0 | 1800.0 | 1170.0 | 732.0 | 573.0 | 481.0 | 367.0 |
| stream from Halfday Creek and 4.0 | | 1938-80 | 10 | 10900.0 | 7090.0 | 3910.0 | 2470.0 | 1590.0 | 972.0 | 760.0 | 632.0 | 478.0 |
| miles northwest of Topeka.) | | | 25 | 14400.0 | 9850.0 | 5320.0 | 3310.0 | 2110.0 | 1250.0 | 977.0 | 804.0 | 600.0 |
| | | | 50 | 17000.0 | 11900.0 | 6350.0 | 3910.0 | 2470.0 | 1440.0 | 1120.0 | 916.0 | 677.0 |
| | | | 100 | 19400.0[b] | 14000.0 | 7350.0 | 4470.0 | 2800.0 | 1600.0 | 1250.0 | 1010.0 | 743.0[b] |
| 06 8901 00 Delaware River near | 431 | 1970-81 | 2 | 9310.0[b] | 5070.0 | 2860.0 | 1810.0 | 1160.0 | 719.0 | 547.0 | 449.0 | 339.0[a] |
| Muscotah | | | 5 | 16400.0 | 9120.0 | 5070.0 | 3010.0 | 1840.0 | 1190.0 | 906.0 | 750.0 | 573.0 |
| (Atchison County, 2.0 miles | | | 10 | 21100.0 | 12100.0 | 6710.0 | 3840.0 | 2280.0 | 1510.0 | 1150.0 | 965.0 | 740.0 |
| south of Muscotah.) | | | 25 | 26800.0 | 16200.0 | 8900.0 | 4890.0 | 2820.0 | 1910.0 | 1470.0 | 1250.0 | 956.0 |
| | | | 50 | 30800.0 | 19400.0 | 10600.0 | 5670.0 | 3210.0 | 2200.0 | 1700.0 | 1460.0 | 1120.0 |
| | | | 100 | 34600.0[b] | 22700.0 | 12300.0 | 6430.0 | 3580.0 | 2480.0 | 1920.0 | 1680.0 | 1280.0[b] |
| 06 8905 00 Delaware River at Valley | 922 | 1923-67 | 2 | 11500.0[a] | 6710.0 | 3720.0 | 2360.0 | 1530.0 | 999.0 | 794.0 | 670.0 | 508.0[a] |
| Falls | | | 5 | 21600.0 | 13800.0 | 7580.0 | 4760.0 | 3180.0 | 1970.0 | 1560.0 | 1290.0 | 978.0 |
| (Jefferson County, 200 feet down- | | | 10 | 28500.0 | 19300.0 | 10600.0 | 6540.0 | 4490.0 | 2680.0 | 2120.0 | 1720.0 | 1310.0 |
| stream from Walnut Creek, 300 | | | 25 | 36900.0 | 26800.0 | 14600.0 | 8880.0 | 6290.0 | 3600.0 | 2840.0 | 2260.0 | 1720.0 |
| feet upstream from Atchison, | | | 50 | 42800.0 | 32600.0 | 17600.0 | 10600.0 | 7710.0 | 4290.0 | 3370.0 | 2650.0 | 2010.0 |
| Topeka and Santa Fe Railway | | | 100 | 48200.0[b] | 38400.0 | 20700.0 | 12400.0 | 9180.0 | 4950.0 | 3880.0 | 3020.0 | 2290.0[b] |
| Co. bridge, a quarter of a | | | | | | | | | | | | |
| mile north of Valley Falls.) | | | | | | | | | | | | |

Table 6.--Magnitude and frequency of high flows at streamflow-gaging stations having unregulated flow--Continued

| Station number, name, and location | Contri-buting-drain-age area (square miles) | Records analy-zed | Recur-rence interval (years) | Maximum average discharge, in cubic feet per second, for indicated period of consecutive days | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 day | 3 days | 7 days | 15 days | 30 days | 60 days | 90 days | 120 days | 183 days |
| 06 8920 00 Stranger Creek near Tonganoxie | 406 | 1930-80 | 2 | 4930.0[a] | 3630.0 | 2150.0 | 1320.0 | 869.0 | 577.0 | 459.0 | 393.0 | 303.0[a] |
| (Leavenworth County, at U.S. | | | 5 | 8740.0 | 6820.0 | 4160.0 | 2500.0 | 1660.0 | 1060.0 | 849.0 | 719.0 | 551.0 |
| Highway 40, 2.0 miles upstream | | | 10 | 11300.0 | 9030.0 | 5570.0 | 3300.0 | 2220.0 | 1380.0 | 1100.0 | 924.0 | 708.0 |
| from Tonganoxie Creek and 4.0 | | | 25 | 14500.0 | 11800.0 | 7310.0 | 4250.0 | 2930.0 | 1740.0 | 1390.0 | 1150.0 | 886.0 |
| miles east of Tonganoxie.) | | | 50 | 16700.0 | 13800.0 | 8550.0 | 4910.0 | 3430.0 | 1980.0 | 1570.0 | 1300.0 | 1000.0 |
| | | | 100 | 18800.0[b] | 15600.0 | 9710.0 | 5510.0 | 3920.0 | 2190.0 | 1740.0 | 1430.0 | 1100.0[b] |
| 06 8933 00 Indian Creek at Overland Park | 26.6 | 1964-80 | 2 | 1080.0[a] | 525.0 | 270.0 | 153.0 | 97.0 | 63.0 | 49.0 | 41.0 | 34.0[a] |
| (Johnson County, at Marty | | | 5 | 1580.0 | 794.0 | 423.0 | 246.0 | 160.0 | 98.0 | 74.0 | 62.0 | 49.0 |
| Street in Overland Park.) | | | 10 | 1900.0 | 966.0 | 538.0 | 311.0 | 205.0 | 121.0 | 92.0 | 76.0 | 58.0 |
| | | | 25 | 2260.0 | 1170.0 | 682.0 | 394.0 | 262.0 | 149.0 | 113.0 | 92.0 | 68.0 |
| | | | 50 | 2550.0 | 1320.0 | 791.0 | 457.0 | 306.0 | 170.0 | 128.0 | 104.0 | 75.0 |
| | | | 100 | 2810.0[b] | 1460.0 | 901.0 | 519.0 | 350.0 | 191.0 | 144.0 | 115.0 | 81.0[b] |
| 06 9108 00 Marais des Cygnes River near Reading | 177 | 1970-81 | 2 | 4180.0[a] | 2010.0 | 1130.0 | 702.0 | 443.0 | 288.0 | 224.0 | 184.0 | 144.0[a] |
| (Lyon County, 1.9 miles downstream | | | 5 | 6710.0 | 3530.0 | 1950.0 | 1120.0 | 678.0 | 433.0 | 342.0 | 291.0 | 222.0 |
| from confluence of One Hundred and | | | 10 | 8610.0 | 4760.0 | 2610.0 | 1440.0 | 846.0 | 535.0 | 424.0 | 368.0 | 275.0 |
| Forty-two Mile Creek and Elm Creek, | | | 25 | 11300.0 | 6580.0 | 3580.0 | 1890.0 | 1070.0 | 669.0 | 532.0 | 470.0 | 341.0 |
| 4.3 miles upstream from Duck Creek | | | 50 | 13400.0 | 8140.0 | 4410.0 | 2250.0 | 1240.0 | 773.0 | 615.0 | 549.0 | 389.0 |
| and 3.0 miles north of Reading.) | | | 100 | 15700.0[b] | 9860.0 | 5320.0 | 2630.0 | 1420.0 | 880.0 | 699.0 | 630.0 | 438.0[b] |
| 06 9115 00 Salt Creek near Lyndon | 111 | 1940-80 | 2 | 2400.0[a] | 1250.0 | 782.0 | 394.0 | 247.0 | 142.0 | 120.0 | 98.0 | 76.0[b] |
| (Osage County, 2.5 miles east of | | | 5 | 5450.0 | 2870.0 | 1410.0 | 911.0 | 592.0 | 374.0 | 293.0 | 242.0 | 183.0 |
| Lyndon.) | | | 10 | 7600.0 | 4000.0 | 1640.0 | 1260.0 | 829.0 | 580.0 | 413.0 | 344.0 | 257.0 |
| | | | 25 | 10100.0 | 5340.0 | 1780.0 | 1660.0 | 1100.0 | 880.0 | 551.0 | 464.0 | 341.0 |
| | | | 50 | 11800.0 | 6230.0 | 1830.0 | 1900.0 | 1260.0 | 1120.0 | 639.0 | 542.0 | 394.0 |
| | | | 100 | 13300.0[b] | 7020.0 | 1860.0 | 2110.0 | 1410.0 | 1360.0 | 713.0 | 609.0 | 439.0[b] |
| 06 9119 00 Dragoon Creek near Burlingame | 114 | 1961-80 | 2 | 3060.0[a] | 1400.0 | 749.0 | 462.0 | 299.0 | 189.0 | 149.0 | 124.0 | 94.0[a] |
| (Osage County, 0.2 mile down- | | | 5 | 5400.0 | 2400.0 | 1280.0 | 751.0 | 476.0 | 303.0 | 243.0 | 205.0 | 155.0 |
| stream from U.S. Highway 56, 2.0 | | | 10 | 7120.0 | 3110.0 | 1670.0 | 945.0 | 588.0 | 375.0 | 303.0 | 258.0 | 193.0 |
| miles downstream from Plum Creek, | | | 25 | 9400.0 | 4010.0 | 2190.0 | 1190.0 | 720.0 | 458.0 | 374.0 | 322.0 | 238.0 |
| and 3.0 miles south of Burlingame.) | | | 50 | 11200.0 | 4680.0 | 2590.0 | 1360.0 | 810.0 | 515.0 | 422.0 | 368.0 | 269.0 |
| | | | 100 | 13000.0[b] | 5340.0 | 2990.0 | 1530.0 | 894.0 | 567.0 | 468.0 | 410.0 | 298.0[b] |
| 06 9140 00 Pottawatomie Creek near Garnett | 334 | 1940-80 | 2 | 7790.0[a] | 4680.0 | 2430.0 | 1440.0 | 908.0 | 577.0 | 442.0 | 375.0 | 295.0[a] |
| (Anderson County, at U.S. Highway 59, | | | 5 | 13900.0 | 8360.0 | 4430.0 | 2560.0 | 1630.0 | 1020.0 | 794.0 | 666.0 | 534.0 |
| 0.6 mile downstream from conflu- | | | 10 | 18700.0 | 11200.0 | 5850.0 | 3380.0 | 2150.0 | 1320.0 | 1040.0 | 864.0 | 695.0 |
| ence of North Pottawatomie and | | | 25 | 25500.0 | 15100.0 | 7750.0 | 4470.0 | 2830.0 | 1710.0 | 1360.0 | 1110.0 | 888.0 |
| Cedar Creeks, 0.2 mile upstream | | | 50 | 31000.0 | 18200.0 | 9210.0 | 5320.0 | 3330.0 | 1990.0 | 1590.0 | 1280.0 | 1020.0 |
| from Atchison, Topeka and Santa | | | 100 | 36900.0[b] | 21500.0 | 10700.0 | 6180.0 | 3830.0 | 2260.0 | 1810.0 | 1440.0 | 1150.0[b] |
| Fe Railway Co., bridge, 4.0 miles north of Garnett.) | | | | | | | | | | | | |

