MAGNITUDE AND FREQUENCY OF FLOODS IN NEBRASKA

U.S. GEOLOGICAL SURVEY

Water-Resources Investigations 76-109

Prepared in cooperation with the

Nebraska Department of Roads

BIBLIOGRAPHIC DATA SHEET	1. Report No.	2.	3. Recipient's Accession No.
4. Title and Subtitle MAGNITUDE AND FREQUENCY OF FLOODS IN NEBRASKA			5. Report Date October 1976
			6.
7. Author(s) Emil W. Beckman			8. Performing Organization Rept. No. WRI 76-109
9. Performing Organization Name and Address U.S. Geological Survey Room 406, Federal Bldg. and U.S. Courthouse 100 Centennial Mall North Lincoln, Nebraska 68508			10. Project/Task/Work Unit No.
			11. Contract/Grant No.
12. Sponsoring Organization Name and Address Nebraska Department of Roads P.O. Box 94759 State Capitol Lincoln, Nebraska 68509			13. Type of Report & Period Covered Interim
			14.

15. Supplementary Notes Supersedes "Floods in Nebraska, Magnitude and Frequency," by Furness, 1955; Beckman and Hutchison, 1962; and the Nebraska portion of Water-Supply Papers 1679 and 1680, by Patterson and Matthai, respectively.

16. Abstracts

Estimates of flood characteristics with recurrence intervals up to 100 years can be obtained at most sites in Nebraska. Instructions and methods are presented to aid in estimating the magnitude and frequency of flood peaks. Five hydrologic regions are defined in Nebraska for estimating flood peaks on natural streams. Diagrams are presented for estimating flood characteristics on major controlled streams: North Platte, South Platte, Platte, and Republican Rivers. Observed maximum flood peaks at 303 gaging stations, 57 short-term stations, and 31 miscellaneous sites are compared to maximum observed floods in the United States.

17. Key Words and Document Analysis. 17a. Descriptors

*Floods, *Flood magnitude and frequency, *Maximum known floods, *Flood frequency analysis, *Regional flood equations, Drainage area, Channel length, Channel slope, Mean annual precipitation.

17b. Identifiers/Open-Ended Terms

*Nebraska, *Natural streams, *Controlled streams, *Sandhills, *Nonsandhills, Soil type, Hydrologic regions, Log-Pearson Type III, Stream basins, Recurrence interval.

17c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
No restriction on distribution	UNCLASSIFIED	134
	20. Security Class (This Page) UNCLASSIFIED	22. Price

MAGNITUDE AND FREQUENCY OF FLOODS IN NEBRASKA

By Emil W. Beckman

U.S. GEOLOGICAL SURVEY

Water-Resources Investigations 76-109

Prepared in cooperation with the

Nebraska Department of Roads

October 1976

UNITED STATES DEPARTMENT OF THE INTERIOR

Thomas S. Kleppe, Secretary

GEOLOGICAL SURVEY

V. E. McKelvey, Director

For additional information write to:

U.S. Geological Survey
Room 406, Federal Bldg. and U.S. Courthouse
100 Centennial Mall North
Lincoln, Nebraska 68508

CONTENTS

ILLUSTRATIONS

CONTENTS

CONTENTS

TABLES

MAGNITUDE AND FREQUENCY OF FLOODS IN NEBRASKA

By

Emil W. Beckman

ABSTRACT

Estimates of flood characteristics with recurrence intervals up to 100 years can be obtained at most sites in Nebraska by use of techniques presented in this report. Instructions, equations, and graphs are presented to aid the design engineer in estimating the magnitude and frequency of floods.

For natural-flow streams, the estimating equations and graphical solutions are based on regional relations between floods of a specific return period and selected basin characteristics. Nebraska was subdivided into five hydrologic regions by means of regressions and residuals from the regressions. The boundaries of Regions 1 and 2 were determined to a great extent by differences in soil type. The divisions between Region 2 and Region 4 were also determined by differences in soil type. Boundaries of Region 3 and Region 5 are along or near basin divides.

Flood magnitude and frequency solution diagrams are presented for major controlled streams such as the North Platte, South Platte, Platte, and Republican Rivers. Flood information on small controlled streams is limited to available station data.

Flood characteristics are tabulated for 303 gaging stations having 13 or more years of record. These flood characteristics provide the best information on floods at these gaged sites.

Observed maximum flood peaks at 303 gaging stations with 13 or more years of record and significant peaks at 57 short-term stations and 31 miscellaneous sites are useful in designing flood-control works for maximum safety from flood damage. Comparison is made with maximum observed floods in the United States.

INTRODUCTION

Knowledge of flood characteristics is essential for designing culverts, bridges, and drainage systems; for planning use of flood-prone lands; and for establishing flood-insurance rates. Only through reliable estimates of the magnitude of flooding and the related frequency of occurrence is it possible to make optimum designs, prepare realistic zoning ordinances, and establish equitable flood-insurance rates.

Purpose and Scope

The purposes of this report are (1) to describe and illustrate a method for estimating the magnitude of floods of assumed recurrence intervals up to 100 years for natural-flow streams in the State of Nebraska, and (2) to present diagrams by which the magnitude of floods of recurrence intervals up to 100 years can be estimated for the currently controlled conditions on the North Platte, South Platte, Platte, and Republican Rivers in Nebraska. Other regulated streams do not have sufficient record to develop reliable flood magnitude and frequency diagrams. Station data collected for these regulated streams are shown in tables 1, 2, and 3 and may be of some value should frequency data be needed.

This report also presents information on maximum known floods which should be useful in designing structures which must withstand exposure to outstanding floods.

The scope of the study is limited to peak flows and does not consider the shape or volume of the flood hydrograph. When flood elevations, profiles, and velocities are needed, hydraulic studies must be made for the particular site or reach of stream.

The equations and graphical-solution diagrams given in this report for the five hydrologic flood regions are applicable to any size natural drainage area greater than 0.1 mi^2 (0.259 km^2) contributing drainage area except in Region 2 where the lower-limiting contributing drainage area is 10 mi^2 (25.90 km^2).

Flood magnitude and frequency relations herein presented are based on a greater amount of data which have been analyzed by more rigorous techniques than those in earlier studies by Furness (1955), Beckman and Hutchison (1962), Patterson (1966), and Matthai (1968). The relationships in this report are considered the most reliable for estimating flood magnitudes for design purposes.

These relationships should not be applied to streams draining areas with significant urban development nor to streams containing manmade storage reservoirs or significant channel change. Neither are they applicable to floods caused by channel obstructions such as ice and debris jams, and by dam failures.

Acknowledgments

This report was prepared by the U.S. Geological Survey in cooperation with the Nebraska Department of Roads. The information used was collected as part of cooperative programs with the Nebraska Department of Water Resources, the Nebraska Department of Roads, the Nebraska Game and Parks Commission, and the Lower Platte South Natural Resources District. Part of the funds and services for the collection of information was provided by the Corps of Engineers, U.S. Army, and the Missouri River Basin Program. Aid in collecting records was furnished by the Central Nebraska Public Power and Irrigation District, the Nebraska Public Power District, and the Loup River Public Power District.

Personnel from U.S. Geological Survey offices in states adjacent to Nebraska furnished records and information on stations operated in their respective areas of responsibility.

Comments and review from personnel of the U.S. Bureau of Reclamation and Corps of Engineers were helpful in developing the diagrams for controlled streams.

Use of Metric Units of Measurement

Analyses and data compilations in this report are based on English units of measurements. The equivalent metric units are given in the text and illustrations where appropriate. Only English units are shown in the tables because of space limitations.

English units		Conversion factor		Metric units
Length in inches (in)	x	25.40	=	millimeters (mm)
in inches (in)	x	2.540	=	centimeters (cm)
in feet (ft)	x	.3048	=	meters (m)
in miles (mi)	x	1.609	=	kilometers (km)
Area in square miles (mi^2)	x	2.590	=	square kilometers (km^2)
Runoff rate in cubic feet per second (ft^3/s)	x	.02832	=	cubic meters per second (m^3/s)
Unit runoff in cubic feet per second per square mile [(ft^3/s)/mi^2]	x	.01093	=	cubic meters per second per square kilometer [(m^3/s)/km^2]
Slope in feet per mile	x	.1894	=	meters per kilometer (m/km)
Temperature in degrees Fahrenheit (°F)		(°F -32) 5/9	=	temperature in degrees Celsius (°C)

FLOOD-FREQUENCY ESTIMATING TECHNIQUE

This section of the report tells how to use the report to obtain flood-frequency estimates needed by planners and designers. Technical description of the analysis for a hydrologist is found in a later section.

Station Data Used

Flood-frequency curves were defined for 303 gaging stations having 13 or more years of record through 1972. Of the 303 stations, 258 have natural or near-natural flow; 42 have controlled flow; and 3 on the Republican River have records collected both before and after construction of present controls. These three stations drain too large and diverse a region for the data to be used in a regression analysis.

The total period of record available was used for analysis of natural-flow streams. Only the period of record applicable for present level of control was used for analysis of controlled streams (table 3).

The natural-flow records collected on streams that are presently controlled were used in the analysis. Some analysis was made also for the controlled-stream period although the controlled period generally was too short for developing firm conclusions.

Locations of the 303 stations used in the analysis are shown in figure 1 and are listed in tables 1, 2, and 3.

Table 1 lists the stations used by number and name, the hydrologic flood region in which the station is located, and the magnitude of the 2-, 5-, 10-, 25-, 50-, and 100-year recurrence interval computed from the station data by the log-Pearson Type III method or a modification of it.

Table 2 lists all stations used by number and name and gives eight basin characteristics determined for each natural-flow stream. Usually, only total drainage area is given for controlled streams. The eight basin characteristics listed were found to be useful in some part of the State to define flood-frequency characteristics.

Table 3 lists the stations used by number, the period of record of peaks observed, the period of record of peaks used in the analysis, the number of years of record included in the study, the hydrologic flood region in which the station is located, and the maximum peak discharge observed during the period used for the study.

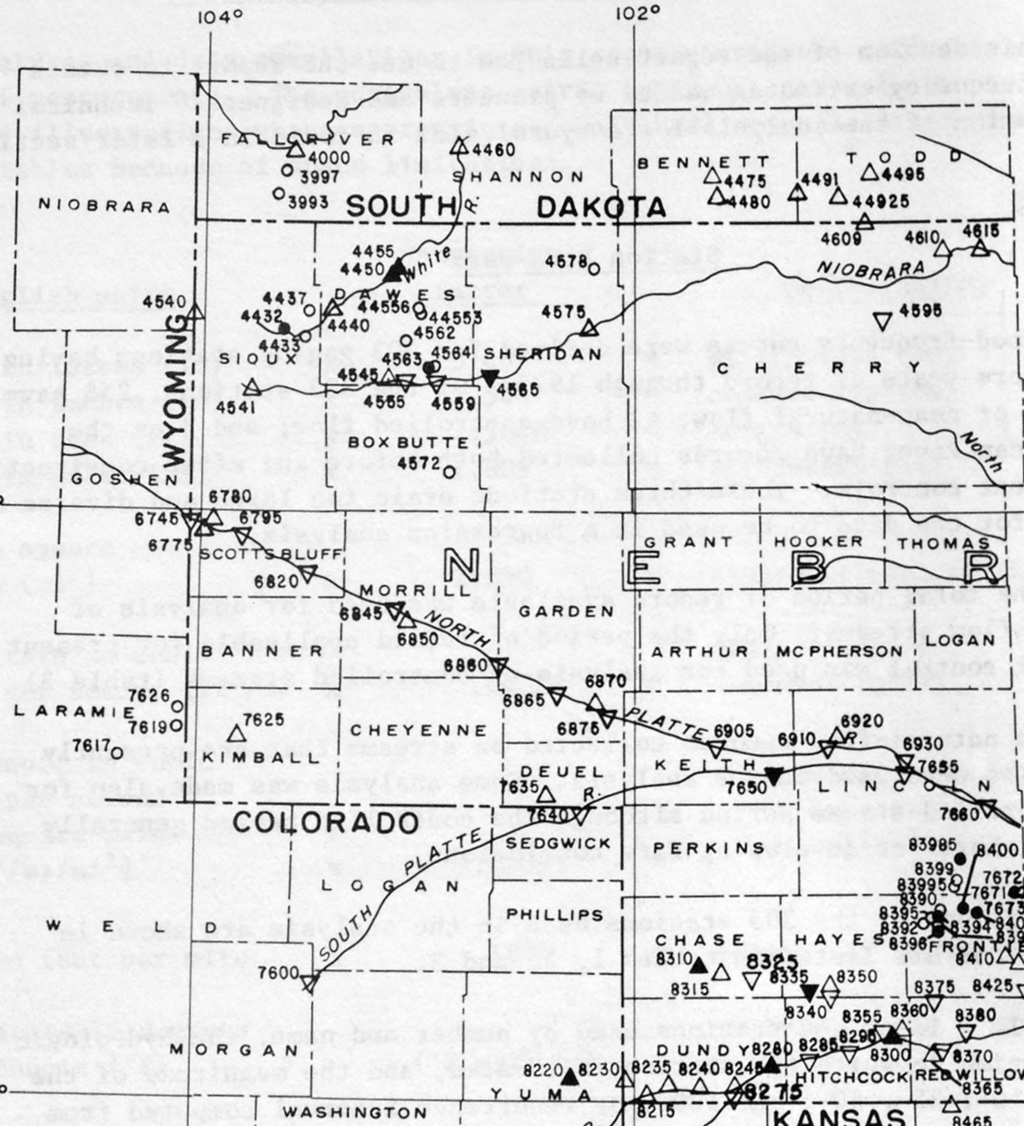


Figure 1.--Map of Nebraska and parts of adjacent states showing location of stations used in this study.

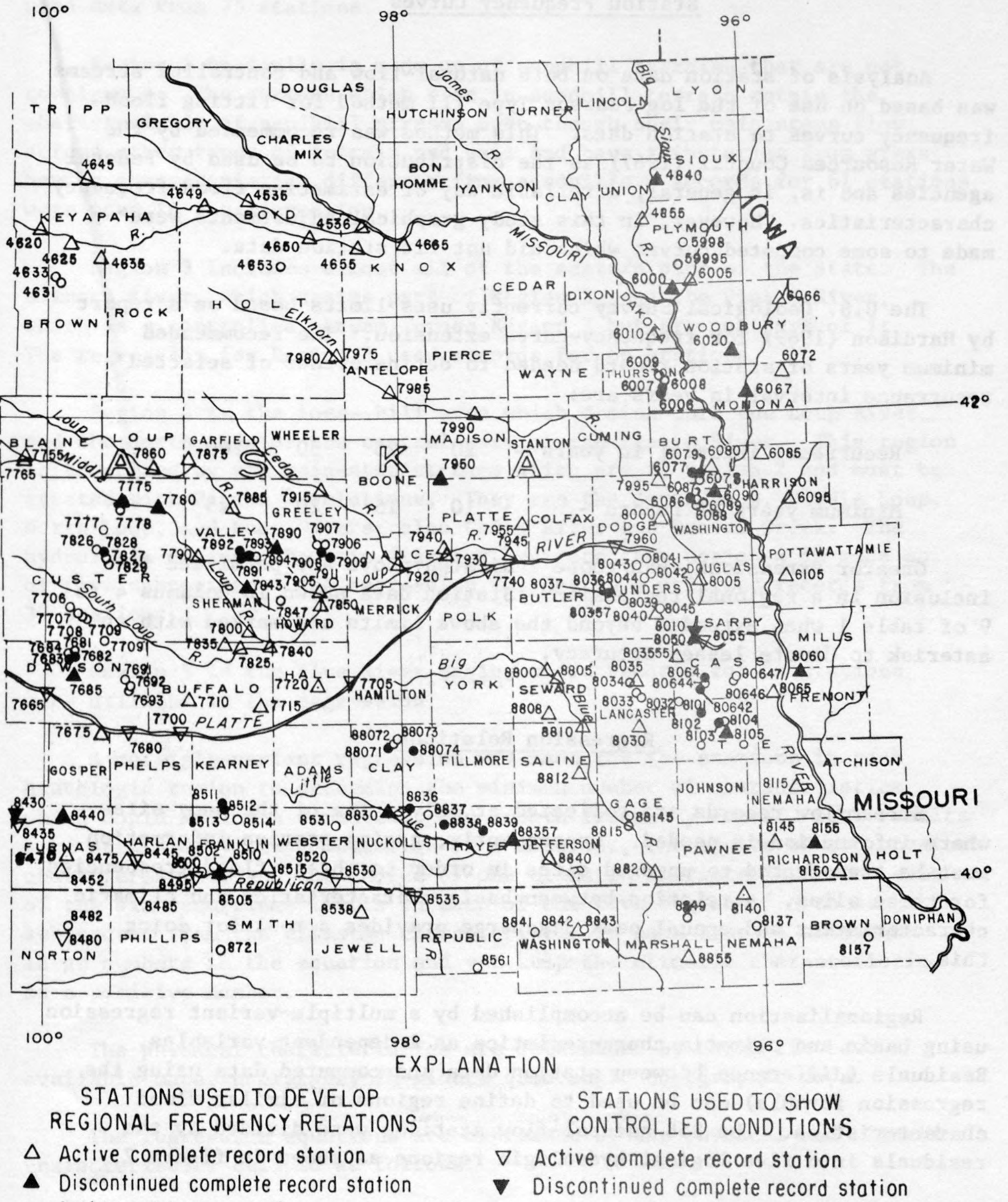


Figure 1.--Continued.

Station Frequency Curves

Analysis of station data on both natural-flow and controlled streams was based on use of the log-Pearson Type III method for fitting flood-frequency curves to station data. This method was recommended by the Water Resources Council (1967) as the distribution to be used by Federal agencies and is, in general, a reliable way of estimating flood-frequency characteristics. However, in this study graphical adjustments were made to some computed curves which did not fit station data.

The U.S. Geological Survey currently uses limits based on a report by Hardison (1969) for frequency-curve extension. The recommended minimum years of station record needed to define events of selected recurrence interval in years are:

Recurrence interval in years -	10	25	50	100
Minimum years of record -	10	15	20	25

Greater extensions than those indicated above are permitted for inclusion in a regional regression. Station data shown in columns 4 to 9 of table 1 when extended beyond the above limits are marked with an asterisk to denote lesser accuracy.

Regression Relations

Streamflow records are collected at only a few of the many sites where information is needed. Consequently, gaging-station information must be transferred to ungaged sites in order to obtain flood frequencies for these sites. A relation between basin characteristics and climatic characteristics and annual peak discharge provides a tool for doing this.

Regionalization can be accomplished by a multiple-variant regression using basin and climatic characteristics as independent variables. Residuals (difference between station data and computed data using the regression formula) can be used to define regions of similar flood characteristics. The 258 natural-flow stations were divided by the residuals into five logical hydrologic regions as shown in figure 2.

Region 1 is made up of widely scattered parts, and not all of the parts are contiguous. It is the remnant after the other four regions were separated from the entire group of 258 stations. In general, it is along the northern border and in the southwestern part of the State; and stations in this region display the greatest variance. The regression used data from 75 stations.

Region 2 basically is made up of sandhill terrains that are not contiguous. The streams which rise in sandhill terrain retain the characteristic of sandhill streams even though their main stems flow across other types of terrain and soil and have tributaries from areas having characteristics different from sandhills. Records for 61 stations were used in the regression.

Region 3 includes almost all of the eastern part of the State. The Elkhorn River, which drains part of Region 2, and the Platte River, which is a controlled stream, cross Region 3 but are not part of it. The regression for Region 3 used records for 66 stations.

Region 4 is the loess-hill area which drains into the Loup River and the north side of the central part of the Platte River. This region is traversed by the main-stem streams which are in Region 2 and must be treated with Region 2 relations. They are the South Loup, Middle Loup, North Loup, and Loup Rivers; also Cedar River and Beaver Creek. The hydrologic regions shown in figure 2 indicate that Region 4 is made up of five subregions. The regression for Region 4 utilized records from 32 stations.

Region 5 is the Blue River basin, where records for 24 stations were utilized in the regression.

A multiple-variant regression was made for the stations in each hydrologic region to determine the minimum number of characteristics which would define a consistent and smooth frequency curve. Best results were obtained by the computation of a constant, the choice of two physical characteristics, and the choice of one climatic characteristic for each of the six recurrence levels in each of the five regions. A constant is subtracted from the climatic characteristic in each case to eliminate large numbers in the equation and yet keep the climatic characteristic as a positive number.

The physical characteristics are determined by using the best available maps, preferably 7½-minute quadrangle topographic maps.

The regression equations are expressed by the physical and climatic characteristics defined as follows:

A. <u>Total drainage area</u>, in square miles, is the total drainage area upstream from the gaging-station site.

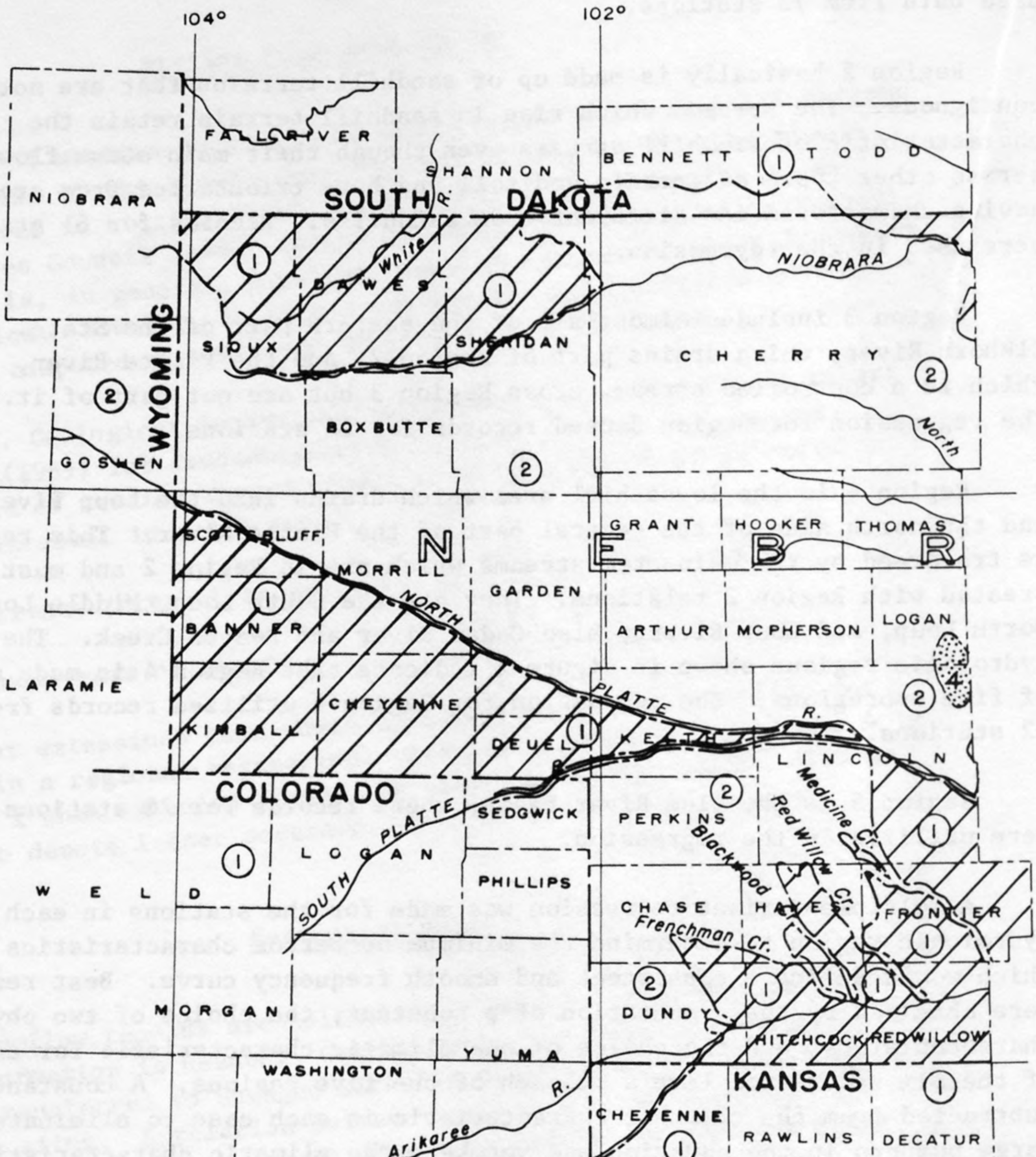


Figure 2.--Map of Nebraska and parts of adjacent states showing hydrologic regions defined in this study.

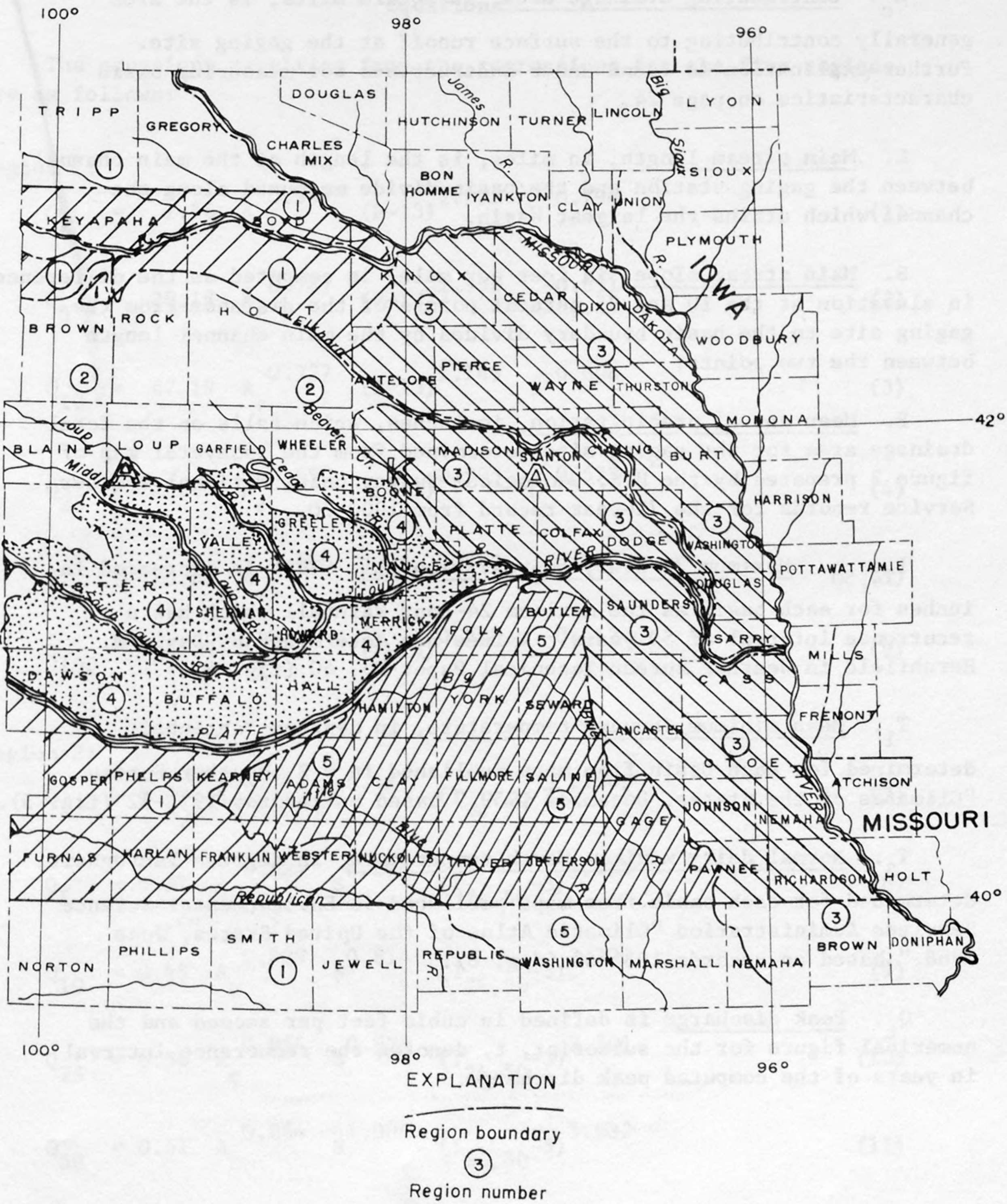


Figure 2.--Continued

A_c. Contributing drainage area, in square miles, is the area generally contributing to the surface runoff at the gaging site. Further explanation is found under instructions for measuring basin characteristics on page 24.

L. Main stream length, in miles, is the length of the main channel between the gaging station and the basin divide measured along the channel which drains the largest basin.

S. Main stream slope, in feet per mile, is computed as the difference in elevation at the 10 and 85 percent points of the distance from the gaging site to the basin boundary divided by the main channel length between the two points.

P. Mean annual precipitation, in inches, which falls on the total drainage area for the gaging site determined from the isohyetal map of figure 3 prepared by the U.S. Geological Survey using National Weather Service records for the 71-year record from 1900-70.

$I_{24,50}$. Maximum 24-hour, 50-year rainfall. This is expressed in inches for each basin as the maximum 24-hour rainfall which has a recurrence interval of 50 years. Values are determined by David M. Hershfield in Weather Bureau Technical Paper No. 40 (fig. 4).

T_1. Mean minimum January temperature, in degrees Fahrenheit, determined for each basin from maps published in U.S. Weather Bureau "Climates of the States, December 1959," based on records 1931-52 (fig. 5).

T_3. Normal daily maximum March temperature, in degrees Fahrenheit, determined for each basin from maps published in Environmental Science Services Administration "Climatic Atlas of the United States, June 1968," based on records 1931-60 (fig. 6).

Q_t. Peak discharge is defined in cubic feet per second and the numerical figure for the subscript, t, denotes the recurrence interval in years of the computed peak discharge.

Equations

The equations resulting from the regressions for the five regions are as follows:

Region 1:

$$Q_2 = 1.56\ A_c^{0.997}\ (P-13)^{1.952}\ L^{-0.794} \qquad (1)$$

$$Q_5 = 20.18\ A_c^{0.787}\ (P-13)^{1.396}\ L^{-0.631} \qquad (2)$$

$$Q_{10} = 67.19\ A_c^{0.737}\ (P-13)^{1.149}\ L^{-0.608} \qquad (3)$$

$$Q_{25} = 222.93\ A_c^{0.690}\ (P-13)^{0.905}\ L^{-0.573} \qquad (4)$$

$$Q_{50} = 490.86\ A_c^{0.656}\ (P-13)^{0.742}\ L^{-0.543} \qquad (5)$$

$$Q_{100} = 996.78\ A_c^{0.624}\ (P-13)^{0.588}\ L^{-0.512} \qquad (6)$$

Region 2:

$$Q_2 = 0.63\ A_c^{0.797}\ S^{0.427}\ (I_{24,50}-3)^{2.863} \qquad (7)$$

$$Q_5 = 0.51\ A_c^{0.824}\ S^{0.696}\ (I_{24,50}-3)^{3.155} \qquad (8)$$

$$Q_{10} = 0.49\ A_c^{0.839}\ S^{0.814}\ (I_{24,50}-3)^{3.320} \qquad (9)$$

$$Q_{25} = 0.50\ A_c^{0.854}\ S^{0.928}\ (I_{24,50}-3)^{3.501} \qquad (10)$$

$$Q_{50} = 0.51\ A_c^{0.864}\ S^{1.008}\ (I_{24,50}-3)^{3.632} \qquad (11)$$

$$Q_{100} = 0.55\ A_c^{0.872}\ S^{1.063}\ (I_{24,50}-3)^{3.731} \qquad (12)$$

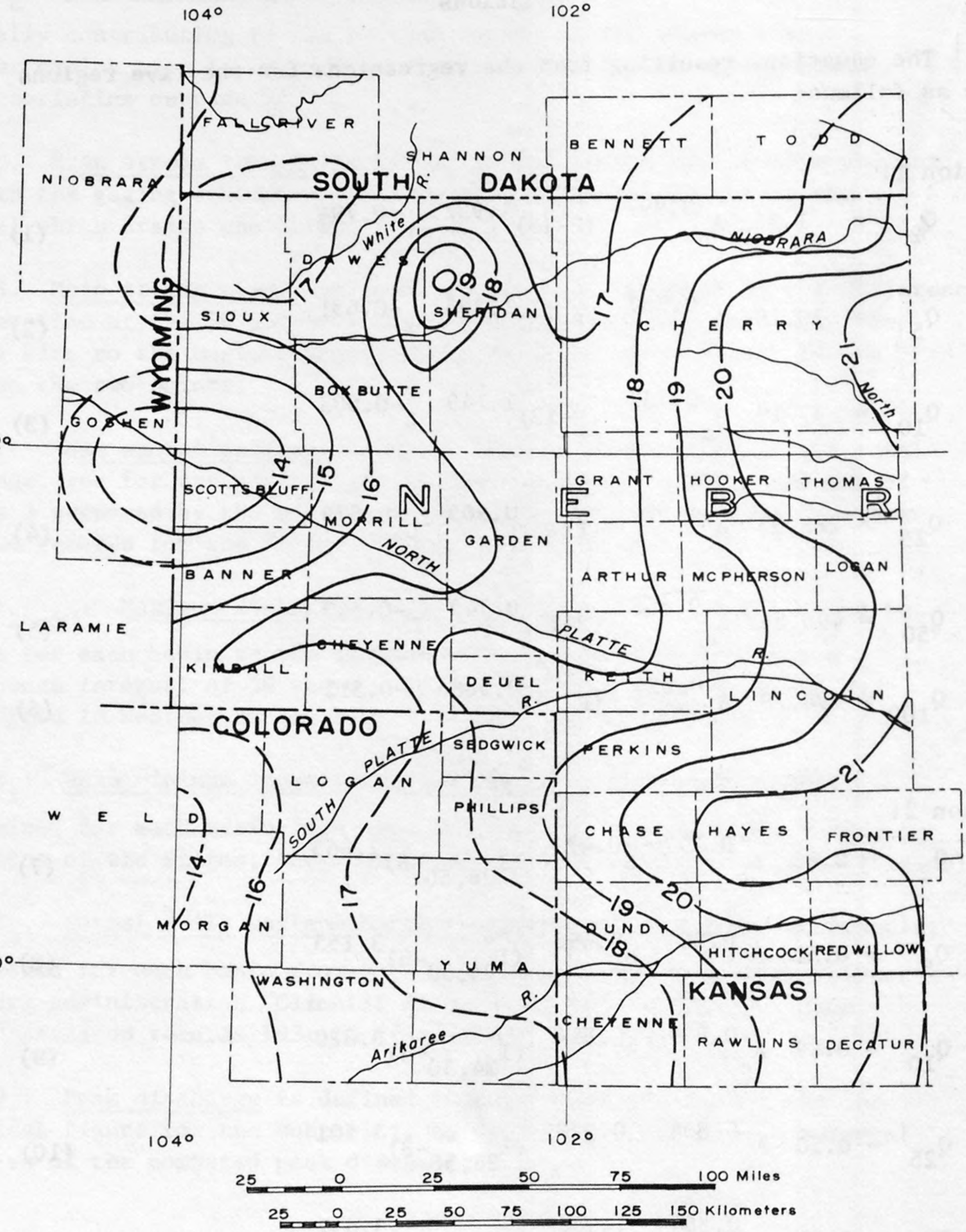
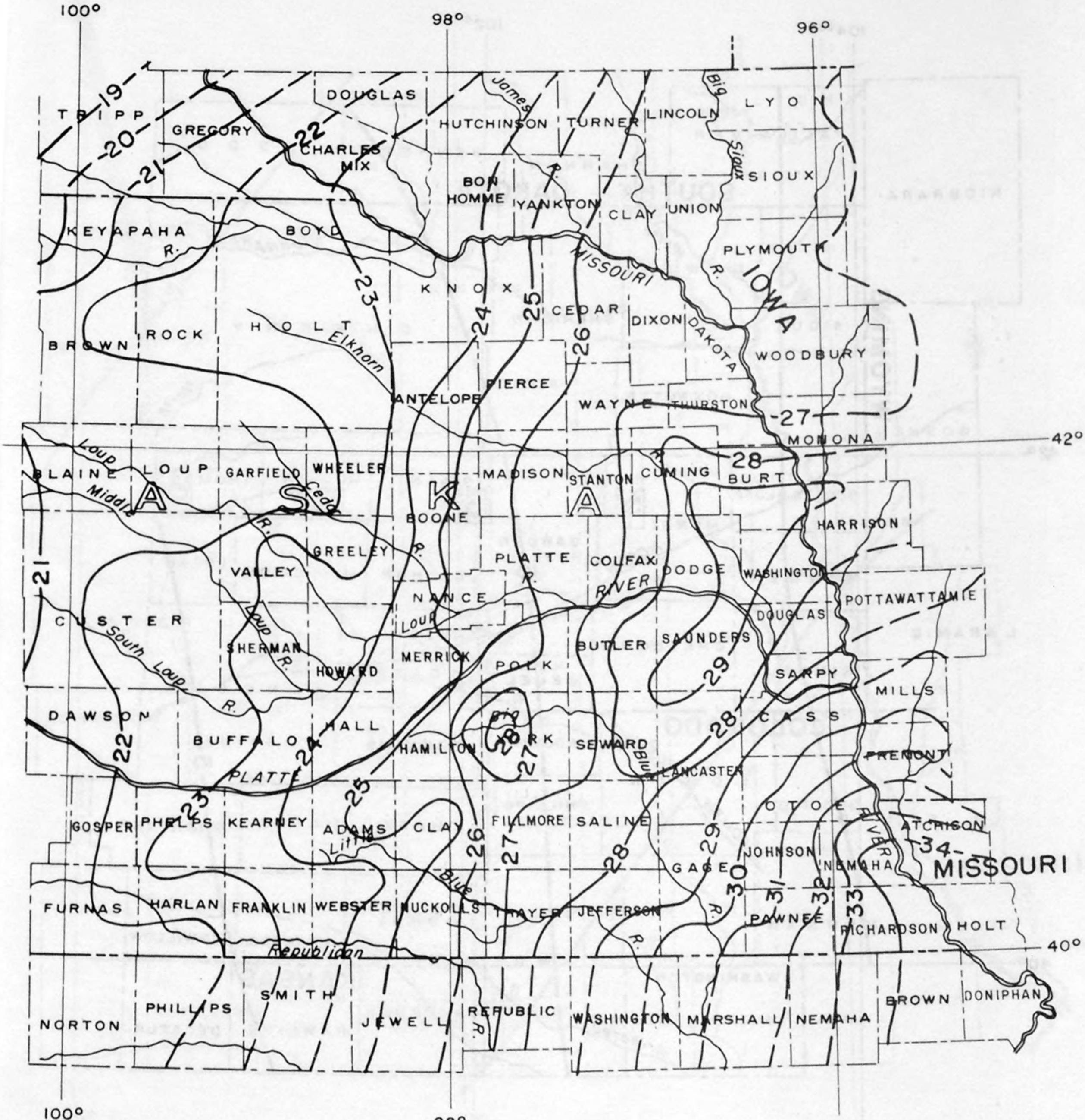


Figure 3.--Map of Nebraska and parts of adjacent states showing mean annual precipitation (P) for period 1900-70.