Table 6.--Magnitude and frequency of high flows at streamflow-gaging stations having unregulated flow--Continued

| Station number, name, and location | Contri-buting-drain-age area (square miles) | Records analy-zed | Recur-rence interval (years) | Maximum average discharge, in cubic feet per second, for indicated period of consecutive days | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 day | 3 days | 7 days | 15 days | 30 days | 60 days | 90 days | 120 days | 183 days |
| 06 9165 00 Big Sugar Creek at | 198 | 1930-31, | 2 | 4250.0[a] | 2300.0 | 1240.0 | 743.0 | 471.0 | 296.0 | 231.0 | 205.0 | 161.0[a] |
| Farlinville | | 1950-70 | 5 | 8060.0 | 4440.0 | 2330.0 | 1420.0 | 910.0 | 588.0 | 484.0 | 416.0 | 329.0 |
| (Linn County, at State Highway | | | 10 | 11300.0 | 6270.0 | 3260.0 | 1990.0 | 1290.0 | 854.0 | 719.0 | 590.0 | 465.0 |
| 7 at Farlinville, 5.2 miles up- | | | 25 | 16300.0 | 9080.0 | 4670.0 | 2870.0 | 1870.0 | 1290.0 | 1100.0 | 846.0 | 659.0 |
| stream from Richland Creek and 14.0 | | | 50 | 20600.0 | 11500.0 | 5890.0 | 3630.0 | 2380.0 | 1690.0 | 1460.0 | 1060.0 | 816.0 |
| miles upstream from Little Sugar | | | 100 | 25500.0[b] | 14300.0 | 7280.0 | 4480.0 | 2960.0 | 2160.0 | 1880.0 | 1290.0 | 983.0[b] |
| Creek.) | | | | | | | | | | | | |
| 06 9170 00 Little Osage River at | 295 | 1950-80 | 2 | 6530.0[a] | 4160.0 | 2370.0 | 1410.0 | 860.0 | 560.0 | 438.0 | 367.0 | 281.0[a] |
| Fulton | | | 5 | 11500.0 | 7600.0 | 4270.0 | 2540.0 | 1580.0 | 1030.0 | 840.0 | 713.0 | 554.0 |
| (Bourbon County, at U.S. Highway | | | 10 | 14000.0 | 9470.0 | 5300.0 | 3180.0 | 2020.0 | 1310.0 | 1100.0 | 935.0 | 730.0 |
| 69, 0.8 mile north of Fulton.) | | | 25 | 16300.0 | 11300.0 | 6280.0 | 3820.0 | 2500.0 | 1610.0 | 1390.0 | 1180.0 | 929.0 |
| | | | 50 | 17500.0 | 12200.0 | 6830.0 | 4190.0 | 2800.0 | 1800.0 | 1580.0 | 1350.0 | 1060.0 |
| | | | 100 | 18300.0[b] | 13000.0 | 7250.0 | 4490.0 | 3060.0 | 1950.0 | 1740.0 | 1490.0 | 1170.0[b] |
| 06 9175 00 Marmaton River near Fort | 408 | 1922-24, | 2 | 9410.0[a] | 5980.0 | 3380.0 | 1980.0 | 1250.0 | 799.0 | 628.0 | 517.0 | 404.0[a] |
| Scott | | 1930-71 | 5 | 16900.0 | 11200.0 | 6420.0 | 3820.0 | 2470.0 | 1520.0 | 1170.0 | 963.0 | 751.0 |
| (Bourbon County, 0.6 mile down- | | | 10 | 21200.0 | 14300.0 | 8310.0 | 5040.0 | 3320.0 | 2000.0 | 1530.0 | 1260.0 | 976.0 |
| stream from Wolverine Creek and 1 | | | 25 | 25500.0 | 17600.0 | 10400.0 | 6470.0 | 4390.0 | 2580.0 | 1960.0 | 1600.0 | 1230.0 |
| mile north of Fort Scott.) | | | 50 | 28100.0 | 19600.0 | 11700.0 | 7440.0 | 5140.0 | 2980.0 | 2250.0 | 1830.0 | 1400.0 |
| | | | 100 | 30100.0[b] | 21300.0 | 12800.0 | 8310.0 | 5850.0 | 3350.0 | 2520.0 | 2040.0 | 1550.0[b] |
| 07 1386 50 Whitewoman Creek near | 750 | 1967-81 | 2 | 79.0[c] | 32.0 | 15.0 | 8.3 | 4.9 | 2.8 | 2.2 | 1.6 | 1.2[b] |
| Leoti | | | 5 | 356.0 | 139.0 | 59.0 | 32.0 | 18.0 | 10.0 | 7.0 | 5.2 | 3.6 |
| (Wichita County, at State Highway | | | 10 | 743.0 | 285.0 | 120.0 | 62.0 | 34.0 | 18.0 | 13.0 | 9.1 | 6.0 |
| 96, 7 miles west of Leoti.) | | | 25 | 1570.0 | 591.0 | 252.0 | 116.0 | 65.0 | 32.0 | 22.0 | 16.0 | 10.0 |
| | | | 50 | 2490.0 | 929.0 | 403.0 | 173.0 | 100.0 | 48.0 | 32.0 | 23.0 | 14.0 |
| | | | 100 | 3730.0[c] | 1380.0 | 611.0 | 251.0 | 151.0 | 69.0 | 43.0 | 32.0 | 19.0[c] |
| 07 1398 00 Mulberry Creek near Dodge | 73.8 | 1969-81 | 2 | 108.0[c] | 50.0 | 23.0 | 13.0 | 7.0 | 3.8 | 2.7 | 2.4 | 1.4[b] |
| City | | | 5 | 417.0 | 168.0 | 63.0 | 32.0 | 17.0 | 8.9 | 6.0 | 5.0 | 3.1 |
| (Ford County, near U.S. Highway | | | 10 | 769.0 | 293.0 | 108.0 | 51.0 | 26.0 | 14.0 | 9.2 | 7.6 | 4.9 |
| 283, 9 miles south of Dodge City.) | | | 25 | 1380.0 | 501.0 | 192.0 | 83.0 | 42.0 | 23.0 | 15.0 | 12.0 | 8.0 |
| | | | 50 | 1940.0 | 690.0 | 280.0 | 115.0 | 59.0 | 32.0 | 20.0 | 17.0 | 11.0 |
| | | | 100 | 2580.0[c] | 901.0 | 399.0 | 156.0 | 80.0 | 44.0 | 27.0 | 22.0 | 16.0[c] |