EXPLANATION

——22—— — —

Mean annual precipitation, in inches

Dashed where approximately located

Interval 1 inch (25.4 mm)

Figure 3.--Continued

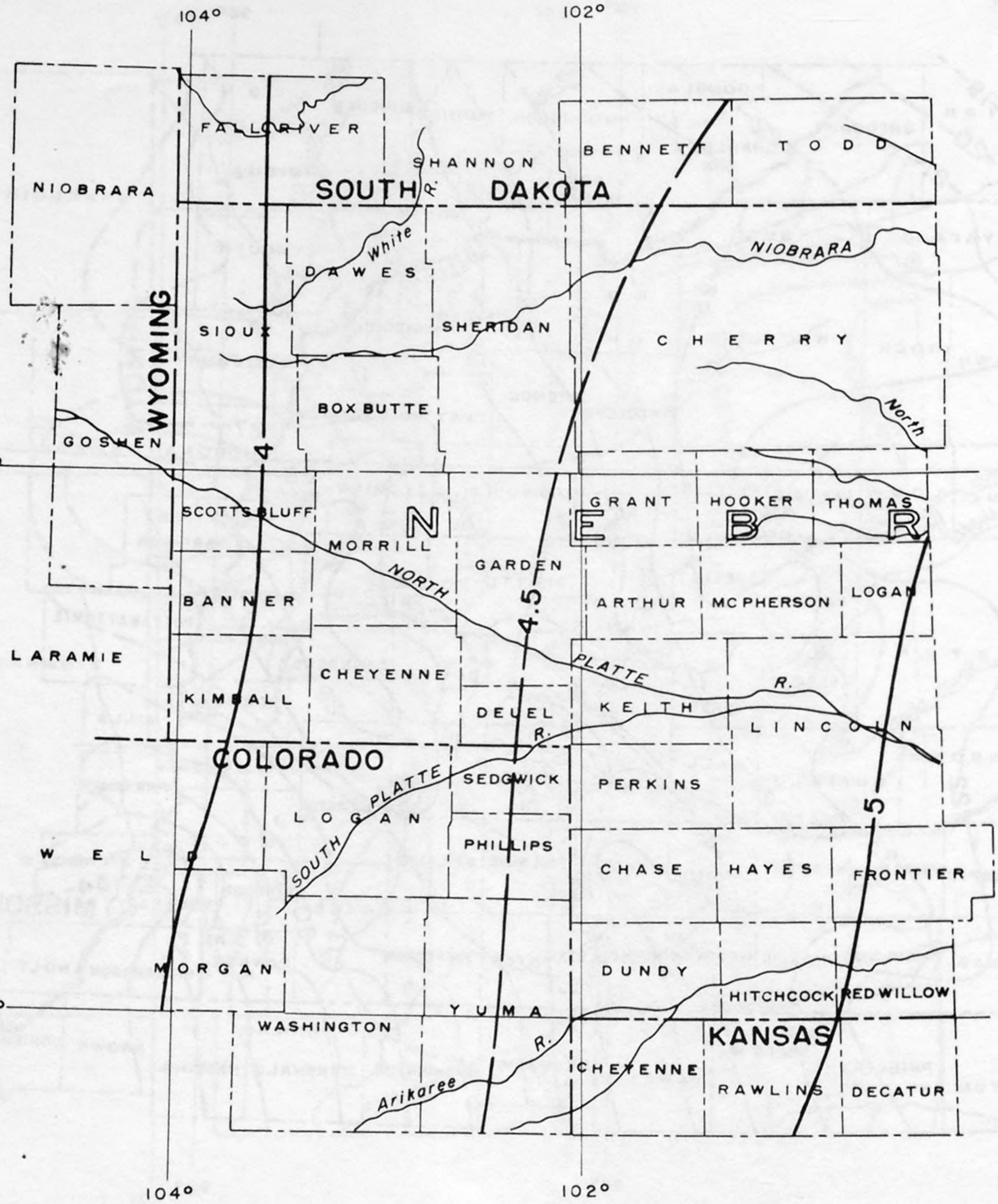
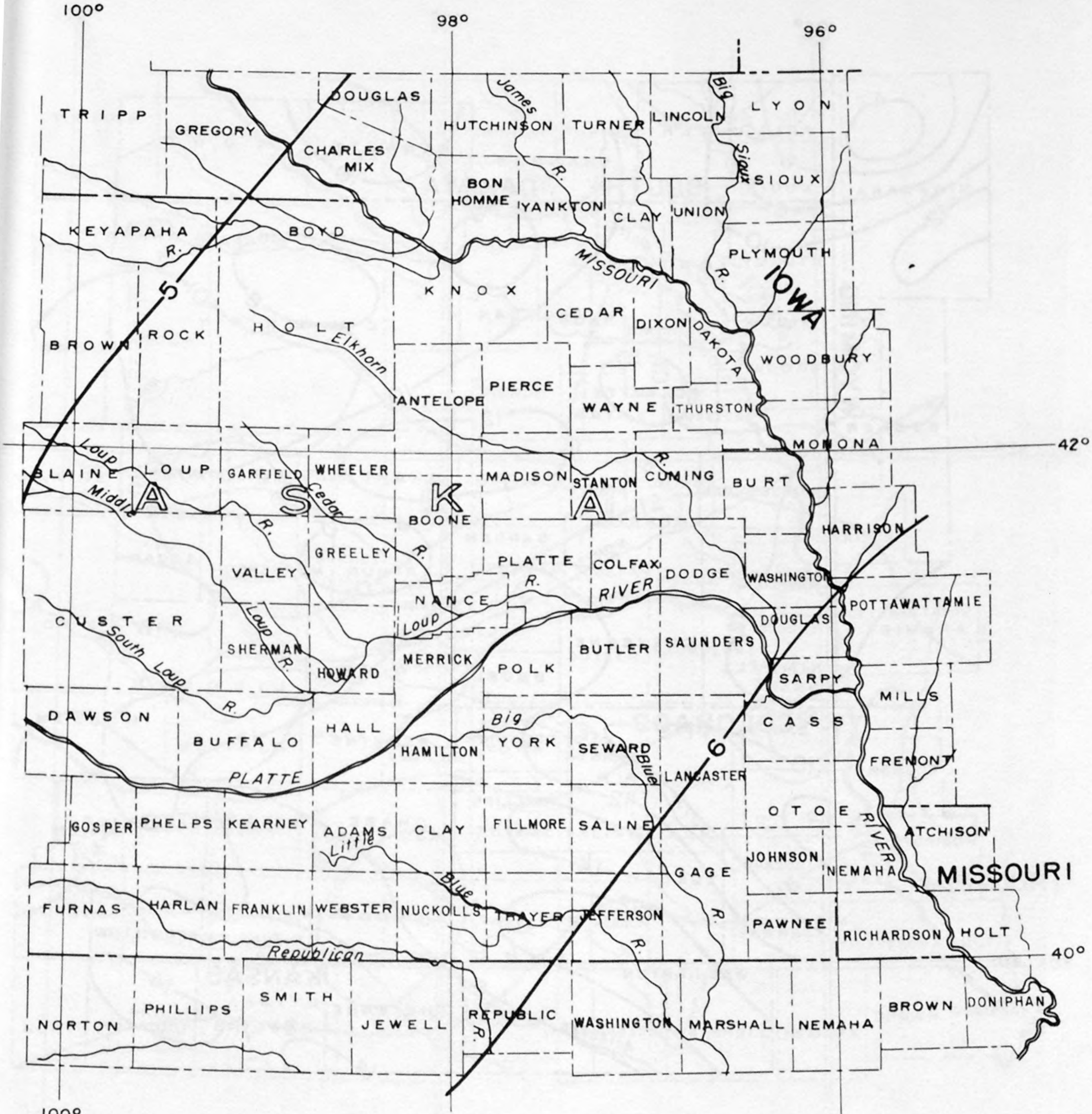


Figure 4.--Map of Nebraska and parts of adjacent states showing maximum 24 hour rainfall with 50-year recurrence interval ($I_{24,50}$).



EXPLANATION

——— 6 ——— 24 hour rainfall amount, in inches

Figure 4.--Continued.

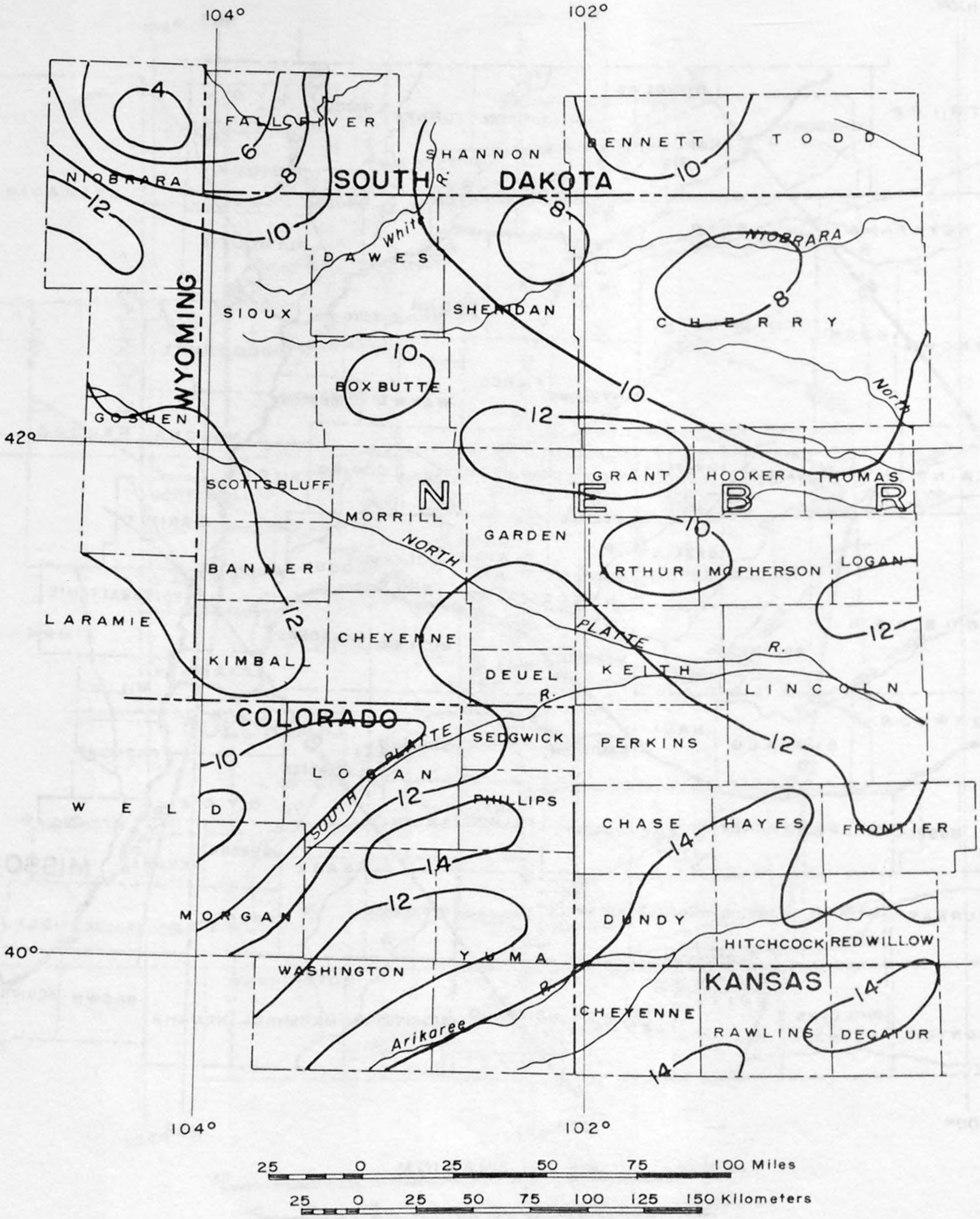
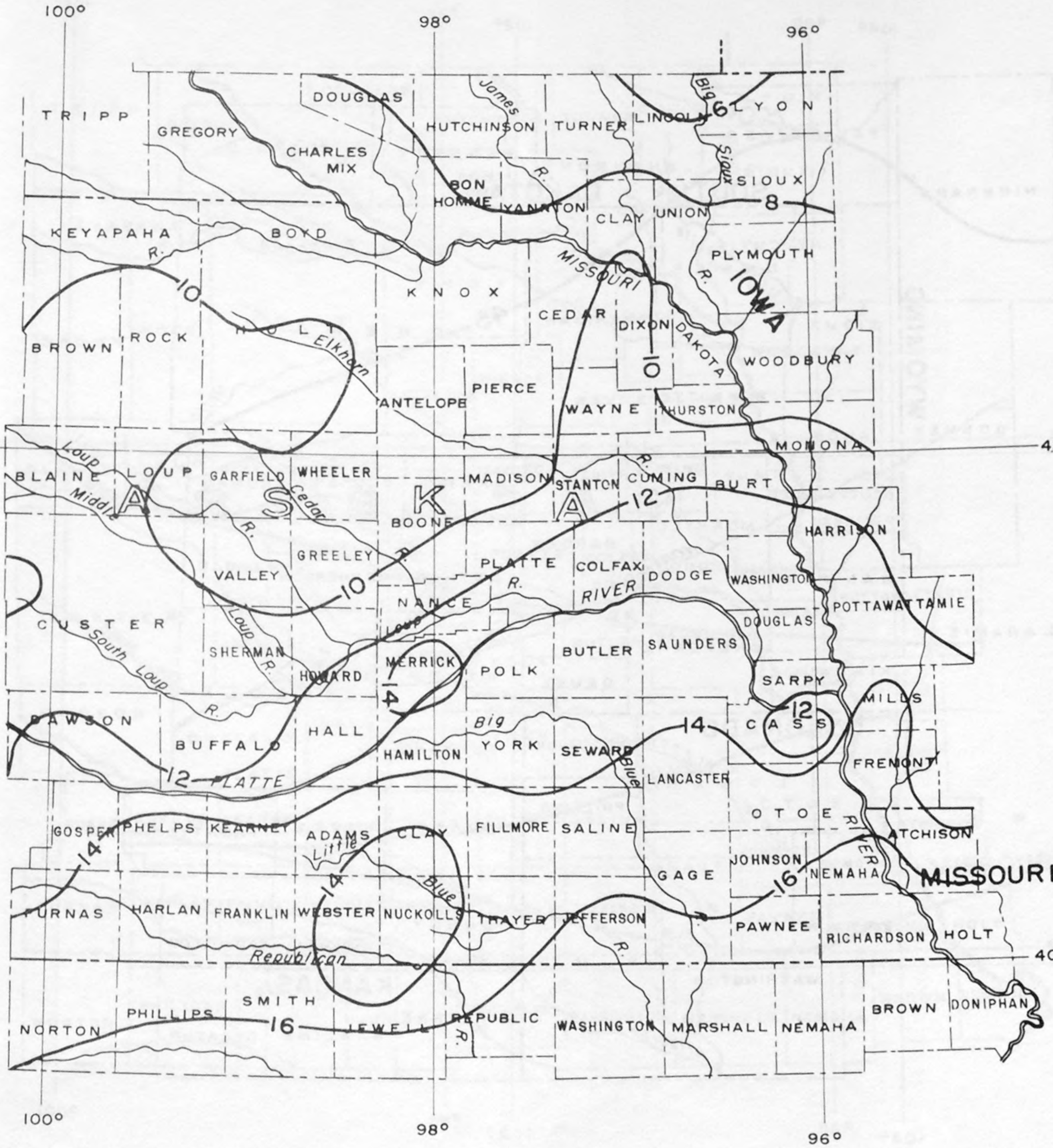


Figure 5.--Map of Nebraska and parts of adjacent states showing mean minimum January temperature (T_1).



EXPLANATION

——14——
Temperature in degrees Fahrenheit

Figure 5.-- Continued.

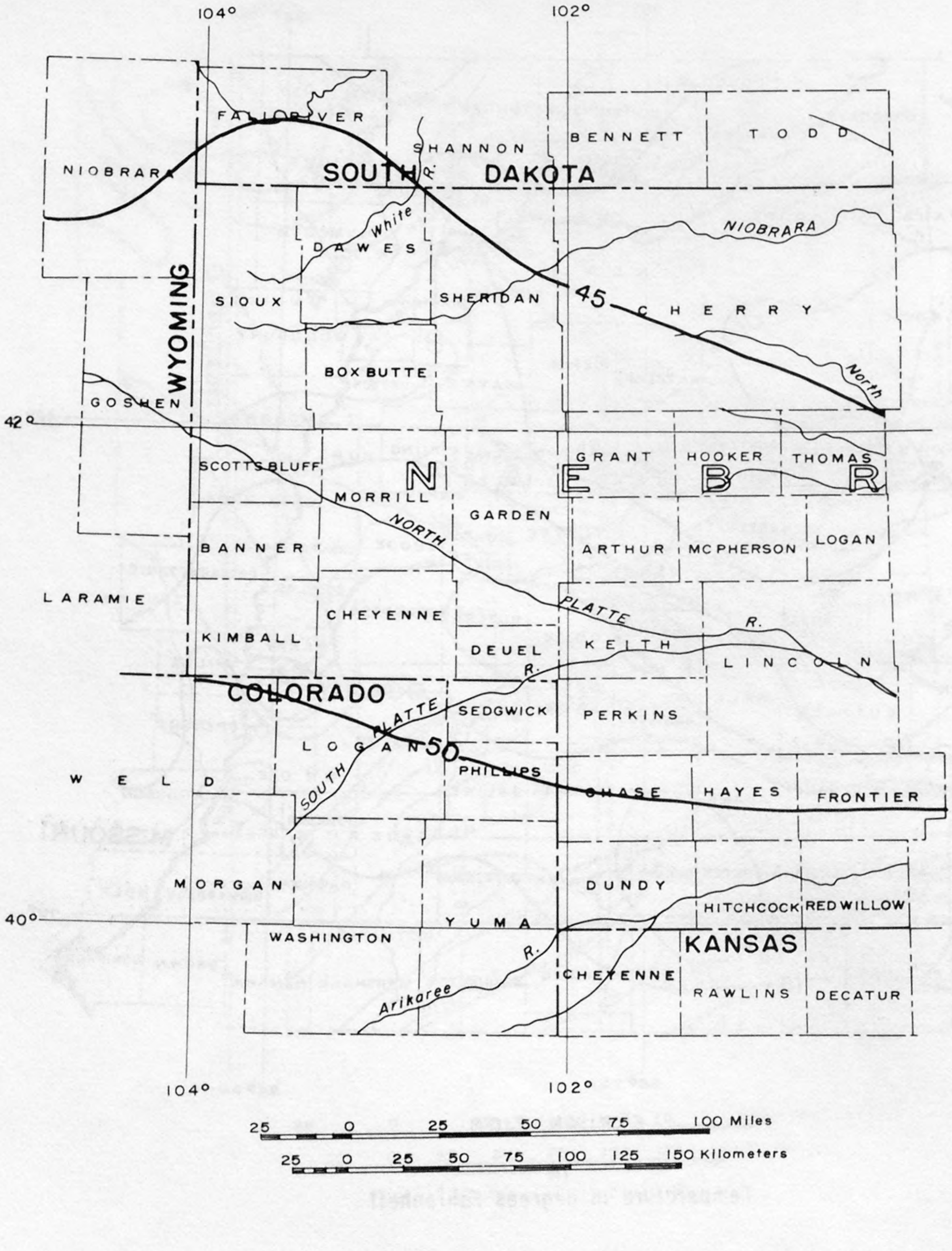


Figure 6.-- Map of Nebraska and parts of adjacent states showing normal daily maximum March temperature (T_3).

EXPLANATION

—50— Temperature in degrees Fahrenheit

Figure 6.--Continued.

Region 3:

$$Q_2 = 103\ A_c^{1.231}\ (T_3-37)^{0.798}\ L^{-1.230} \quad (13)$$

$$Q_5 = 266\ A_c^{1.095}\ (T_3-37)^{0.760}\ L^{-1.050} \quad (14)$$

$$Q_{10} = 412\ A_c^{1.026}\ (T_3-37)^{0.741}\ L^{-0.948} \quad (15)$$

$$Q_{25} = 646\ A_c^{0.952}\ (T_3-37)^{0.727}\ L^{-0.838} \quad (16)$$

$$Q_{50} = 887\ A_c^{0.891}\ (T_3-37)^{0.703}\ L^{-0.745} \quad (17)$$

$$Q_{100} = 1{,}162\ A_c^{0.843}\ (T_3-37)^{0.686}\ L^{-0.671} \quad (18)$$

Region 4:

$$Q_2 = 1{,}774\ A^{1.226}\ (I_{24,50}-5)^{1.831}\ L^{-1.380} \quad (19)$$

$$Q_5 = 5{,}408\ A^{1.376}\ (I_{24,50}-5)^{1.602}\ L^{-1.669} \quad (20)$$

$$Q_{10} = 8{,}475\ A^{1.451}\ (I_{24,50}-5)^{1.491}\ L^{-1.783} \quad (21)$$

$$Q_{25} = 15{,}288\ A^{1.561}\ (I_{24,50}-5)^{1.426}\ L^{-1.953} \quad (22)$$

$$Q_{50} = 22{,}301\ A^{1.650}\ (I_{24,50}-5)^{1.382}\ L^{-2.081} \quad (23)$$

$$Q_{100} = 31{,}454\ A^{1.724}\ (I_{24,50}-5)^{1.365}\ L^{-2.184} \quad (24)$$

Region 5:

$$Q_2 = 0.94 \ A_c^{0.831} \ (T_1-11)^{1.606} \ S^{0.501} \quad (25)$$

$$Q_5 = 6.10 \ A_c^{0.747} \ (T_1-11)^{1.280} \ S^{0.430} \quad (26)$$

$$Q_{10} = 13.25 \ A_c^{0.721} \ (T_1-11)^{1.114} \ S^{0.443} \quad (27)$$

$$Q_{25} = 27.51 \ A_c^{0.701} \ (T_1-11)^{0.955} \ S^{0.482} \quad (28)$$

$$Q_{50} = 44.07 \ A_c^{0.687} \ (T_1-11)^{0.845} \ S^{0.521} \quad (29)$$

$$Q_{100} = 63.87 \ A_c^{0.680} \ (T_1-11)^{0.741} \ S^{0.572} \quad (30)$$

The equations are based on English units of measurements. To convert the final answers of discharge from cubic feet per second to the metric equivalent of cubic meters per second, multiply by the factor of 0.02832. Note that substitution of values using metric units for the variables A, A_c, P, L, S, $I_{24,50}$, T_1 and T_3 will not provide the right answer because the conversion of units would also be involved in the constants.

Instructions for measuring basin characteristics

The four physical characteristics A, A_c, L, and S and the four climatic characteristics P, $I_{24,50}$, T_1, and T_3 used in expressing the regression equations 1 through 30 are defined in the previous section. The definition given there seems adequate for instructions in measuring the characteristic except for the total drainage area, A, and the contributing drainage area, A_c.

Jamison (1974) prepared a tabulation of drainage area and river mileage for Salt Creek, Weeping Water Creek, Big Nemaha River, Little Nemaha River, and minor tributaries of the Platte and Missouri Rivers in southeast Nebraska. This publication is helpful for determining the total drainage area, A, the stream length, L, and the stream slope, S, at any site in the above-named basins. Similar reports are planned for other basins in the State when topographic mapping is complete and personnel are available to measure and tabulate the data.

The total drainage area, A, and contributing drainage area, A_c, for stations and sites used in this report are shown in tables 2, 4, and 5. Active station values are taken from "Water Resources Data for Nebraska, 1973, Part 1. Surface Water Records." Drainage areas for discontinued stations are from the last year of published record. Revisions to drainage areas are possible with the publication of better maps. In such cases the last revised figure is used in this report and for discontinued stations may not agree with the previous published figure.

Contributing drainage area, A_c, is the part of the total drainage area that contributes directly to surface runoff. For many streams in Nebraska, the contributing drainage area is equal to the total drainage area but in some parts the contributing drainage area is only a small part of the total drainage area. The use of contributing drainage area gave significantly better results in the statistical analysis for Regions 1, 2, 3, and 5; therefore, the method of determining contributing drainage area are explained here.

For an ungaged site, obtain the best topographic maps available which cover the basin. Locate the site of interest on the stream, and from this point outline the total drainage basin to enclose all the area which slopes toward the point of interest.

In moderately impermeable soil areas such as found in Regions 1, 3, and 5, some of the area has depressions or lakes which can under most normal conditions detain runoff from portions of the total drainage until the depression or lake is filled and the outlet is overtopped. The area draining into these depressions or lakes is considered noncontributing drainage area.

The soil in Region 2 is a permeable (sandhill) soil. Depressions and lakes are also found in this region but in addition the soil allows rapid infiltration of precipitation to the ground water. The absence of stream pattern on the maps indicates that infiltration occurs rather than surface runoff. The area draining into the depressions and lakes and not immediately adjacent to a developed stream is considered as noncontributing drainage area.

The contributing drainage area is the total drainage area less the noncontributing drainage area.

Instructions for graphical solutions

The 30 equations used for determining the flood-peak discharges for the six recurrence intervals in the five flood regions are given in a previous section. An electric slide-rule computer will readily solve the equations; but for those who prefer a graphical solution, nomographs have been prepared for 25-, 50-, and 100-year recurrence intervals (figs. 7 to 21, inclusive). Two nomographs are needed for the solution of each equation because a constant and three variable characteristics are used for definition. The two nomographs are on facing pages to facilitate the use of the graphical solution in going from the first diagram to the second diagram.

To illustrate the graphical solution, the following examples are given:

Example 1a, by steps

(1) The selected site is on Houchen Creek at Brock, Nebr., at Nebraska Highway 67 crossing in NE¼NW¼ sec. 21, T. 6 N., R. 13 E., Nemaha County. A search of tables 1, 4, and 5 reveals no gaging stations on this stream from which to obtain basin characteristics.

(2) Inspection of an index to topographic maps of Nebraska shows that the site is on the Brock 7½-minute topographic quadrangle map. The upper end of the drainage area also extends into the Tecumseh NE quadrangle map.

(3) The stream is located in Hydrologic Region 3 in figure 2. From equations 13 through 18 the required variable characteristics are contributing drainage area, A_c, in square miles; normal daily maximum March temperature, T_3, in degrees Fahrenheit; and main stream length, L, in miles.

(4) Outline the drainage area upstream from the site on Brock and Tecumseh NE quadrangles. Jamison (1974) published the stream length and drainage areas for Houchen Creek on page 81 of the report. The drainage area at the mouth is 10.3 mi^2, thus only determination of the drainage area is needed between

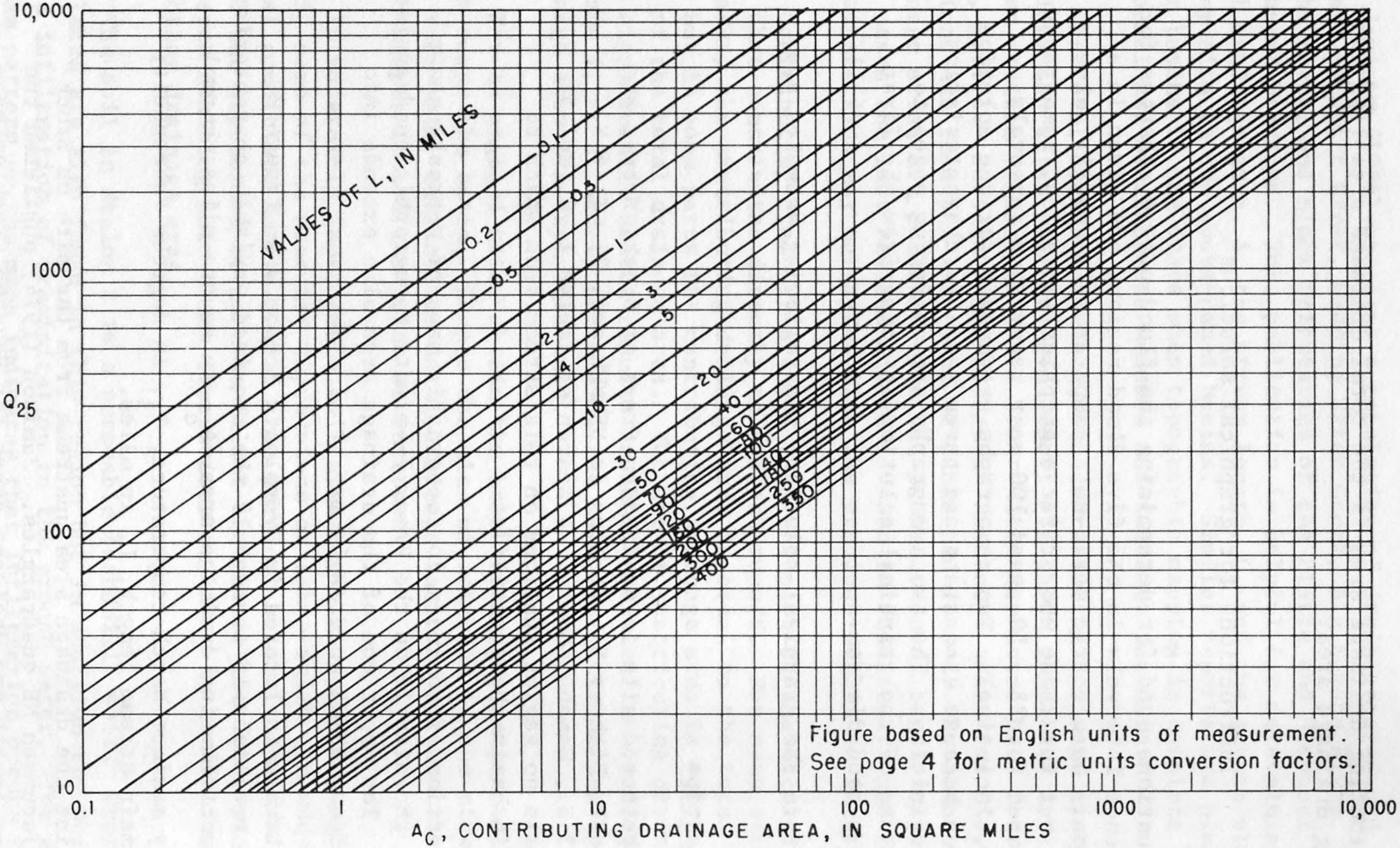


Figure 7.--Nomograph for solution of 25-year flood peak in Region I.

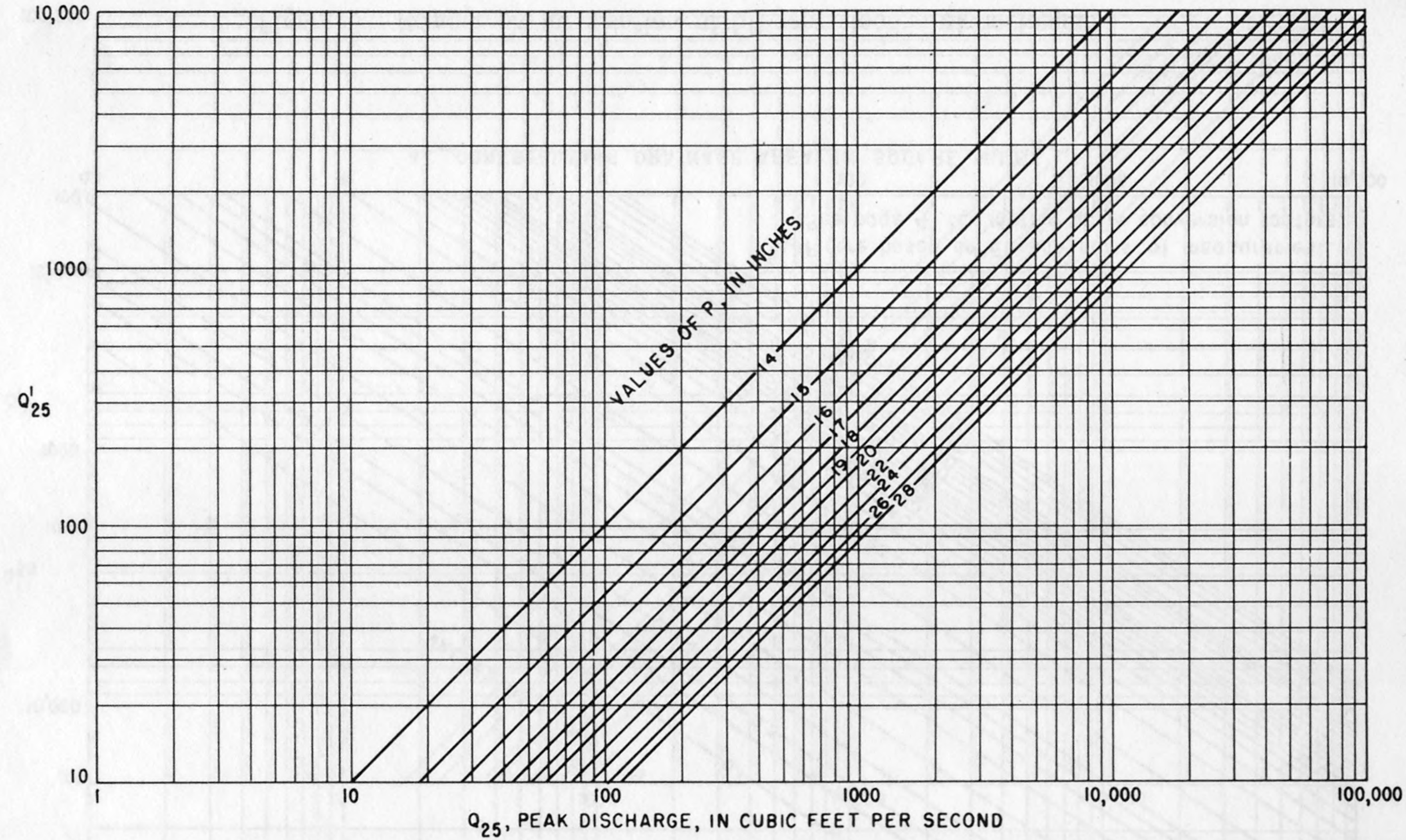


Figure 7.--Continued.

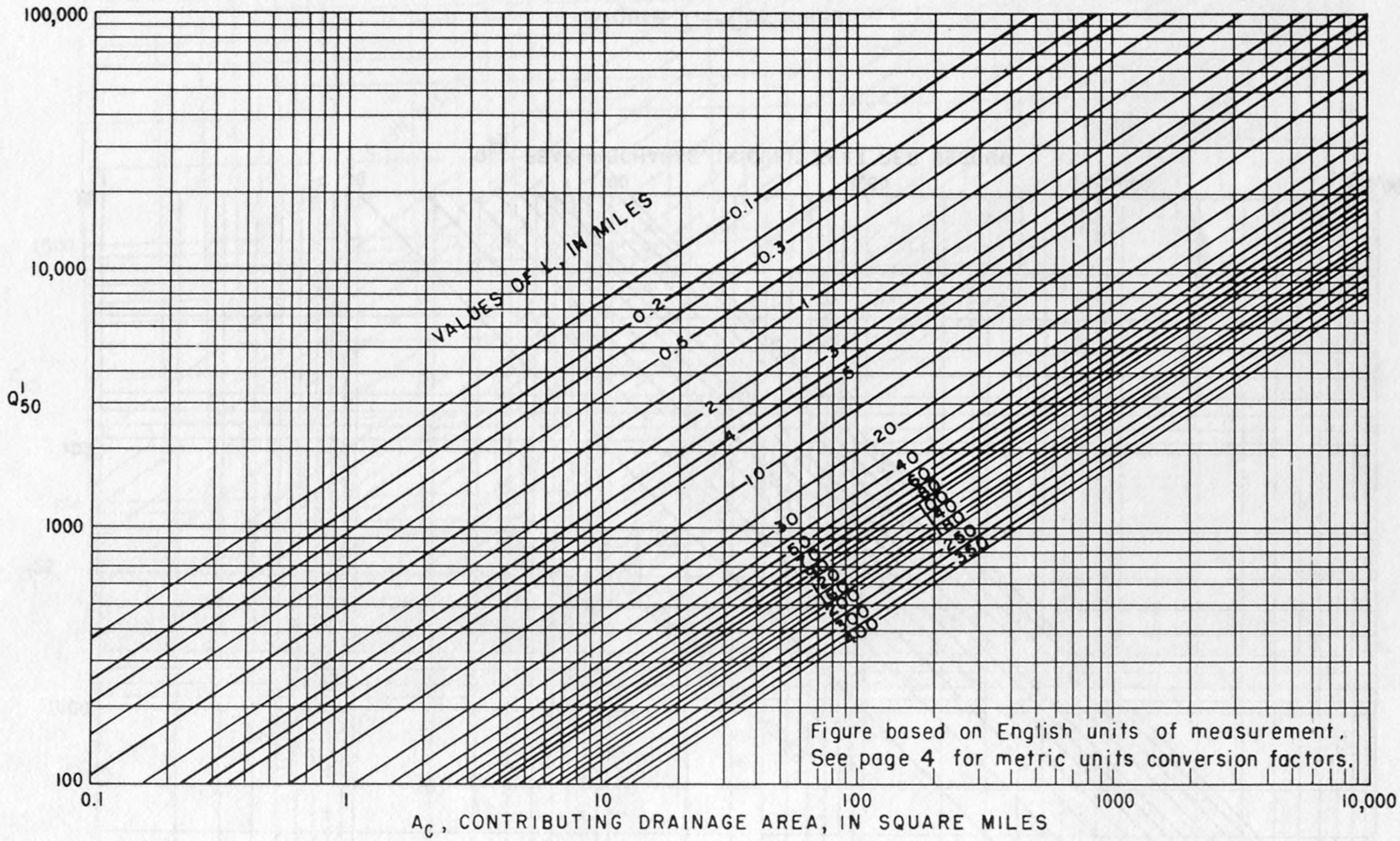


Figure 8.--Nomograph for solution of 50-year flood peak in Region I.

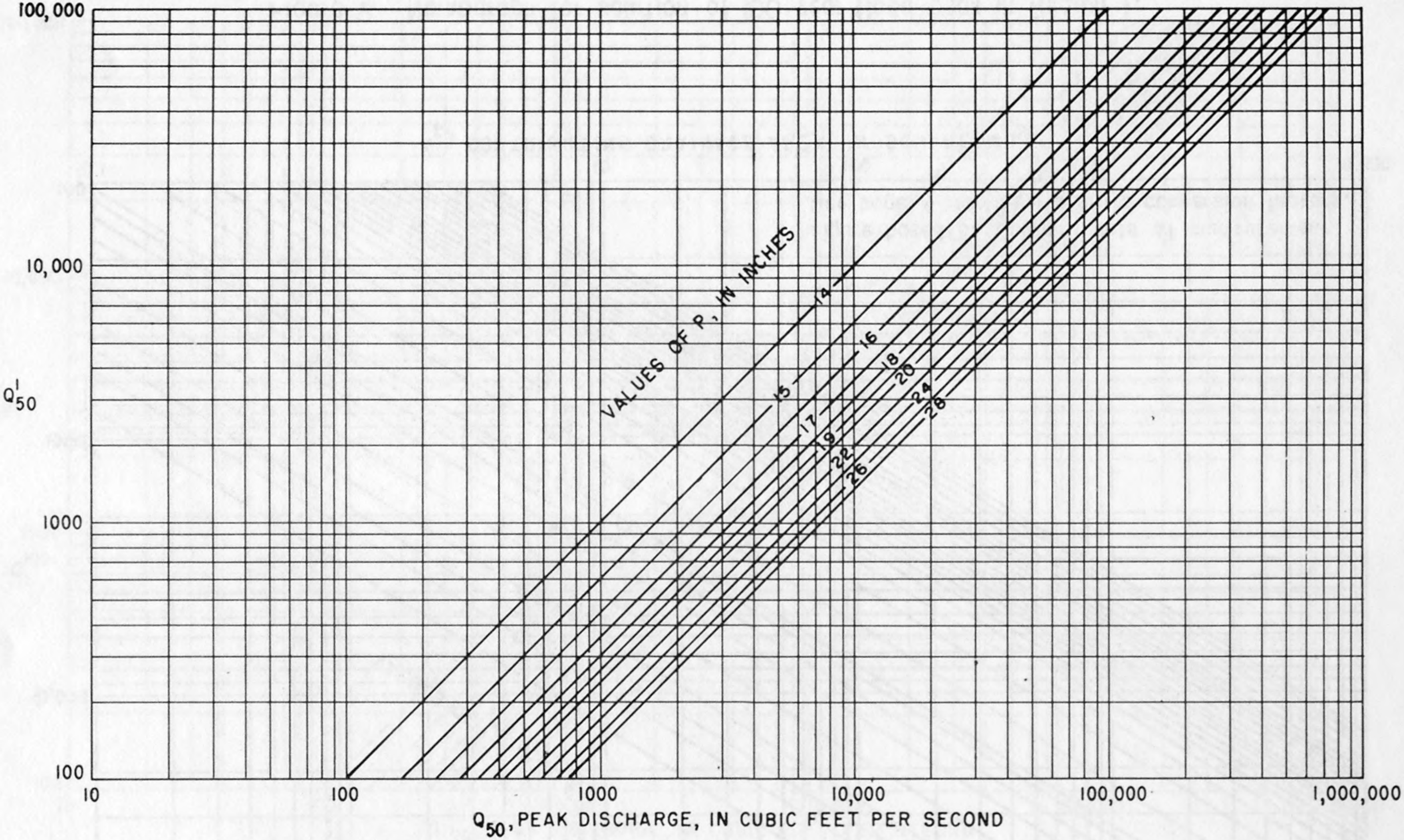


Figure 8.--Continued.