Table 6.--Magnitude and frequency of high flows at streamflow-gaging stations having unregulated flow--Continued

| Station number, name, and location | Contri-buting-drain-age area (square miles) | Records analy-zed | Recur-rence interval (years) | Maximum average discharge, in cubic feet per second, for indicated period of consecutive days | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 day | 3 days | 7 days | 15 days | 30 days | 60 days | 90 days | 120 days | 183 days |
| 07 1407 00 Guzzlers Gulch near Ness City (Ness County, 11 miles south-west of Ness City.) | 58.2 | 1962-80 | 2 | 178.0[b] | 81.0 | 40.0 | 20.0 | 12.0 | 6.5 | 4.6 | 3.6 | 2.3[b] |
| | | | 5 | 608.0 | 290.0 | 148.0 | 72.0 | 32.0 | 17.0 | 12.0 | 9.1 | 5.8 |
| | | | 10 | 1040.0 | 508.0 | 265.0 | 131.0 | 54.0 | 28.0 | 19.0 | 15.0 | 10.0 |
| | | | 25 | 1720.0 | 855.0 | 459.0 | 234.0 | 92.0 | 49.0 | 33.0 | 25.0 | 17.0 |
| | | | 50 | 2290.0 | 1150.0 | 631.0 | 331.0 | 130.0 | 69.0 | 47.0 | 35.0 | 24.0 |
| | | | 100 | 2880.0[c] | 1470.0 | 820.0 | 444.0 | 179.0 | 96.0 | 64.0 | 48.0 | 33.0[b] |
| | | 1966-80 | 2 | 140.0[b] | 65.0 | 32.0 | 16.0 | 10.0 | 5.3 | 3.7 | 2.9 | 1.9[b] |
| | | | 5 | 551.0 | 268.0 | 139.0 | 69.0 | 30.0 | 16.0 | 11.0 | 8.0 | 5.1 |
| | | | 10 | 1020.0 | 507.0 | 273.0 | 137.0 | 54.0 | 29.0 | 19.0 | 14.0 | 9.0 |
| | | | 25 | 1840.0 | 930.0 | 523.0 | 269.0 | 102.0 | 54.0 | 35.0 | 26.0 | 17.0 |
| | | | 50 | 2600.0 | 1320.0 | 769.0 | 404.0 | 156.0 | 83.0 | 54.0 | 39.0 | 26.0 |
| | | | 100 | 3460.0[c] | 1770.0 | 1060.0 | 572.0 | 232.0 | 124.0 | 80.0 | 57.0 | 38.0[c] |
| 07 1412 00 Pawnee River near Larned (Pawnee County, 0.8 mile north of U.S. Highway 156 and 14 miles west of Larned.) | 2,010 | 1925-80 | 2 | 2150.0[a] | 1630.0 | 908.0 | 502.0 | 306.0 | 180.0 | 132.0 | 106.0 | 75.0[a] |
| | | | 5 | 4500.0 | 3680.0 | 2110.0 | 1200.0 | 746.0 | 452.0 | 326.0 | 257.0 | 179.0 |
| | | | 10 | 6750.0 | 5620.0 | 3290.0 | 1890.0 | 1210.0 | 750.0 | 534.0 | 418.0 | 289.0 |
| | | | 25 | 10500.0 | 8820.0 | 5280.0 | 3080.0 | 2050.0 | 1310.0 | 921.0 | 715.0 | 490.0 |
| | | | 50 | 14100.0 | 11800.0 | 7180.0 | 4220.0 | 2910.0 | 1910.0 | 1320.0 | 1020.0 | 696.0 |
| | | | 100 | 18500.0[b] | 15300.0 | 9470.0 | 5610.0 | 4010.0 | 2690.0 | 1850.0 | 1420.0 | 960.0[b] |
| | | 1966-80 | 2 | 1820.0[a] | 1420.0 | 769.0 | 401.0 | 240.0 | 134.0 | 95.0 | 75.0 | 52.0[b] |
| | | | 5 | 3510.0 | 2910.0 | 1610.0 | 889.0 | 519.0 | 291.0 | 204.0 | 157.0 | 110.0 |
| | | | 10 | 5040.0 | 4240.0 | 2370.0 | 1360.0 | 778.0 | 436.0 | 303.0 | 231.0 | 162.0 |
| | | | 25 | 7550.0 | 6310.0 | 3580.0 | 2150.0 | 1200.0 | 671.0 | 462.0 | 349.0 | 245.0 |
| | | | 50 | 9900.0 | 8170.0 | 4690.0 | 2900.0 | 1590.0 | 887.0 | 607.0 | 456.0 | 320.0 |
| | | | 100 | 12700.0[b] | 10300.0 | 5970.0 | 3800.0 | 2040.0 | 1140.0 | 776.0 | 590.0 | 406.0[b] |
| 07 1417 80 Walnut Creek near Rush Center (Rush County, at State High-way 96, 3.0 miles west of Rush Center.) | 1,152 | 1970-81 | 2 | 1170.0[b] | 798.0 | 406.0 | 221.0 | 120.0 | 67.0 | 52.0 | 41.0 | 30.0[b] |
| | | | 5 | 2450.0 | 1680.0 | 858.0 | 475.0 | 253.0 | 143.0 | 106.0 | 84.0 | 64.0 |
| | | | 10 | 3490.0 | 2380.0 | 1230.0 | 692.0 | 371.0 | 211.0 | 154.0 | 121.0 | 96.0 |
| | | | 25 | 4960.0 | 3370.0 | 1770.0 | 1020.0 | 558.0 | 322.0 | 228.0 | 176.0 | 147.0 |
| | | | 50 | 6140.0 | 4160.0 | 2210.0 | 1290.0 | 725.0 | 422.0 | 293.0 | 225.0 | 193.0 |
| | | | 100 | 7370.0[c] | 4980.0 | 2670.0 | 1600.0 | 916.0 | 539.0 | 366.0 | 279.0 | 247.0[c] |
| 07 1419 00 Walnut Creek at Albert (Barton County, 0.2 mile north of Albert and 14 miles northwest of Great Bend.) | 1,306 | 1959-80 | 2 | 1750.0[a] | 1430.0 | 834.0 | 463.0 | 261.0 | 158.0 | 114.0 | 94.0 | 67.0[b] |
| | | | 5 | 3390.0 | 2930.0 | 1830.0 | 1020.0 | 582.0 | 363.0 | 262.0 | 211.0 | 151.0 |
| | | | 10 | 4620.0 | 4120.0 | 2670.0 | 1500.0 | 871.0 | 555.0 | 408.0 | 319.0 | 230.0 |
| | | | 25 | 6280.0 | 5760.0 | 3910.0 | 2220.0 | 1320.0 | 867.0 | 657.0 | 497.0 | 360.0 |
| | | | 50 | 7560.0 | 7070.0 | 4950.0 | 2830.0 | 1730.0 | 1150.0 | 898.0 | 660.0 | 481.0 |
| | | | 100 | 8850.0[b] | 8410.0 | 6070.0 | 3490.0 | 2180.0 | 1480.0 | 1190.0 | 852.0 | 624.0[b] |

Table 6.--Magnitude and frequency of high flows at streamflow-gaging stations having unregulated flow--Continued

| Station number, name, and location | Contri-buting-drain-age area (square miles) | Records analy-zed | Recur-rence interval (years) | Maximum average discharge, in cubic feet per second, for indicated period of consecutive days | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 day | 3 days | 7 days | 15 days | 30 days | 60 days | 90 days | 120 days | 183 days |
| (07 1419 00)--Continued | | 1966-80 | 2 | 1620.0[a] | 1340.0 | 752.0 | 419.0 | 226.0 | 129.0 | 95.0 | 76.0 | 54.0[b] |
| | | | 5 | 2750.0 | 2320.0 | 1380.0 | 825.0 | 476.0 | 287.0 | 207.0 | 163.0 | 119.0 |
| | | | 10 | 3500.0 | 2970.0 | 1830.0 | 1140.0 | 697.0 | 437.0 | 310.0 | 244.0 | 182.0 |
| | | | 25 | 4440.0 | 3760.0 | 2400.0 | 1570.0 | 1040.0 | 631.0 | 477.0 | 378.0 | 286.0 |
| | | | 50 | 5120.0 | 4320.0 | 2820.0 | 1910.0 | 1340.0 | 908.0 | 631.0 | 503.0 | 386.0 |
| | | | 100 | 5770.0[b] | 4840.0 | 3240.0 | 2260.0 | 1690.0 | 1180.0 | 810.0 | 652.0 | 505.0[b] |
| 07 1423 00 Rattlesnake Creek near Macksville (Stafford County, 8 miles south-east of Macksville.) | 356 | 1960-80 | 2 | 362.0[b] | 264.0 | 166.0 | 110.0 | 74.0 | 53.0 | 45.0 | 41.0 | 35.0[a] |
| | | | 5 | 1140.0 | 800.0 | 473.0 | 287.0 | 176.0 | 113.0 | 91.0 | 30.0 | 67.0 |
| | | | 10 | 2080.0 | 1640.0 | 842.0 | 490.0 | 288.0 | 174.0 | 136.0 | 117.0 | 97.0 |
| | | | 25 | 3990.0 | 2740.0 | 1590.0 | 891.0 | 498.0 | 285.0 | 213.0 | 179.0 | 147.0 |
| | | | 50 | 6080.0 | 4150.0 | 2430.0 | 1330.0 | 721.0 | 397.0 | 289.0 | 238.0 | 196.0 |
| | | | 100 | 8910.0[c] | 6060.0 | 3600.0 | 1930.0 | 1020.0 | 540.0 | 384.0 | 311.0 | 256.0[b] |
| | | 1966-80 | 2 | 436.0[b] | 309.0 | 191.0 | 123.0 | 81.0 | 55.0 | 45.0 | 39.0 | 34.0[b] |
| | | | 5 | 1390.0 | 953.0 | 573.0 | 342.0 | 209.0 | 128.0 | 100.0 | 84.0 | 71.0 |
| | | | 10 | 2570.0 | 1740.0 | 1040.0 | 603.0 | 354.0 | 207.0 | 157.0 | 129.0 | 108.0 |
| | | | 25 | 4950.0 | 3330.0 | 2020.0 | 1130.0 | 637.0 | 355.0 | 259.0 | 209.0 | 174.0 |
| | | | 50 | 7580.0 | 5090.0 | 3130.0 | 1720.0 | 945.0 | 509.0 | 364.0 | 289.0 | 242.0 |
| | | | 100 | 11100.0[c] | 7480.0 | 4680.0 | 2520.0 | 1360.0 | 712.0 | 499.0 | 391.0 | 329.0[c] |
| 07 1426 20 Rattlesnake Creek near Raymond (Rice County, 3.5 miles south of Raymond.) | 598 | 1961-80 | 2 | 349.0[b] | 326.0 | 274.0 | 202.0 | 152.0 | 114.0 | 94.0 | 85.0 | 71.0[a] |
| | | | 5 | 763.0 | 700.0 | 568.0 | 389.0 | 277.0 | 195.0 | 158.0 | 140.0 | 118.0 |
| | | | 10 | 1150.0 | 1040.0 | 779.0 | 548.0 | 332.0 | 261.0 | 212.0 | 186.0 | 156.0 |
| | | | 25 | 1760.0 | 1560.0 | 1120.0 | 792.0 | 542.0 | 362.0 | 294.0 | 255.0 | 214.0 |
| | | | 50 | 2320.0 | 2030.0 | 1420.0 | 1010.0 | 682.0 | 449.0 | 366.0 | 315.0 | 264.0 |
| | | | 100 | 2970.0[b] | 2560.0 | 1740.0 | 1250.0 | 841.0 | 549.0 | 448.0 | 383.0 | 321.0[b] |
| 07 1428 60 Cow Creek near Claflin (Barton County, at State High-way 4, 2.5 miles west of Claflin.) | 43 | 1967-80 | 2 | 415.0[b] | 213.0 | 104.0 | 56.0 | 33.0 | 18.0 | 13.0 | 11.0 | 7.5[b] |
| | | | 5 | 974.0 | 497.0 | 238.0 | 131.0 | 78.0 | 43.0 | 31.0 | 24.0 | 18.0 |
| | | | 10 | 1480.0 | 752.0 | 356.0 | 200.0 | 120.0 | 66.0 | 48.0 | 37.0 | 28.0 |
| | | | 25 | 2280.0 | 1150.0 | 537.0 | 308.0 | 188.0 | 106.0 | 77.0 | 59.0 | 46.0 |
| | | | 50 | 2980.0 | 1490.0 | 692.0 | 404.0 | 249.0 | 143.0 | 104.0 | 80.0 | 64.0 |
| | | | 100 | 3770.0[c] | 1860.0 | 862.0 | 511.0 | 319.0 | 187.0 | 137.0 | 106.0 | 85.0[c] |
| 07 1429 00 Blood Creek near Boyd (Barton County, at State High-way 4, 1.3 miles northwest of Hoisington and 11.9 miles up-stream from Cheyenne Bottoms.) | 61 | 1963-80 | 2 | 520.0[b] | 237.0 | 115.0 | 64.0 | 35.0 | 20.0 | 15.0 | 12.0 | 8.1[b] |
| | | | 5 | 1090.0 | 474.0 | 239.0 | 137.0 | 75.0 | 45.0 | 32.0 | 25.0 | 17.0 |
| | | | 10 | 1580.0 | 682.0 | 354.0 | 203.0 | 115.0 | 70.0 | 49.0 | 38.0 | 26.0 |
| | | | 25 | 2330.0 | 1010.0 | 542.0 | 310.0 | 182.0 | 114.0 | 77.0 | 60.0 | 42.0 |
| | | | 50 | 2980.0 | 1290.0 | 717.0 | 409.0 | 246.0 | 157.0 | 104.0 | 80.0 | 57.0 |
| | | | 100 | 3710.0[b] | 1620.0 | 925.0 | 524.0 | 325.0 | 210.0 | 137.0 | 106.0 | 75.0[b] |

Table 6.--Magnitude and frequency of high flows at streamflow-gaging stations having unregulated flow--Continued