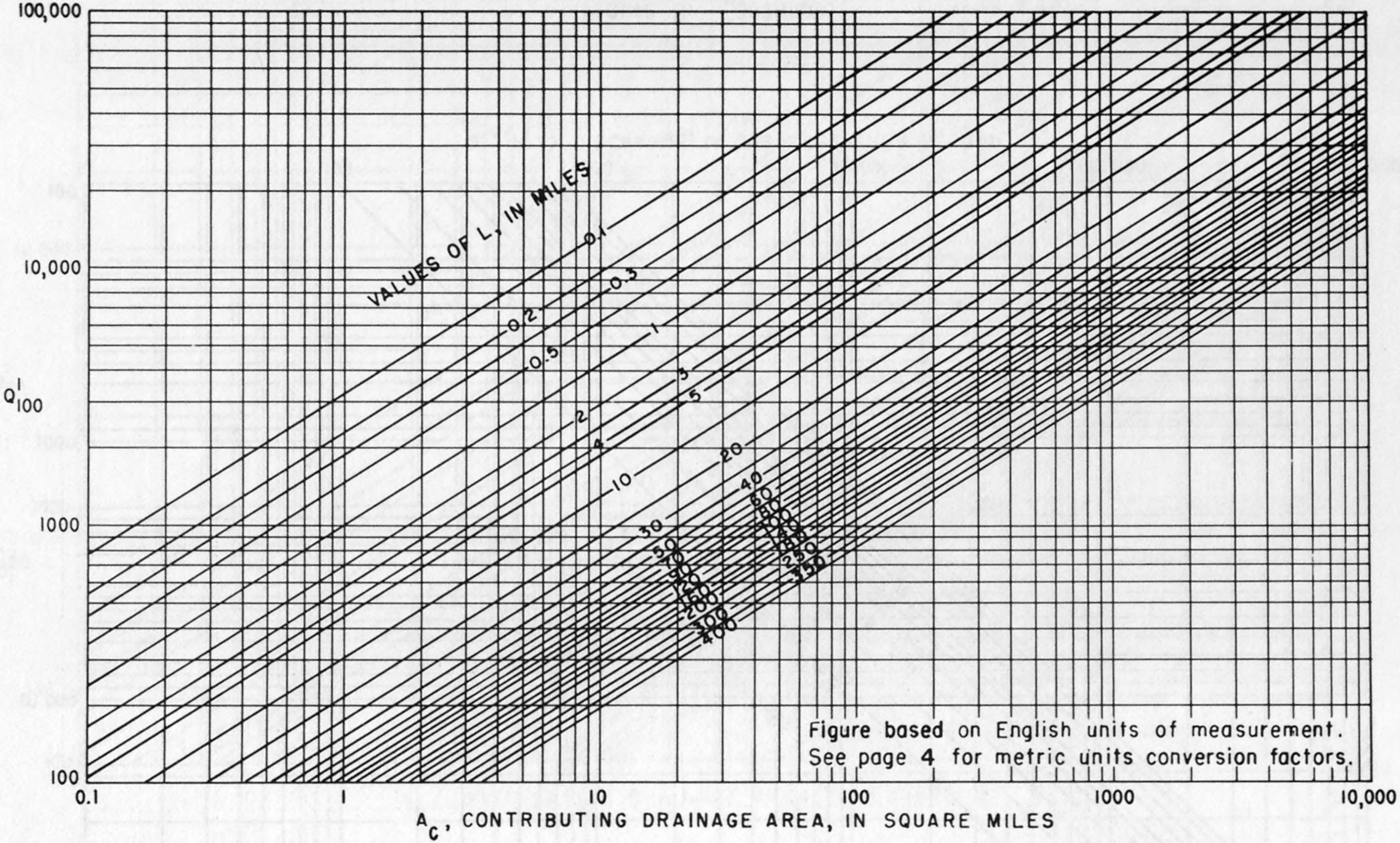


Figure 9.--Nomograph for solution of 100-year flood peak in Region I.

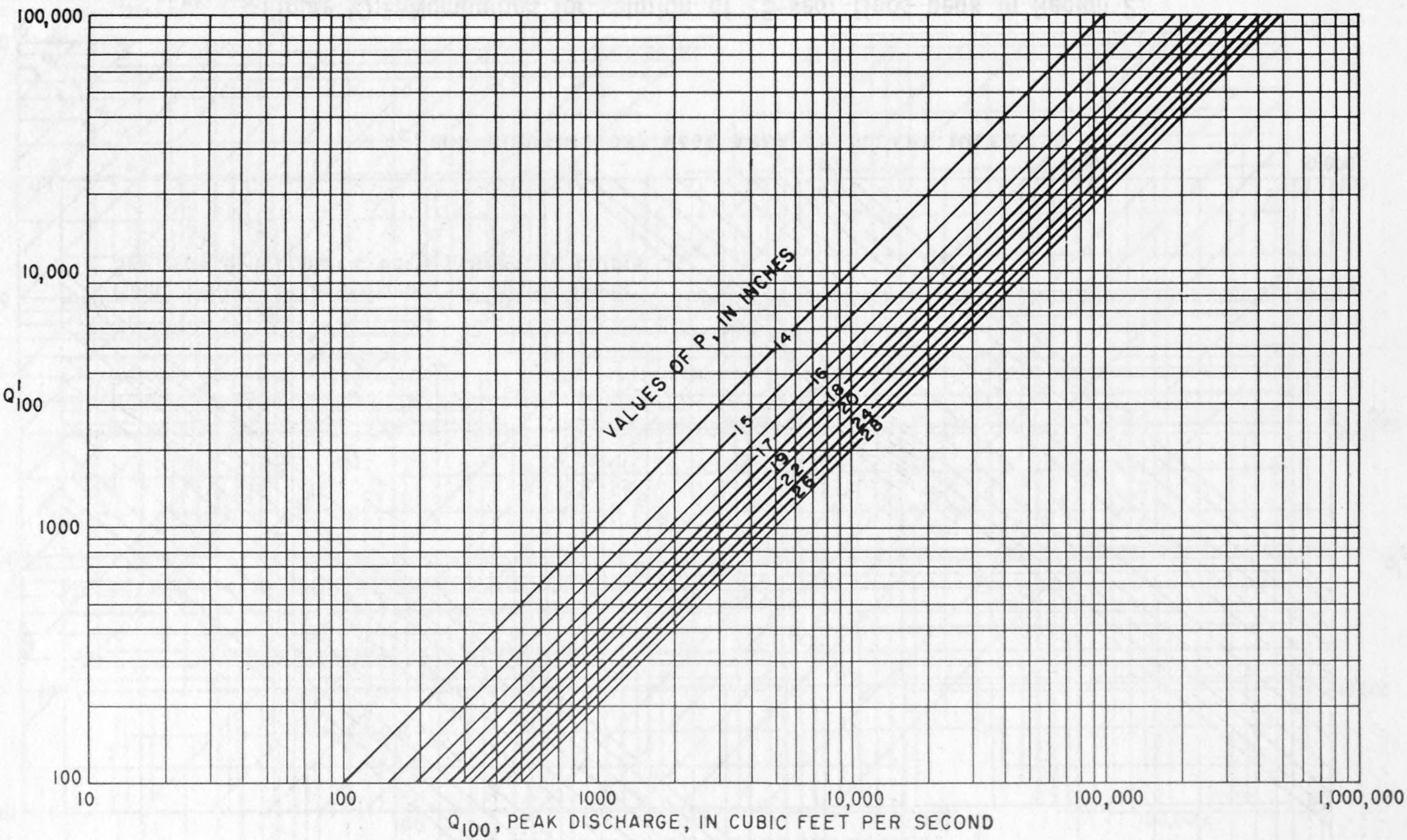


Figure 9.--Continued.

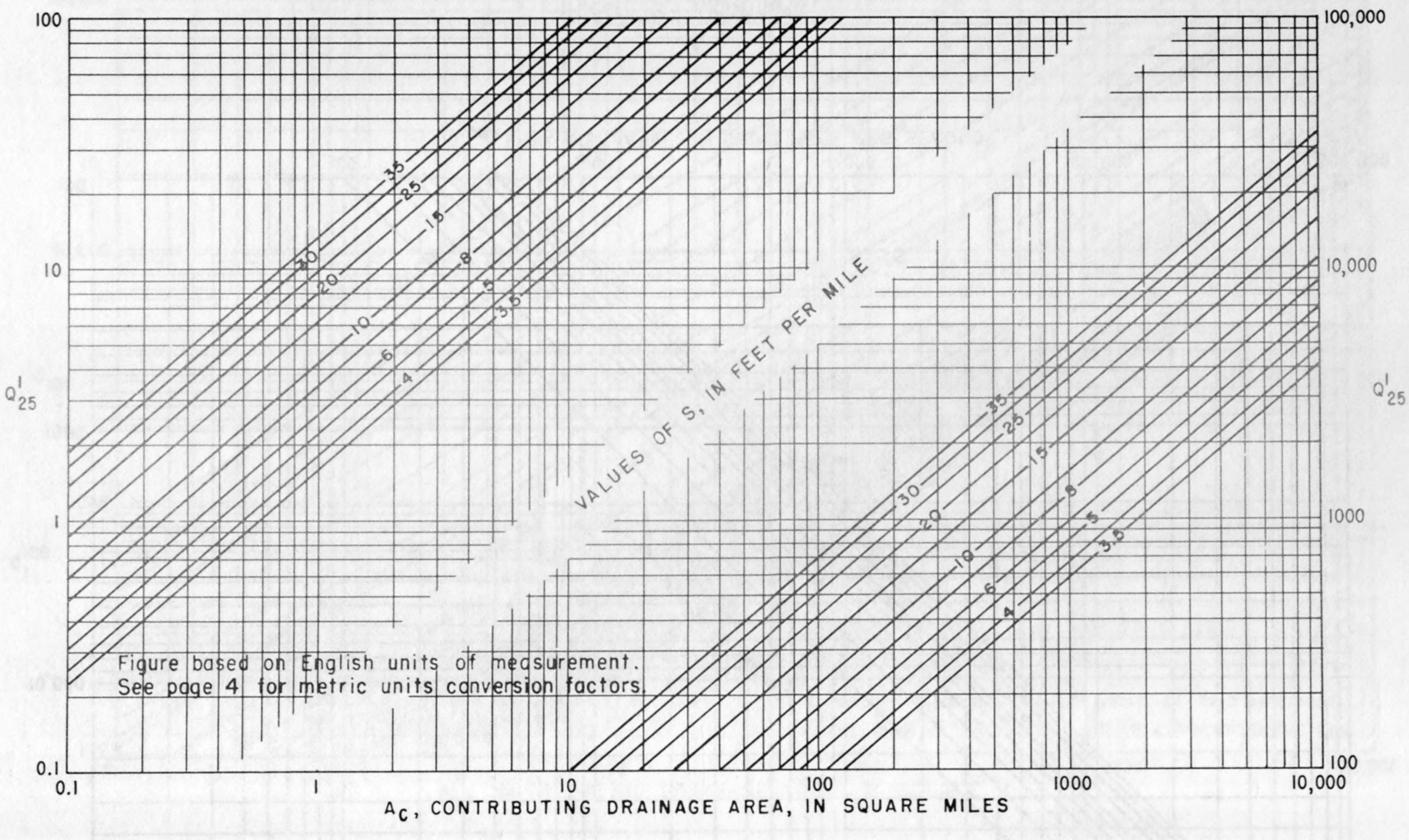


Figure 10.--Nomograph for solution of 25-year flood peak in Region 2.

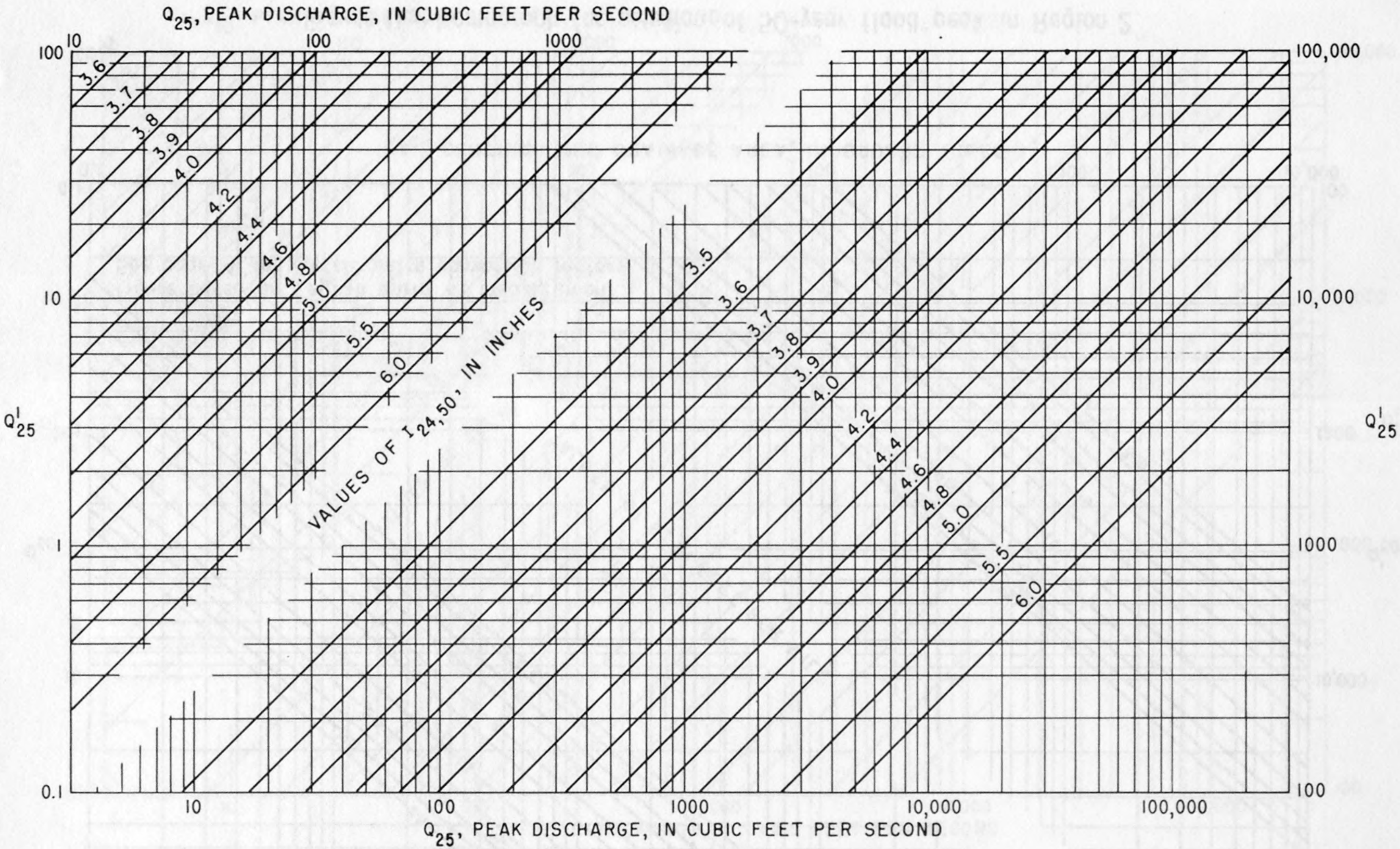


Figure 10.--Continued.

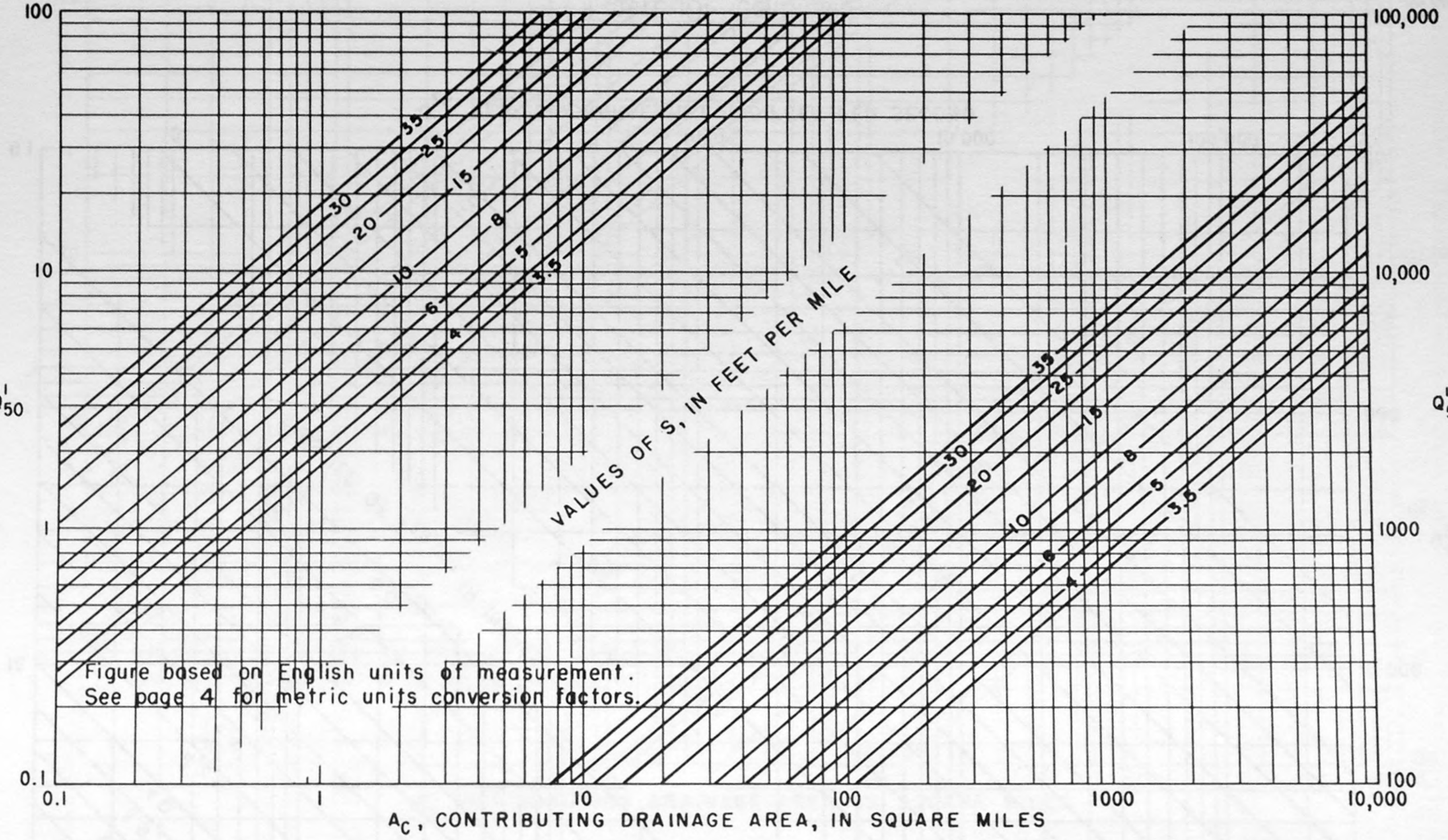


Figure 11.--Nomograph for solution of 50-year flood peak in Region 2.

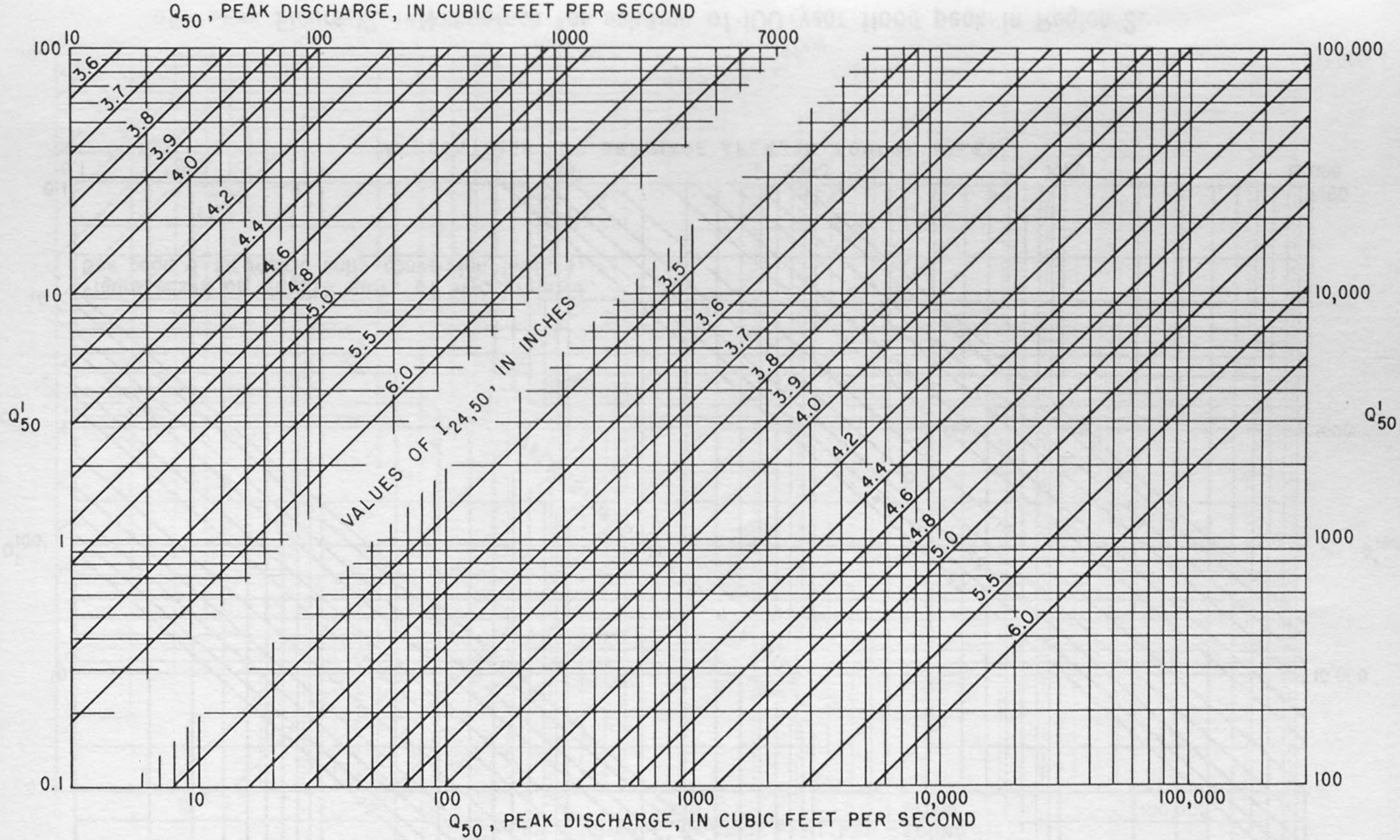


Figure 11.--Continued.

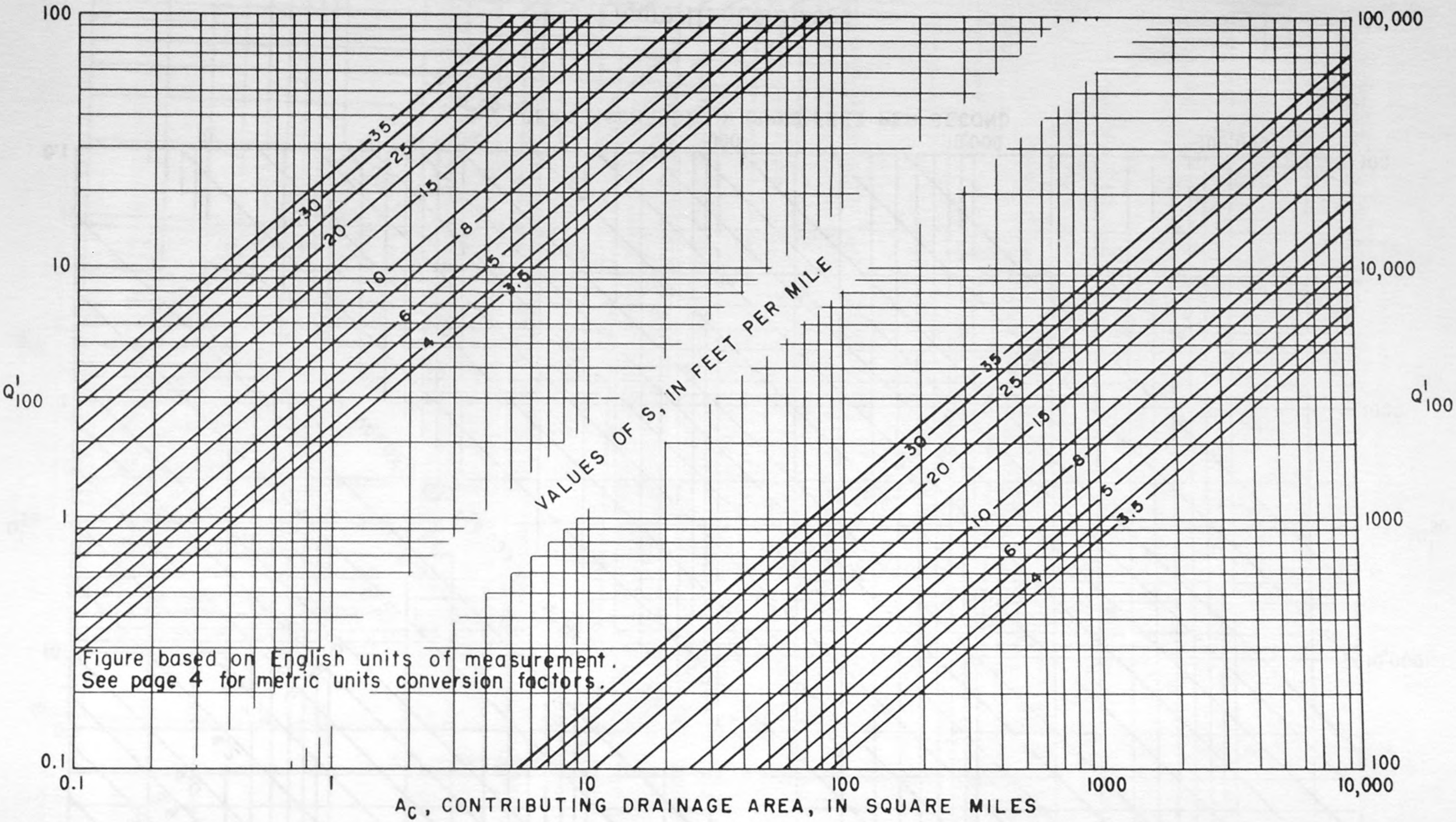


Figure 12.--Nomograph for solution of 100-year flood peak in Region 2.

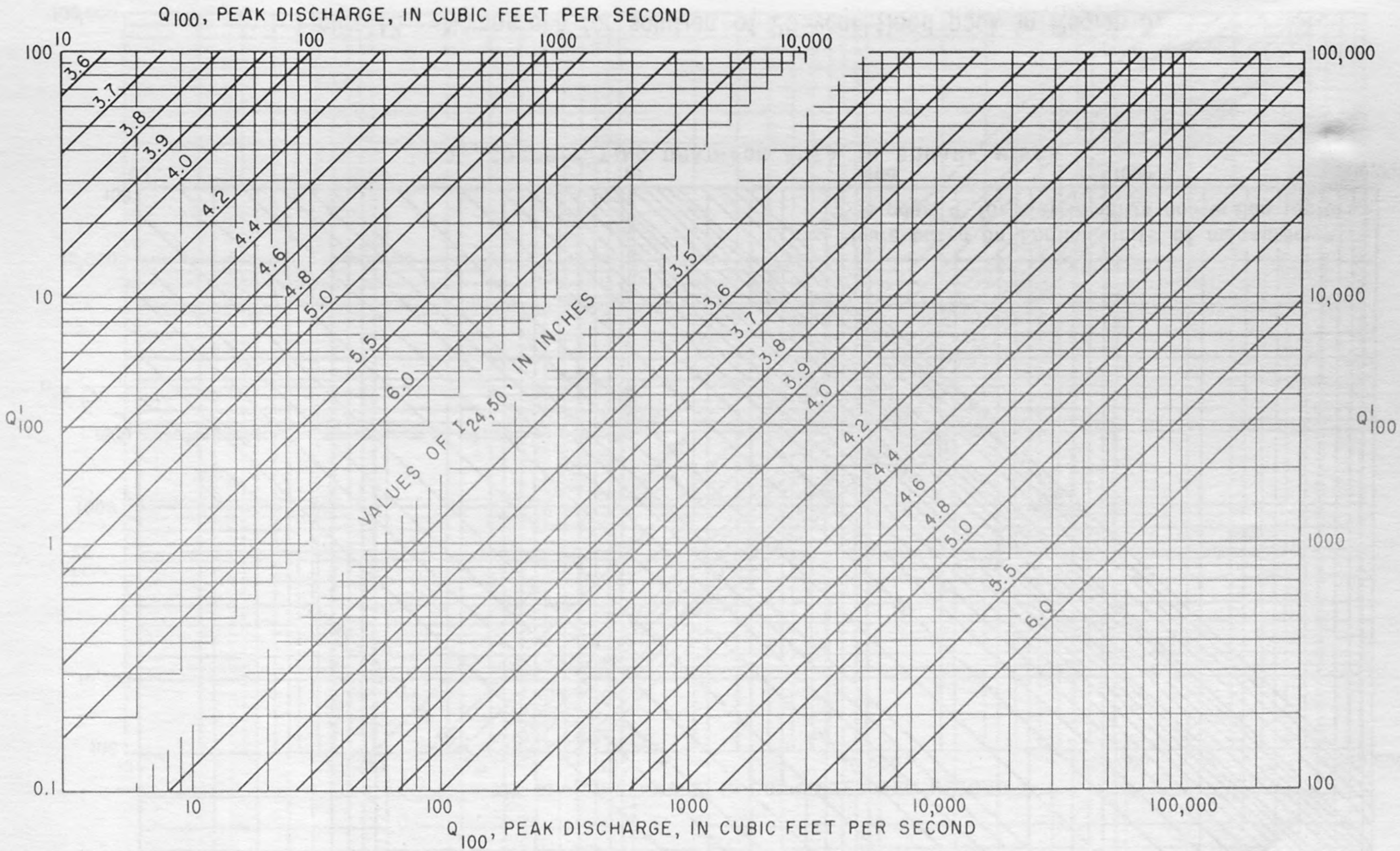


Figure 12.--Continued.

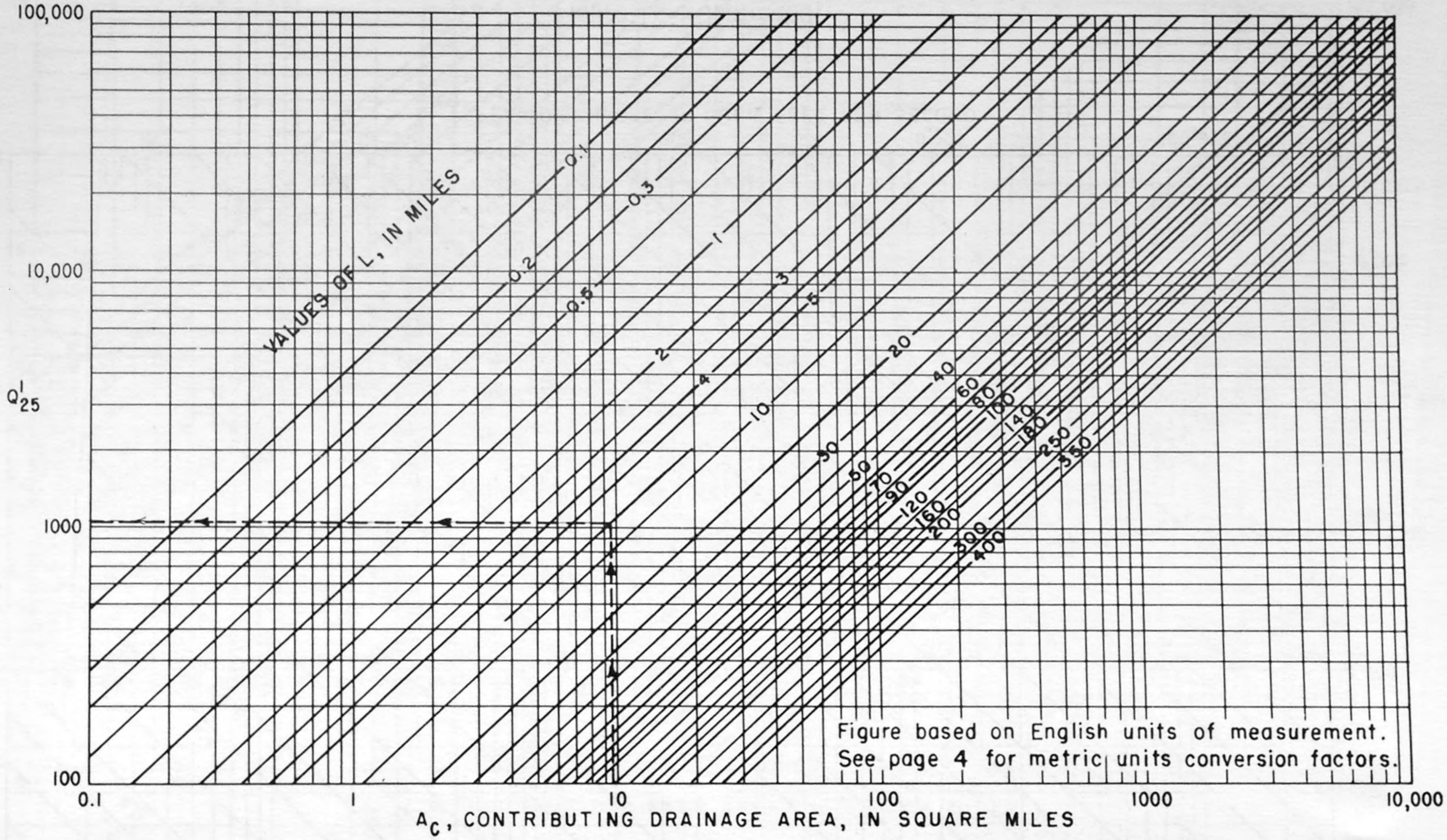


Figure 13.--Nomograph for solution of 25-year flood peak in Region 3.

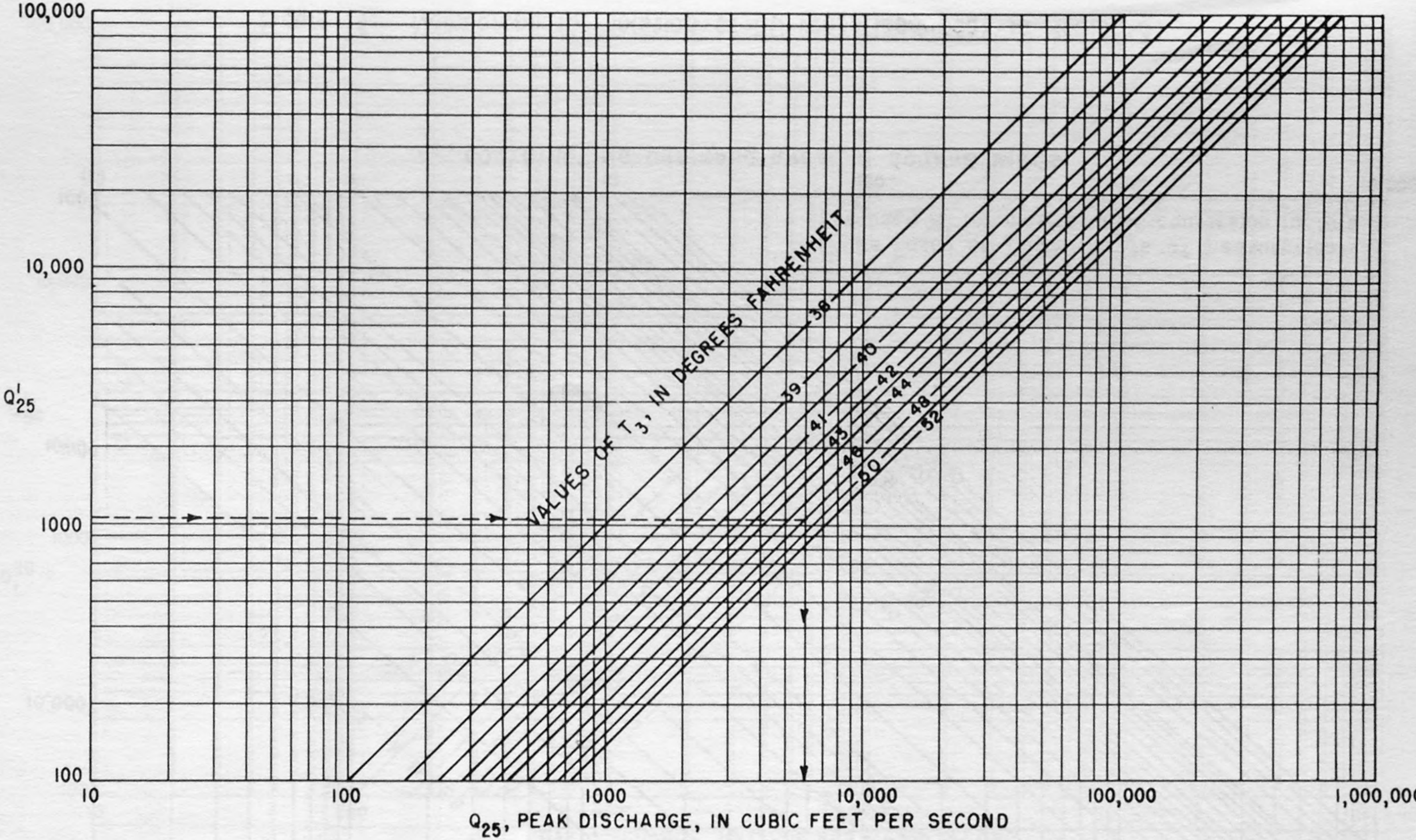


Figure 13.--Continued.

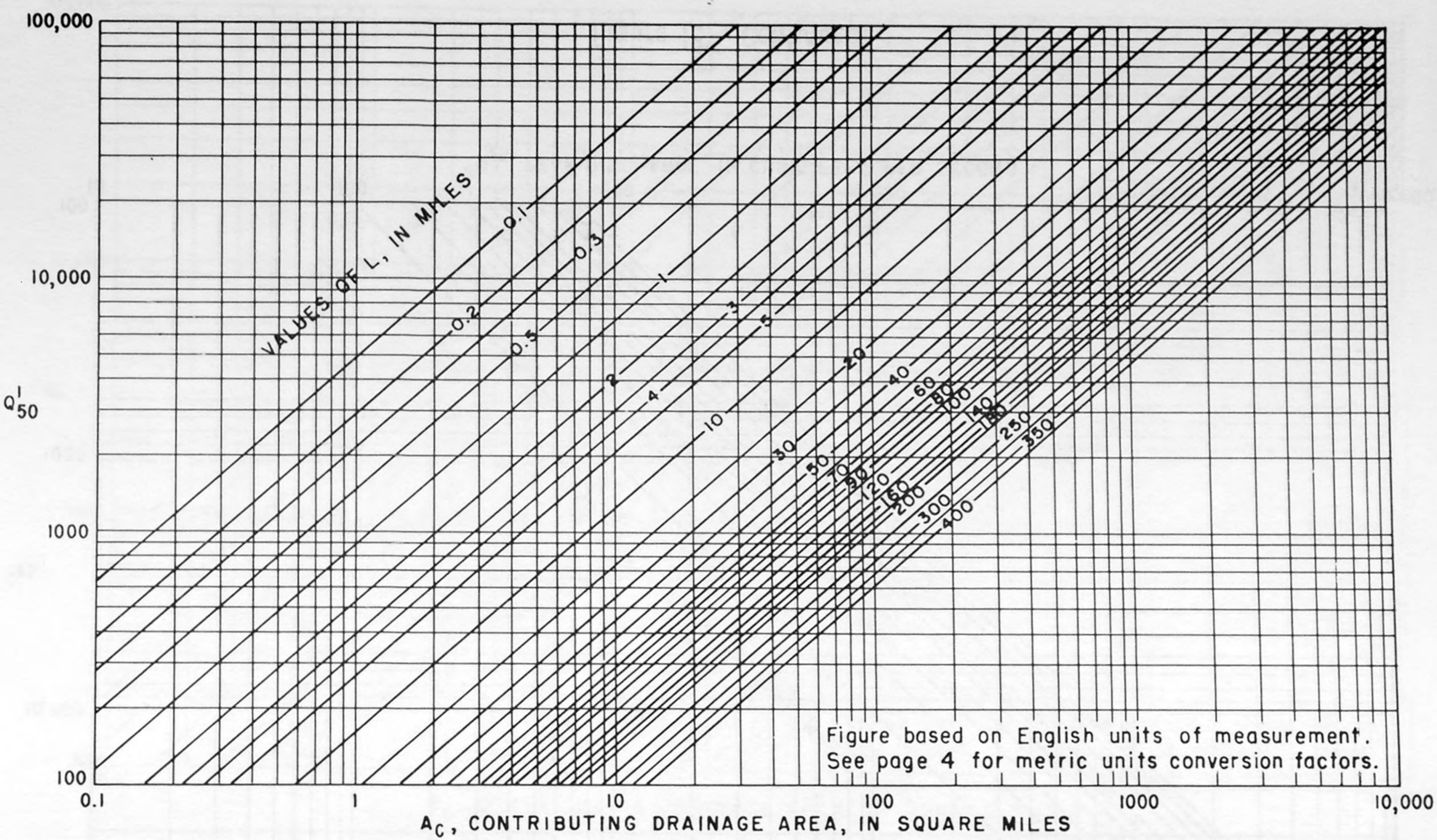


Figure 14.--Nomograph for solution of 50-year flood peak in Region 3.

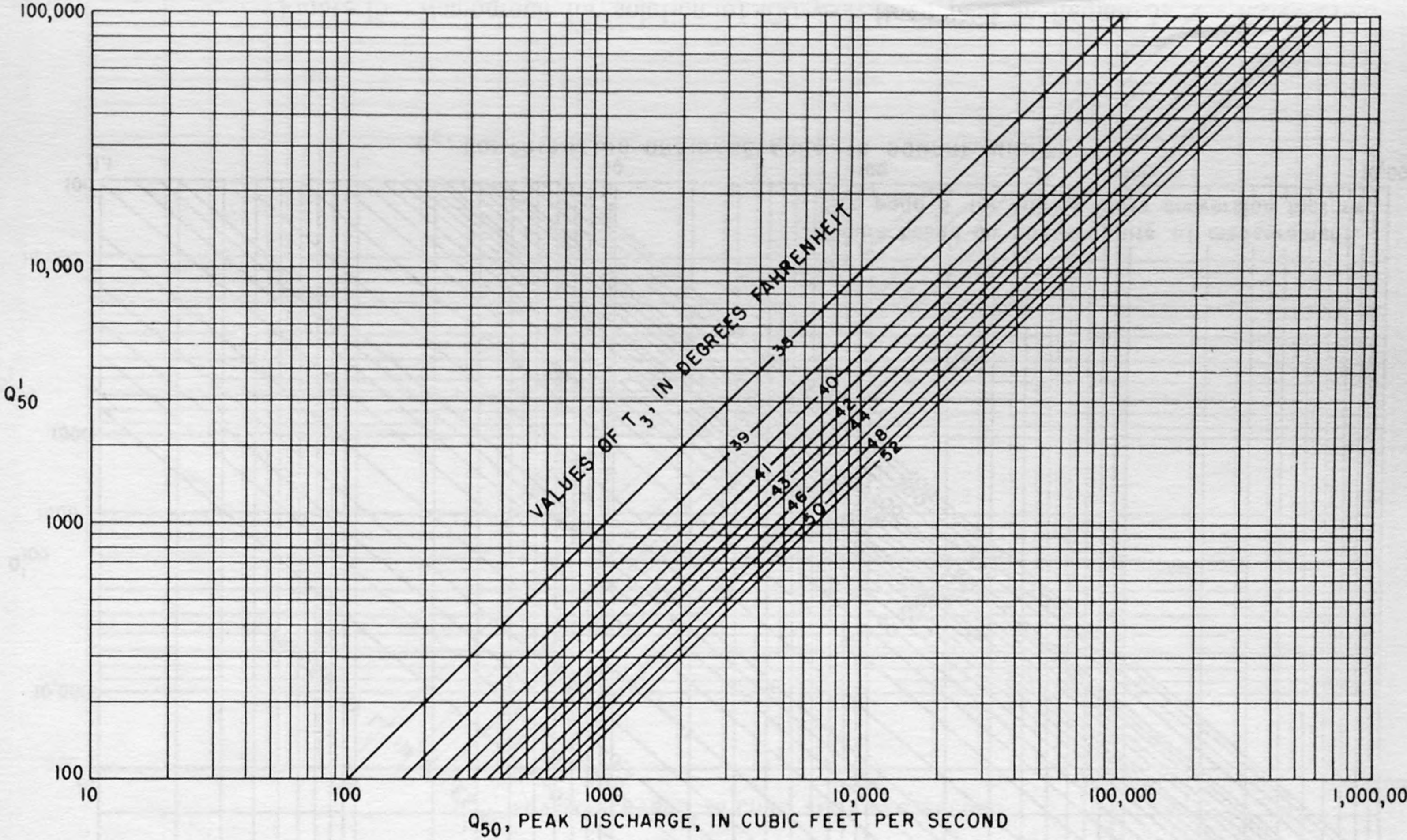


Figure 14.--Continued.

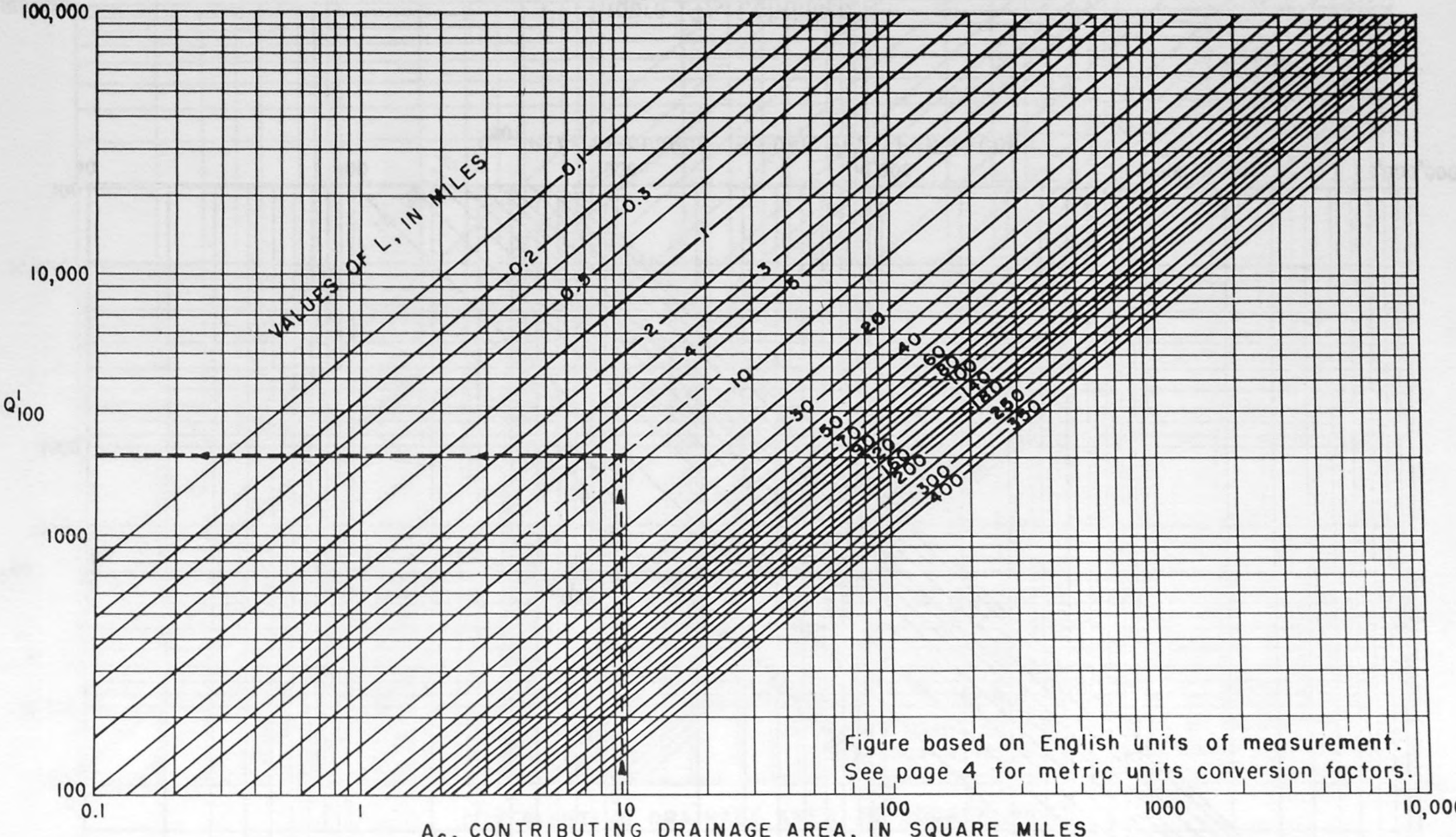


Figure 15.--Nomograph for solution of 100-year flood peak in Region 3.

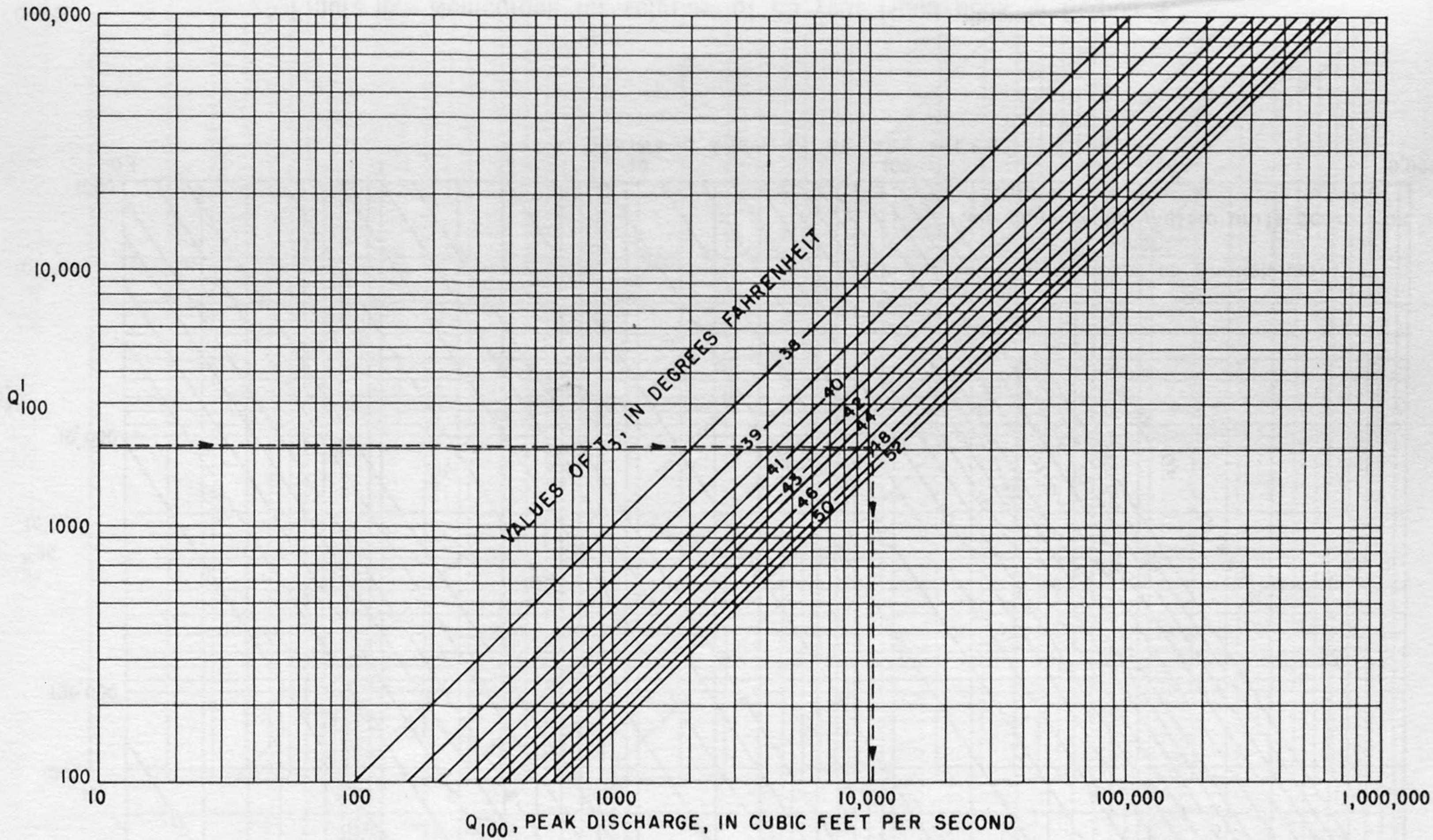


Figure 15.--Continued.

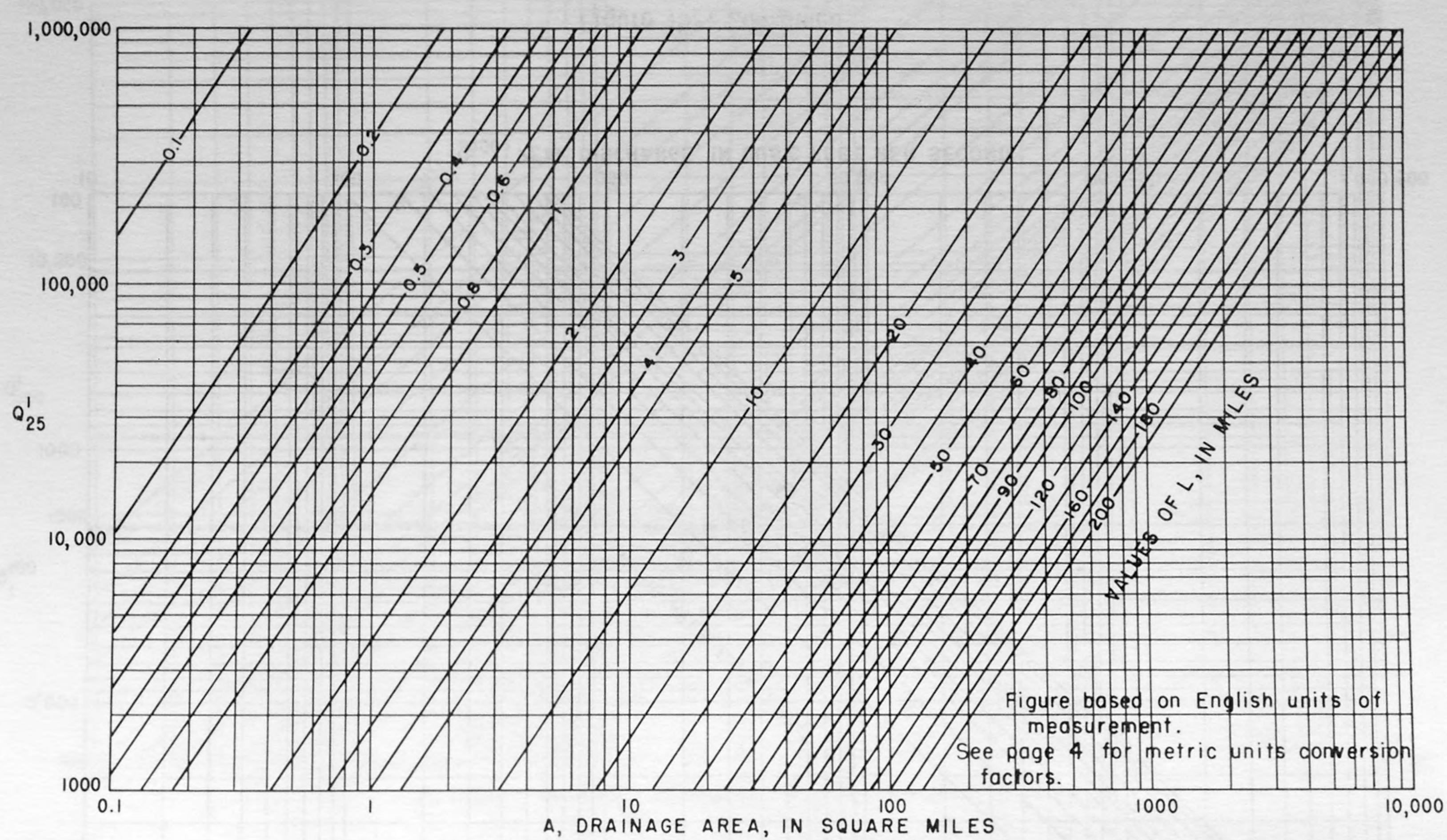


Figure 16.--Nomograph for solution of 25-year flood peak in Region 4.

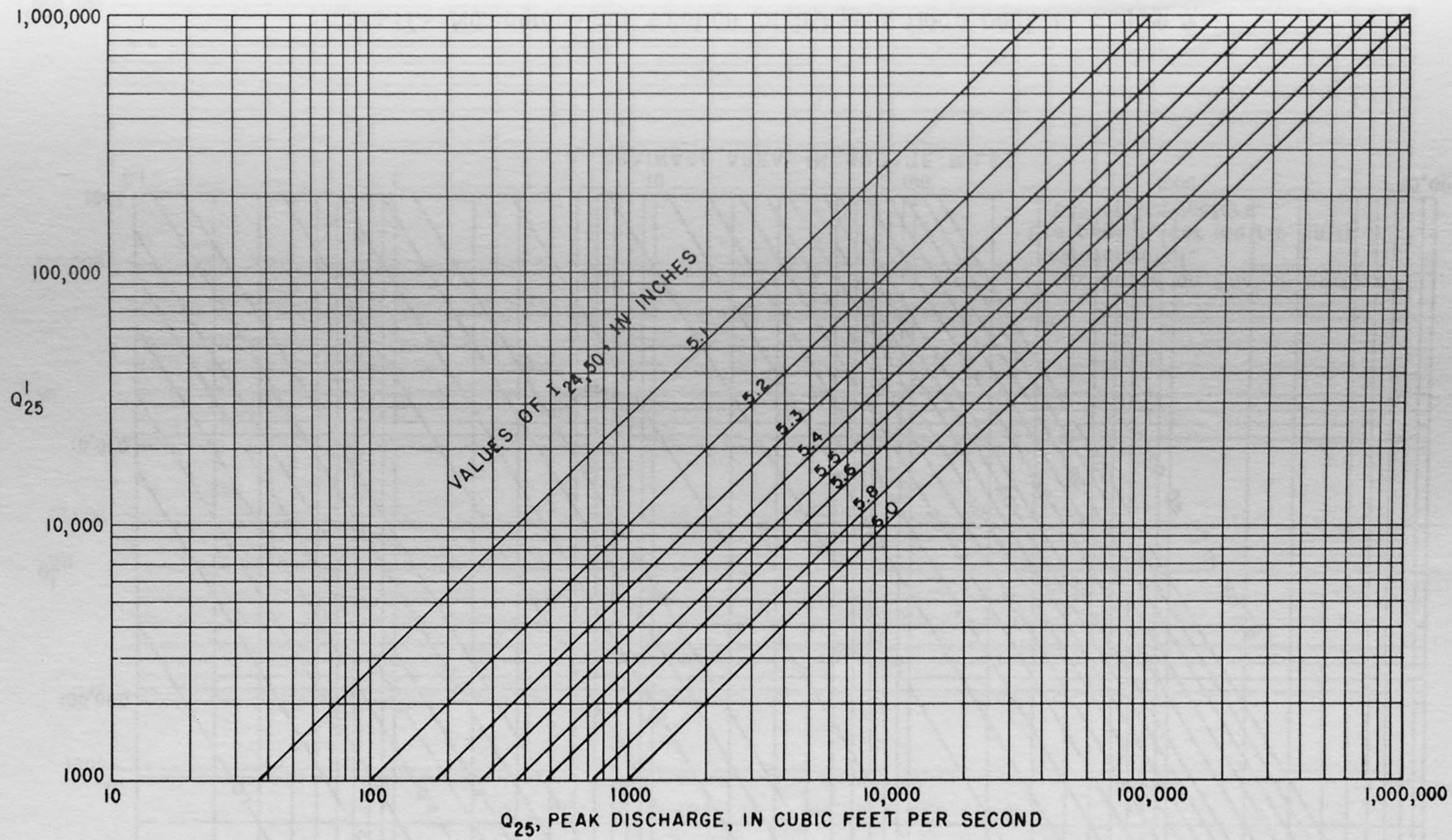


Figure 16.--Continued.

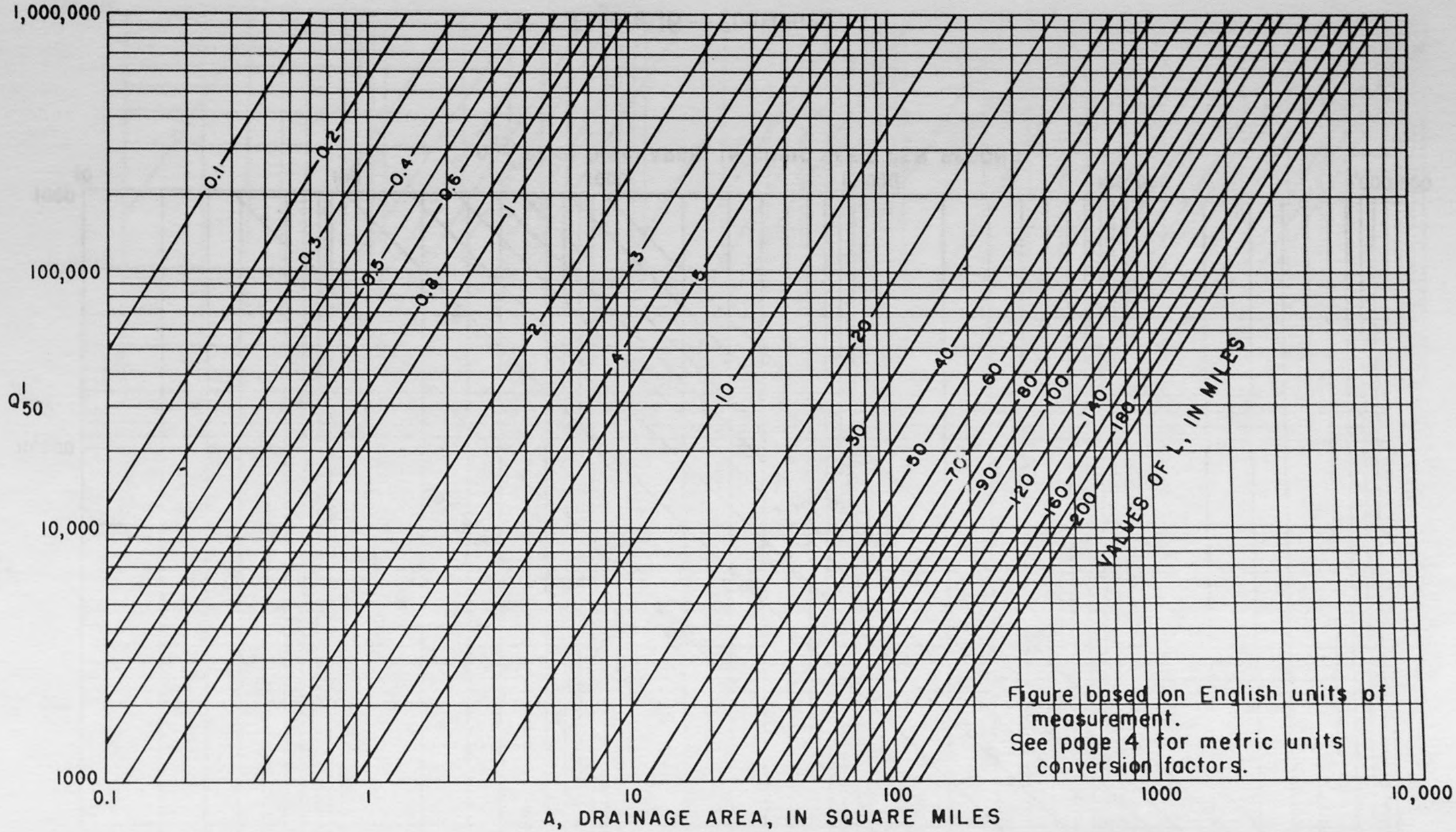


Figure 17.--Nomograph for solution of 50-year flood peak in Region 4.

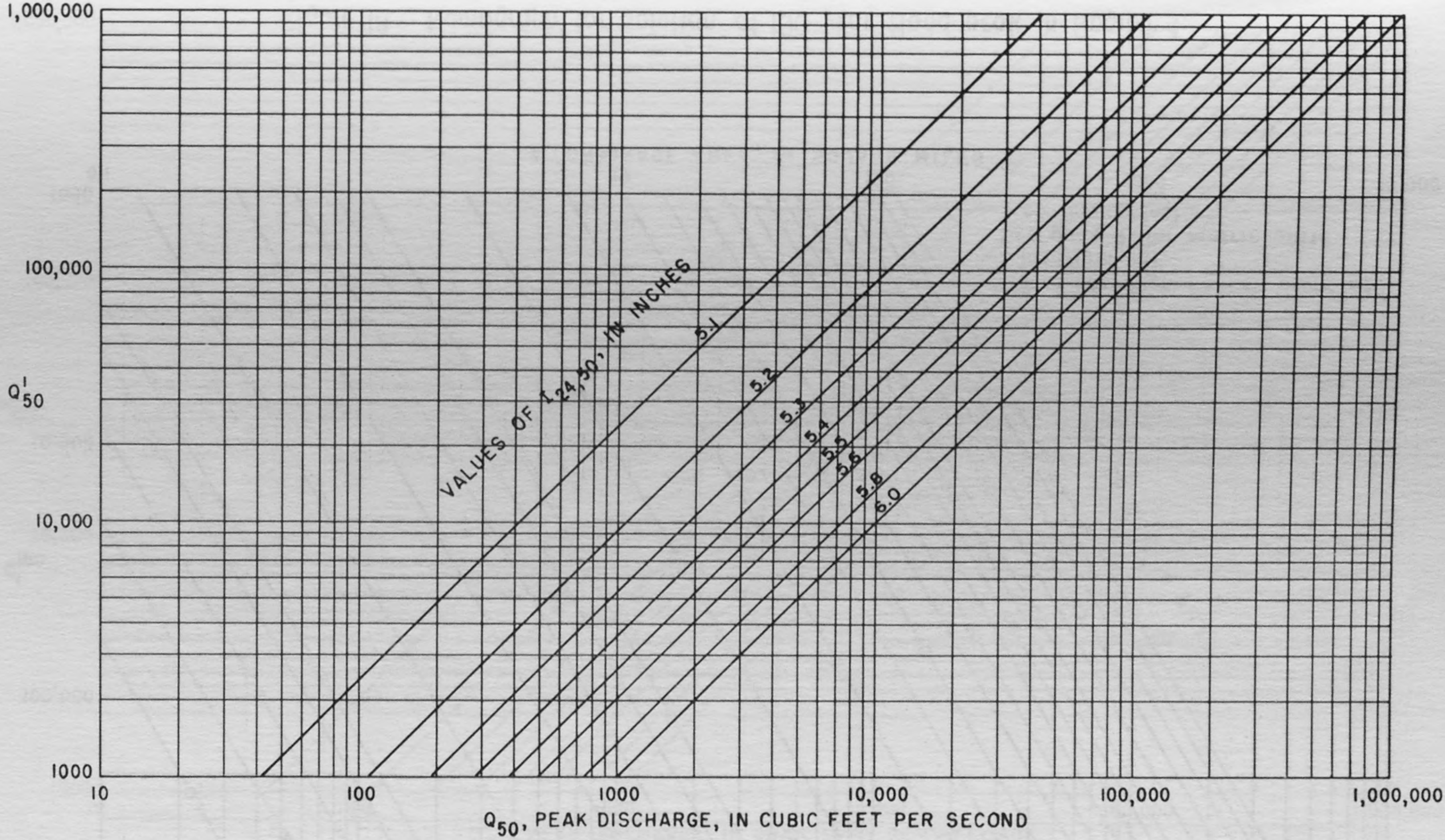


Figure 17.--Continued.

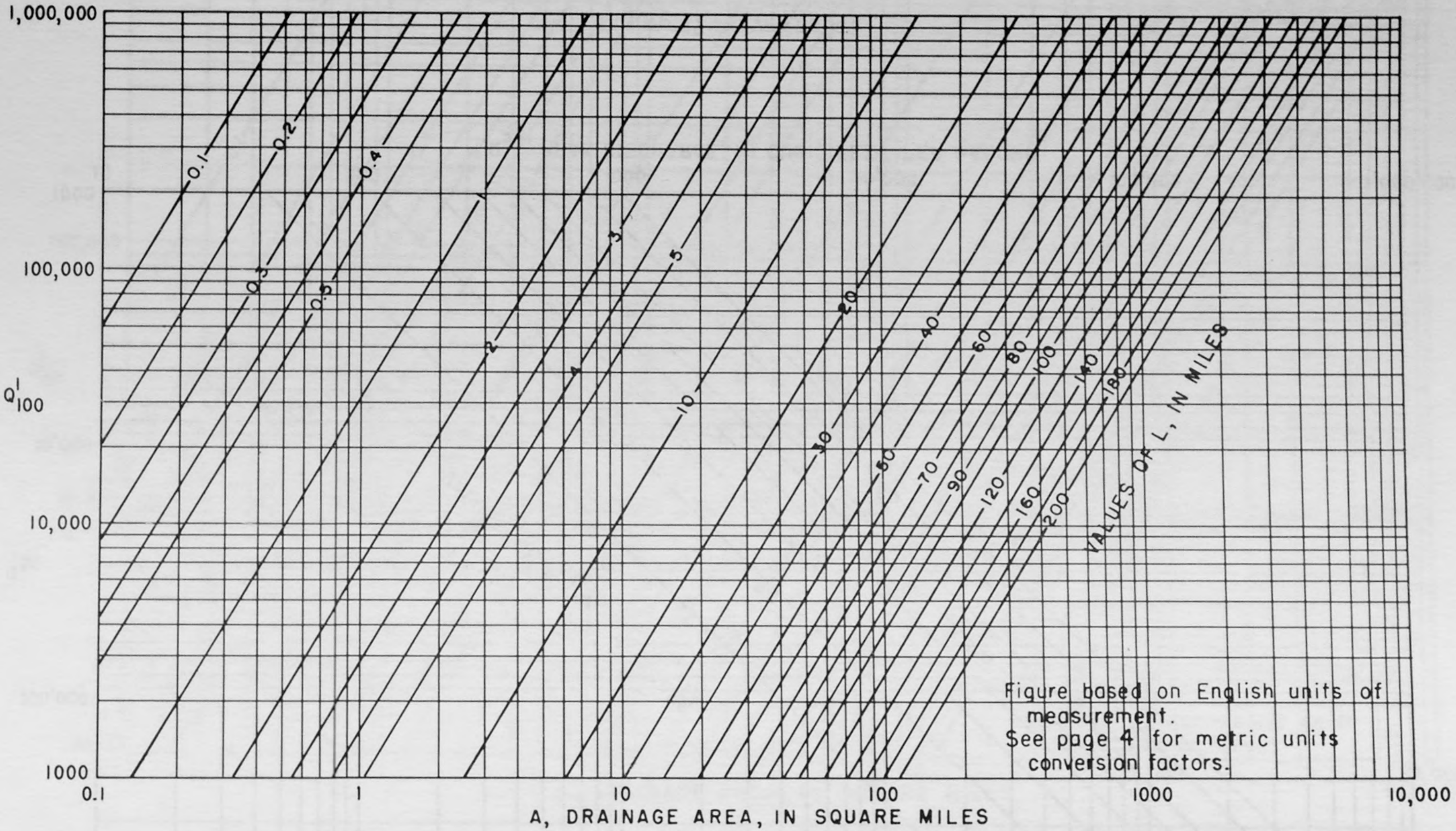


Figure 18.-- Nomograph for solution of 100-year flood peak in Region 4.

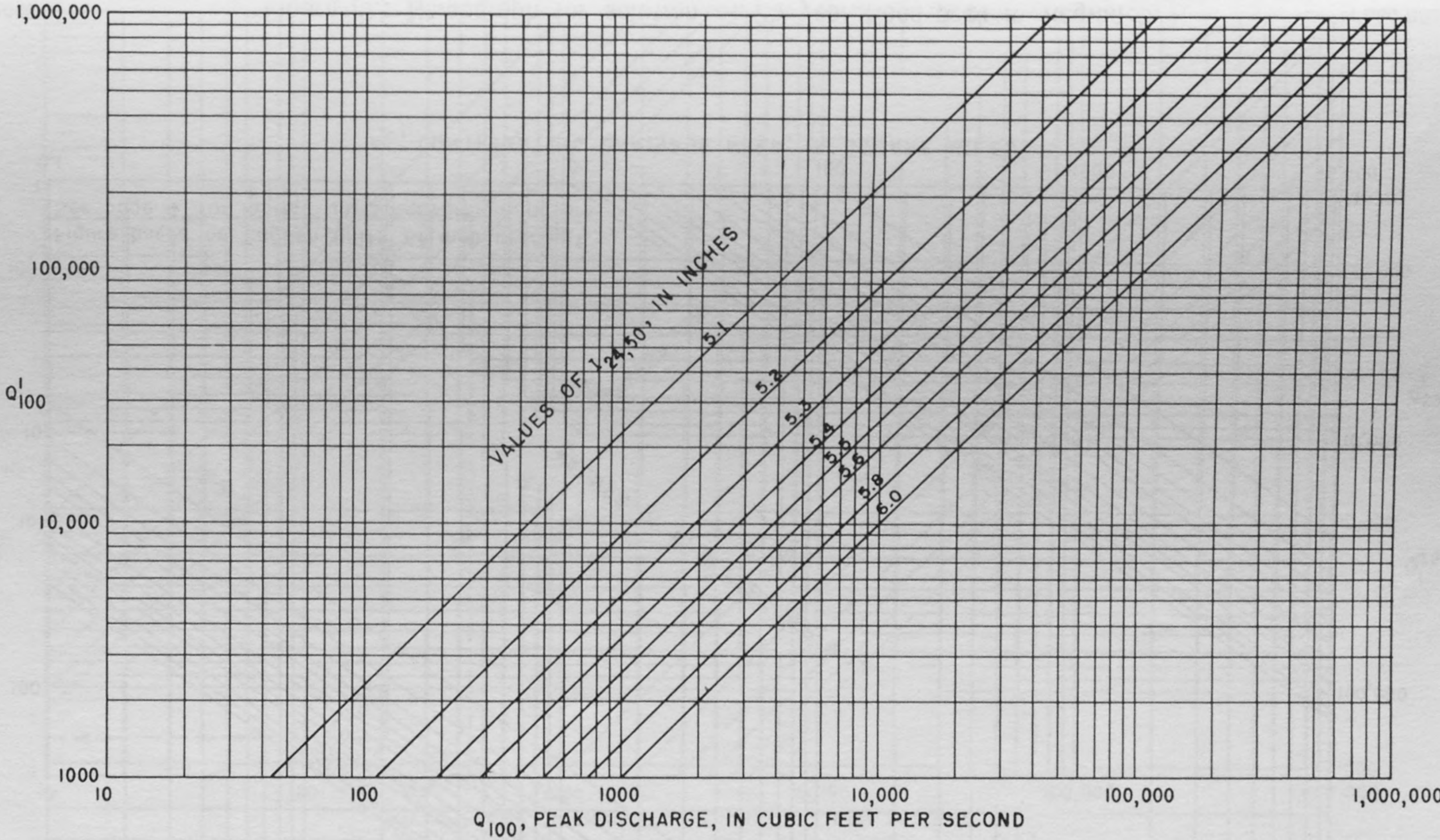


Figure 18--Continued.

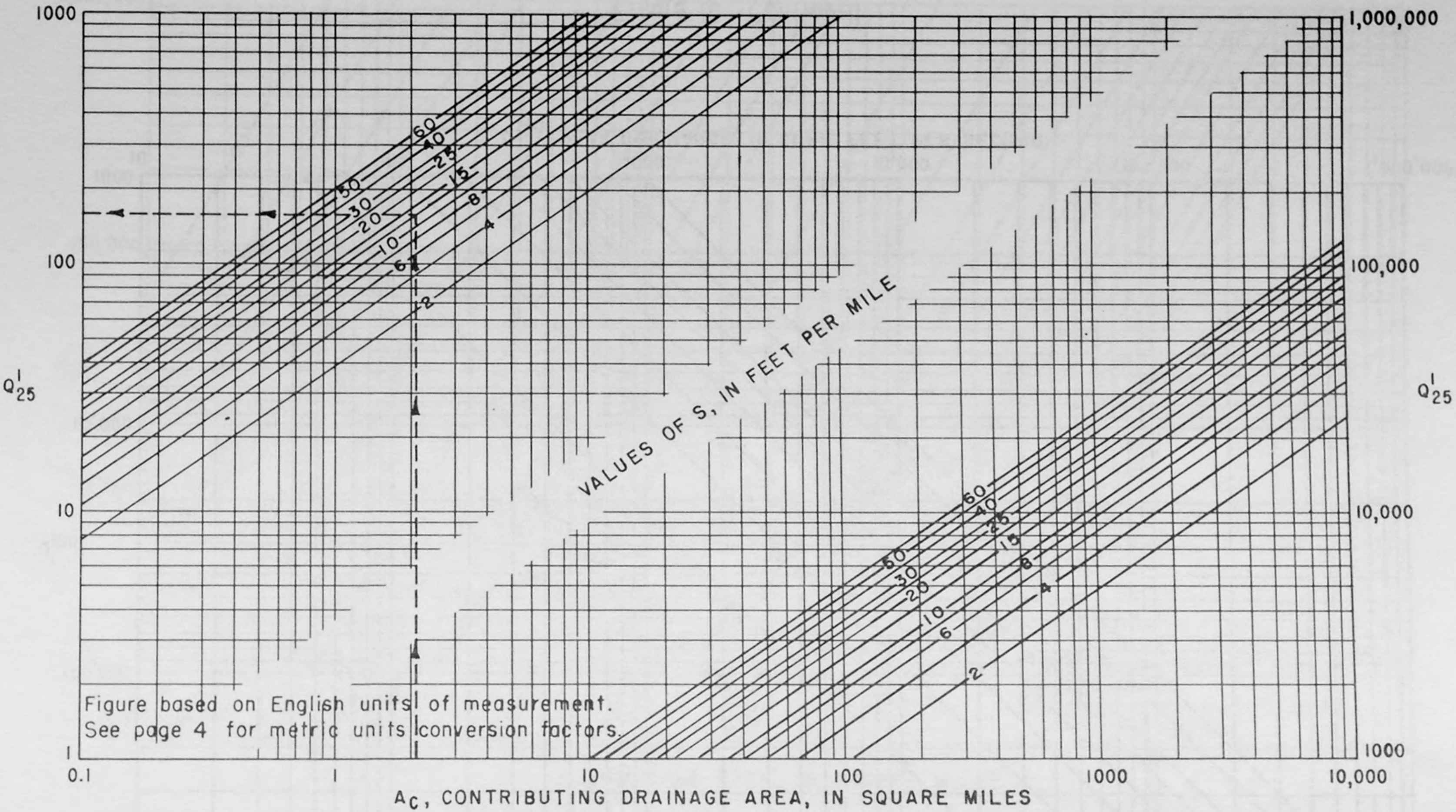


Figure 19.--Nomograph for solution of 25-year flood peak in Region 5.