| Station number, name, and location | Contributing drainage area (square miles) | Records analyzed | Recurrence interval (years) | Maximum average discharge, in cubic feet per second, for indicated period of consecutive days | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 day | 3 days | 7 days | 15 days | 30 days | 60 days | 90 days | 120 days | 183 days |
| (07 1429 00)--Continued | | 1966-80 | 2 | 540.0[b] | 247.0 | 122.0 | 66.0 | 37.0 | 21.0 | 16.0 | 13.0 | 8.9[b] |
| | | | 5 | 1160.0 | 499.0 | 255.0 | 145.0 | 80.0 | 49.0 | 35.0 | 28.0 | 19.0 |
| | | | 10 | 1700.0 | 720.0 | 378.0 | 223.0 | 124.0 | 77.0 | 54.0 | 42.0 | 29.0 |
| | | | 25 | 2530.0 | 1060.0 | 580.0 | 357.0 | 201.0 | 127.0 | 85.0 | 66.0 | 47.0 |
| | | | 50 | 3250.0 | 1370.0 | 768.0 | 489.0 | 277.0 | 177.0 | 117.0 | 90.0 | 64.0 |
| | | | 100 | 4050.0[b] | 1710.0 | 991.0 | 653.0 | 373.0 | 239.0 | 155.0 | 119.0 | 85.0[b] |
| 07 1433 00 Cow Creek near Lyons | 499 | 1939-51, | 2 | 2070.0[a] | 1570.0 | 936.0 | 518.0 | 348.0 | 209.0 | 148.0 | 134.0 | 99.0[a] |
| (Rice County, near Missouri | | 1962-80 | 5 | 4440.0 | 3430.0 | 1970.0 | 1160.0 | 701.0 | 417.0 | 318.0 | 263.0 | 196.0 |
| Pacific Railroad bridge, 500 | | | 10 | 6230.0 | 4810.0 | 2700.0 | 1730.0 | 947.0 | 566.0 | 475.0 | 358.0 | 272.0 |
| feet downstream from Little Cow | | | 25 | 8590.0 | 6570.0 | 3600.0 | 2610.0 | 1250.0 | 757.0 | 733.0 | 483.0 | 378.0 |
| Creek and 3.0 miles south of | | | 50 | 10300.0 | 7840.0 | 4230.0 | 3360.0 | 1450.0 | 895.0 | 970.0 | 575.0 | 463.0 |
| Lyons.) | | | 100 | 12000.0[b] | 9030.0 | 4800.0 | 4210.0 | 1650.0 | 1030.0 | 1250.0 | 666.0 | 551.0[b] |
| 07 1436 00 Little Arkansas River near Little River | 71 | 1960-71 | 2 | 643.0[a] | 309.0 | 158.0 | 81.0 | 46.0 | 28.0 | 21.0 | 17.0 | 13.0[b] |
| (Rice County, 1 mile north- | | | 5 | 940.0 | 445.0 | 232.0 | 127.0 | 78.0 | 50.0 | 38.0 | 33.0 | 24.0 |
| west of Little River.) | | | 10 | 1080.0 | 517.0 | 270.0 | 153.0 | 98.0 | 64.0 | 50.0 | 44.0 | 32.0 |
| | | | 25 | 1210.0 | 591.0 | 307.0 | 180.0 | 122.0 | 81.0 | 64.0 | 57.0 | 42.0 |
| | | | 50 | 1270.0 | 635.0 | 328.0 | 196.0 | 137.0 | 93.0 | 75.0 | 67.0 | 49.0 |
| | | | 100 | 1320.0[b] | 673.0 | 345.0 | 210.0 | 151.0 | 103.0 | 84.0 | 76.0 | 56.0[b] |
| 07 1442 00 Little Arkansas River at Valley Center | 1,250 | 1923-80 | 2 | 4600.0[a] | 4260.0 | 2850.0 | 1700.0 | 1050.0 | 651.0 | 502.0 | 423.0 | 326.0[a] |
| (Sedgwick County, 0.5 mile west | | | 5 | 11900.0 | 9120.0 | 6210.0 | 3810.0 | 2460.0 | 1530.0 | 1160.0 | 964.0 | 723.0 |
| of Valley Center.) | | | 10 | 18700.0 | 12300.0 | 8430.0 | 5310.0 | 3560.0 | 2240.0 | 1700.0 | 1400.0 | 1040.0 |
| | | | 25 | 29800.0 | 15800.0 | 10900.0 | 7130.0 | 5000.0 | 3200.0 | 2430.0 | 1990.0 | 1480.0 |
| | | | 50 | 40000.0 | 18000.0 | 12500.0 | 8360.0 | 6060.0 | 3940.0 | 2990.0 | 2440.0 | 1820.0 |
| | | | 100 | 51900.0[b] | 19900.0 | 13800.0 | 9470.0 | 7080.0 | 4670.0 | 3560.0 | 2900.0 | 2170.0[b] |
| 07 1447 80 North Fork Ninnescah River above Cheney Reservoir | 550 | 1966-80 | 2 | 2910.0[b] | 1890.0 | 1110.0 | 693.0 | 455.0 | 297.0 | 243.0 | 215.0 | 180.0[a] |
| | | | 5 | 9090.0 | 5010.0 | 2650.0 | 1490.0 | 912.0 | 543.0 | 426.0 | 370.0 | 299.0 |
| | | | 10 | 15700.0 | 7960.0 | 4010.0 | 2140.0 | 1270.0 | 728.0 | 557.0 | 481.0 | 382.0 |
| (Reno County, at State High- | | | 25 | 27300.0 | 12600.0 | 6030.0 | 3040.0 | 1770.0 | 978.0 | 731.0 | 626.0 | 489.0 |
| way 17, 12 miles south of | | | 50 | 38300.0 | 16600.0 | 7730.0 | 3760.0 | 2160.0 | 1170.0 | 863.0 | 735.0 | 570.0 |
| Hutchinson and 12.5 miles up- | | | 100 | 51300.0[c] | 21100.0 | 9550.0 | 4500.0 | 2570.0 | 1370.0 | 997.0 | 845.0 | 651.0[b] |
| stream from Cheney Dam.) | | | | | | | | | | | | |
| 07 1448 50 South Fork South Fork Ninnescah River near Pratt | 21 | 1962-80 | 2 | 175.0[b] | 79.0 | 37.0 | 19.0 | 11.0 | 5.7 | 4.6 | 3.6 | 2.7[b] |
| | | | 5 | 532.0 | 256.0 | 125.0 | 72.0 | 43.0 | 22.0 | 14.0 | 11.0 | 6.7 |
| | | | 10 | 876.0 | 435.0 | 216.0 | 133.0 | 82.0 | 41.0 | 24.0 | 19.0 | 11.0 |
| (Pratt County, 6.0 miles south- | | | 25 | 1410.0 | 716.0 | 365.0 | 240.0 | 155.0 | 76.0 | 40.0 | 31.0 | 17.0 |
| west of Pratt.) | | | 50 | 1850.0 | 956.0 | 495.0 | 341.0 | 228.0 | 111.0 | 55.0 | 42.0 | 23.0 |
| | | | 100 | 2320.0[c] | 1210.0 | 637.0 | 459.0 | 316.0 | 153.0 | 73.0 | 56.0 | 30.0[b] |

Table 6.--Magnitude and frequency of high flows at streamflow-gaging stations having unregulated flow--Continued

| Station number, name, and location | Contri-buting-drain-age area (square miles) | Records analy-zed | Recur-rence interval (years) | Maximum average discharge, in cubic feet per second, for indicated period of consecutive days | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 day | 3 days | 7 days | 15 days | 30 days | 60 days | 90 days | 120 days | 183 days |
| 07 1452 00 South Fork Ninnescah | 543 | 1951-59 | 2 | 3520.0[a] | 2120.0 | 1230.0 | 783.0 | 540.0 | 383.0 | 317.0 | 288.0 | 246.0[a] |
| River near Murdock | | 1965-80 | 5 | 7860.0 | 4630.0 | 2590.0 | 1530.0 | 962.0 | 653.0 | 513.0 | 452.0 | 366.0 |
| (Kingman County, 4.0 miles south- | | | 10 | 11800.0 | 6990.0 | 3860.0 | 2190.0 | 1310.0 | 881.0 | 672.0 | 583.0 | 458.0 |
| east of Murdock.) | | | 25 | 18100.0 | 10900.0 | 5940.0 | 3240.0 | 1830.0 | 1230.0 | 909.0 | 773.0 | 589.0 |
| | | | 50 | 23800.0 | 14500.0 | 7890.0 | 4190.0 | 2280.0 | 1540.0 | 1110.0 | 936.0 | 698.0 |
| | | | 100 | 30300.0[b] | 18800.0 | 10200.0 | 5300.0 | 2780.0 | 1890.0 | 1340.0 | 1120.0 | 817.0[a] |
| 07 1457 00 Slate Creek at Welling- | 154 | 1970-80 | 2 | 2850.0[b] | 1710.0 | 918.0 | 472.0 | 285.0 | 166.0 | 124.0 | 104.0 | 81.0[a] |
| ton | | | 5 | 5080.0 | 3110.0 | 1650.0 | 813.0 | 505.0 | 290.0 | 210.0 | 184.0 | 132.0 |
| (Sumner County, at U.S. Highway | | | 10 | 6560.0 | 4010.0 | 2140.0 | 1040.0 | 655.0 | 376.0 | 269.0 | 240.0 | 166.0 |
| 81, at southern edge of Welling- | | | 25 | 8330.0 | 5040.0 | 2730.0 | 1310.0 | 842.0 | 484.0 | 343.0 | 310.0 | 208.0 |
| ton.) | | | 50 | 9560.0 | 5730.0 | 3140.0 | 1500.0 | 977.0 | 563.0 | 396.0 | 362.0 | 237.0 |
| | | | 100 | 10700.0[b] | 6340.0 | 3520.0 | 1680.0 | 1110.0 | 640.0 | 447.0 | 413.0 | 266.0[b] |
| 07 1465 70 Cole Creek near DeGraff | 30 | 1962-80 | 2 | 996.0[b] | 497.0 | 260.0 | 145.0 | 89.0 | 52.0 | 40.0 | 35.0 | 25.0[a] |
| (Butler County, 5.0 miles south- | | | 5 | 2010.0 | 933.0 | 482.0 | 269.0 | 163.0 | 94.0 | 71.0 | 61.0 | 43.0 |
| east of DeGraff.) | | | 10 | 2710.0 | 1190.0 | 613.0 | 340.0 | 205.0 | 118.0 | 90.0 | 76.0 | 53.0 |
| | | | 25 | 3560.0 | 1470.0 | 749.0 | 413.0 | 247.0 | 142.0 | 109.0 | 91.0 | 64.0 |
| | | | 50 | 4150.0 | 1640.0 | 831.0 | 456.0 | 272.0 | 156.0 | 121.0 | 100.0 | 70.0 |
| | | | 100 | 4700.0[b] | 1780.0 | 898.0 | 491.0 | 291.0 | 168.0 | 131.0 | 108.0 | 76.0[b] |
| 07 1470 70 Whitewater River at Towanda | 426 | 1962-80 | 2 | 6790.0[b] | 4480.0 | 2390.0 | 1360.0 | 886.0 | 544.0 | 429.0 | 364.0 | 264.0[a] |
| (Butler County, at State Highway | | | 5 | 13400.0 | 8460.0 | 4430.0 | 2520.0 | 1690.0 | 1050.0 | 783.0 | 679.0 | 478.0 |
| 254, 0.5 mile west of Towanda and | | | 10 | 17700.0 | 10900.0 | 5640.0 | 3220.0 | 2200.0 | 1370.0 | 1000.0 | 884.0 | 619.0 |
| 2.4 miles downstream from West | | | 25 | 22500.0 | 13400.0 | 6930.0 | 3970.0 | 2770.0 | 1750.0 | 1250.0 | 1120.0 | 788.0 |
| Branch.) | | | 50 | 25700.0 | 14900.0 | 7700.0 | 4430.0 | 3130.0 | 2010.0 | 1400.0 | 1280.0 | 904.0 |
| | | | 100 | 28400.0[b] | 16200.0 | 8340.0 | 4820.0 | 3440.0 | 2230.0 | 1530.0 | 1430.0 | 1010.0[b] |
| 07 1478 00 Walnut River at Winfield | 1,872 | 1923-80 | 2 | 19700.0[a] | 14900.0 | 8790.0 | 5250.0 | 3320.0 | 2100.0 | 1620.0 | 1340.0 | 1030.0[a] |
| (Cowley County, at U.S. Highway | | | 5 | 36700.0 | 29300.0 | 17800.0 | 10600.0 | 6760.0 | 4240.0 | 3250.0 | 2700.0 | 2080.0 |
| 77, 1.0 mile south of Winfield.) | | | 10 | 46300.0 | 37800.0 | 23300.0 | 13900.0 | 8960.0 | 5630.0 | 4300.0 | 3580.0 | 2780.0 |
| | | | 25 | 55700.0 | 46500.0 | 29200.0 | 17300.0 | 11400.0 | 7200.0 | 5500.0 | 4530.0 | 3570.0 |
| | | | 50 | 61100.0 | 51500.0 | 32700.0 | 19300.0 | 12900.0 | 8200.0 | 6270.0 | 5230.0 | 4090.0 |
| | | | 100 | 65200.0[b] | 55500.0 | 35600.0 | 20900.0 | 14200.0 | 9070.0 | 6940.0 | 5790.0 | 4550.0[b] |
| 07 1490 00 Medicine Lodge River near | 903 | 1939-50, | 2 | 2760.0[a] | 1670.0 | 945.0 | 587.0 | 378.0 | 260.0 | 210.0 | 186.0 | 157.0[a] |
| Kiowa | | 1955, | 5 | 5130.0 | 3220.0 | 1820.0 | 1100.0 | 702.0 | 473.0 | 363.0 | 310.0 | 256.0 |
| (Barber County, at State High- | | 1960-80 | 10 | 6800.0 | 4340.0 | 2500.0 | 1530.0 | 996.0 | 662.0 | 496.0 | 416.0 | 338.0 |
| way 14, 200 feet downstream from | | | 25 | 8930.0 | 5790.0 | 3460.0 | 2140.0 | 1470.0 | 965.0 | 703.0 | 579.0 | 465.0 |
| the Atchison, Topeka and Santa | | | 50 | 10500.0 | 6870.0 | 4220.0 | 2660.0 | 1920.0 | 1240.0 | 891.0 | 725.0 | 578.0 |
| Fe Railway Co. bridge and 1.5 | | | 100 | 12000.0[b] | 7930.0 | 5020.0 | 3230.0 | 2450.0 | 1570.0 | 1110.0 | 893.0 | 709.0[a] |
| miles northeast of Kiowa.) | | | | | | | | | | | | |

Table 6.--Magnitude and frequency of high flows at streamflow-gaging stations having unregulated flow--Continued