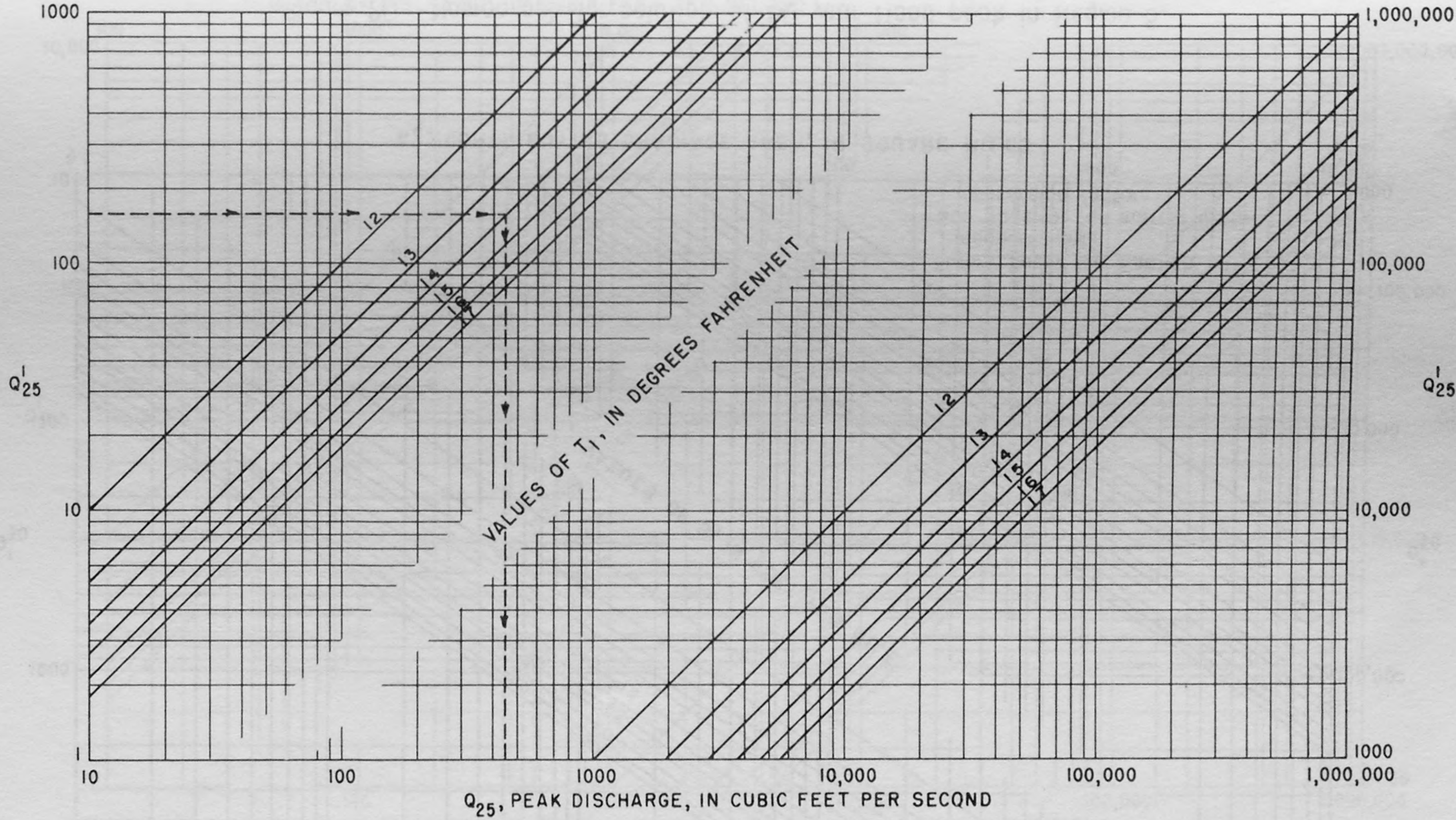


Figure 19.--Continued.

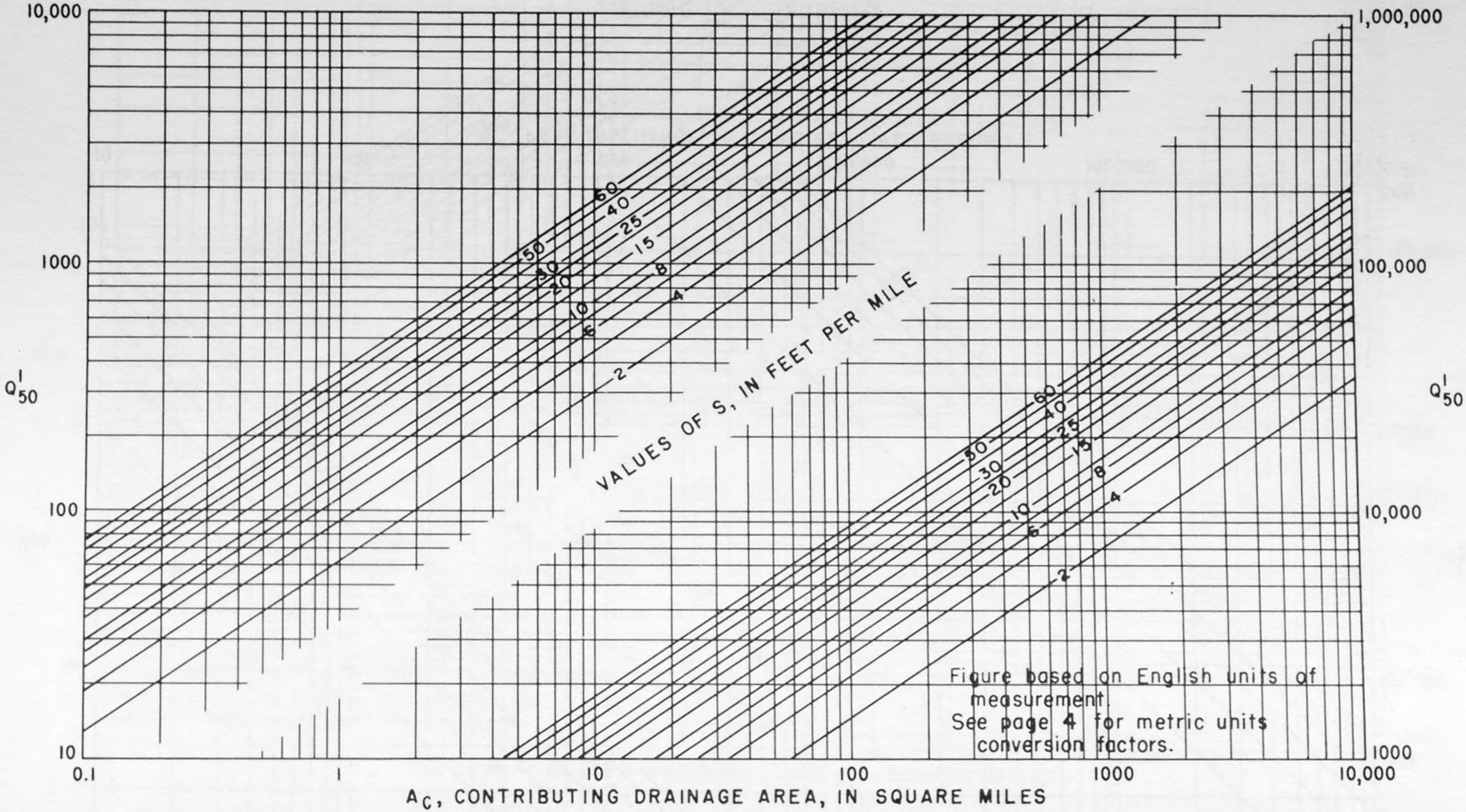


Figure 20.--Nomograph for solution of 50-year flood peak in Region 5.

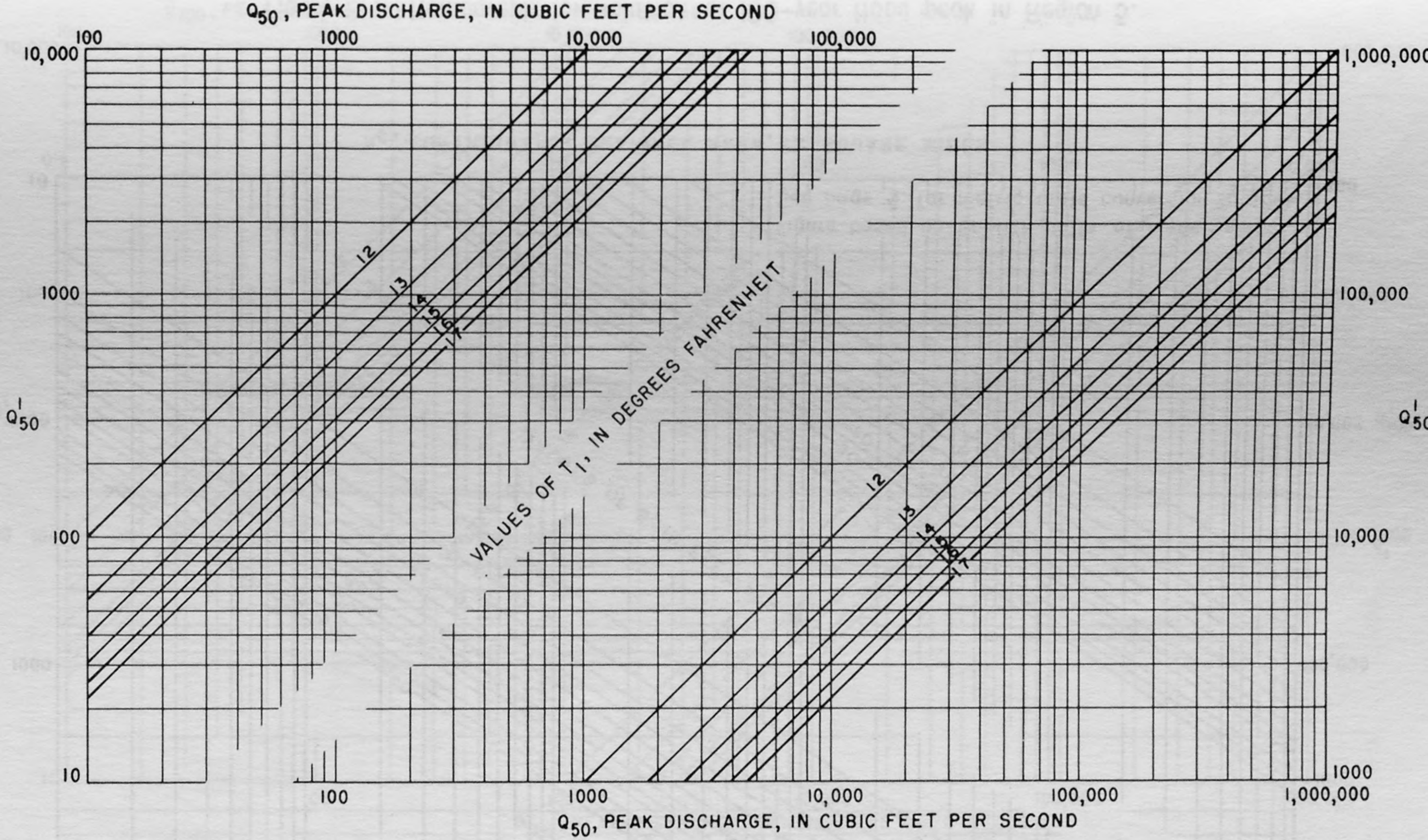


Figure 20.--Continued.

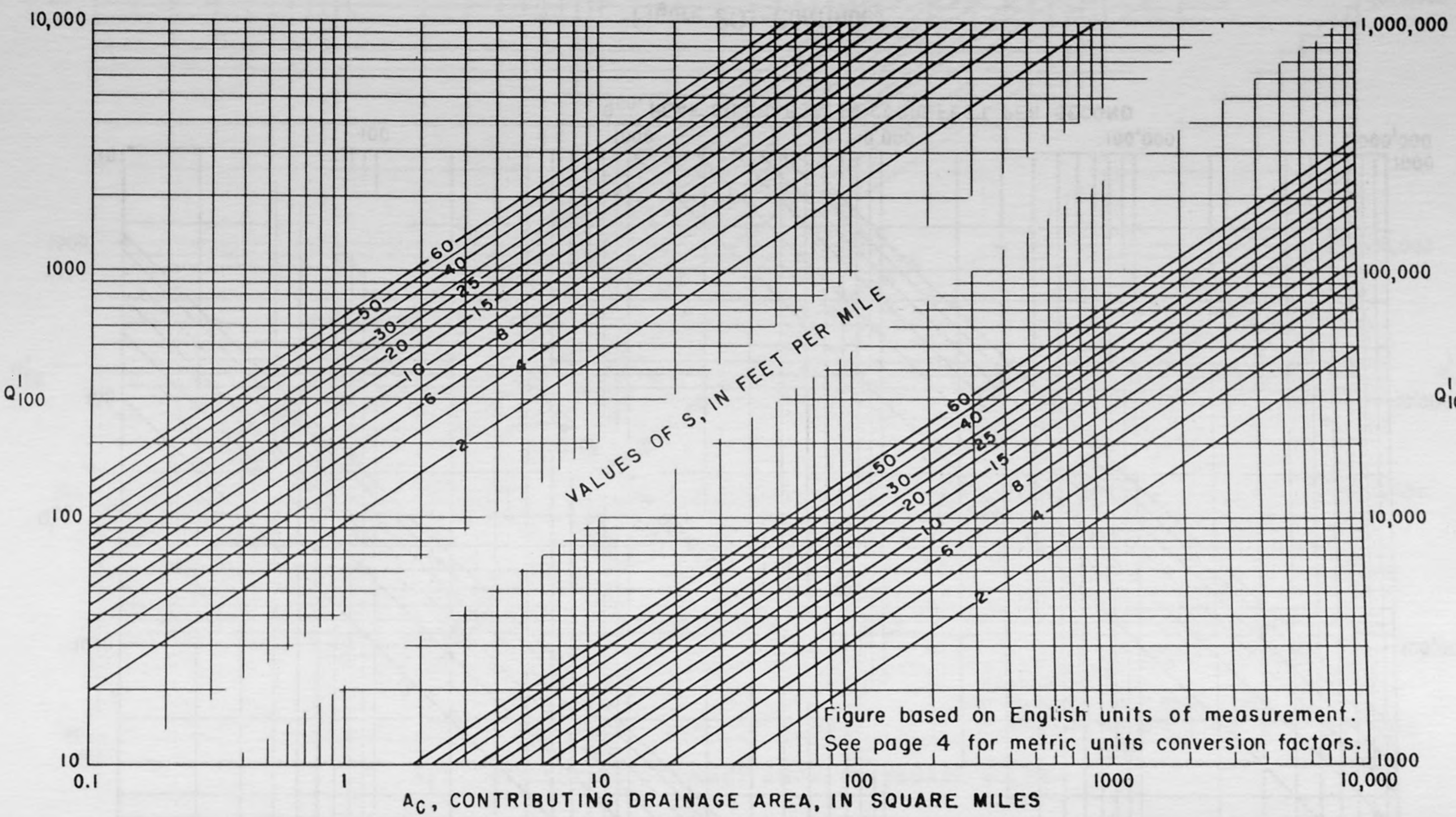


Figure 21.--Nomograph for solution of 100-year flood peak in Region 5.

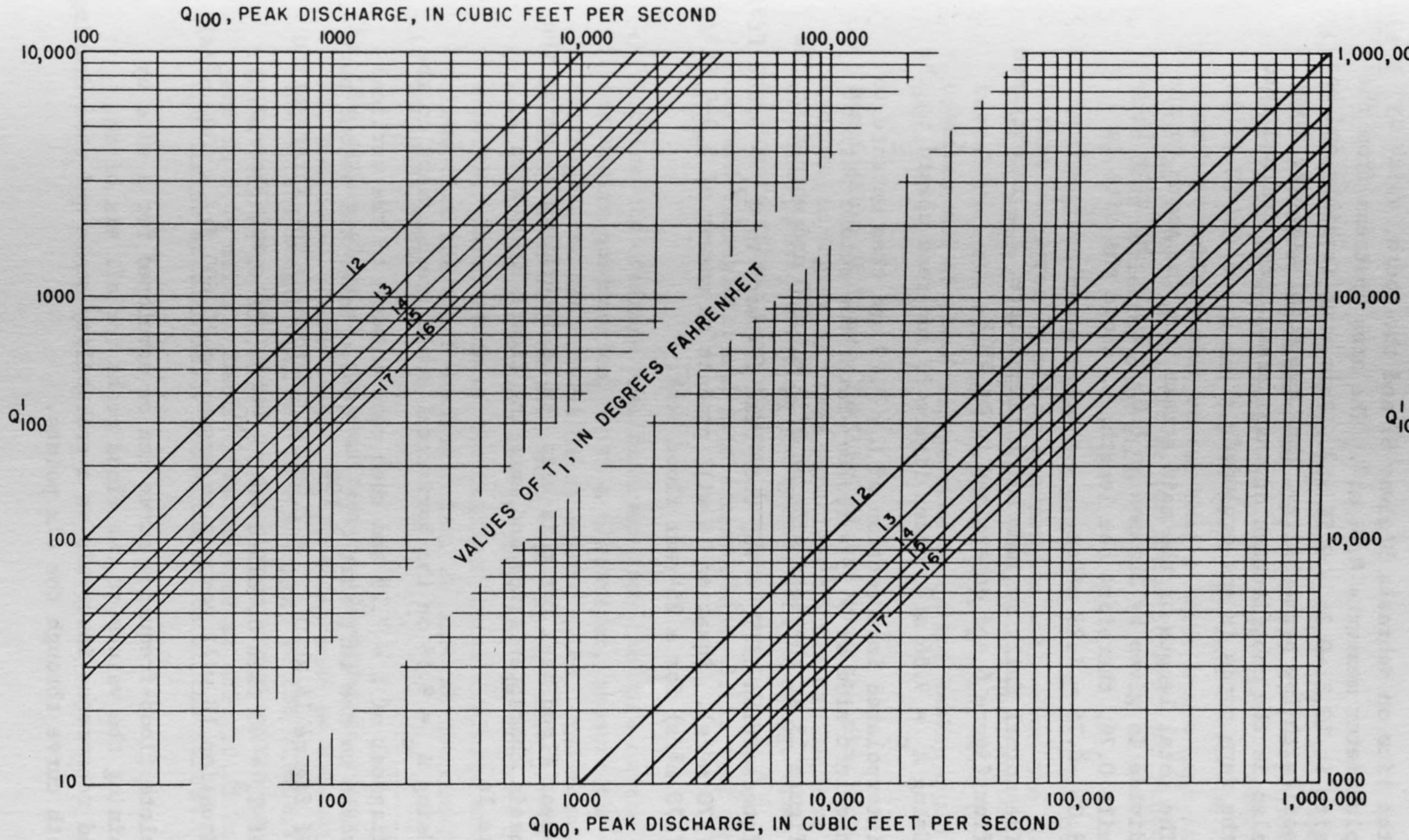


Figure 21.--Continued.

the site on Nebraska Highway 67 and the mouth, which by planimeter measures 0.74 mi^2. The area upstream from the site is 10.3 -0.74 = 9.56 mi^2. This area is hilly and has soil with low permeability, thus the total drainage area also is the contributing drainage area. Area drained into the farm ponds is not excluded.

(5) The total length of the main stream from the mouth to the divide is given by Jamison as 8.05 miles. The site is at mile 0.76, therefore the length, L, above the site is 8.05 -0.76 = 7.29 miles.

(6) The normal daily maximum March temperature, T_3, is obtained from figure 6 and determined to be 48°F.

(7) Using A_c = 9.56 mi^2, enter figure 13 and read upward to the interpolated intersection of L = 7.29 and then outward to the left side at Q'_{25} = 1,070. Enter the second part of figure 13 at the left side at Q'_{25} = 1,070 and across to the intersection of T_3 = 48, then read downward to Q_{25} = 6,000 ft^3/s (170 m^3/s). Equation 16 will produce an answer of 5,990 ft^3/s (170 m^3/s) for a 25-year flood peak.

Example 1b

A 100-year flood peak for this site can be determined by using the same basin characteristics and entering figure 15 at step 7, Example 1a

(7) Using A_c = 9.56 on the horizontal scale, read upward to the diagonal of L = 7.29 and then read outward to the vertical scale to the left that Q'_{100} = 2,060. Enter the second part of figure 15 at Q'_{100} = 2,060 and across to the intersection of T_3 = 48 then downward to Q_{100} = 10,500 ft^3/s (297 m^3/s). Equation 18 will compute an answer of 10,600 ft^3/s (300 m^3/s).

A complete flood-frequency curve can be developed for a site by determining the values of the flood peaks for all six of the defined recurrence intervals on a probability scale and then drawing a smooth curve through the six points.

Example 2

(1) The selected site is on Spring Creek tributary near Ruskin, Nebr., located in SE¼NE¼ sec. 25, T. 2 N., R. 5 W., Nuckolls County, at a culvert under the north-south county road, 2.3 mi (3.70 km) south and 2.5 mi (4.02 km) east of Ruskin. A search of table 5 will reveal that a crest-stage gage is located at this site. It is station 06883540, and records have been collected only since 1967.

(2) The topographic-map index for Nebraska indicates that the Ruskin and Byron 7½-minute quadrangles will cover the desired area of study. An examination of the Byron quadrangle will reveal that the site is located on this map but that the upstream end of the drainage area is on the Ruskin quadrangle map.

(3) Examination of figure 2 will indicate that the site is in Hydrologic Region 5. From equations 25 through 30, the required characteristics are contributing drainage area, A_c, in square miles; mean minimum January temperature, T_1, in degrees Fahrenheit; and main stream Slope, S, in feet per mile.

(4) Outline the drainage area upstream from the site on the Byron and Ruskin quadrangles. With a planimeter, measure the drainage area and convert it to square miles. The total drainage area will be 2.11 mi^2, which agrees with the drainage area published in table 5 and in other U.S. Geological Survey reports. Examination of the outlined total drainage area shows that the total drainage area, A, also is the contributing drainage area, A_c.

(5) The stream slope, S, is required; but in order to determine it, the total stream length, L, in miles must be determined. The stream length upstream from the gage to the divide is measured along the thread of the stream shown on the maps and is 3.44 miles. The site is located at mile 10.23 and the divide at mile 13.67 above the mouth of the stream.

The contour interval of the maps is 10 feet, so the mile location of each contour crossing the stream can be determined as follows:

Contour	Mile
1620	9.31
site	10.23
1630	10.37
1640	11.68
1650	12.49
1660	12.94
1670	13.31
1680	13.60
divide	13.67

The points of interest in determining the slope are at 10 percent and 85 percent of the distance from the site to the basin divide. These points are 0.10 x 3.44 = 0.34 and 0.85 x 3.44 = 2.92 miles above the site or equal to mile 10.23 + 0.34 = 10.57 and 10.23 + 2.92 = 13.15 on the stream. Interpolation from the tabulated figures above

$$\frac{10.57 - 10.37}{11.68 - 10.37} \times 10 + 1{,}630 = \frac{0.20}{1.31} 10 + 1{,}630 = 1{,}631.52 \text{ ft}$$

elevation at the 10 percent point.

$$\frac{13.15 - 12.94}{13.31 - 12.94} \times 10 + 1{,}660 = \frac{0.21}{0.37} 10 + 1{,}660 = 1{,}665.68 \text{ ft}$$

elevation at the 85 percent point.

The length of stream between the 10 percent and the 85 percent points is (0.85 -0.10) 3.44 = 2.58 miles. This can be checked by the previously determined points as 13.15 -10.57 = 2.58 miles.

The slope of the stream, S, is computed as

$$\frac{1{,}665.68 - 1{,}631.52}{2.58} = \frac{34.16}{2.58} = 13.2 \text{ ft per mile}$$

(6) The mean minimum January temperature, T_1, in degrees Fahrenheit for the drainage area near Ruskin is obtained from figure 5 and is determined as 14°F.

(7) Use A_c as 2.11 mi^2 to enter the horizontal scale of figure 19. Read upward to the intersection of S = 13.2 ft per mile and then across to the left to Q'_{25} scale for a value of 157. Reenter part 2 of figure 19 with the Q'_{25} value and move horizontally to T_1 = 14°F then read downward to the Q_{25} scale where a peak discharge of 450 ft^3/s (12.7 m^3/s) is determined for a 25-year recurrence interval. Equation 28, with the variables used in steps 4, 5, and 6, provides a value of Q_{25} = 460 ft^3/s (13.0 m^3/s) as a check against the graphical solution from figure 19.

The nomographs in figures 20 and 21 will provide the peak discharges for Q_{50}, and Q_{100}. The peak discharges for Q_2, Q_5, and Q_{10} can be determined from equations 25, 26, and 27 found on page 23.

LIMITATION AND ACCURACY OF RELATIONS

The relations used in the preceding equations 1 through 30 and the nomograph solutions shown in figures 7 through 21 are not applicable to streams affected by regulation or urbanization.

Equations and nomographs for Hydrologic Regions 1, 3, 4, and 5 are applicable for any size natural drainage area greater than 0.1 mi^2 (0.259 km^2) contributing drainage area. Equations and nomographs for Hydrologic Region 2 are recommended only for contributing drainage areas greater than 10 mi^2 (25.90 km^2).

Streams that start in Region 2 retain that region's characteristics for their entire length and equations developed for Region 2 must be applied to those main streams as they flow through the corridors between parts of Regions 1, 3, and 4 as shown in figure 2.

Stations located in states adjacent to Nebraska were used in the study to support Nebraska data. The relations developed are applicable to natural-flow streams located in Nebraska or that flow into Nebraska from an adjacent state, but they are not intended for use in developing the flood-frequency relations of streams in adjacent states.

The reliability of flood estimates at ungaged sites is based on the relations established and is indicated indirectly by the standard error of estimate. These values for each of the six flood levels in each of the five regions is given in the following table.

Region	Flood level	Standard error of estimate, in percent	
		Mean	Range
1	Q_2	102	+146, -59
	Q_5	67	+88, -47
	Q_{10}	65	+84, -46
	Q_{25}	72	+96, -49
	Q_{50}	85	+116, -54
	Q_{100}	98	+139, -58
2	Q_2	76	+100, -50
	Q_5	60	+76, -43
	Q_{10}	60	+77, -43
	Q_{25}	66	+87, -46
	Q_{50}	75	+100, -50
	Q_{100}	84	+115, -54
3	Q_2	51	+63, -39
	Q_5	38	+45, -31
	Q_{10}	37	+43, -30
	Q_{25}	41	+48, -33
	Q_{50}	46	+56, -36
	Q_{100}	52	+65, -39
4	Q_2	54	+67, -40
	Q_5	43	+52, -34
	Q_{10}	45	+54, -35
	Q_{25}	51	+63, -39
	Q_{50}	57	+73, -42
	Q_{100}	65	+84, -46
5	Q_2	35	+41, -29
	Q_5	23	+26, -20
	Q_{10}	22	+25, -20
	Q_{25}	26	+30, -23
	Q_{50}	32	+37, -27
	Q_{100}	37	+44, -31

In each region, Q_5 or Q_{10} have the best standard error of estimate and Q_{100} and Q_2 generally have the poorest standard error of estimate.

At or near gaged sites, the design engineer may use flood magnitudes based on estimated relations, or he may choose to use streamflow characteristics based on records collected at that site. In making the decision, the standard error of estimate should be considered. Use of data from gaged sites with short records is probably less desirable than the use of estimated relations, especially in Hydrologic Regions 2, 3, 4, and 5. Long records at a site may provide a more accurate answer than the estimated relations, particularly in Hydrologic Region 1. For a desired site located between two gage sites, each having relatively long records, an interpolation of flood magnitudes based on drainage area should be considered in preference to estimated relations.

REGULATED STREAMS

Forty-four gaging stations are located on controlled streams, and part of the record for 5 other stations was obtained after the streams on which they are located were controlled. These stations are designated with an "a" in the "Region" column of tables 1 and 3.

North Platte River

Records from the 10 stations on the North Platte River are of variable length; some began as early as 1895. However, changes in controls have been made over the years. Glendo Reservoir, which started filling October 17, 1957, probably does not have a major effect on flood peaks in the North Platte River in Nebraska. The other reservoirs were in operation before 1941, so available records from the 10 stations for the period 1941-72 were used for developing station flood-frequency curves. The control during this period of record was consistent enough to represent present conditions and for projection into the future if there are no additional changes in controls. Magnitude and frequency of floods in the North Platte River are given in figure 22.

The Corps of Engineers defined an Intermediate Regional Flood as one having an average frequency of occurrence in the order of once in 100 years. They made a flood study at North Platte (1973b) and at Scottsbluff (1975) in which an Intermediate Regional Flood was defined as 13,500 ft^3/s (382.32 m^3/s) and 18,500 ft^3/s (523.92 m^3/s), respectively. These values are plotted on figure 22.

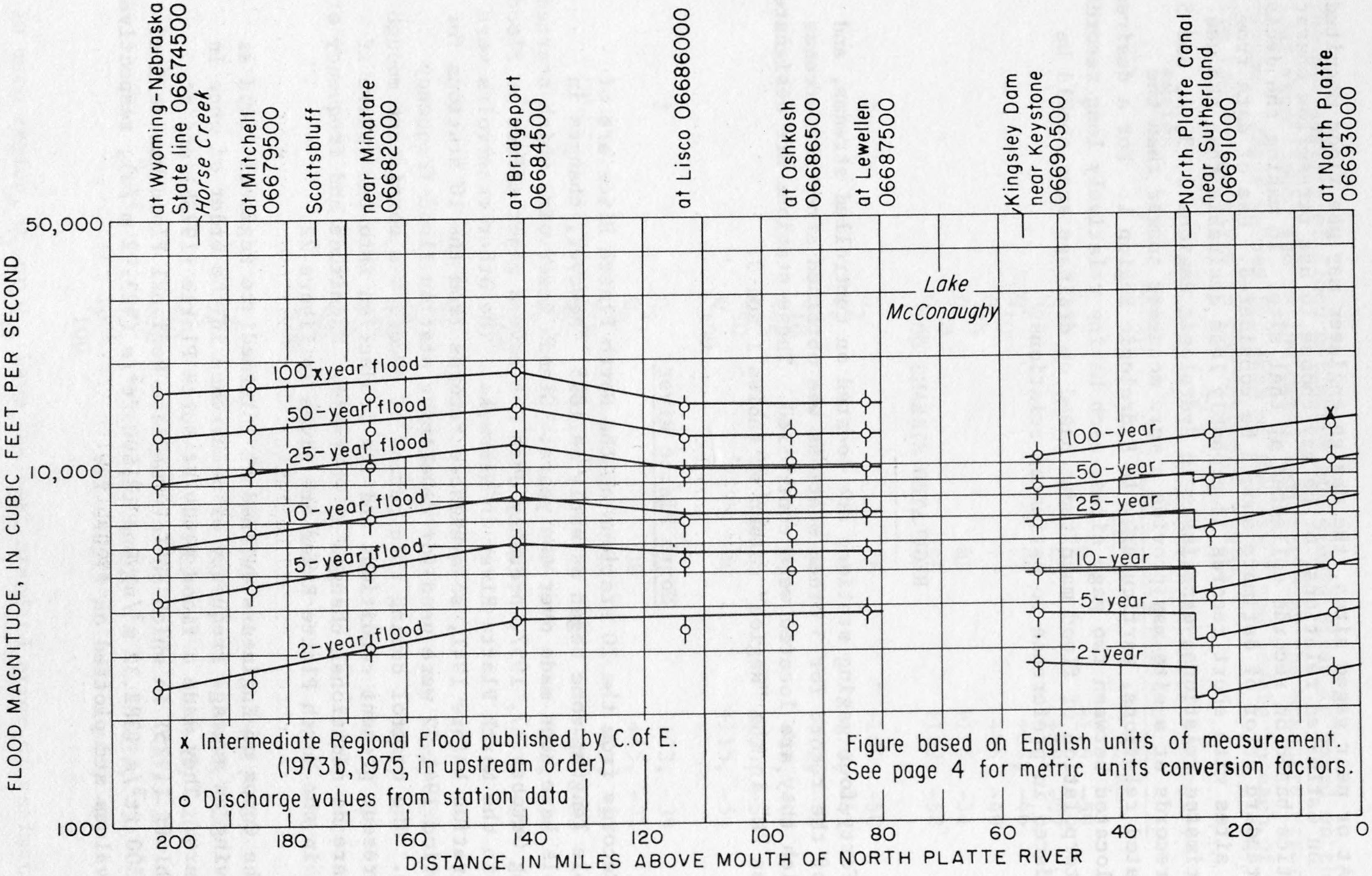


Figure 22.--Flood frequency for North Platte River downstream from Wyoming-Nebraska State line.

South Platte River

The South Platte River was controlled by man prior to the collection of streamflow records. Therefore, records available are considered applicable for predicting future flood peaks under present controlled conditions. Four stations are used for analysis. Flood magnitudes computed are plotted against the location of the station by river miles above the mouth (fig. 23).

The Corps of Engineers (1973b) defined an Intermediate Regional Flood on the South Platte River at North Platte as having a magnitude of 60,000 ft^3/s (1,699.20 m^3/s).

Platte River

The Platte River is all within Nebraska, extending from the confluence of the North Platte and South Platte Rivers to the confluence of the Platte and Missouri Rivers near Plattsmouth. Numerous tributaries enter the Platte River in this 310.1 mi (498.95 km) of river channel. The major tributaries are Salt Creek which enters at mile 25.7, Elkhorn River which enters at mile 32.5, and Loup River which enters at mile 103.8.

The reach of the Platte River from the confluence of the North and South Platte Rivers to the mouth of the Loup River has six gaging stations. Computations for each station, using only the records from 1941-72, indicate fair agreement among the six stations. An examination of records from the South Platte and Platte Rivers shows that the larger floods in the Platte River upstream from the Loup River usually are generated from South Platte River drainage.

The above findings suggest that only the three longest records obtained from these six Platte River stations should be used. Stations 06768000, 06770500, and 06774000 are the longer records. The latter station has the longest record beginning when conditions were uncontrolled. The first 14 annual peak discharges for station 06774000 are consistently higher than any other period in the station record and should be eliminated because they are from totally uncontrolled conditions. Values from the station analysis plotted against the location of the station by river miles above the mouth are shown in figure 24. Relations shown by the curves in figure 24 agree reasonably with those of the Missouri River Basin Commission (1975).

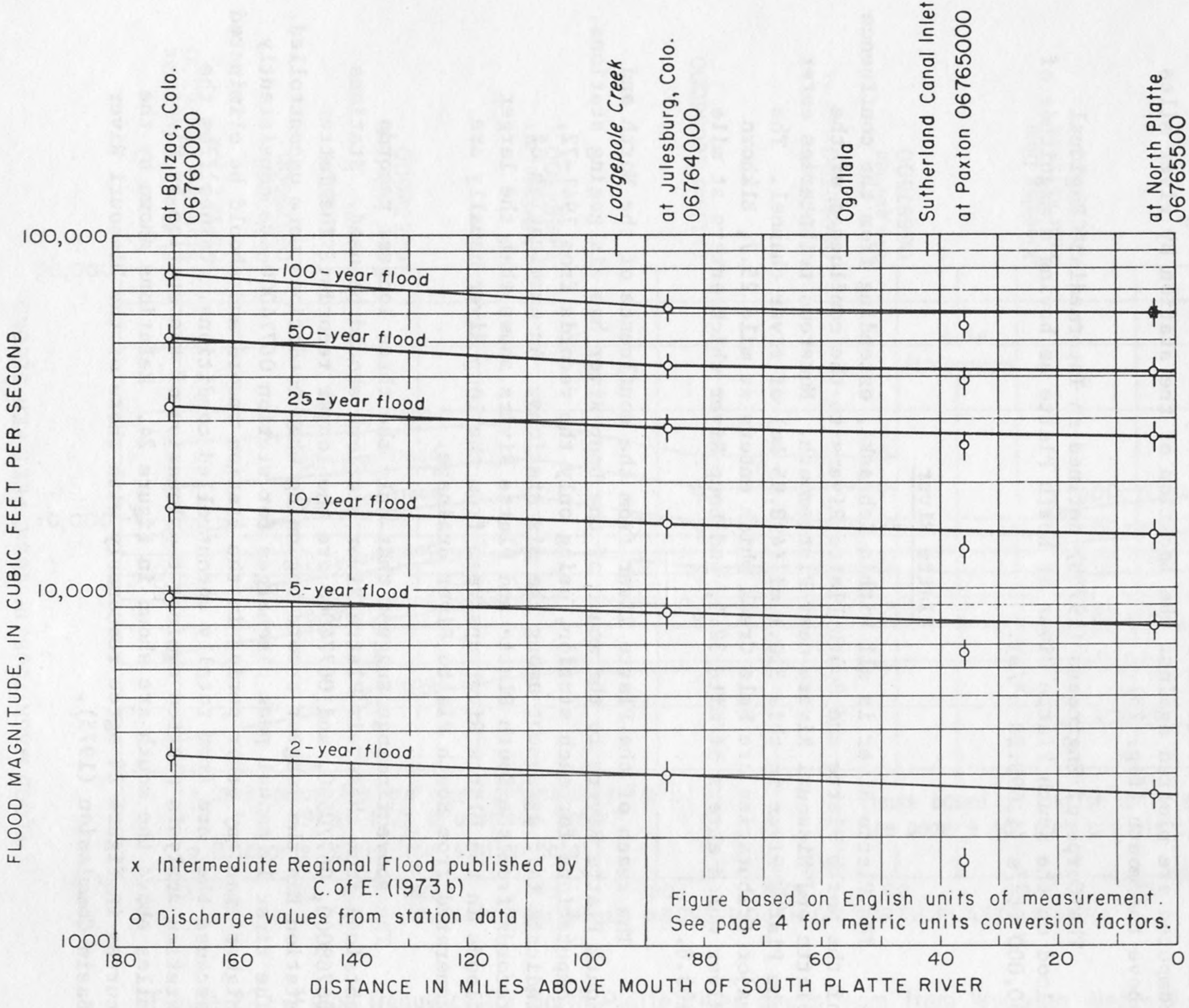


Figure 23.--Flood frequency for South Platte River downstream from Balzac, Colo.