| Station number, name, and location | Contributing drainage area (square miles) | Records analyzed | Recurrence interval (years) | Maximum average discharge, in cubic feet per second, for indicated period of consecutive days | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 day | 3 days | 7 days | 15 days | 30 days | 60 days | 90 days | 120 days | 183 days |
| 07 1515 00 Chikaskia River near Corbin | 794 | 1951-65, | 2 | 5280.0[b] | 3140.0 | 1800.0 | 1080.0 | 685.0 | 430.0 | 351.0 | 307.0 | 250.0[a] |
| (Sumner County, at State Highway | | 1976-80 | 5 | 11600.0 | 6750.0 | 3690.0 | 2160.0 | 1370.0 | 920.0 | 710.0 | 599.0 | 470.0 |
| 49, 1 mile upstream from Prairie | | | 10 | 18200.0 | 10100.0 | 5350.0 | 3080.0 | 1960.0 | 1400.0 | 1050.0 | 860.0 | 662.0 |
| Creek and 3 miles west of | | | 25 | 28800.0 | 15400.0 | 7930.0 | 4480.0 | 2880.0 | 2220.0 | 1610.0 | 1230.0 | 963.0 |
| Corbin.) | | | 50 | 38900.0 | 20200.0 | 10200.0 | 5680.0 | 3690.0 | 3030.0 | 2140.0 | 1660.0 | 1230.0 |
| | | | 100 | 51000.0[b] | 25800.0 | 12800.0 | 7010.0 | 4620.0 | 4020.0 | 2790.0 | 2110.0 | 1550.0[b] |
| 07 1562 20 Bear Creek near Johnson | 835 | 1967-80 | 2 | 232.0[c] | 103.0 | 45.0 | 22.0 | 12.0 | 6.4 | 4.4 | 3.4 | 2.3[c] |
| (Stanton County, at U.S. Highway | | | 5 | 1140.0 | 603.0 | 258.0 | 125.0 | 71.0 | 40.0 | 27.0 | 21.0 | 14.0 |
| 270, 3.5 miles north of Johnson.) | | | 10 | 2450.0 | 1410.0 | 610.0 | 293.0 | 172.0 | 100.0 | 67.0 | 52.0 | 34.0 |
| | | | 25 | 5190.0 | 3280.0 | 1450.0 | 692.0 | 424.0 | 255.0 | 171.0 | 132.0 | 86.0 |
| | | | 50 | 8280.0 | 5570.0 | 2530.0 | 1200.0 | 755.0 | 463.0 | 312.0 | 241.0 | 158.0 |
| | | | 100 | 12500.0[c] | 8910.0 | 4150.0 | 1960.0 | 1270.0 | 812.0 | 540.0 | 417.0 | 276.0[c] |
| 07 1569 00 Cimarron River near Forgan, Oklahoma | 4,220 | 1966-80 | 2 | 1120.0[b] | 659.0 | 397.0 | 250.0 | 179.0 | 134.0 | 118.0 | 110.0 | 97.0[a] |
| (Meade County, Kansas, at State | | | 5 | 3020.0 | 1710.0 | 937.0 | 532.0 | 333.0 | 222.0 | 178.0 | 157.0 | 129.0 |
| Highway 23, 0.8 mile north of | | | 10 | 5110.0 | 2900.0 | 1520.0 | 816.0 | 476.0 | 297.0 | 227.0 | 192.0 | 153.0 |
| Oklahoma-Kansas State line and | | | 25 | 9010.0 | 5200.0 | 2600.0 | 1320.0 | 714.0 | 416.0 | 300.0 | 243.0 | 185.0 |
| 7.8 miles north of Forgan.) | | | 50 | 13000.0 | 7670.0 | 3740.0 | 1840.0 | 941.0 | 523.0 | 363.0 | 295.0 | 211.0 |
| | | | 100 | 18200.0[c] | 11000.0 | 5240.0 | 2490.0 | 1220.0 | 649.0 | 434.0 | 331.0 | 238.0[a] |
| 07 1575 00 Crooked Creek near Nye | 813 | 1943-80 | 2 | 586.0[b] | 342.0 | 220.0 | 140.0 | 89.0 | 60.0 | 49.0 | 43.0 | 36.0[a] |
| (Meade County, 11.5 miles west | | | 5 | 1850.0 | 1090.0 | 708.0 | 430.0 | 256.0 | 166.0 | 127.0 | 105.0 | 81.0 |
| of Englewood.) | | | 10 | 3480.0 | 2090.0 | 1370.0 | 816.0 | 475.0 | 305.0 | 224.0 | 178.0 | 133.0 |
| | | | 25 | 6980.0 | 4340.0 | 2860.0 | 1690.0 | 968.0 | 618.0 | 433.0 | 332.0 | 236.0 |
| | | | 50 | 11100.0 | 7090.0 | 4700.0 | 2760.0 | 1580.0 | 1010.0 | 682.0 | 510.0 | 353.0 |
| | | | 100 | 16900.0[b] | 11200.0 | 7450.0 | 4370.0 | 2500.0 | 1600.0 | 1050.0 | 765.0 | 516.0[b] |
| | | 1966-80 | 2 | 340.0[b] | 213.0 | 144.0 | 96.0 | 62.0 | 41.0 | 35.0 | 31.0 | 27.0[a] |
| | | | 5 | 846.0 | 549.0 | 370.0 | 235.0 | 143.0 | 89.0 | 71.0 | 61.0 | 49.0 |
| | | | 10 | 1390.0 | 933.0 | 633.0 | 396.0 | 234.0 | 141.0 | 109.0 | 90.0 | 71.0 |
| | | | 25 | 2410.0 | 1690.0 | 1160.0 | 725.0 | 418.0 | 241.0 | 178.0 | 143.0 | 110.0 |
| | | | 50 | 3470.0 | 2510.0 | 1760.0 | 1100.0 | 625.0 | 349.0 | 250.0 | 198.0 | 149.0 |
| | | | 100 | 4840.0[c] | 3630.0 | 2580.0 | 1620.0 | 915.0 | 495.0 | 346.0 | 268.0 | 199.0[b] |
| 07 1579 00 Cavalry Creek at Coldwater | 39 | 1967-81 | 2 | 144.0[b] | 61.0 | 30.0 | 17.0 | 10.0 | 6.6 | 4.8 | 4.2 | 3.6[b] |
| (Comanche County, 1.0 mile | | | 5 | 469.0 | 208.0 | 102.0 | 55.0 | 31.0 | 17.0 | 13.0 | 10.0 | 7.8 |
| west of Coldwater.) | | | 10 | 869.0 | 398.0 | 196.0 | 105.0 | 56.0 | 29.0 | 21.0 | 16.0 | 12.0 |
| | | | 25 | 1680.0 | 802.0 | 399.0 | 212.0 | 109.0 | 53.0 | 38.0 | 28.0 | 20.0 |
| | | | 50 | 2560.0 | 1260.0 | 638.0 | 337.0 | 169.0 | 80.0 | 56.0 | 40.0 | 27.0 |
| | | | 100 | 3750.0[c] | 1910.0 | 977.0 | 514.0 | 254.0 | 116.0 | 80.0 | 55.0 | 37.0[b] |

Table 6.--Magnitude and frequency of high flows at streamflow-gaging stations having unregulated flow--Continued

| Station number, name, and location | Contributing drainage area (square miles) | Records analyzed | Recurrence interval (years) | Maximum average discharge, in cubic feet per second, for indicated period of consecutive days | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 day | 3 days | 7 days | 15 days | 30 days | 60 days | 90 days | 120 days | 183 days |
| 07 1657 00 Verdigris River near | 181 | 1956-76 | 2 | 4090.0[b] | 2340.0 | 1370.0 | 777.0 | 466.0 | 285.0 | 240.0 | 208.0 | 166.0[b] |
| Madison | | | 5 | 8260.0 | 4630.0 | 2660.0 | 1490.0 | 892.0 | 563.0 | 481.0 | 429.0 | 334.0 |
| (Greenwood County, at State High- | | | 10 | 10800.0 | 5980.0 | 3380.0 | 1880.0 | 1130.0 | 720.0 | 618.0 | 556.0 | 430.0 |
| way 57, 1.5 miles east of Madison | | | 25 | 13600.0 | 7340.0 | 4070.0 | 2250.0 | 1350.0 | 871.0 | 750.0 | 681.0 | 523.0 |
| and 3.0 miles upstream from | | | 50 | 15300.0 | 8130.0 | 4440.0 | 2460.0 | 1470.0 | 934.0 | 824.0 | 749.0 | 574.0 |
| Halderman Creek.) | | | 100 | 16700.0[b] | 8760.0 | 4730.0 | 2610.0 | 1570.0 | 1020.0 | 879.0 | 802.0 | 613.0[b] |
| 07 1670 00 Fall River near Eureka | 307 | 1947-76 | 2 | 5970.0[b] | 3230.0 | 1840.0 | 1100.0 | 721.0 | 465.0 | 380.0 | 322.0 | 246.0[b] |
| (Greenwood County, at State High- | | | 5 | 14300.0 | 7340.0 | 4100.0 | 2410.0 | 1620.0 | 1040.0 | 853.0 | 732.0 | 571.0 |
| way 99, 3.0 miles southeast of | | | 10 | 19500.0 | 9800.0 | 5480.0 | 3210.0 | 2200.0 | 1420.0 | 1150.0 | 994.0 | 781.0 |
| Eureka and 5.0 miles downstream | | | 25 | 24700.0 | 12200.0 | 6890.0 | 4030.0 | 2800.0 | 1820.0 | 1470.0 | 1270.0 | 1010.0 |
| from Spring Creek.) | | | 50 | 27600.0 | 13600.0 | 7680.0 | 4500.0 | 3160.0 | 2070.0 | 1660.0 | 1440.0 | 1140.0 |
| | | | 100 | 29800.0[c] | 14600.0 | 8300.0 | 4860.0 | 3450.0 | 2260.0 | 1800.0 | 1570.0 | 1250.0[b] |
| 07 1675 00 Otter Creek at Climax | 129 | 1947-80 | 2 | 3100.0[b] | 1520.0 | 838.0 | 513.0 | 321.0 | 203.0 | 159.0 | 133.0 | 102.0[b] |
| (Greenwood County, at State High- | | | 5 | 7660.0 | 3630.0 | 1970.0 | 1210.0 | 774.0 | 492.0 | 390.0 | 337.0 | 261.0 |
| way 99, 0.5 mile south of Climax | | | 10 | 10900.0 | 5060.0 | 2710.0 | 1660.0 | 1070.0 | 678.0 | 541.0 | 470.0 | 368.0 |
| and 5.5 miles downstream from | | | 25 | 14500.0 | 6650.0 | 3520.0 | 2130.0 | 1390.0 | 873.0 | 702.0 | 610.0 | 482.0 |
| South Branch.) | | | 50 | 16900.0 | 7620.0 | 4010.0 | 2410.0 | 1590.0 | 986.0 | 796.0 | 690.0 | 548.0 |
| | | | 100 | 18800.0[b] | 8430.0 | 4400.0 | 2630.0 | 1740.0 | 1070.0 | 870.0 | 752.0 | 601.0[c] |
| 07 1698 00 Elk River at Elk Falls | 220 | 1968-80 | 2 | 7880.0[b] | 4400.0 | 2400.0 | 1280.0 | 783.0 | 490.0 | 385.0 | 320.0 | 236.0[a] |
| (Elk County, at U.S. Highway 60 | | | 5 | 15300.0 | 7890.0 | 4160.0 | 2140.0 | 1280.0 | 780.0 | 621.0 | 528.0 | 393.0 |
| in Elk Falls, 2 miles upstream | | | 10 | 20900.0 | 10300.0 | 5300.0 | 2680.0 | 1590.0 | 951.0 | 761.0 | 654.0 | 492.0 |
| from Wildcat Creek.) | | | 25 | 28500.0 | 13200.0 | 6630.0 | 3300.0 | 1920.0 | 1140.0 | 915.0 | 794.0 | 608.0 |
| | | | 50 | 34400.0 | 15300.0 | 7540.0 | 3720.0 | 2140.0 | 1260.0 | 1010.0 | 886.0 | 687.0 |
| | | | 100 | 40500.0[b] | 17300.0 | 8370.0 | 4090.0 | 2320.0 | 1360.0 | 1100.0 | 966.0 | 759.0[b] |
| 07 1700 00 Elk River near Elk City | 575 | 1939-69 | 2 | 9820.0[b] | 6060.0 | 3320.0 | 1970.0 | 1240.0 | 780.0 | 618.0 | 514.0 | 399.0[b] |
| (Montgomery County, 150 feet down- | | | 5 | 22100.0 | 14100.0 | 7760.0 | 4620.0 | 2920.0 | 1850.0 | 1410.0 | 1160.0 | 917.0 |
| stream from Salt Creek and 1.8 miles | | | 10 | 30900.0 | 19800.0 | 11100.0 | 6600.0 | 4210.0 | 2670.0 | 1970.0 | 1600.0 | 1280.0 |
| south of Elk City.) | | | 25 | 41400.0 | 26800.0 | 15200.0 | 9080.0 | 5860.0 | 3710.0 | 2650.0 | 2120.0 | 1700.0 |
| | | | 50 | 48600.0 | 31500.0 | 18000.0 | 10800.0 | 7050.0 | 4450.0 | 3100.0 | 2460.0 | 1980.0 |
| | | | 100 | 55000.0[b] | 35700.0 | 20700.0 | 12400.0 | 8170.0 | 5140.0 | 3510.0 | 2750.0 | 2210.0[b] |
| 07 1720 00 Caney River near Elgin | 445 | 1940-80 | 2 | 8800.0[a] | 4850.0 | 2800.0 | 1690.0 | 1080.0 | 689.0 | 528.0 | 444.0 | 343.0[a] |
| (Chautauqua County, 2 miles west | | | 5 | 17900.0 | 9700.0 | 5540.0 | 3350.0 | 2180.0 | 1410.0 | 1080.0 | 907.0 | 712.0 |
| of Elgin.) | | | 10 | 23900.0 | 12700.0 | 7240.0 | 4370.0 | 2870.0 | 1870.0 | 1420.0 | 1200.0 | 944.0 |
| | | | 25 | 30500.0 | 15800.0 | 9060.0 | 5470.0 | 3620.0 | 2370.0 | 1790.0 | 1510.0 | 1200.0 |
| | | | 50 | 34800.0 | 17700.0 | 10200.0 | 6130.0 | 4080.0 | 2680.0 | 2020.0 | 1700.0 | 1350.0 |
| | | | 100 | 38400.0[b] | 19300.0 | 11100.0 | 6670.0 | 4460.0 | 2940.0 | 2200.0 | 1860.0 | 1470.0[b] |