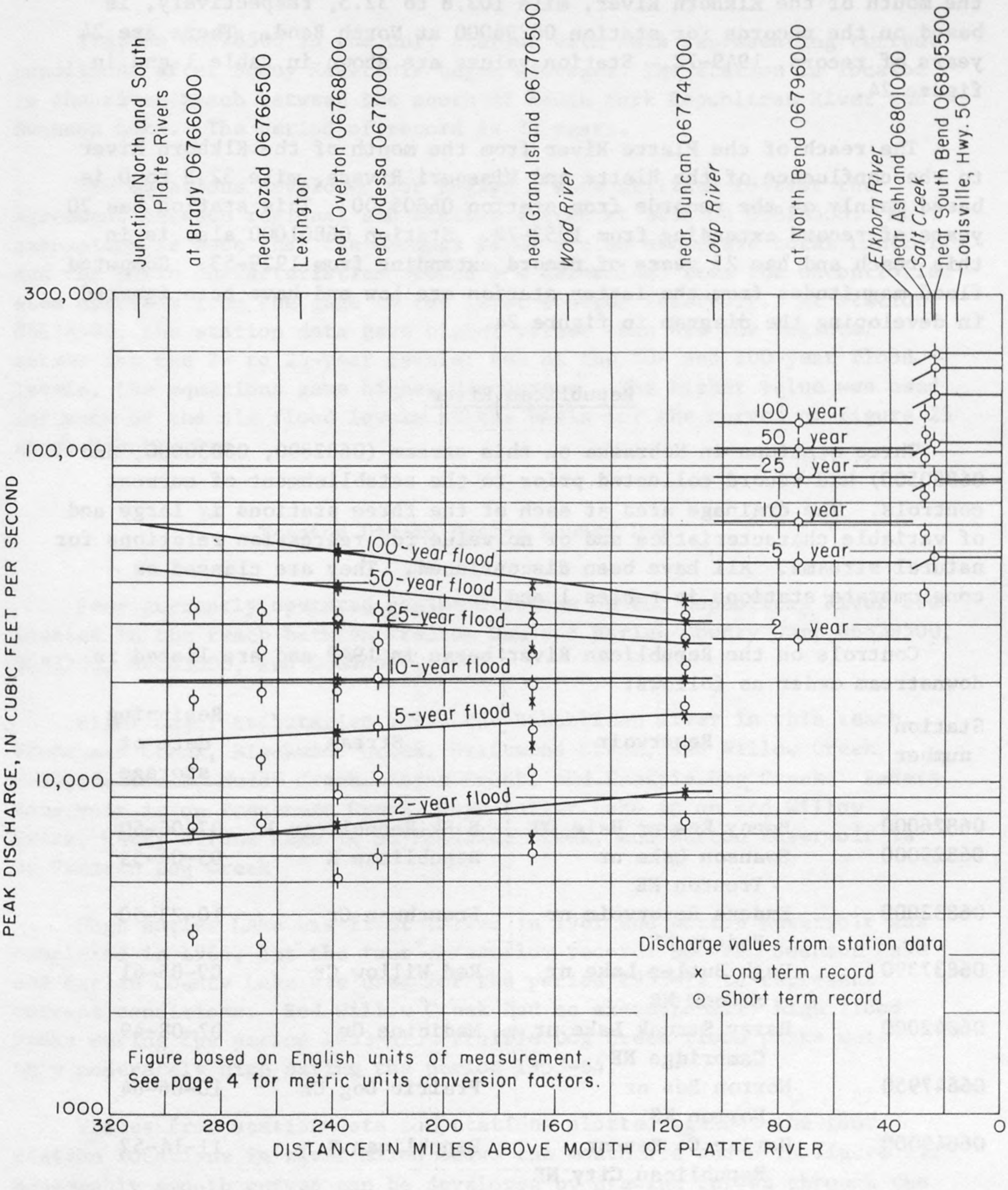


Figure 24.--Flood frequency for Platte River downstream from junction of North Platte and South Platte Rivers.

The reach of the Platte River from the mouth of the Loup River to the mouth of the Elkhorn River, mile 103.8 to 32.5, respectively, is based on the records for station 06796000 at North Bend. There are 24 years of record, 1949-72. Station values are shown in table 1 and in figure 24.

The reach of the Platte River from the mouth of the Elkhorn River to the confluence of the Platte and Missouri Rivers, mile 32.5 to 0 is based mainly on the records from station 06805500. This station has 20 years of record extending from 1953-72. Station 06801000 also is in this reach and has 25 years of record extending from 1929-53. Computed flood magnitudes from the latter station are low and have been ignored in developing the diagram in figure 24.

Republican River

Three stations in Nebraska on this stream (0682800, 06830000, and 06850500) had record collected prior to the establishment of current controls. The drainage area at each of the three stations is large and of variable characteristics and of no value for regression relations for natural streams. All have been discontinued. They are classed as conglomerate stations in tables 1 and 3.

Controls on the Republican River began in 1949 and are listed in downstream order as follows:

Station number	Reservoir	Stream	Beginning date of storage
06826000	Bonny Res nr Hale CO	S Fk Republican R	07-06-50
06829000	Swanson Lake nr Trenton NE	Republican R	05-04-53
06832000	Enders Reservoir nr Enders NE	Frenchman Cr	10-23-50
06837390	Hugh Butler Lake nr McCook NE	Red Willow Cr	09-05-61
06842000	Harry Strunk Lake nr Cambridge NE	Medicine Cr	07-08-49
06847950	Norton Res nr Norton KS	Prairie Dog Cr	10-06-64
06849000	Harlan Co Res nr Republican City NE	Republican R	11-14-52

Reservoir locations and station numbers are not shown in figure 1, but their locations with respect to the streamflow stations can be estimated by the station numbers.

Mouth of South Fork Republican River to Trenton Dam

Station 06828500 is the only station with data representing current conditions after Bonny Reservoir began storage. The station is located in the river reach between the mouth of South Fork Republican River and Swanson Lake. The period of record is 23 years.

The equations developed for Region 2 were utilized to test the agreement between regional and station values at station 06828500. An assumption is made that the manmade lakes are an effective total control and the basin characteristics needed are determined from the uncontrolled area upstream from the gage to the first control reservoir. At station 06828500, the station data gave higher values than did the regional curves for the 2- to 25-year levels; but at the 50- and 100-year flood levels, the equations gave higher discharges. The higher value was used for each of the six flood levels as the basis for the curves of figure 25 above Trenton Dam.

Trenton Dam to Harlan County Dam

Four currently operated gaging stations on the Republican River are located in the reach between Trenton Dam and Harlan County Dam, 06829500, 0683700, 06843500, and 06844500.

Eight major tributaries enter the Republican River in this reach. Frenchman Creek, Blackwood Creek, Driftwood Creek, Red Willow Creek, Medicine Creek, Muddy Creek, Sappa Creek, and Prairie Dog Creek. Enders Reservoir is on Frenchman Creek, Hugh Butler Lake is on Red Willow Creek, Harry Strunk Lake is on Medicine Creek, and Norton Reservoir is on Prairie Dog Creek.

Hugh Butler Lake was first filled in 1961 and Norton Reservoir was completed in 1964, but the four streamflow records between Swanson Lake and Harlan County Lake are used for the period 1953-72 to represent current conditions. Red Willow Creek had no exceptionally high flood peaks during the period 1953-61. Prairie Dog Creek flood peaks were only moderately high during the period 1953-64.

Values from station-data computations plotted against the four station locations in river miles above the mouth are shown in figure 25. Reasonably smooth curves can be developed by drawing curves through the station data. A review by the Corps of Engineers, U.S. Army, and the U.S. Bureau of Reclamation pointed to the low magnitude of a 100-year flood in the reach between Swanson Lake (Trenton Dam) and Harlan County Lake.

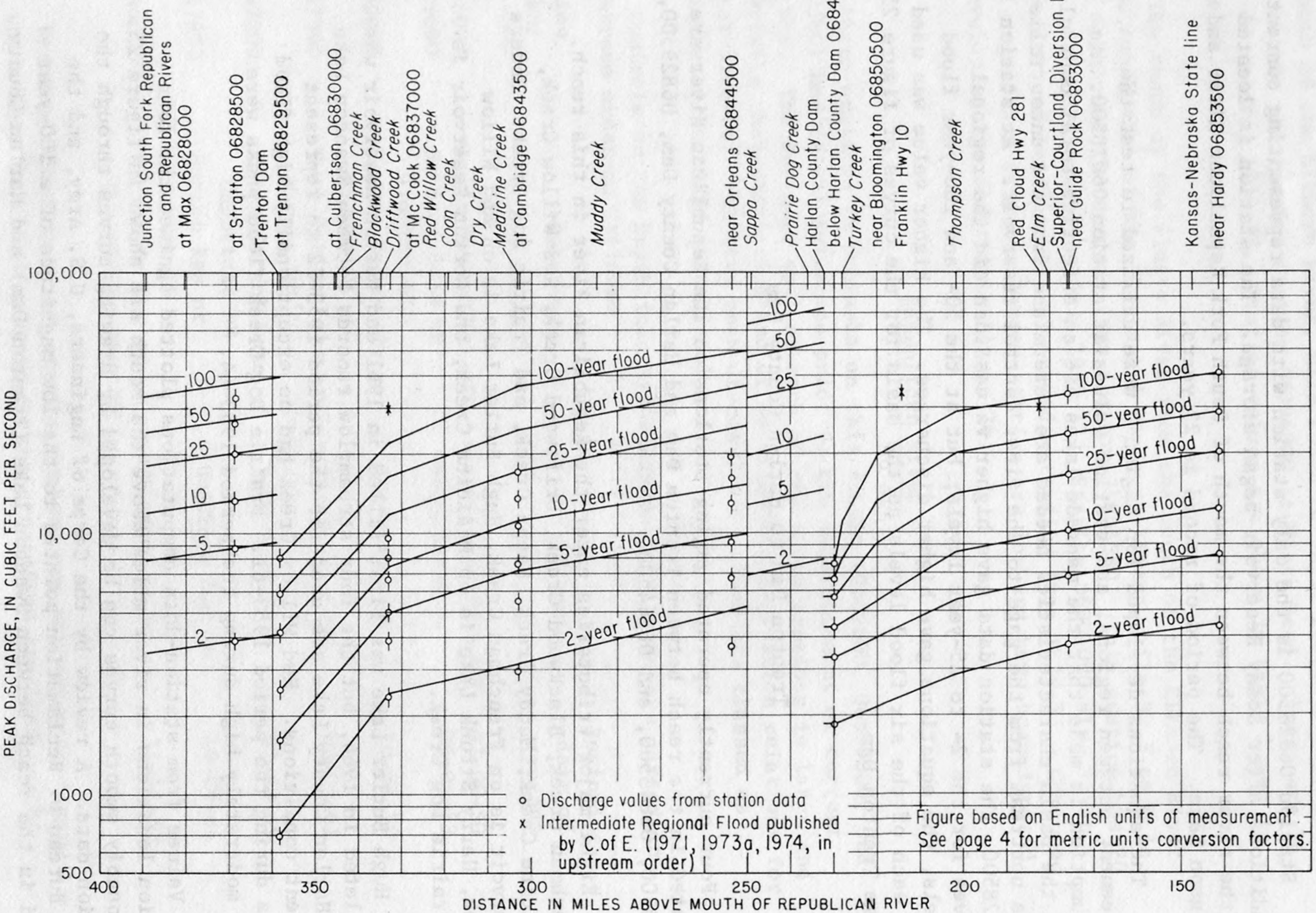


Figure 25.--Flood frequency for Republican River from mouth of South Fork Republican River to Republican River near Hardy.

The Republican River reach from Trenton Dam to Harlan County Dam drains from an area which is transitional from Hydrologic Region 2 to Hydrologic Region 1. Computations for the six flood levels at any site were weighted on the basis of the amount of contributing drainage area which is in Region 2 or Region 1. Results of these computations were used to develop the curves shown in figure 25.

The Corps of Engineers (1974) prepared a flood report for McCook in which they indicated an Intermediate Regional Flood on the Republican River as having a magnitude of 30,000 ft^3/s (849.6 m^3/s). Their value is shown in figure 25.

Downstream from Harlan County Dam

Harlan County Lake began storage on November 14, 1952. Records from three stations for the period 1953-72 represent current conditions in the Republican River from Harlan County Dam to the Kansas-Nebraska State line.

The uncontrolled contributing drainage area of the Republican River downstream from Harlan County Lake is all from Hydrologic Region 1. The equations developed for Region 1 were used to compute the magnitude of floods at the gaging stations and several other identified points in this reach. Magnitudes of computed flood peaks generally were smaller than the values developed from individual station data. The higher values from station data were given preference but the equation computations were used to shape the curves between the station locations.

The Corps of Engineers (1973a) prepared a flood report for the City of Franklin in which the magnitude of an Intermediate Regional Flood on the Republican River was identified as 34,700 ft^3/s (982.70 m^3/s).

The Corps of Engineers (1971) prepared a flood report for the City of Red Cloud. In that report the Intermediate Regional Flood on the Republican River was assigned a magnitude of 30,000 ft^3/s (849.6 m^3/s).

Other Controlled Streams

The North Platte, South Platte, Platte, and Republican Rivers were covered by flood-magnitude versus river-mile diagrams as a guide for estimating flood magnitude and frequency. These diagrams were based to some extent on 31 station records.

This leaves 18 stations with some record under controlled conditions but not enough to adequately define flood-frequency characteristics. Controlled streams on which some record is available are 06455500, 06455900, 06456500, 06459500, 06803200, 06803300, 06803400, 06827500, 06832500, 06833500, 06834000, 06835500, 06837500, and 06838000, 06842500, 06843000, 06848000, and 06848500. If flood-magnitude and flood-frequency information is required on these streams, the station data should be used as a rough guide. Updated records may be obtained from the U.S. Geological Survey, if additional records have been collected since 1972, and the updates should be included in the analysis.

Frequency curves were defined for stations 06803400 and 06833500 for the entire period of record because no detectable difference is evident between flood characteristics for the uncontrolled and the controlled period of record.

MAXIMUM KNOWN FLOODS

The maximum observed flood peak for each of the 303 gaging-station records used is shown in table 3. Five stations appear twice since they have an uncontrolled as well as a controlled period. Table 4 contains significant observed peak discharges at 57 short-term gaging stations. Table 5 lists outstanding peak discharges at 31 miscellaneous sites. The 396 events were located in the five hydrologic regions which had been defined by regressions. Peak discharge was plotted against the contributing drainage for each station. Each of the five hydrologic regions had a separate plot. An envelope curve was drawn to enclose the highest observed peak discharges in each of the five regions. The enveloping curve developed for each region and the highest observed peaks in each region were transferred to figure 26. Observed peaks are identified by station number and the table from which the observation is taken.

Matthai (1969) developed a curve for maximum floods observed in the United States. It also is reproduced in figure 26. His curve is higher than any of those observed in Nebraska.

The enveloping curves of maximum observed floods are not an upper limit. They may be used as a guide for discharges which might occur at intervals much greater than 100 years, and they may be of value in selecting a design flood where failure of the structure would be disastrous.

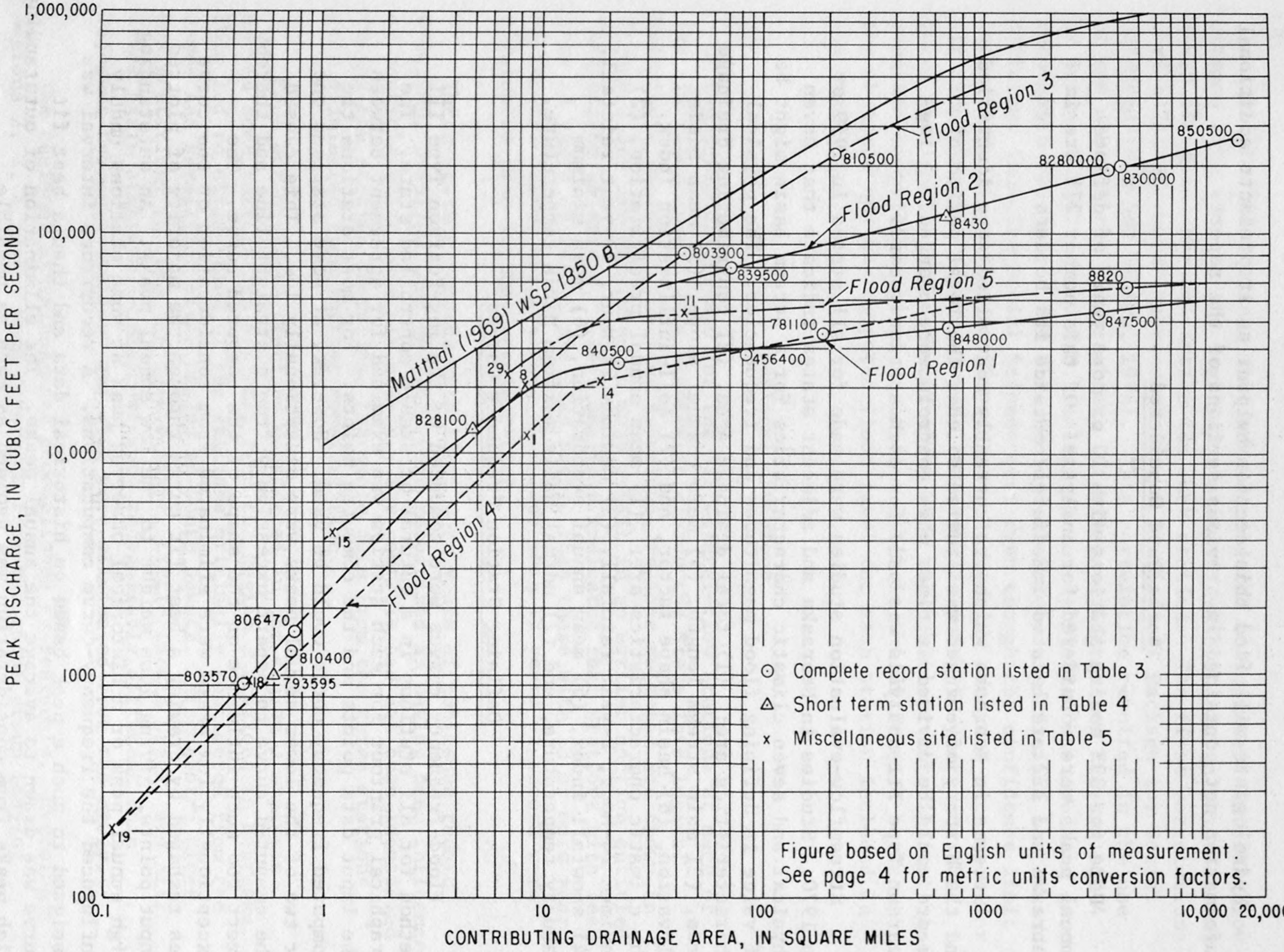


Figure 26.--Enveloping curves of maximum known flood peaks in relation to contributing drainage area.

FLOOD-FREQUENCY ANALYTICAL TECHNIQUE

Hydrologists will find this section helpful as it presents additional information not contained in previous sections of the report.

Basic Data Considered

Data for 393 gaging stations with 10 or more years of defined annual peaks were considered for analysis. Of this number 271 are in Nebraska and 122 are located immediately outside its borders.

Streams in Nebraska which are currently controlled were identified and the history of changes was studied so that the total period of record could be divided at times when controls were changed. A log-Pearson Type III analysis was made for each station record.

Streamflow-evaluation studies were made for all states in 1969 or in 1970. Studies in Nebraska and adjacent states indicate that seven physical and seven climatic characteristics for a stream basin might be of value in defining flood magnitudes and frequencies. The physical characteristics are: (1) total drainage area, (2) contributing drainage area, (3) main stream length, (4) main channel slope, (5) mean basin elevation, (6) basin shape factor, and (7) soil-infiltration index. The climatic characteristics are: (1) mean annual precipitation, (2) maximum 24-hour, 2-year rainfall, (3) maximum 24-hour, 50-year rainfall, (4) snowfall index, (5) mean annual evaporation, (6) mean minimum January temperature, and (7) normal daily maximum March temperature.

Defining Station Frequency Curves

Flood-frequency curves were computed by the log-Pearson Type III method for all stations in a natural or stable controlled state. The graphical printout for each station was examined for agreement between the input data points and the computed points. For most stations the computed frequency curve could be used. However, at some stations one or two of the lower annual peaks were exceptionally low. This caused the computed curve to depart excessively from a straight line and thereby exert too much influence on the shape of the computed curve. The exceptionally low peaks were eliminated from consideration or the curve was reshaped by drawing a best fit curve through the majority of plotted input points, giving less weight to the low annual peaks. An outstanding high annual peak or a historical observed peak at some stations unduly influenced the frequency-curve computations. A recurrence interval was assigned to such a peak based on historical data and then a best fit curve was drawn to average the annual peaks. The elimination of outstanding high peaks from consideration was avoided as much as possible.

Regression Analysis

All the 348 stations that were considered to represent natural-flow streams were used in the regression analysis with the seven physical and seven climatic characteristics for each station. The first correlations used a "stepforward" regression from a Statistical Package for Social Sciences (Nie and others, 1975). This correlation resulted in the use of too many of the 14 variables. Stepforward Regression Program D0094 by Selner (1968) in the U.S. Geological Survey STATPAC was used and gave reasonable results. The U.S. Geological Survey significance test was different from the Social Science test even though the confidence limit for each was specified as 95 percent. Regression analyses were made for six flood levels, 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year, from each station to correlate with the basin characteristics. A separate computation gives a residual which is the difference between the observed and the computed flood level for each station included in the regression.

Regional divisions

Residuals determined for the 348 natural-flow stations at each of the six flood levels were studied to divide the State into logical hydrologic regions. The five hydrologic regions selected are shown in figure 2 and are described in more detail in an earlier section entitled "Regression Relations." This analysis indicated that stations with less than 13 years of record are less stable than those with 13 or more years of record. Thus, all stations with less than 13 years of record were eliminated from further consideration.

Three station records with 13 or more years of published record 06443900, 06457700, and 06777600 were recognized as having been influenced by controls which were not stable. The controls had not been identified during the station operation, therefore data from the three stations were eliminated from further consideration.

Some out-of-State stations considered in the Region 3 analysis showed some correlation variance from the Region 3 stations in Nebraska. This led to elimination of the stations originally considered from the James and Vermillion River basins in South Dakota. Nishnabotna River basin stations in Iowa and Tarkio River, Little Tarkio Creek, and Mill Creek basin stations in Missouri were recognizably different than adjacent Nebraska stations and also were eliminated from the study.

The regional divisions were accomplished by residuals. Hydrologic Regions 2, 3, 4, and 5 were separated from the total group leaving

Hydrologic Region 1 as the remnant. The 75 stations in Region 1 have the greatest scatter displayed in the State. The standard error of estimate for the entire group of 258 natural stations is about the same as the standard error of estimate that remains for the 75 stations in Region 1.

Stepwise regressions

The correlation of the flood levels with the basin characteristics indicated A_c was the most significant characteristic in Regions 1, 2, 3, and 5, and $I_{24,50}$ was the most important characteristic in Region 4. The second and third most significant characteristics were not quite as positively designated, but a selection was made on the majority of appearances in the six flood levels in any one region. Generally, if no majority selection of a characteristic was made, substitution of one physical characteristic for another did not seriously affect the standard error of estimate. An example of this is in the use of L for S.

In order to prevent regression equations from becoming overly complex, a constant and three variable characteristics were used to define each flood level in a region. It was evident that all six flood levels in a region must be defined by the same variable characteristics in order to avoid undulations in a computed station frequency curve.

In every instance the regression equations were defined by two physical and one climatic variable. A constant was subtracted from each climatic variable so that it would remain a positive number and keep the constant in the equation to a reasonable value.

The climatic variables, especially T_1 and T_3, have statistical significance but do not conform with hydrologic principles. Substitution of latitude and longitude of the centroid of each basin for the climatic variable would have permitted directional orientation in the regression and could well have replaced all of the four climatic variables without appreciable change in the standard error of estimate.

In recent years some studies have been made relating selected streamflow characteristics to active channel geometry. Flood-frequency chacteristics were related by Hedman, Kastner and Hejl (1974) to such channel geometry in Kansas.

Standard errors

The reliability of flood estimates at ungaged sites is indicated by the standard error of estimate of a regression equation. The standard error, given in percent, is the range of error to be expected about two-thirds of the time. That is, the difference between the computed and the station value for two-thirds of the estimates made will be within plus or minus one standard error of estimate. Because the analyses used logarithms of variables, standard errors are larger in the positive direction.

Approximate standard errors of estimate for defined relations are shown in section "Limitation and accuracy of relations" and will not be repeated here.

SELECTED REFERENCES

Beckman, E. W., and Hutchison, N. E., 1962, Floods in Nebraska on small drainage area, magnitude and frequency: U.S. Geol. Survey Circ. 458, 33 p.

Brice, H. D., Shaffer, F. B., and Stuthmann, N. G., 1970, A proposed streamflow-data program for Nebraska: U.S. Geol. Survey open-file rept., 63 p.

Burmeister, I. L., 1970, The streamflow-data program in Iowa: U.S. Geol. Survey open-file rept., 82 p.

Furness, L. W., 1955, Floods in Nebraska, magnitude and frequency: Nebraska Dept. of Roads and Irrigation, 103 p.

Hardison, C. H., 1969, Accuracy of streamflow characteristics: U.S. Geol. Survey Prof. Paper 650-D, p. D210-D214.

Hedman, E. R., Kastner, W. M., and Hejl, H. R., 1974, Selected streamflow characteristics as related to active-channel geometry of streams in Kansas: Kansas Water Resources Board Tech. Rept. 10, 21 p.

Hershfield, D. M., 1961, Rainfall frequency atlas of the United States: NOAA (formerly U.S. Weather Bureau) Tech. Paper 40, 115 p.

Jamison, Gordon G., 1974, Drainage area and river mileage of Nebraska streams, Part 1: U.S. Geol. Survey open-file rept. 7404, 111 p.

Jordan, P. R., and Hedman, E. R., 1969, Evaluation of the surface-water data program in Kansas: Kansas Water Resources Board Bull. 12, 49 p.

Larimer, O. J., 1970, A proposed streamflow-data program for South Dakota: U.S. Geol. Survey open-file rept., 46 p.

Matthai, H. F., 1968, Magnitude and frequency of floods in the United States, Part 6-B, Missouri River basin below Sioux City, Iowa: U.S. Geol. Survey Water-Supply Paper 1680, 491 p.

______1969, Floods of June 1965 in South Platte River basin, Colorado: U.S. Geol. Survey Water-Supply Paper 1850-B, 64 p.

Missouri River Basin Commission, 1975, Platte River basin, Nebraska, Level B study, hydrology and hydraulics technical paper: Missouri River Basin Comm. tech. paper, 223 p.

Nie, N. H., Hull, C. H., Jenkins, J. G., Steinbrenner, K., and Bent, D. H., 1975, Statistical package for the social sciences: New York, McGraw-Hill Book Co., 2d ed., p. 320-367.

Patterson, James L., 1966, Magnitude and frequency of floods in the United States, Part 6-A, Missouri River basin above Sioux City, Iowa: U.S. Geol. Survey Water-Supply Paper 1679, 471 p.

Selner, Gary I., 1968, Computer program documentation, stepforward regression program D0094: U.S. Geol. Survey, Computer Center Div., Denver, Colo., p. 263-277.

U.S. Army Corps of Engineers, 1971, Republican River and Crooked Creek at Red Cloud, Nebr.: U.S. Army Corps of Engineers, Kansas City District, special flood hazard inf. rept., 1 folded sheet.

______1973a, Republican River at Franklin, Nebr.: U.S. Army Corps of Engineers, Kansas City District, flood plain inf. rept., 31 p.

______1973b, North Platte River and South Platte River at North Platte, Nebr.: U.S. Army Corps of Engineers, Omaha District, flood plain inf. rept., 37 p.

______1974, Republican River and unnamed stream, McCook, Nebr.: U.S. Army Corps of Engineers, Kansas City District, flood plain inf. rept., 45 p.

______1975, North Platte River at Scottsbluff, Nebr.: U.S. Army Corps of Engineers, Omaha District, flood plain inf. rept., 61 p.

U.S. Geological Survey, 1974, Water resources data for Nebraska, 1973, Part 1, Surface water records: U.S. Geol. Survey ann. rept.

U.S. National Oceanic and Atmospheric Administration (formerly U.S. Weather Bureau), 1959, Climates of the states: NOAA, Weather Bureau, Climatography of the United States.

______1968, Climatic atlas of the United States: NOAA, Weather Bureau, 80 p.

Water Resources Council, 1967, A uniform technique for determining floodflow frequencies: Water Resources Council Bull. 15, 15 p.

Table 1.--Flood-frequency characteristics for gaging stations

[Discharges marked with asterisk are less accurate than other values because of short length of station record]

Station number 06-	Station name	Region	Station-data peak discharge in cubic feet per second for indicated recurrence interval in years					
			Q_2	Q_5	Q_{10}	Q_{25}	Q_{50}	Q_{100}
399300	Hat Cr trib nr Ardmore SD	1	51	310	680	1,400	2,140*	3,060*
399700	Pine Cr nr Ardmore SD	1	860	1,270	1,510	1,840	2,120*	3,270*
400000	Hat Cr nr Edgemont SD	1	1,160	3,410	6,200	12,000	18,700	28,200*
443200	White R trib nr Glen NE	1	33	200	510	1,400	2,900*	5,400*
443300	Deep Cr nr Glen NE	1	32	190	470	1,180	2,140	3,670*
443700	Soldiers Cr nr Crawford NE	1	100	730	2,090	6,560	13,900*	27,600*
444000	White R at Crawford NE	1	420	920	1,330	1,920	2,400	2,900
445000	White R blw Cottonwood Cr nr Whitney NE	1	800	1,800	3,200	6,500*	11,200*	18,700*
445500	White R nr Chadron NE	1	1,220	2,430	3,470	5,070	6,460*	8,040*
445530	Chadron Cr trib at Chadron State Park NE	1	3	45	110	270	490	830*
445560	Chadron Cr at Chadron State Park NE	1	100	690	1,620	3,650	5,840	8,640*
446000	White R nr Oglala SD	1	1,000	1,900	2,680	3,880	4,950	6,170
447500	Little White R nr Martin SD	1	180	460	780	1,430*	2,170*	3,220*
448000	Lake Cr abv refuge nr Tuthill SD	2	78	110	130	160*	170*	180*
449100	Little White R nr Vetal SD	1	380	690	970	1,430*	1,860*	2,390*
449250	Spring Cr nr St Francis SD	2	42	64	78	97*	110*	130*
449500	Little White R nr Rosebud SD	1	800	1,740	2,760	4,720	6,830	9,700
453500	Ponca Cr at Anoka NE	1	1,910	3,710	5,350	8,030	10,500	13,500*
453600	Ponca Cr at Verdel NE	1	2,210	4,830	7,820	13,900	20,800*	30,500*
454000	Niobrara R at WY-NE State line	2	88	280	500	980	1,530*	2,290*

Table 1.--Flood-frequency characteristics for gaging stations--Continued

Station number 06-	Station name	Re-gion	Station-data peak discharge in cubic feet per second for indicated recurrence interval in years					
			Q_2	Q_5	Q_{10}	Q_{25}	Q_{50}	Q_{100}
454100	Niobrara R at Agate NE	2	69	110	150	200	250*	300*
454500	Niobrara R abv Box Butte Res NE	2	190	470	900	2,080	3,870	7,170
455500	Niobrara R blw Box Butte Res NE	a/	200	220	240	520	760	1,000
455900	Niobrara R nr Dunlap NE	a/	190	380	750	1,240*	1,800*	2,840*
456200	Pebble Cr nr Esther NE	1	15	83	240	800	1,850	4,370*
456300	Pebble Cr nr Dunlap NE	1	30	550	1,670	5,200	11,700*	22,000*
456400	Cottonwood Cr nr Dunlap NE	1	55	1,040	4,600	19,000	47,000	84,000*
456500	Niobrara R nr Hay Springs NE	a/	760	2,210	3,810	6,740	9,290*	13,600*
457200	Berea Cr nr Alliance NE	2	37	78	110	150	200	240*
457500	Niobrara R nr Gordon NE	2	1,090	2,690	4,380	7,440	10,500	14,500
457800	Antelope Cr trib nr Gordon NE	1	10	320	1,140	3,170	6,000	10,000*
459500	Snake R nr Burge NE	2	440	590	780	1,130	1,500*	1,980*
459500	Snake R nr Burge NE	a/	420	670	860	1,120*	1,300*	1,500*
460900	Minnechaduza Cr nr Kilgore NE	2	70	100	130	160	190*	220*
461000	Minnechaduza Cr at Valentine NE	2	210	370	530	850	1,190	1,660
461500	Niobrara R nr Sparks NE	2	3,770	5,640	7,030	8,940	10,500	12,100
462000	Niobrara R nr Norden NE	2	2,830	4,100	5,070	6,450	7,610	8,870*
462500	Plum Cr at Meadville NE	2	440	760	1,060	1,570	2,070	2,690
463100	Bone Cr trib nr Ainsworth NE	1	35	160	340	800*	1,400*	2,290*
463300	Sand Draw trib nr Ainsworth NE	1	77	360	790	1,800	3,040*	4,850*

Table 1.--Flood-frequency characteristics for gaging stations--Continued

Station number 06-	Station name	Re-gion	Station-data peak discharge in cubic feet per second for indicated recurrence interval in years					
			Q_2	Q_5	Q_{10}	Q_{25}	Q_{50}	Q_{100}
463500	Long Pine Cr nr Riverview NE	2	1,220	2,590	3,960	6,390	8,830	11,900*
464500	Keya Paha R at Wewela SD	1	760	1,780	2,880	4,940	7,100	9,950*
464900	Keya Paha R nr Naper NE	1	2,440	4,530	6,320	9,070	11,500*	14,300*
465000	Niobrara R nr Spencer NE	2	9,190	14,000	17,700	22,900	27,200	31,900
465300	Camp Cr nr O'Neill NE	1	19	97	240	600	1,100*	1,950*
465500	Niobrara R nr Verdel NE	2	8,700	15,500	22,500	35,500	49,200*	67,600*
466500	Bazile Cr nr Niobrara NE	3	6,530	17,300	27,100	47,000	69,000	93,000*
484000	Dry Cr nr Hawarden IA	3	740	2,360	4,030	7,300	11,000	15,000*
485500	Big Sioux R at Akron IA	3	10,300	22,800	32,900	48,000	66,000	85,000
599800	Perry Cr nr Merrill IA	3	240	880	1,690	3,320	5,090*	7,420*
599950	Perry Cr nr Hinton IA	3	720	1,910	3,250	5,810	8,530*	12,100*
600000	Perry Cr at 38th St Sioux City IA	3	2,880	4,950	6,530	8,800	10,100	13,300
600500	Floyd R at James IA	3	3,310	8,580	14,700	27,000	40,600	59,400
600600	S Omaha Cr trib No 1 nr Walthill NE	3	410	830	1,170	1,720	2,250*	2,850*
600700	S Omaha Cr nr Walthill NE	3	1,350	3,860	6,430	10,700	14,700*	19,400*
600800	S Omaha Cr trib No 2 nr Walthill NE	3	360	890	1,360	2,220	3,170*	4,250*
600900	S Omaha Cr at Walthill NE	3	2,180	5,160	7,960	12,500	16,600*	21,300*
601000	Omaha Cr at Homer NE	3	4,060	9,250	14,500	24,000	33,400	45,300
602000	West Fork Ditch at Holly Springs IA	3	3,300	6,140	8,200	11,600	14,700	18,000
606600	Little Sioux R at Correctionville IA	3	6,860	12,900	17,200	22,700	27,400	32,800

Table 1.--Flood-frequency characteristics for gaging stations--Continued

Station number 06-	Station name	Region	Station-data peak discharge in cubic feet per second for indicated recurrence interval in years					
			Q_2	Q_5	Q_{10}	Q_{25}	Q_{50}	Q_{100}
606700	Little Sioux R nr Kennebec IA	3	8,200	13,600	18,700	25,600	32,200	38,700
607200	Maple R at Mapleton IA	3	6,500	11,300	14,400	18,100	20,700	23,000
067700	S Br Tekamah Cr nr Craig NE	3	590	1,210	1,750	2,600	3,360*	4,220*
607800	S Br Tekamah Cr trib nr Tekamah NE	3	630	1,290	1,830	2,720	3,600	4,550*
607900	S Br Tekamah Cr nr Tekamah NE	3	1,190	2,080	2,860	4,120	5,280*	6,650*
608000	Tekamah Cr at Tekamah NE	3	1,800	3,700	5,110	6,940	8,290	9,610*
608500	Soldier R at Pisgah IA	3	9,890	15,600	19,200	23,400	26,200	28,900
608600	New York Cr nr Spiker NE	3	320	1,060	1,750	2,740	3,500*	4,250*
608700	New York Cr trib nr Spiker NE	3	280	760	1,170	1,770	2,560	3,340*
608800	New York Cr north of Spiker NE	3	1,000	2,310	3,360	4,790	5,880	6,980*
608900	New York Cr east of Spiker NE	3	840	2,480	4,400	8,120	12,100	17,300*
609000	New York Cr at Herman NE	3	1,540	3,260	4,450	6,200	7,700	9,250
609500	Boyer R at Logan IA	3	12,000	17,700	21,000	26,200	30,300	34,600
610500	Indian Cr at Council Bluffs IA	3	720	1,570	2,250	3,200	4,000*	4,900*
674500	N Platte R at WY-NE State line	a/	2,440	4,240	6,010	9,130	12,300	16,300
677500	Horse Cr Nr Lyman NE	1	730	1,360	1,880	2,690	3,380	4,170
678000	Sheep Cr nr Morrill NE	2	200	280	330	400	450	500
679500	N Platte R at Mitchell NE	a/	2,510	4,580	6,530	9,830	13,000	17,000
682000	N Platte R nr Minatare NE	a/	3,130	5,310	7,170	10,100	12,700	15,700
684500	N Platte R at Bridgeport NE	a/	3,720	6,120	8,230	11,600	14,700	18,400

Table 1.--Flood-frequency characteristics for gaging stations--Continued

Station number 06-	Station name	Region	Station-data peak discharge in cubic feet per second for indicated recurrence interval in years					
			Q_2	Q_5	Q_{10}	Q_{25}	Q_{50}	Q_{100}
685000	Pumpkin Cr nr Bridgeport NE	1	150	400	800	1,950	3,750	7,140
686000	N Platte R at Lisco NE	a/	3,490	5,370	6,990	9,540	11,900	14,600
686500	N Platte R at Oshkosh NE	a/	3,510	5,040	6,340	8,350	10,200	12,300*
687000	Blue Cr nr Lewellen NE	2	220	340	440	600	750	930
687500	N Platte R at Lewellen NE	a/	3,840	5,680	7,280	9,810	12,100	14,800
690500	N Platte R nr Keystone NE	a/	2,730	3,740	4,900	6,800	8,400	10,300
691000	N Platte R nr Sutherland NE	a/	2,200	3,180	4,120	6,300	8,800	11,800
692000	Birdwood Cr nr Hershey NE	2	410	600	780	1,060	1,320	1,640
693000	N Platte R at North Platte NE	a/	2,530	3,680	5,000	7,600	10,000	12,600
760000	S Platte R at Balzac CO	a/	3,440	9,580	17,200	33,100	51,700	78,400
761700	Muddy Cr trib nr Burns WY	1	7	130	510	1,840*	4,170*	9,050*
761900	Lodgepole Cr trib nr Pine Bluffs WY	1	31	70	110	160*	210*	270*
762500	Lodgepole Cr at Bushnell NE	1	210	970	2,330	6,270	12,300	22,900
762600	Lodgepole Cr trib No 2 nr Albin WY	1	55	220	470	1,120*	2,090*	3,680*
763500	Lodgepole Cr at Ralton NE	1	73	200	680	4,300	15,700	48,000*
764000	S Platte R at Julesburg CO	a/	3,000	8,630	15,300	28,400	42,800	62,100
765000	S Platte R at Paxton NE	a/	1,700	6,670	13,000	25,500	38,800	55,700
765500	S Platte R at North Platte NE	a/	2,610	7,860	14,200	27,000	41,000	60,100
766000	Platte R at Brady NE	a/	3,490	7,290	11,100	17,900	24,800	33,600
766500	Platte R nr Cozad NE	a/	3,260	7,590	11,800	18,700	25,100	32,800

Table 1.--Flood-frequency characteristics for gaging stations--Continued

Station number 06-	Station name	Region	Station-data peak discharge in cubic feet per second for indicated recurrence interval in years Q_2	Q_5	Q_{10}	Q_{25}	Q_{50}	Q_{100}
767100	S Fk Plum Cr trib nr Farnam NE	1	190	550	950	1,720	2,590	3,760*
767200	N Fk Plum Cr trib nr Farnam NE	1	14	64	150	360	680	1,200*
767300	Plum Cr trib at Farnam NE	1	110	830	2,350	6,200	10,400	15,000*
767400	N Plum Cr nr Farnam NE	1	71	420	940	1,980	3,110	4,630*
767410	Plum Cr nr Farnam NE	1	130	710	1,680	4,200	7,530	12,700*
767500	Plum Cr nr Smithfield NE	1	470	1,120	1,610	2,600	3,500	4,450
768000	Platte R nr Overton NE	a/	7,400	14,200	20,300	30,100	39,000	49,500
768100	E Buffalo Cr nr Buffalo NE	4	23	86	150	240	310	390*
768200	Buffalo Cr at Buffalo NE	4	95	300	520	980	1,570*	2,270*
768300	Buffalo Cr trib No 2 nr Buffalo NE	4	36	120	170	240	290*	350*
768400	W Buffalo Cr nr Buffalo NE	4	60	160	260	440	630	870*
768500	Buffalo Cr nr Darr NE	4	180	660	1,270	2,550	4,200	6,300*
769100	Elm Cr trib nr Overton NE	4	62	120	160	230	290	360*
769200	Elm Cr nr Sumner NE	4	72	260	500	1,050	1,680	2,580*
769300	Elm Cr trib No 2 nr Overton NE	4	160	350	500	740	980	1,200*
770000	Platte R nr Odessa NE	a/	5,920	10,500	14,800	20,800	26,600	33,000
770500	Platte R nr Grand Island NE	a/	6,720	13,000	17,700	25,000	32,000	39,000
770600	Wood R trib nr Lodi NE	4	10	43	76	140	210	290*
770700	Wood R nr Lodi NE	4	19	73	150	310	520	800*
770800	Wood R nr Oconto NE	4	120	490	900	1,530	2,030	2,580*

Table 1.--Flood-frequency characteristics for gaging stations--Continued

Station number 06-	Station name	Region	Station-data peak discharge in cubic feet per second for indicated recurrence interval in years					
			Q_2	Q_5	Q_{10}	Q_{25}	Q_{50}	Q_{100}
770900	Wood R at Oconto NE	4	160	510	830	1,570	2,380	3,400*
770910	Wood R nr Lomax NE	4	220	690	1,210	2,110	2,970	3,980*
771000	Wood R nr Riverdale NE	4	530	1,660	3,270	7,000	11,800	18,500*
771500	Wood R nr Gibbon NE	4	710	1,460	2,200	3,200	4,200	5,300*
772000	Wood R nr Alda NE	4	480	940	1,320	1,900	2,500*	3,200*
774000	Platte R nr Duncan NE	a/	9,440	16,000	20,600	26,500	30,900	35,300
775500	Middle Loup R nr Dunning NE	2	710	820	880	960	1,020	1,070
776500	Dismal R at Dunning NE	2	510	610	690	880	1,040	1,180
777500	Middle Loup R at Walworth NE	2	1,860	2,370	2,740	3,200	3,600	4,000*
777700	Lillian Cr nr Broken Bow NE	4	100	490	900	1,530	2,020	2500*
777800	Lillian Cr trib nr Walworth NE	4	21	90	200	500	900	1,500*
778000	Middle Loup R at Sargent NE	2	1,780	2,260	2,800	3,700	4,500	5,500*
779000	Middle Loup R at Arcadia NE	2	2,600	4,260	6,400	11,400	23,000	25,600
780000	Middle Loup R at Rockville NE	2	2,470	5,900	9,200	14,800	20,800*	28,000*
782500	South Loup R at Ravenna NE	2	3,900	8,990	14,400	24,400	34,900	48,600*
782600	S Br Mud Cr trib nr Broken Bow NE	4	38	120	190	310	400	490*
782700	S Br Mud Cr at Broken Bow NE	2	23	160	460	1,500	3,400	7,000*
782800	N Br Mud Cr at Broken Bow NE	2	77	410	940	2,330	4,300*	7,200*
782900	Mud Cr trib nr Broken Bow NE	4	31	230	600	1,600	3,100	5,200*
783500	Mud Cr nr Sweetwater NE	4	960	2,500	4,490	9,010	14,700	23,500

Table 1.--Flood-frequency characteristics for gaging stations--Continued

Station number 06-	Station name	Re- gion	Station-data peak discharge in cubic feet per second for indicated recurrence interval in years					
			Q_2	Q_5	Q_{10}	Q_{25}	Q_{50}	Q_{100}
784000	South Loup R at St Michael NE	2	3,660	8,820	14,500	25,300	36,800	52,000
784300	Oak Cr nr Loup City NE	4	360	860	1,270	2,020	2,740*	3,600*
784700	Turkey Cr nr Farwell NE	4	730	1,370	1,710	2,260	2,670	3,100*
785000	Middle Loup R at St Paul NE	2	8,720	15,300	21,100	30,700	39,600	50,200
786000	North Loup R at Taylor NE	2	1,410	1,870	2,360	2,990	3,600	4,140
787500	Calamus R nr Burwell NE	2	580	800	990	1,450	1,870	2,430
788500	North Loup R at Ord NE	2	2,810	4,260	5,430	7,900	10,300	13,000*
789000	North Loup R at Scotia NE	2	5,200	10,100	15,500	25,700	36,900	52,300
789100	Davis Cr trib nr North Loup NE	4	240	780	1,350	2,500	3,800*	5,500*
789200	Davis Cr trib No 2 nr North Loup NE	4	160	610	1,090	2,200	3,400*	5,000*
789300	Davis Cr nr North Loup NE	4	520	1,370	1,870	2,660	3,400*	4,300*
789400	Davis Cr southwest of North Loup NE	4	290	1,070	1,880	3,250	4,500	6,000*
790500	North Loup R nr St Paul NE	2	6,410	12,600	19,500	33,000	48,100	69,300
790600	E Br Spring Cr trib nr Wolbach NE	4	97	340	580	1,150	1,740	2,500*
790700	W Br Spring Cr at Brayton NE	4	700	2,260	4,000	7,300	11,000	15,400*
790800	W Br Spring Cr nr Wolbach NE	4	1,030	2,720	4,400	7,600	10,800*	15,300*
790900	Mary's Cr at Wolbach NE	4	200	890	1,900	4,400	8,000*	13,000*
791100	Spring Cr nr Cushing NE	4	1,230	3,410	5,810	10,300	14,900	20,800
791500	Cedar R nr Spalding NE	2	570	1,080	1,640	2,740	3,960	5,680*
792000	Cedar R nr Bullerton NE	2	3,110	6,720	11,100	20,300	31,400	48,000

Table 1.--Flood-frequency characteristics for gaging stations--Continued

Station number 06-	Station name	Re-gion	Station-data peak discharge in cubic feet per second for indicated recurrence interval in years					
			Q_2	Q_5	Q_{10}	Q_{25}	Q_{50}	Q_{100}
793000	Loup R nr Genoa NE	2	15,200	30,900	46,800	75,700	105,500	144,100
794000	Beaver Cr at Genoa NE	2	2,320	5,350	8,740	15,400	22,700	32,800
794500	Loup R at Columbus NE	2	18,000	32,900	45,400	64,400	80,900	99,600
795000	Shell Cr at Newman Grove NE	3	1,890	5,670	9,720	18,000	26,800*	37,500*
795500	Shell Cr nr Columbus NE	3	1,610	2,980	3,990	5,340	6,380	7,430
796000	Platte R at North Bend NE	a/	27,200	46,200	61,400	83,400	102,100	122,600
797500	Elkhorn R at Ewing NE	2	1,400	3,390	5,410	8,920	12,400	16,600
798000	S Fk Elkhorn R at Ewing NE	2	520	1,210	1,910	3,160	4,410	6,000*
798500	Elkhorn R at Neligh NE	2	1,760	4,310	7,070	12,200	17,600	24,600
799000	Elkhorn R nr Norfolk NE	2	4,600	9,340	13,300	19,000	23,800	28,900
799500	Logan Cr nr Uehling NE	3	6,110	12,100	17,000	24,700	32,000	40,000
800000	Maple Cr nr Nickerson NE	3	2,500	6,500	10,700	18,500	26,000	36,000*
800500	Elkhorn R at Waterloo NE	2	10,600	21,400	31,800	49,500	66,800	88,000
801000	Platte R nr Ashland NE	a/	37,500	57,200	74,000	95,000	113,000	130,000
803000	Salt Cr at Roca NE	3	2,750	9,200	16,500	32,000	49,000	73,000*
803200	Antelope Cr at 48th St Lincoln NE	a/	400	800	1,230	2,050*	2,950*	4,170*
803300	Antelope Cr at 27th St Lincoln NE	a/	940	1,700	2,300	3,300*	4,200*	5,100*
803400	Antelope Cr at 17th St Lincoln NE	3,a/	1,460	2,500	3,250	4,300	5,200*	6,300*
803500	Salt Cr at Lincoln NE	3	8,620	19,000	26,000	37,000	47,000	58,000*
803555	Salt Cr at Greenwood NE	3	11,200	26,400	37,800	52,100	62,200	71,500*

Table 1.--Flood-frequency characteristics for gaging stations--Continued

Station number 06-	Station name	Re-gion	Station-data peak discharge in cubic feet per second for indicated recurrence interval in years					
			Q_2	Q_5	Q_{10}	Q_{25}	Q_{50}	Q_{100}
803570	Dunlap Cr trib nr Weston NE	3	240	480	660	920	1,160	1,400*
803600	N Fk Wahoo Cr nr Prague NE	3	1,700	5,700	9,600	17,000	24,000	33,000*
803700	N Fk Wahoo Cr trib nr Weston NE	3	1,430	3,720	5,690	9,600	13,500*	17,900*
803900	N Fk Wahoo Cr at Weston NE	3	2,100	6,900	12,500	24,500	38,000	58,000*
804000	Wahoo Cr at Ithaca NE	3	4,220	12,600	23,400	46,800	75,000	116,100*
804100	Silver Cr nr Cedar Bluffs NE	3	570	1,420	2,240	3,700	5,400	7,200*
804200	Silver Cr nr Colon NE	3	800	2,800	5,000	10,100	16,000	24,700*
804300	Silver Cr trib nr Colon NE	3	91	430	950	2,150	4,020	7,330*
804400	Silver Cr trib at Colon NE	3	160	690	1,380	3,000	5,000	7,600*
804500	Silver Cr at Ithaca NE	3	1,030	4,150	8,200	16,100	25,000	37,000*
805000	Salt Cr nr Ashland NE	3	17,800	32,000	42,500	58,000	71,000	84,000*
805500	Platte R nr South Bend NE	a/	48,300	82,800	106,500	150,000	180,000	200,000*
806000	Waubonsie Cr nr Bartlett IA	3	2,900	5,800	8,400	13,000	17,500	22,500*
806400	Weeping Water Cr at Elmwood NE	3	1,700	5,260	8,340	12,500	15,500*	18,400*
806420	Stove Cr nr Elmwood NE	3	1,230	2,600	3,450	4,450	5,200*	5,800*
806440	Stove Cr at Elmwood NE	3	1,600	3,570	5,200	7,800	10,300	12,500*
806460	Weeping Water Cr at Weeping Water NE	3	3,450	8,300	12,700	19,600	26,000	33,000*
806470	Weeping Water Cr trib nr Weeping Water NE	3	290	720	1,050	1,560	2,020	2,550*
806500	Weeping Water Cr at Union NE	3	3,700	9,900	17,400	32,500	51,000	74,000*
810100	Hooper Cr trib nr Palmyra NE	3	740	1,610	2,400	3,750	5,000	6,250*

Table 1.--Flood-frequency characteristics for gaging stations--Continued

Station number 06-	Station name	Re-gion	Station-data peak discharge in cubic feet per second for indicated recurrence interval in years					
			Q_2	Q_5	Q_{10}	Q_{25}	Q_{50}	Q_{100}
810200	Hooper Cr nr Palmyra NE	3	2,770	7,240	12,200	21,900	32,200*	45,800*
810300	Wolf Cr nr Syracuse NE	3	1,820	5,420	8,800	13,900	18,000*	22,300*
810400	Little Nemaha R trib nr Syracuse NE	3	240	510	710	1,040	1,360	1,750*
810500	Little Nemaha R nr Syracuse NE	3	7,600	17,300	26,500	42,500	58,000	77,000*
811500	Little Nemaha R at Auburn NE	3	17,800	39,000	58,000	90,000	120,200	160,000*
813700	Tennessee Cr trib nr Senaca KS	3	260	670	1,100	1,900	2,800*	3,900*
814000	Turkey Cr nr Senaca KS	3	4,430	9,540	14,000	22,000	30,000	39,000*
814500	N Fk Big Nemaha R at Humboldt NE	3	17,500	30,800	40,500	54,000	64,000	77,000*
815000	Big Nemaha R at Falls City NE	3	25,000	38,500	47,000	58,000	69,000	78,000
815500	Muddy Cr at Verdon NE	3	8,910	17,200	24,200	35,100	44,700	55,600*
815700	Buttermilk Cr nr Willis KS	3	2,200	3,650	4,550	5,650	6,500*	7,300*
821500	Arikaree R at Haigler NE	2	2,830	7,910	13,700	25,000	37,200	53,200
822000	N Fk Republican R nr Wray CO	2	130	210	280	370	450*	540*
823000	N Fk Republican R at CO-NE State line	2	300	610	900	1,400	1,900	2,500
823500	Buffalo Cr nr Haigler NE	2	33	62	89	130	180	230
824000	Rock Cr at Parks NE	2	43	82	120	210	310	440
824500	Republican R at Benkelman NE	2	1,690	4,740	8,290	15,300	22,800	33,000
827500	S Fk Republican R nr Benkelman NE	a/	3,100	6,500	9,400	14,300	19,000	24,800*
828000	Republican R at Max NE	b/	4,820	16,100	33,900	81,800	152,200*	275,300*
828500	Republican R at Stratton NE	a/	3,900	8,800	13,300	20,200	26,300	33,200*

Table 1.--Flood-frequency characteristics for gaging stations--Continued

Station number 06-	Station name	Region	Station-data peak discharge in cubic feet per second for indicated recurrence interval in years					
			Q_2	Q_5	Q_{10}	Q_{25}	Q_{50}	Q_{100}
829500	Republican R at Trenton NE	a/	700	1,620	2,530	4,200	5,900*	8,100*
830000	Republican R at Culbertson NE	b/	12,500	36,100	59,600	99,300	136,200	179,500*
831000	Frenchman Cr blw Champion NE	2	390	880	1,370	2,220	3,000	3,900*
831500	Frenchman Cr nr Imperial NE	2	260	660	1,140	2,130	3,350	5,000
832500	Frenchman Cr nr Enders NE	a/	360	510	600	720	800	880
833500	Frenchman Cr nr Hamlet NE	2,a/	760	1,510	2,290	3,700	5,180	7,110
834000	Frenchman Cr at Palisade NE	a/	770	1,420	2,070	3,240	4,450	6,010*
835000	Stinking Water Cr nr Palisade NE	2	380	860	1,380	2,370	3,430	4,830*
835500	Frenchman Cr at Culbertson NE	2	1,330	2,880	4,400	7,100	9,800	13,400*
835500	Frenchman Cr at Culbertson NE	a/	1,170	2,490	3,810	6,100	8,380	11,200*
836000	Blackwood Cr nr Culbertson NE	2	420	1,040	1,730	3,070	4,510	6,440
836500	Driftwood Cr nr McCook NE	1	870	2,300	3,760	6,700	9,900	13,800
837000	Republican R at McCook NE	a/	2,380	3,900	5,000	6,700	8,100*	9,600*
837500	Red Willow Cr nr McCook NE	a/	170	290	390	760*	1,200*	1,820*
838000	Red Willow Cr nr Red Willow NE	2	1,550	4,520	8,210	16,900	28,200*	46,200*
838000	Red Willow Cr nr Red Willow NE	a/	440	950	1,440	2,790*	4,420*	6,720*
839000	Medicine Cr at Maywood NE	2	260	720	1,220	2,330	3,650	5,450*
839200	Elkhorn Canyon nr Maywood NE	1	270	900	1,680	3,330	5,300	8,200*
839400	Elkhorn Canyon southwest of Maywood NE	1	450	1,740	3,690	8,610	15,200*	25,800*
839500	Brushy Cr nr Maywood NE	2	1,290	5,600	11,900	26,000	44,000	70,000*

Table 1.--Flood-frequency characteristics for gaging stations--Continued

Station number 06-	Station name	Region	Station-data peak discharge in cubic feet per second for indicated recurrence interval in years					
			Q_2	Q_5	Q_{10}	Q_{25}	Q_{50}	Q_{100}
839600	Frazier Cr nr Maywood NE	1	650	2,240	4,520	10,000	17,100*	28,300*
839700	Frazier Cr trib nr Maywood NE	1	46	190	390	880	1,550	2,500*
839850	Fox Cr north of Curtis NE	1	170	710	1,440	2,750	4,000*	5,500*
839900	Fox Cr abv Cut Canyon nr Curtis NE	1	300	870	1,470	2,630	4,000	5,700*
839950	Cut Canyon nr Curtis NE	1	340	740	1,070	1,800	2,500	3,240*
840000	Fox Cr at Curtis NE	1	690	1,350	1,900	2,800	3,600*	4,500*
840500	Dry Cr nr Curtis NE	1	750	2,800	5,400	11,000	18,700	29,000*
841000	Medicine Cr abv Harry Strunk Lake NE	2	2,500	5,720	8,970	14,700	20,400	27,500*
841500	Mitchell Cr abv Harry Strunk Lake NE	1	590	1,960	3,550	6,900	11,000	16,500*
842500	Medicine Cr blw Harry Strunk Lake NE	a/	420	700	890	1,140	1,380	1,670*
843000	Medicine Cr at Cambridge NE	a/	660	1,170	1,610*	3,070*	4,830*	7,260*
843500	Republican R at Cambridge NE	a/	2,940	5,500	7,600	10,700	13,500	17,000*
844000	Muddy Cr at Arapahoe NE	1	1,350	3,300	5,150	8,200	11,600	15,300*
844500	Republican R nr Orleans NE	a/	3,660	6,700	9,200	12,900	16,000	19,500*
845000	Sappa Cr nr Oberlin KS	1	870	2,470	4,490	8,680	13,400	20,100
845100	Long Branch Draw nr Norcatur KS	1	550	1,200	1,860	2,870	3,950*	5,100*
845200	Sappa Cr nr Beaver City NE	1	1,380	3,000	4,450	7,000	9,500	12,000
846000	Beaver Cr at Ludell KS	1	630	1,530	2,500	4,100	5,700	7,800*
846200	Beaver Cr trib nr Ludell KS	1	510	710	840	1,010	1,130*	1,250*
846500	Beaver Cr at Cedar Bluffs KS	1	510	1,700	3,300	6,900	11,400	17,700

Table 1.--Flood-frequency characteristics for gaging stations--Continued

Station number 06-	Station name	Region	Station-data peak discharge in cubic feet per second for indicated recurrence interval in years					
			Q_2	Q_5	Q_{10}	Q_{25}	Q_{50}	Q_{100}
847000	Beaver Cr nr Beaver City NE	1	720	1,680	2,500	3,630	4,700	5,900
847500	Sappa Cr nr Stamford NE	1	1,390	3,850	6,990	13,900	22,400	35,000
848000	Prairie Dog Cr at Norton KS	1	2,200	7,400	13,400	27,000	43,000*	64,000*
848000	Prairie Dog Cr at Norton KS	a/	110	130	160*	180*	190*	210*
848200	Prairie Dog Cr trib nr Norton KS	1	210	370	500	680	850*	1,010*
848500	Prairie Dog Cr nr Woodruff KS	1	1,800	5,400	9,600	18,000	28,600	43,000*
848500	Prairie Dog Cr nr Woodruff KS	a/	800	2,510	4,610*	8,900*	13,700*	20,100*
849500	Republican R blw Harlan Co Dam NE	a/	1,870	3,320	4,340	5,650	6,620	7,570*
850000	Turkey Cr at Naponee NE	1	750	1,400	1,900	2,640	3,400*	4,100*
850200	Cottonwood Cr nr Bloomington NE	1	190	470	720	1,200	1,700	2,250*
850500	Republican R nr Bloomington NE	b/	10,000	19,000	33,300	74,000	140,000	260,000*
851000	Center Cr at Franklin NE	1	380	1,070	1,680	2,840	4,100*	5,600*
851100	W Br Thompson Cr at Hildreth NE	1	180	440	690	1,170	1,670*	2,250*
851200	W Br Thompson Cr nr Hildreth NE	1	380	950	1,500	2,500	3,470*	4,650*
851300	W Br Thompson Cr trib nr Hildreth NE	1	260	640	860	1,150	1,360	1,550*
851400	W Br Thomson Cr nr Upland NE	1	380	910	1,430	2,350	3,300	4,500*
851500	Thompson Cr at Riverton NE	1	1,740	3,700	5,400	8,200	11,000*	14,100*
852000	Elm Cr at Amboy NE	1	820	1,900	3,140	5,620	8,400*	12,300*
853000	Republican R nr Guide Rock NE	a/	3,730	6,790	10,100	16,600	23,900	33,900*
853100	Beaver Cr nr Rosemont NE	1	190	440	680	1,040	1,370	1,740

Table 1.--Flood-frequency characteristics for gaging stations--Continued

Station number 06-	Station name	Region	Station-data peak discharge in cubic feet per second for indicated recurrence interval in years					
			Q_2	Q_5	Q_{10}	Q_{25}	Q_{50}	Q_{100}
853500	Republican R nr Hardy NE	a/	4,340	8,150	12,300	20,200	28,900	40,900*
853800	White Rock Cr nr Burr Oak KS	1	1,450	2,650	3,800	5,700	7,800*	10,000*
856100	West Cr nr Talmo KS	1	860	3,160	6,550	14,800	25,700*	42,800*
872100	Middle Cedar Cr at Kensington KS	1	650	2,030	3,800	7,200	11,200*	16,300*
880000	Lincoln Cr nr Seward NE	5	1,130	2,850	4,720	8,230	11,900*	16,700*
880500	Big Blue R at Seward NE	5	2,720	7,300	12,000	20,000	27,600*	36,600*
880710	School Cr trib No 1 nr Harvard NE	5	41	230	500	1,030	1,570*	2,260*
880720	School Cr nr Harvard NE	5	330	850	1,370	2,300	3,300	4,500*
880730	School Cr trib No 2 nr Harvard NE	5	180	430	650	1,050	1,460	1,930*
880740	School Cr nr Saronville NE	5	600	1,360	2,080	3,280	4,530*	6,000*
880800	W Fk Big Blue R nr Dorchester NE	5	3,030	7,690	14,100	29,400	49,900*	82,300*
881000	Big Blue R nr Crete NE	5	6,990	15,400	22,700	33,500	42,600	52,500
881200	Turkey Cr nr Wilber NE	5	2,080	4,220	6,190	9,440*	12,500*	16,100*
881450	Indian Cr at Beatrice NE	5	760	2,380	4,100	7,600	11,500*	16,400*
881500	Big Blue R at Beatrice NE	5	9,100	19,900	28,600	40,700	50,400	60,200
882000	Big Blue R at Barneston NE	5	13,700	23,400	31,000	42,000	52,000	62,000
883000	Little Blue R nr Deweese NE	5	4,090	9,180	14,400	23,600	33,000	44,800*
883570	Little Blue R nr Gilead NE	5	5,600	11,700	17,000	25,700*	34,000*	44,000*
883600	S Fk Big Sandy Cr nr Edgar NE	5	110	400	670	1,100	1,540*	2,050*
883700	S Fk Big Sandy Cr nr Davenport NE	5	190	540	940	1,680	2,440	3,415*

Table 1.--Flood-frequency characteristics for gaging stations--Continued

Station number 06-	Station name	Region	Station-data peak discharge in cubic feet per second for indicated recurrence interval in years					
			Q_2	Q_5	Q_{10}	Q_{25}	Q_{50}	Q_{100}
883800	S Fk Big Sandy Cr nr Carleton NE	5	360	1,010	1,710	3,150	4,750*	6,700*
883900	S Fk Big Sandy Cr nr Hebron NE	5	800	1,630	2,360	3,450	4,550*	5,800*
884000	Little Blue R nr Fairbury NE	5	7,990	15,700	21,800	31,500	39,600	48,800
884100	Mulberry Cr trib nr Haddam KS	5	170	560	1,030	2,030	3,270*	5,000*
884200	Mill Cr at Washington KS	5	4,720	8,700	11,400	15,700*	19,300*	23,000*
884300	Mill Cr trib nr Washington KS	5	270	500	760	1,320	1,970*	2,930*
884900	Robidoux Cr at Beattie KS	5	1,940	3,580	4,790	6,420	7,670*	8,940*
885500	Black Vermillion Cr nr Frankfort KS	5	6,820	16,900	27,400	46,300	65,400	89,300*

a/ Controlled discharge station.

b/ Probably natural discharge record, but station is not assigned to a region because its drainage area is large and consists of conglomerate soil.

Table 2.--Drainage-basin and climatic characteristics for gaging stations

Station number 06-	Station name	Basin characteristics							
		A	A_c	L	S	P	$I_{24,50}$	T_1	T_3
399300	Hat Cr trib nr Ardmore SD	3.74	3.74	4.6	28.74	17.0	4.0	8.0	45
399700	Pine Cr nr Ardmore SD	5.47	5.47	3.88	56.70	17.0	4.0	8.0	45
400000	Hat Cr nr Edgemont SD	1,044	1,044	90.1	10.53	17.0	3.9	10.0	46
443200	White R trib nr Glen NE	7.97	7.97	5.78	94.7	17.0	4.0	10.0	46
443300	Deep Cr nr Glen NE	10.9	10.9	8.00	83.3	17.0	4.0	10.0	47
443700	Soldiers Cr nr Crawford NE	52.6	52.6	15.88	56.2	17.5	4.0	10.0	46
444000	White R at Crawford NE	313	313	34.2	34.8	17.3	4.0	10.0	46
445000	White R blw Cottonwood Cr nr Whitney NE	676	676	60.4	24.5	17.0	4.1	10.0	46
445500	White R nr Chadron NE	750	750	65.7	22.8	17.0	4.1	10.0	46
445530	Chadron Cr trib at Chadron State Park NE	2.59	2.59	3.90	97.0	17.3	4.2	10.0	46
445560	Chadron Cr at Chadron State Park NE	15.4	15.4	5.38	78.5	17.3	4.2	10.0	46
446000	White R nr Oglala SD	2,200	2,200	159	8.6	17.0	4.2	10.0	45
447500	Little White R nr Martin SD	310	230	57	8.7	16.7	4.4	10.0	44
448000	Lake Cr abv refuge nr Tuthill SD	58	23	11.5	5.9	16.7	4.4	10.0	44
449100	Little White R nr Vetal SD	590	415	92	7.2	17.0	4.4	10.0	43
449250	Spring Cr nr St Francis SD	57	10	19	10.5	17.5	4.6	9.0	44
449500	Little White R nr Rosebud SD	1,020	760	126.5	8.42	17.2	4.5	9.0	43
453500	Ponca Cr at Anoka NE	505	505	104	5.89	21.3	5.0	9.0	42
453600	Ponca Cr at Verdel NE	812	812	152	6.96	21.7	5.1	9.0	42
454000	Niobrara R at WY-NE State line	450	400	75.8	8.7	16.0	3.8	11.0	46
454100	Niobrara R at Agate NE	840	750	125	6.6	16.0	3.8	11.0	46
454500	Niobrara R abv Box Butte Res NE	1,400	1,300	193	5.9	16.2	3.9	10.0	46
455500	Niobrara R blw Box Butte Res NE	1,460	1,320	200	5.8	16.2	3.9	10.0	46
455900	Niobrara R nr Dunlap NE	1,580	1,340	211	5.9	16.2	3.9	10.0	46
456200	Pebble Cr nr Esther NE	3.07	3.07	4.12	38.9	17.1	4.2	10.0	46

Table 2.--Drainage-basin and climatic characteristics for gaging stations--Continued

Station number 06-	Station name	Basin characteristics							
		A	A_c	L	S	P	$I_{24,50}$	T_1	T_3
456300	Pebble Cr nr Dunlap NE	23.5	23.5	15.74	29.6	17.3	4.2	10.0	46
456400	Cottonwood Cr nr Dunlap NE	82.2	82.2	21.90	24.3	17.2	4.2	10.0	46
456500	Niobrara R nr Hay Springs NE	1,790	1,400	225	6.1	16.6	4.0	10.0	46
457200	Berea Cr nr Alliance NE	32.3	32.3	23.7	16.0	16.3	4.2	10.0	47
457500	Niobrara R nr Gordon NE	4,290	3,130	259	6.5	17.8	4.2	10.0	46
457800	Antelope Cr trib nr Gordon NE	26.6	26.6	16.2	16.6	16.5	4.3	8.0	44
459500	Snake R nr Burge NE	660	44	108.6	9.05	18.5	4.6	9.0	44
460900	Minnechaduza Cr nr Kilgore NE	85	10	20.09	9.97	17.7	4.7	9.0	43
461000	Minnechaduza Cr at Valentine NE	390	200	52.31	9.52	18.0	4.7	9.0	43
461500	Niobrara R nr Sparks NE	8,090	3,700	396	7.4	18.0	4.3	9.0	45
462000	Niobrara R nr Norden NE	8,390	3,770	418	7.4	18.1	4.4	9.0	45
462500	Plum Cr at Meadville NE	600	340	102	9.9	21.0	4.9	10.0	44
463100	Bone Cr trib nr Ainsworth NE	.39	.39	.46	31.9	22.1	4.9	10.0	44
463300	Sand Draw trib nr Ainsworth NE	1.07	1.07	1.77	18.8	22.0	4.9	10.0	44
463500	Long Pine Cr nr Riverview NE	390	110	44.3	17.46	22.3	5.0	10.0	44
464500	Keya Paha R at Wewela SD	1,070	1,070	93.2	8.25	19.5	4.6	9.0	43
464900	Keya Paha R nr Naper NE	1,630	1,630	153	5.68	20.0	4.8	9.0	43
465000	Niobrara R nr Spencer NE	12,100	6,040	498	7.5	19.1	4.7	9.0	44
465300	Camp Cr nr O'Neill NE	1.65	1.65	2.8	28.2	22.6	5.2	10.0	43
465500	Niobrara R nr Verdel NE	12,600	6,430	523	7.6	19.2	4.8	9.0	44
466500	Bazile Cr nr Niobrara NE	440	440	45.2	14.9	24.2	5.3	9.0	43
484000	Dry Cr nr Hawarden IA	48.4	48.4	22.8	9.08	25.4	5.6	7.0	41
485500	Big Sioux R at Akron IA	7,060	7,060	351	2.07	23.7	5.4	4.0	38
599800	Perry Cr nr Merrill IA	8.17	8.17	4.30	20.4	26.2	5.6	8.5	42
599950	Perry Cr nr Hinton IA	30.8	30.8	11.4	12.6	26.0	5.6	8.5	42

Table 2.--Drainage-basin and climatic characteristics for gaging stations--Continued

Station number 06-	Station name	Basin characteristics							
		A	A_c	L	S	P	$I_{24,50}$	T_1	T_3
600000	Perry Cr at 38th St Sioux City IA	64.8	64.8	18.8	11.3	25.7	5.6	8.5	42
600500	Floyd R at James IA	882	882	90.8	4.38	26.7	5.6	7.5	41
600600	S Omaha Cr trib No 1 nr Walthill NE	2.58	2.58	2.98	58.7	26.9	5.7	10.0	43
600700	S Omaha Cr nr Walthill NE	15.2	15.2	6.62	22.8	26.9	5.7	10.0	43
600800	S Omaha Cr trib No 2 nr Walthill NE	1.65	1.65	2.59	70.0	26.9	5.7	10.0	43
600900	S Omaha Cr at Walthill NE	51.2	51.2	15.16	11.6	26.9	5.7	10.0	43
601000	Omaha Cr at Homer NE	168	168	30.22	10.32	26.7	5.7	10.0	43
602000	West Fork Ditch at Holly Springs IA	399	399	56.0	6.50	26.6	5.8	9.0	42
606600	Little Sioux R at Correctionville IA	2,500	2,500	169	1.99	27.7	5.8	7.0	41
606700	Little Sioux R nr Kennebec IA	2,738	2,738	203	1.93	27.6	5.8	7.0	41
607200	Maple R at Mapleton IA	669	669	67.8	4.83	27.3	5.9	9.0	42
607700	S Br Tekamah Cr nr Craig NE	2.54	2.54	2.28	74.2	29.4	5.8	12.0	44
607800	S Br Tekamah Cr trib nr Tekamah NE	4.08	4.08	3.96	39.2	29.4	5.8	12.0	44
607900	S Br Tekamah Cr nr Tekamah NE	9.73	9.73	5.04	32.0	29.4	5.8	12.0	44
608000	Tekamah Cr at Tekamah NE	23.0	23.0	10.6	21.9	29.4	5.8	12.0	44
608500	Soldier R at Pisgah IA	407	407	49.2	8.11	27.5	5.9	11.0	44
608600	New York Cr nr Spiker NE	1.75	1.75	2.87	48.90	29.0	5.9	12.0	44
608700	New York Cr trib nr Spiker NE	1.55	1.55	2.52	45.90	29.0	5.9	12.0	44
608800	New York Cr north of Spiker NE	6.50	6.50	4.90	36.40	29.0	5.9	12.0	44
608900	New York Cr east of Spiker NE	13.9	13.9	7.69	24.75	29.0	5.9	12.0	44
609000	New York Cr at Herman NE	25.4	25.4	15.02	16.45	29.0	5.9	12.0	44
609500	Boyer R at Logan IA	871	871	92.9	3.56	28.0	5.9	10.5	43
610500	Indian Cr at Council Bluffs IA	7.99	7.99	4.50	47.7	30.2	6.0	12.5	45
674500	N Platte R at WY-NE State line	26,177	20,289	......	.....	....	...	....	..
677500	Horse Cr nr Lyman NE	1,570	1,530	205.6	14.30	15.0	3.7	12.5	46

Station number 06-	Station name	Basin characteristics							
		A	A_c	L	S	P	$I_{24,50}$	T_1	T_3
678000	Sheep Cr nr Morrill NE	362	337	45.7	18.2	14.4	3.8	11.9	47
679500	N Platte R at Mitchell NE	28,300	22,340	......	.....	....	...	....	..
682000	N Platte R nr Minatare NE	28,700	22,740	......	.....	....	...	....	..
684500	N Platte R at Bridgeport NE	29,300	23,340	......	.....	....	...	....	..
685000	Pumpkin Cr nr Bridgeport NE	1,020	1,020	118.1	8.17	15.7	4.1	11.6	48
686000	N Platte R at Lisco NE	30,700	24,700	......	.....	....	...	....	..
686500	N Platte R at Oshkosh NE	31,300	25,300	......	.....	....	...	....	..
687000	Blue Cr nr Lewellen NE	1,190	80	132.1	7.90	16.6	4.4	11.7	47
687500	N Platte R at Lewellen NE	32,600	26,600	......	.....	....	...	....	..
690500	N Platte R nr Keystone NE	33,300	....	......	.....	....	...	....	..
691000	N Platte R nr Sutherland NE	33,800	....	......	.....	....	...	....	..
692000	Birdwood Cr nr Hershey NE	940	80	81.7	10.50	18.5	4.8	10.2	47
693000	N Platte R at North Platte NE	34,900	....	......	.....	....	...	....	..
760000	S Platte R at Balzac CO	16,852	....	......	.....	....	...	....	..
761700	Muddy Cr trib nr Burns WY	24.8	24.8	21.3	28.0	16.4	3.8	12.0	48
761900	Lodgepole Cr trib nr Pine Bluffs WY	.44	.44	1.2	56.0	16.4	3.8	13.0	49
762500	Lodgepole Cr at Bushnell NE	1,361	1,361	158	16.0	16.0	3.8	11.0	46
762600	Lodgepole Cr trib No 2 nr Albin WY	5.69	5.69	6.6	26.5	16.1	3.8	13.0	49
763500	Lodgepole Cr at Ralton NE	3,307	3,307	326	10.3	16.6	4.0	11.3	48
764000	S Platte R at Julesburg CO	23,138	....	......	.....	....	...	....	..
765000	S Platte R at Paxton NE	24,000	....	......	.....	....	...	....	..
765500	S Platte R at North Platte NE	24,300	....	......	.....	....	...	....	..
766000	Platte R at Brady NE	60,200	....	......	.....	....	...	....	..
766500	Platte R nr Cozad NE	60,500	....	......	.....	....	...	....	..
767100	S Fk Plum Cr trib nr Farnam NE	10.4	10.4	8.90	16.31	21.4	5.1	12.0	49

Table 2.--Drainage-basin and climatic characteristics for gaging stations--Continued

Station number 06-	Station name	Basin characteristics							
		A	A_c	L	S	P	$I_{24,50}$	T_1	T_3
767200	N Fk Plum Cr trib nr Farnam NE	1.83	1.83	3.36	38.04	21.4	5.1	12.0	49
767300	Plum Cr trib at Farnam NE	19.3	19.3	12.17	13.71	21.4	5.1	12.0	49
767400	N Plum Cr nr Farnam NE	40.4	40.4	21.50	9.29	21.3	5.1	12.0	49
767410	Plum Cr nr Farnam NE	80.4	80.4	27.53	7.97	21.4	5.1	12.0	49
767500	Plum Cr nr Smithfield NE	229	229	87.04	5.17	21.7	5.2	12.4	49
768000	Platte R nr Overton NE	61,700	....	......	.....	....	...	....	..
768100	E Buffalo Cr nr Buffalo NE	5.21	5.21	7.00	23.46	21.8	5.2	11.6	48
768200	Buffalo Cr at Buffalo NE	33.5	30.6	15.50	24.30	21.8	5.2	11.6	48
768300	Buffalo Cr trib No 2 nr Buffalo NE	1.93	1.93	3.74	26.50	21.8	5.2	11.6	48
768400	W Buffalo Cr nr Buffalo NE	17.1	17.1	11.19	18.49	21.7	5.2	11.6	48
768500	Buffalo Cr nr Darr NE	63	58.5	25.25	13.17	21.8	5.2	11.8	48
769100	Elm Cr trib nr Overton NE	.58	.58	1.24	46.88	22.2	5.2	11.8	48
769200	Elm Cr nr Sumner NE	14.9	14.9	10.27	11.06	22.2	5.2	11.8	48
769300	Elm Cr trib No 2 nr Overton NE	5.62	5.62	4.63	16.47	22.2	5.2	11.8	48
770000	Platte R nr Odessa NE	62,100	....	......	.....	....	...	....	..
770500	Platte R nr Grand Island NE	62,800	....	......	.....	....	...	....	..
770600	Wood R trib nr Lodi NE	2.02	2.02	3.30	30.70	21.7	5.1	11.5	47
770700	Wood R nr Lodi NE	12.9	12.9	10.90	16.16	21.7	5.1	11.5	47
770800	Wood R nr Oconto NE	26.4	26.4	12.30	13.30	21.8	5.1	11.5	47
770900	Wood R at Oconto NE	44.8	44.8	16.51	10.86	21.8	5.2	11.5	47
770910	Wood R nr Lomax NE	79.6	79.6	28.88	8.18	21.9	5.2	11.5	48
771000	Wood R nr Riverdale NE	379	379	100.8	4.95	22.5	5.3	11.5	48
771500	Wood R nr Gibbon NE	572	572	150.6	3.97	22.9	5.3	11.6	48
772000	Wood R nr Alda NE	628	628	185.8	3.60	23.0	5.4	11.7	48
774000	Platte R nr Duncan NE	64,900	....	......	.....	....	...	....	..