Table 6.--Magnitude and frequency of high flows at streamflow-gaging stations having unregulated flow--Continued

| Station number, name, and location | Contri- buting- drain- age area (square miles) | Records analy- zed | Recur- rence interval (years) | Maximum average discharge, in cubic feet per second, for indicated period of consecutive days | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 day | 3 days | 7 days | 15 days | 30 days | 60 days | 90 days | 120 days | 183 days |
| 07 1805 00 Cedar Creek near Cedar Point | 110 | 1939-80 | 2 | 2560.0[a] | 1160.0 | 617.0 | 357.0 | 223.0 | 145.0 | 116.0 | 100.0 | 76.0[a] |
| (Chase County, 4.0 miles south of Cedar Point.) | | | 5 | 4930.0 | 2180.0 | 1210.0 | 719.0 | 457.0 | 289.0 | 230.0 | 199.0 | 148.0 |
| | | | 10 | 6320.0 | 2770.0 | 1570.0 | 933.0 | 595.0 | 372.0 | 295.0 | 254.0 | 188.0 |
| | | | 25 | 7780.0 | 3340.0 | 1920.0 | 1150.0 | 737.0 | 455.0 | 361.0 | 308.0 | 226.0 |
| | | | 50 | 8630.0 | 3670.0 | 2130.0 | 1280.0 | 818.0 | 501.0 | 398.0 | 338.0 | 246.0 |
| | | | 100 | 9320.0[b] | 3920.0 | 2300.0 | 1380.0 | 882.0 | 537.0 | 427.0 | 360.0 | 262.0[b] |
| 07 1815 00 Middle Creek near Elmdale | 92 | 1939-50 | 2 | 2490.0[b] | 1170.0 | 630.0 | 381.0 | 233.0 | 143.0 | 106.0 | 90.0 | 69.0[b] |
| (Chase County, 4 miles northwest of Elmdale.) | | | 5 | 5150.0 | 2310.0 | 1280.0 | 782.0 | 488.0 | 288.0 | 210.0 | 174.0 | 131.0 |
| | | | 10 | 6830.0 | 3000.0 | 1690.0 | 1030.0 | 657.0 | 381.0 | 276.0 | 225.0 | 167.0 |
| | | | 25 | 8650.0 | 3750.0 | 2120.0 | 1300.0 | 649.0 | 486.0 | 349.0 | 279.0 | 206.0 |
| | | | 50 | 9760.0 | 4190.0 | 2390.0 | 1470.0 | 972.0 | 553.0 | 396.0 | 311.0 | 229.0 |
| | | | 100 | 10700.0[c] | 4560.0 | 2610.0 | 1610.0 | 1080.0 | 610.0 | 435.0 | 338.0 | 248.0[c] |
| 07 1831 00 Owl Creek near Piqua | 177 | 1960-70 | 2 | 4990.0[b] | 2810.0 | 1470.0 | 857.0 | 481.0 | 275.0 | 227.0 | 194.0 | 148.0[b] |
| (Woodson County, 5.4 miles southwest of Piqua.) | | | 5 | 9410.0 | 5170.0 | 2670.0 | 1500.0 | 873.0 | 505.0 | 439.0 | 378.0 | 293.0 |
| | | | 10 | 12300.0 | 6660.0 | 3400.0 | 1870.0 | 1120.0 | 651.0 | 578.0 | 496.0 | 390.0 |
| | | | 25 | 15500.0 | 8340.0 | 4180.0 | 2270.0 | 1380.0 | 814.0 | 738.0 | 631.0 | 502.0 |
| | | | 50 | 17700.0 | 9430.0 | 4660.0 | 2510.0 | 1550.0 | 920.0 | 844.0 | 717.0 | 576.0 |
| | | | 100 | 19600.0[c] | 10400.0 | 5070.0 | 2720.0 | 1700.0 | 1010.0 | 937.0 | 792.0 | 641.0[c] |
| 07 1840 00 Lightning Creek near McCune | 197 | 1939-46, 1960-80 | 2 | 5040.0[a] | 3350.0 | 1790.0 | 1020.0 | 635.0 | 400.0 | 314.0 | 259.0 | 200.0[a] |
| (Cherokee County, 5.0 miles south of McCune and 13.0 miles southwest of Parsons.) | | | 5 | 9100.0 | 5810.0 | 3160.0 | 1780.0 | 1100.0 | 688.0 | 522.0 | 442.0 | 347.0 |
| | | | 10 | 12000.0 | 7430.0 | 4030.0 | 2290.0 | 1400.0 | 881.0 | 650.0 | 559.0 | 441.0 |
| | | | 25 | 15800.0 | 9380.0 | 5200.0 | 2910.0 | 1760.0 | 1120.0 | 795.0 | 697.0 | 553.0 |
| | | | 50 | 18600.0 | 10700.0 | 5990.0 | 3350.0 | 2000.0 | 1280.0 | 890.0 | 791.0 | 629.0 |
| | | | 100 | 21400.0[b] | 12000.0 | 6740.0 | 3770.0 | 2230.0 | 1440.0 | 976.0 | 878.0 | 699.0[b] |

[a] Approximate standard error less than 20 percent.

[b] Approximate standard error 20 to 50 percent.

[c] Approximate standard error larger than 50 percent.