Table 2.--Drainage-basin and climatic characteristics for gaging stations--Continued

Station number 06-	Station name	Basin characteristics							
		A	A_c	L	S	P	$I_{24,50}$	T_1	T_3
775500	Middle Loup R nr Dunning NE	1,850	80	145	9.5	19.1	4.7	10.0	46
776500	Dismal R at Dunning NE	2,040	45	147	11.7	19.1	4.8	10.2	47
777500	Middle Loup R at Walworth NE	4,650	430	179	9.1	19.5	4.8	10.3	46
777700	Lillian Cr nr Broken Bow NE	4.77	4.77	4.1	28.0	22.1	5.2	10.4	46
777800	Lillian Cr trib nr Walworth NE	2.04	2.04	3.98	33.6	21.9	5.2	10.0	46
778000	Middle Loup R at Sargent NE	4,790	475	190	9.1	19.6	4.9	10.3	46
779000	Middle Loup R at Arcadia NE	5,040	820	212	8.8	19.7	4.9	10.2	46
780000	Middle Loup R at Rockville NE	5,310	1,090	242	8.4	19.9	4.9	10.3	46
782500	South Loup R at Ravenna NE	1,570	890	189	5.8	21.3	5.2	11.6	47
782600	S Br Mud Cr trib nr Broken Bow NE	.40	.40	1.56	40.5	22.2	5.2	11.0	46
782700	S Br Mud Cr at Broken Bow NE	86.1	45.9	21	8.6	22.1	5.2	11.0	46
782800	N Br Mud Cr at Broken Bow NE	15.5	10.8	11	33.6	22.3	5.2	11.0	46
782900	Mud Cr trib nr Broken Bow NE	5.90	5.90	4.94	56.6	22.6	5.2	11.0	46
783500	Mud Cr nr Sweetwater NE	707	655	105	5.9	22.5	5.3	11.0	47
784000	South Loup R at St Michael NE	2,350	1,650	202	4.6	21.7	5.3	11.4	47
784300	Oak Cr nr Loup City NE	41.9	41.9	20.1	9.9	23.2	5.3	10.1	46
784700	Turkey Cr nr Farwell NE	27.2	27.2	15.7	12.9	23.4	5.4	10.7	46
785000	Middle Loup R at St Paul NE	8,090	3,200	271	8.1	20.6	5.0	10.7	46
786000	North Loup R at Taylor NE	2,280	180	185	7.6	20.6	4.8	9.4	45
787500	Calamus R nr Burwell NE	1,060	110	111	8.2	21.6	5.1	10.4	44
788500	North Loup R at Ord NE	3,750	770	221	7.1	21.1	4.9	9.7	45
789000	North Loup R at Scotia NE	3,960	910	240	7.0	21.2	4.9	9.7	45
789100	Davis Cr trib nr North Loup NE	2.29	2.29	2.0	49.3	23.1	5.3	9.9	46
789200	Davis Cr trib No 2 nr North Loup NE	6.79	6.79	6.0	22.9	23.1	5.3	9.9	46
789300	Davis Cr nr North Loup NE	21.1	21.1	10.1	16.2	23.1	5.4	9.9	46

Table 2.--Drainage-basin and climatic characteristics for gaging stations--Continued

Station number 06-	Station name	Basin characteristics							
		A	A_c	L	S	P	$I_{24,50}$	T_1	T_3
789400	Davis Cr southwest of North Loup NE	31.2	31.2	18.4	10.0	23.2	5.4	9.9	46
790500	North Loup R nr St Paul NE	4,290	1,270	262	7.0	21.4	5.0	9.8	45
790600	E Br Spring Cr trib nr Wolbach NE	1.52	1.52	2.9	41.4	23.0	5.4	9.8	45
790700	W Br Spring Cr at Brayton NE	19.5	19.5	11.7	16.3	23.0	5.4	9.8	45
790800	W Br Spring Cr nr Wolbach NE	36.9	36.9	17.5	13.3	23.1	5.4	9.9	45
790900	Mary's Cr at Wolbach NE	7.63	7.63	5.1	27.5	23.8	5.4	10.3	45
791100	Spring Cr nr Cushing NE	184	184	48.24	7.7	23.3	5.4	9.9	45
791500	Cedar R nr Spalding NE	762	50	93	5.2	21.8	5.3	9.8	44
792000	Cedar R nr Fullerton NE	1,220	480	148	4.42	22.6	5.3	9.9	44
793000	Loup R nr Genoa NE	14,400	6,000	318	7.5	21.2	5.1	10.4	46
794000	Beaver Cr at Genoa NE	647	410	126	4.5	24.6	5.4	9.9	44
794500	Loup R at Columbus NE	15,200	6,530	342	7.1	21.4	5.1	10.4	46
795000	Shell Cr at Newman Grove NE	122	122	31.6	9.3	25.4	5.4	9.9	44
795500	Shell Cr nr Columbus NE	270	270	93	4.6	25.8	5.5	10.9	44
796000	Platte R at North Bend NE	81,100	....	......	.....	....	...	....	..
797500	Elkhorn R at Ewing NE	1,400	740	139.8	4.66	22.2	5.2	10.1	43
798000	S Fk Elkhorn R at Ewing NE	320	190	89.4	7.08	22.1	5.2	10.2	44
798500	Elkhorn R at Neligh NE	2,200	1,200	165.4	4.58	22.4	5.2	9.9	43
799000	Elkhorn R nr Norfolk NE	2,790	1,790	207.4	4.43	23.0	5.3	9.8	43
799500	Logan Cr nr Uehling NE	1,030	1,030	95.9	4.25	26.9	5.6	10.6	43
800000	Maple Cr nr Nickerson NE	450	450	75.51	5.23	27.7	5.7	12.3	44
800500	Elkhorn R at Waterloo NE	6,900	5,900	313.2	3.98	25.5	5.5	10.7	43
801000	Platte R nr Ashland NE	88,100	....	......	.....	....	...	....	..
803000	Salt Cr at Roca NE	167	167	32.99	5.69	28.2	6.0	14.9	48
803200	Antelope Cr at 48th St Lincoln NE	7.14	7.14	6.01	28.25	28.0	6.0	14.4	47

Table 2.--Drainage-basin and climatic characteristics for gaging stations--Continued

Station number 06-	Station name	Basin characteristics							
		A	A_c	L	S	P	$I_{24,50}$	T_1	T_3
803300	Antelope Cr at 27th St Lincoln NE	10.6	10.6	7.84	25.04	28.0	6.0	14.3	47
803400	Antelope Cr at 17th St Lincoln NE	12.1	12.1	9.71	22.91	28.0	6.0	14.3	47
803500	Salt Cr at Lincoln NE	684	684	58.99	3.93	28.0	5.9	14.4	48
803555	Salt Cr at Greenwood NE	1,051	1,051	77.0	3.50	28.0	5.9	14.3	47
803570	Dunlap Cr trib nr Weston NE	.43	.43	1.20	85.71	29.0	5.8	13.3	46
803600	N Fk Wahoo Cr nr Prague NE	15.4	15.4	6.83	26.98	29.0	5.8	13.1	46
803700	N Fk Wahoo Cr trib nr Weston NE	9.09	9.09	6.35	26.44	29.0	5.8	13.2	46
803900	N Fk Wahoo Cr at Weston NE	43.3	43.3	16.6	11.95	29.0	5.8	13.2	46
804000	Wahoo Cr at Ithaca NE	271	268	38.53	5.98	29.0	5.9	13.3	46
804100	Silver Cr nr Cedar Bluffs NE	7.00	6.70	4.31	10.24	29.0	5.9	13.1	45
804200	Silver Cr nr Colon NE	30.3	23.4	10.65	7.87	29.0	5.9	13.1	45
804300	Silver Cr trib nr Colon NE	10.3	7.30	7.59	8.33	29.0	5.9	13.1	45
804400	Silver Cr trib at Colon NE	17.6	14.2	13.31	7.66	29.0	5.9	13.1	45
804500	Silver Cr at Ithaca NE	80.0	63.4	24.68	6.74	28.8	5.9	13.3	45
805000	Salt Cr nr Ashland NE	1,620	1,590	87.8	3.33	28.0	5.9	14.0	46
805500	Platte R nr South Bend NE	89,800	....	......	.....	....	...	....	..
806000	Waubonsie Cr nr Bartlett IA	30.4	30.4	11.4	21.0	32.2	6.2	14.5	47
806400	Weeping Water Cr at Elmwood NE	20.8	20.8	10.06	11.17	29.0	6.1	12.0	47
806420	Stove Cr nr Elmwood NE	5.23	5.23	3.33	21.13	29.2	6.1	12.0	47
806440	Stove Cr at Elmwood NE	10.3	10.3	5.95	15.42	29.2	6.1	12.0	47
806460	Weeping Water Cr at Weeping Water NE	80.1	80.1	29.44	8.03	29.2	6.2	12.0	47
806470	Weeping Water Cr trib nr Weeping Water NE	.73	.73	1.64	97.56	29.7	6.2	12.0	47
806500	Weeping Water Cr at Union NE	241	241	52.03	6.48	29.8	6.2	12.5	47
810100	Hooper Cr trib nr Palmyra NE	8.00	8.00	8.84	16.77	28.8	6.1	14.5	47
810200	Hooper Cr nr Palmyra NE	59.6	59.6	23.03	9.81	28.9	6.1	14.5	47

Table 2.--Drainage-basin and climatic characteristics for gaging stations--Continued

Station number 06-	Station name	Basin characteristics							
		A	A_c	L	S	P	$I_{24,50}$	T_1	T_3
810300	Wolf Cr nr Syracuse NE	25.5	25.5	13.7	14.73	30.1	6.2	14.5	47
810400	Little Nemaha R trib nr Syracuse NE	.71	.71	1.74	62.1	30.5	6.2	14.5	48
810500	Little Nemaha R nr Syracuse NE	212	212	39.0	8.53	29.6	6.2	14.7	48
811500	Little Nemaha R at Auburn NE	793	793	66.9	5.76	31.0	6.2	15.0	48
813700	Tennessee Cr trib nr Senaca KS	.90	.90	1.93	65.5	33.0	6.5	17.5	51
814000	Turkey Cr nr Senaca KS	276	276	55.6	5.87	32.0	6.4	16.5	49
814500	N Fk Big Nemaha R at Humboldt NE	548	548	73.9	6.22	31.0	6.2	16.0	48
815000	Big Nemaha R at Falls City NE	1,340	1,340	104.6	4.87	32.0	6.3	16.0	49
815500	Muddy Cr at Verdon NE	186	186	38.6	8.56	34.0	6.4	16.5	49
815700	Buttermilk Cr nr Willis KS	3.74	3.74	3.5	26.3	34.0	6.6	17.3	51
821500	Arikaree R at Haigler NE	1,640	980	148	17.4	16.7	4.4	13.2	52
822000	N Fk Republican R nr Wray CO	912	40	87	15.8	17.2	4.4	11.6	52
823000	N Fk Republican R at CO-NE State line	1,360	100	112	14.9	17.3	4.4	12.1	51
823500	Buffalo Cr nr Haigler NE	260	13	69	13.3	17.8	4.5	13.1	51
824000	Rock Cr at Parks NE	20	17	18.5	17.8	18.0	4.7	13.9	51
824500	Republican R at Benkelman NE	4,830	1,230	179	15.8	17.2	4.4	13.1	52
827500	S Fk Republican R nr Benkelman NE	2,740	2,190	......	.....	16.4	4.5	14.1	53
828000	Republican R at Max NE	7,890	3,560	191	14.5	17.0	4.5	13.5	52
828500	Republican R at Stratton NE	8,450	3,800	......	.....	....	...	....	..
829500	Republican R at Trenton NE	8,620	3,940	......	.....	....	...	....	..
830000	Republican R at Culbertson NE	8,740	4,060	210	15.5	17.2	4.5	13.6	52
831000	Frenchman Cr blw Champion NE	523	413	119	9.4	18.6	4.5	13.5	50
831500	Frenchman Cr nr Imperial NE	880	720	130	9.6	18.8	4.5	13.8	50
832500	Frenchman Cr nr Enders NE	950	790	......	.....	....	...	....	..
833500	Frenchman Cr nr Hamlet NE	1,090	930	166	9.4	19.1	4.5	13.9	50

Table 2.--Drainage-basin and climatic characteristics for gaging stations--Continued

Station number 06-	Station name	Basin characteristics							
		A	A_c	L	S	P	$I_{24,50}$	T_1	T_3
834000	Frenchman Cr at Palisade NE	1,110	947	177	9.4	19.2	4.6	13.9	50
835000	Stinking Water Cr nr Palisade NE	1,500	380	119	10.7	19.9	4.7	13.1	49
835500	Frenchman Cr at Culbertson NE	2,770	1,470	205	9.0	19.7	4.7	13.5	50
836000	Blackwood Cr nr Culbertson NE	320	270	54	12.4	21.0	4.9	13.8	49
836500	Driftwood Cr nr McCook NE	360	350	75	8.6	19.4	5.0	14.0	51
837000	Republican R at McCook NE	12,310	6,260	......	.....	....	...	....	..
837500	Red Willow Cr nr McCook NE	740	320	76	10.5	20.6	4.9	13.2	50
838000	Red Willow Cr nr Red Willow NE	830	410	91	11.0	20.5	4.9	13.2	50
839000	Medicine Cr at Maywood NE	231	79	37.9	15.0	20.3	4.9	11.8	49
839200	Elkhorn Canyon nr Maywood NE	6.74	6.74	3.75	35.1	21.2	5.0	12.2	50
839400	Elkhorn Canyon southwest of Maywood NE	13.2	13.2	7.9	28.7	21.3	5.0	12.2	50
839500	Brushy Cr nr Maywood NE	95	71	17.7	26.1	21.1	5.0	12.1	50
839600	Frazier Cr nr Maywood NE	11.3	11.3	5.1	31.2	21.3	5.0	12.1	50
839700	Frazier Cr trib nr Maywood NE	.72	.72	1.4	101	21.3	5.0	12.1	50
839850	Fox Cr north of Curtis NE	13.8	13.8	5.2	36.4	20.8	5.0	11.6	49
839900	Fox Cr abv Cut Canyon nr Curtis NE	31.8	31.8	11.6	22.1	20.9	5.0	11.7	49
839950	Cut Canyon near Curtis NE	25.6	25.6	15.2	20.5	20.8	5.0	11.5	49
840000	Fox Cr at Curtis NE	74.3	74.3	19.9	15.6	20.9	5.0	11.8	49
840500	Dry Cr nr Curtis NE	21.6	21.6	11.9	25.1	21.2	5.1	11.8	49
841000	Medicine Cr abv Harry Strunk Lake NE	770	530	70.5	10.1	20.7	5.0	11.8	49
841500	Mitchell Cr abv Harry Strunk Lake NE	52	52	28.0	11.7	21.4	5.1	12.0	50
842500	Medicine Cr blw Harry Strunk Lake NE	880	640	......	.....	....	...	....	..
843000	Medicine Cr at Cambridge NE	909	671	94	8.0	20.8	5.0	11.9	49
843500	Republican R at Cambridge NE	14,520	7,810	......	.....	....	...	....	..
844000	Muddy Cr at Arapahoe NE	246	246	53.8	6.9	21.8	5.2	13.0	50

Table 2.--Drainage-basin and climatic characteristics for gaging stations--Continued

Station number 06-	Station name	Basin characteristics							
		A	A_c	L	S	P	$I_{24,50}$	T_1	T_3
844500	Republican R nr Orleans NE	15,640	8,910	......	.....	....	...	....	..
845000	Sappa Cr nr Oberlin KS	1,063	900	142.8	8.2	19.0	4.9	14.0	52
845100	Long Br Draw nr Norcatur KS	31.7	31.7	15.8	12.7	21.0	5.2	14.0	51
845200	Sappa Cr nr Beaver City NE	1,510	1,350	234.4	6.8	19.6	5.0	14.1	51
846000	Beaver Cr at Ludell KS	1,460	1,120	190	8.8	17.5	4.8	14.6	52
846200	Beaver Cr trib nr Ludell KS	10.2	10.2	6.22	33.2	19.3	4.9	14.5	51
846500	Beaver Cr at Cedar Bluffs KS	1,619	1,325	233	7.6	17.8	4.8	14.5	52
847000	Beaver Cr nr Beaver City NE	1,950	1,650	324	6.7	18.3	4.9	14.4	52
847500	Sappa Cr nr Stamford NE	3,740	3,280	346	6.5	19.1	5.0	14.4	51
848000	Prairie Dog Cr at Norton KS	684	684	122.7	9.53	20.2	5.1	14.8	51
848200	Prairie Dog Cr trib nr Norton KS	1.02	1.02	2.1	51.0	21.3	5.3	15.0	51
848500	Prairie Dog Cr nr Woodruff KS	1,007	1,007	176.8	7.85	20.6	5.2	14.9	51
849500	Republican R blw Harlan Co Dam NE	20,760	....	......	.....	....	...	....	..
850000	Turkey Cr at Naponee NE	129	125	55.5	8.49	22.5	5.4	14.8	50
850200	Cottonwood Cr nr Bloomington NE	15.6	15.6	13.5	15.64	22.7	5.6	15.1	50
850500	Republican R nr Bloomington NE	21,000	13,800	345	11.5	18.9	4.8	13.8	51
851000	Center Cr at Franklin NE	177	56	68.4	5.59	23.0	5.4	14.4	50
851100	W Br Thompson Cr at Hildreth NE	64.0	18.4	27.0	3.58	23.3	5.5	14.6	50
851200	W Br Thompson Cr nr Hildreth NE	105	27.6	32.6	3.58	23.3	5.5	14.6	50
851300	W Br Thompson Cr trib nr Hildreth NE	11.5	8.2	8.46	11.41	23.1	5.5	14.7	50
851400	W Br Thompson Cr nr Upland NE	128	47.6	45.9	3.81	23.3	5.5	14.6	50
851500	Thompson Cr at Riverton NE	279	190	75.9	5.28	23.3	5.5	14.8	50
852000	Elm Cr at Amboy NE	39.2	39.2	27.2	9.80	24.0	5.7	14.0	50
853000	Republican R nr Guide Rock NE	22,040	14,550	......	.....	....	...	....	..
853100	Beaver Cr nr Rosemont NE	.75	.75	1.73	47.71	24.1	5.7	14.0	50

Station number 06-	Station name	Basin characteristics							
		A	A_c	L	S	P	$I_{24,50}$	T_1	T_3
853500	Republican R nr Hardy NE	22,401	14,900	......	.....	....	...	....	..
853800	White Rock Cr nr Burr Oak KS	227	227	37	10.3	24.6	5.7	14.6	51
856100	West Cr nr Talmo KS	42.0	42.0	32.6	9.70	27.5	6.0	16.4	51
872100	Middle Cedar Cr at Kensington KS	58.9	58.9	19.2	16.1	22.5	5.6	15.7	51
880000	Lincoln Cr nr Seward NE	446	446	140.2	3.00	27.0	5.7	13.5	47
880500	Big Blue R at Seward NE	1,101	1,101	151.6	2.84	27.0	5.7	13.3	47
880710	School Cr trib No 1 nr Harvard NE	14.6	14.6	12.8	6.22	24.8	5.7	14.0	49
880720	School Cr nr Harvard NE	51.5	37.7	14.3	7.35	24.8	5.7	14.1	49
880730	School Cr trib No 2 nr Harvard NE	16.4	13.9	10.6	7.55	24.9	5.7	14.1	49
880740	School Cr nr Saronville NE	90.1	49.7	24.7	5.95	24.9	5.7	14.1	49
880800	W Fk Big Blue R nr Dorchester NE	1,206	1,140	184.7	3.15	26.6	5.7	14.4	48
881000	Big Blue R nr Crete NE	2,716	2,650	196.6	2.63	27.0	5.7	14.0	48
881200	Turkey Cr nr Wilber NE	460	460	120.8	3.29	27.4	5.9	14.9	49
881450	Indian Cr at Beatrice NE	74.7	74.7	29.69	6.26	28.9	6.1	15.5	49
881500	Big Blue R at Beatrice NE	3,900	3,830	248.8	2.35	27.3	5.8	14.4	48
882000	Big Blue R at Barneston NE	4,444	4,370	273.6	2.21	27.6	5.8	14.6	48
883000	Little Blue R nr Deweese NE	979	979	103.6	5.75	24.6	5.6	14.1	50
883570	Little Blue R nr Gilead NE	1,552	1,552	163.6	5.00	25.3	5.7	14.1	50
883600	S Fk Big Sandy Cr nr Edgar NE	10.3	10.3	7.35	6.52	25.3	5.8	14.0	50
883700	S Fk Big Sandy Cr nr Davenport NE	28.1	28.1	18.64	4.31	25.8	5.8	14.0	50
883800	S Fk Big Sandy Cr nr Carleton NE	50.4	50.4	28.99	4.27	25.9	5.8	14.0	50
883900	S Fk Big Sandy Cr nr Hebron NE	90.3	90.3	53.18	4.01	26.3	5.9	14.2	50
884000	Little Blue R nr Fairbury NE	2,350	2,350	184.8	4.86	25.6	5.8	14.4	50
884100	Mulberry Cr trib nr Haddam KS	1.64	1.64	2.15	52.2	29.0	6.1	16.6	51
884200	Mill Cr at Washington KS	344	344	63.1	4.72	28.7	6.1	16.5	51

Table 2.--Drainage-basin and climatic characteristics for gaging stations--Continued

Station number 06-	Station name	Basin characteristics A	A_c	L	S	P	$I_{24,50}$	T_1	T_3
884300	Mill Cr trib nr Washington KS	3.20	3.20	3.06	37.1	30.0	6.2	17.2	51
884900	Robidoux Cr at Beattie KS	40.0	40.0	14.52	12.30	31.6	6.2	17.1	50
885500	Black Vermillion Cr nr Frankfort KS	410	410	37.6	8.1	32.0	6.3	17.5	51

Table 3.--Period of record and maximum observed peak discharges at gaging stations

Station number 06-	Period of record of peak discharges observed, water years	Peak-discharge record used if different from observed, water years	Number of years used in analysis	Flood region	Maximum observed flood: Date	Maximum observed flood: Peak discharge in cubic feet per second	Maximum observed flood: Peak discharge in cubic feet per second per square mile contributing
399300	1956-59,1961-72	....	16	1	03-16-63	510	147
399700	1956-72	....	17	1	06-09-68	1,550	283
400000	1905,1951-72	....	23	1	06-16-67	13,300	13
443200	1953-70	....	18	1	06-17-65	740	93
443300	1953-72	....	20	1	08-15-53	3,050	280
443700	1955-72	....	18	1	07-01-66	6,160	117
444000	1920,1931-44,1948-72	....	40	1	03-15-48	1,580	5.0
445000	1949-61	....	13	1	05-20-57	4,480	6.6
445500	1931-43,1947,1949-52	....	18	1	06-22-47	5,500	7.3
445530	1953-72	....	20	1	07-13-63	188	73
445560	1953-72	....	20	1	06-11-62	2,740	178
446000	1944-72	....	29	1	06-21-47	5,200	2.4
447500	1938-40,1962-72	....	14	1	07-19-65	1,190	5.2
448000	1938-40,1962-72	....	14	2	03-09-66	154	6.7
449100	1960-72	....	13	1	03-13-66	1,330	3.2
449250	1960-72	....	13	2	06-21-62	65	6.5
449500	1944-72	....	29	1	06-11-67	4,640	6.1
453500	1949-72	....	24	1	03-27-60	9,810	19
453600	1958-72	....	15	1	03-27-60	15,700	19
454000	1956-72	....	17	2	07-17-69	800	2.0

Table 3.--Period of record and maximum observed peak discharges at gaging stations--Continued

Station number 06-	Period of record of peak discharges observed, water years	Peak-discharge record used if different from observed, water years	Number of years used in analysis	Flood region	Maximum observed flood: Date	Maximum observed flood: Peak discharge in cubic feet per second	Maximum observed flood: Peak discharge in cubic feet per second per square mile contributing
454100	1958-72	....	15	2	06-23-59	181	0.2
454500	1947-72	....	26	2	07-28-51	4,950	3.8
455500	1947-72	....	26	a/	07-02-68	616	....
455900	1931-42,1962-71	1962-71	10	a/	07-30-62	3,230	....
456200	1953-72	....	20	1	07-28-53	2,000	651
456300	1953-70	....	18	1	06-25-65	3,300	140
456400	1948,1951-72	....	23	1	07-28-51	28,100	342
456500	1950-64	....	15	a/	07-28-51	7,330	....
457200	1953-72	....	20	2	03-18-60	107	3.3
457500	1929-32,1946-72	....	31	2	05-21-62	9,130	2.9
457800	1953-72	....	20	1	06-17-55	1,900	71
459500	1948-72	1948-62	15	2	06-30-62	1,830	42
459500	1948-72	1963-72	10	a/	02-07-63	3,170	....
460900	1958-72	....	15	2	06-08-68	147	15
461000	1948-72	....	25	2	03-22-60	1,100	5.5
461500	1946-72	....	27	2	03-05-49	10,200	2.8
462000	1953-72	....	20	2	07-01-62	7,380	2.0
462500	1948-72	....	25	2	09-18-67	2,070	6.1
463100	1956-68	....	13	1	06-27-60	360	923
463300	1956-72	....	17	1	06-30-62	747	698

Table 3.--Period of record and maximum observed peak discharges at gaging stations--Continued

Station number 06-	Period of record of peak discharges observed, water years	Peak-discharge record used if different from observed, water years	Number of years used in analysis	Flood region	Maximum observed flood		
					Date	Peak discharge in cubic feet per second	Peak discharge in cubic feet per second per square mile contributing
463500	1949-53,1955-72	....	23	2	07-01-62	9,650	88
464500	1939-40,1950-72	....	25	1	03-31-52	5,430	5.1
464900	1958-72	....	15	1	07-01-62	9,280	5.7
465000	1908,1914,1928-36,1938-72	1928-36,1938-72	44	2	03-12-55	27,400	4.5
465300	1958-72	....	15	1	06-16-64	833	505
465500	1938-40,1959-72	....	17	2	03-27-60	39,000	6.1
466500	1951-72	....	22	3	06-16-57	68,600	156
484000	1949-69	....	21	3	06-07-53	10,900	225
485500	1929-72	....	44	3	04-09-69	80,800	11
599800	1953-62,1964,1968-72	....	16	3	06-07-53	2,540	311
599950	1953-55,1957-65,1967-70	....	16	3	06-07-53	4,980	162
600000	1939-69	....	31	3	07-07-44	9,600	148
600500	1935-72	....	38	3	06-08-53	71,500	81
600600	1950-67	....	18	3	06-16-57	1,410	547
600700	1950-67	....	18	3	06-21-54	10,100	664
600800	1950-72	....	23	3	06-20-54	2,150	1,303
600900	1951-72	....	22	3	06-13-57	14,200	277
601000	1940,1946-72	....	28	3	[c]06-04-40	51,000	304
602000	1939-69	....	31	3	03-28-62	12,400	31
606600	1919-25,1929-32,1937-72	....	47	3	04-07-65	29,800	12

Table 3.--Period of record and maximum observed peak discharges at gaging stations--Continued

Station number 06-	Period of record of peak discharges observed, water years	Peak-discharge record used if different from observed, water years	Number of years used in analysis	Flood region	Maximum observed flood: Date	Maximum observed flood: Peak discharge in cubic feet per second	Maximum observed flood: Peak discharge in cubic feet per second per square mile contributing
606700	1940-69	....	30	3	04-08-65	29,700	11
607200	1936,1939-72	....	35	3	02-19-71	15,700	23
607700	1950-67	....	18	3	07-15-50	2,580	10
607800	1950-72	....	23	3	07-15-50	5,000	1,225
607900	1950-67	....	18	3	06-05-63	4,560	469
608000	1950-72	....	23	3	06-05-63	6,180	269
608500	1940-72	....	33	3	06-12-50	22,500	55
608600	1952-67	....	16	3	06-20-60	1,700	971
608700	1951-72	....	22	3	06-21-57	1,580	1,019
608800	1951-72	....	22	3	06-20-60	3,620	557
608900	1950-72	....	23	3	06-20-60	9,250	665
609000	1944,1946-69	....	25	3	07-15-50	5,500	217
609500	1918-25,1938-72	....	43	3	02-19-71	25,000	29
610500	1955-72	....	18	3	09-07-65	2,980	373
674500	1929-72	1941-72	32	a/	06-27-55	11,500	....
677500	1931-72	....	42	1	06-06-67	5,110	3.3
678000	1933-72	....	40	2	06-27-55	413	1.2
679500	1901-11,1916-18,1920-72	1941-72	32	a/	06-02-71	12,200	....
682000	1908-09,1916-19,1921-72	1941-72	32	a/	06-02-71	14,900	....
684500	1897-1900,1902-06,1915-72	1941-72	32	a/	06-03-71	16,400	....

Table 3.--Period of record and maximum observed peak discharges at gaging stations--Continued

Station number 06-	Period of record of peak discharges observed, water years	Peak-discharge record used if different from observed, water years	Number of years used in analysis	Flood region	Maximum observed flood: Date	Maximum observed flood: Peak discharge in cubic feet per second	Maximum observed flood: Peak discharge in cubic feet per second per square mile contributing
685000	1921,1932-72	....	42	1	06-09-65	7,880	7.7
686000	1916-17,1932-72	1941-72	32	a/	06-03-71	13,200	....
686500	1916,1928-60	1941-60	20	a/	05-16-42	9,350	....
687000	1931-72	....	42	2	05-20-38	720	9.0
687500	1941-72	....	32	a/	06-04-71	13,500	....
690500	1917,1942-72	1942-72	31	a/	06-10-71	8,850	....
691000	1917,1933,1935,1937-72	1941-72	32	a/	06-08-71	9,090	....
692000	1932-72	....	41	2	04-01-49	1,770	22
693000	1895-1972	1941-72	32	a/	06-10-71	9,580	....
760000	1918-34,1936-72	....	54	a/	06-18-65	123,000	....
761700	1960-72	....	13	1	09-01-66	1,810	73
761900	1960-72	....	13	1	07-06-60	86	195
762500	1932-72	....	41	1	09-15-50	16,500	12
762600	1960-72	....	13	1	05-29-67	528	93
763500	1931,1951-72	....	23	1	08-15-68	4,560	1.4
764000	1902-06,1909-12,1914-15, 1917-18,1920-24,1926-72	....	65	a/	06-20-65	37,600	....
765000	1940-69	....	30	a/	06-21-65	33,800	....
765500	1897,1914-15,1917,1921-72	....	56	a/	06-03-35	37,100	....
766000	1938-72	....	35	a/	06-23-65	16,800	....
766500	1938,1940-72	....	34	a/	05-10-42	16,600	....

Table 3.--Period of record and maximum observed peak discharges at gaging stations--Continued

Station number 06-	Period of record of peak discharges observed, water years	Peak-discharge record used if different from observed, water years	Number of years used in analysis	Flood region	Maximum observed flood		
					Date	Peak discharge in cubic feet per second	Peak discharge in cubic feet per second per square mile contributing
767100	1951-70	....	20	1	06-16-62	2,320	223
767200	1952-72	....	21	1	06-16-62	435	238
767300	1947-48,1951-70	....	22	1	06-22-47	4,300	223
767400	1947,1951-70	....	21	1	07-11-62	1,600	40
767410	1947,1951-72	....	23	1	06-22-47	3,800	47
767500	1947-72	....	26	1	06-23-47	2,800	12
768000	1915-17,1919-23,1926-72	....	55	a/	06-05-35	37,600	....
768100	1951-72	....	22	4	07-19-58	208	40
768200	1951-67	....	17	4	07-19-58	1,570	51
768300	1951-65	....	15	4	06-12-58	172	89
768400	1951-72	....	22	4	07-19-58	479	28
768500	1947-69	....	23	4	06-22-47	9,000	154
769100	1951-72	....	22	4	07-03-65	148	274
769200	1951-72	....	22	4	07-03-65	1,660	111
769300	1951-72	....	22	4	07-03-65	679	131
770000	1937-72	....	36	a/	06-24-47	22,700	....
770500	1934-72	....	39	a/	06-06-35	30,000	....
770600	1952-72	....	21	4	07-26-72	100	50
770700	1952-72	....	21	4	06-16-55	189	15
770800	1950,1952-72	....	22	4	06-17-54	790	30

Table 3.--Period of record and maximum observed peak discharges at gaging stations--Continued

					Maximum observed flood		
Station number 06-	Period of record of peak discharges observed, water years	Peak-discharge record used if different from observed, water years	Number of years used in analysis	Flood region	Date	Peak discharge in cubic feet per second	Peak discharge in cubic feet per second per square mile contributing
770900	1950,1952-72	....	22	4	07-19-58	2,390	53
770910	1952-72	....	21	4	09-20-60	1,750	22
771000	1923,1947-72	....	23	4	06-22-47	20,000	53
771500	1949-72	....	24	4	06-15-67	4,050	7.1
772000	1954-72	....	19	4	06-16-67	1,630	2.4
774000	1896-1909,1911,1913-15, 1928-72	1911,1913-15, 1928-72	49	a/	06-07-35	30,000	....
775500	1946-72	....	27	2	04-20-71	1,020	13
776500	1932,1946-72	....	28	2	05-26-52	996	22
777500	1941-60	....	20	2	10-05-46	2,990	7.0
777700	1947,1951-72	....	23	4	[c]06-22-47	930	195
777800	1951-72	....	22	4	08-12-51	585	287
778000	1937-38,1953-70	....	20	2	03-26-60	3,400	7.2
779000	1938-72	....	35	2	06-22-47	18,500	23
780000	1956-64,1968-72	....	14	2	06-16-57	10,400	9.5
782500	1941-58,1968-72	....	23	2	06-22-47	41,000	46
782600	1951-72	....	22	4	07-20-72	218	545
782700	1945,1951-72	....	23	2	06-17-56	1,790	39
782800	1951-67	....	17	2	06-17-56	1,550	144
782900	1945,1951-72	....	23	4	07-06-68	1,500	254
783500	1947-72	....	26	4	06-22-47	27,000	41

Table 3.--Period of record and maximum observed peak discharges at gaging stations--Continued

Station number 06-	Period of record of peak discharges observed, water years	Peak-discharge record used if different from observed, water years	Number of years used in analysis	Flood region	Maximum observed flood		
					Date	Peak discharge in cubic feet per second	Peak discharge in cubic feet per second per square mile contributing
784000	1944-72	....	29	2	06-22-47	50,000	30
784300	1950-60,1962-64	....	14	4	07-03-51	1,420	34
784700	1950,1953-72	....	21	4	07-09-50	1,600	59
785000	1895-99,1903,1929-72	....	50	2	06-23-47	72,000	22
786000	1937-72	....	36	2	06-14-51	2,770	15
787500	1941-72	....	32	2	05-04-64	1,790	16
788500	1937-38,1952-72	....	23	2	06-07-62	10,100	13
789000	1937-69	....	33	2	08-12-66	37,600	41
789100	1951-67	....	17	4	06-16-62	1,780	777
789200	1951-70	1951-68	18	4	08-13-66	2,360	348
789300	1951-67	....	17	4	07-14-57	1,820	86
789400	1951-72	....	22	4	06-16-57	2,220	71
790500	1896-97,1899,1903,1929-72	....	48	2	06-06-96	90,000	71
790600	1952-72	....	21	4	08-12-66	1,340	224
790700	1945,1952-72	....	22	4	08-12-66	12,800	656
790800	1951-67	....	17	4	08-12-66	12,800	347
790900	1952-67	....	16	4	08-12-66	4,700	616
791100	1948-72	....	25	4	08-13-66	35,000	190
791500	1945-53,1958-72	....	24	2	06-23-47	4,000	80
792000	1932,1941-72	....	33	2	08-13-66	64,700	135

Table 3.--Period of record and maximum observed peak discharges at gaging stations--Continued

Station number 06-	Period of record of peak discharges observed, water years	Peak-discharge record used if different from observed, water years	Number of years used in analysis	Flood region	Maximum observed flood: Date	Maximum observed flood: Peak discharge in cubic feet per second	Maximum observed flood: Peak discharge in cubic feet per second per square mile contributing
793000	1929-32,1944-72	....	33	2	08-13-66	129,000	22
794000	1941-72	....	32	2	07-19-50	21,200	52
794500	1895-1911,1913-15,1933-72	....	60	2	08-14-66	119,000	18
795000	1950-67,1969	....	19	3	08-12-66	14,500	119
795500	1947-72	....	26	3	06-30-50	5,970	22
796000	1949-72	....	24	a/	03-29-60	112,000	....
797500	1947-72	....	26	2	06-10-62	7,500	10
798000	1944,1947-53,1961-72	....	20	2	06-21-47	3,400	18
798500	1932-58,1960-72	....	40	2	03-29-60	12,300	10
799000	1897-1903,1940-72	....	40	2	06-14-67	16,900	9.4
799500	1940-72	....	33	3	02-20-71	25,200	24
800000	1944,1952-72	....	22	3	[c]06-11-44	35,000	78
800500	1899-1903,1911-15,1929-72	....	54	2	06-12-44	100,000	17
801000	1929-53	....	25	a/	06-12-44	107,000	....
803000	1950-72	....	23	3	05-08-50	67,000	401
803200	1951,1958-72	1963-72	10	a/	06-02-65	1,880	690
803300	1957-72	1963-72	10	a/	07-26-67	1,980	242
803400	1958-72	....	15	3,a/	07-26-67	3,370	278
803500	1950-72	....	23	3	06-02-51	28,200	41
803555	1952-72	....	21	3	06-24-63	41,000	39

Table 3.--Period of record and maximum observed peak discharges at gaging stations--Continued

Station number 06-	Period of record of peak discharges observed, water years	Peak-discharge record used if different from observed, water years	Number of years used in analysis	Flood region	Maximum observed flood		
					Date	Peak discharge in cubic feet per second	Peak discharge in cubic feet per second per square mile contributing
803570	1950-72	....	23	3	06-24-63	923	2,146
803600	1951-72	....	22	3	06-24-63	15,900	1,032
803700	1950-67	....	18	3	06-24-63	13,800	1,518
803900	1951-72	....	22	3	06-24-63	81,400	1,880
804000	1950-72	....	23	3	06-24-63	77,400	289
804100	1950-72	....	23	3	08-02-59	4,040	603
804200	1950-72	....	23	3	08-02-59	12,000	513
804300	1951-72	....	22	3	08-02-59	5,000	685
804400	1951-72	....	22	3	08-02-59	4,640	327
804500	1950-72	....	23	3	08-02-59	21,600	341
805000	1947-67	....	21	3	06-25-63	87,000	55
805500	1953-72	....	20	a/	03-30-60	124,000	....
806000	1946-69	....	24	3	05-08-50	14,500	477
806400	1950-67,1971	....	19	3	05-09-50	7,600	365
806420	1950-67,1971	....	19	3	05-09-50	3,730	713
806440	1950-72	....	23	3	05-09-50	9,500	922
806460	1947,1950-72	....	24	3	05-09-50	30,300	378
806470	1950-72	....	23	3	06-20-67	1,570	2,151
806500	1950-72	....	23	3	05-09-50	60,300	250
810100	1950-72	....	23	3	06-24-63	4,210	526

Table 3.--Period of record and maximum observed peak discharges at gaging stations--Continued

Station number 06-	Period of record of peak discharges observed, water years	Peak-discharge record used if different from observed, water years	Number of years used in analysis	Flood region	Maximum observed flood: Date	Maximum observed flood: Peak discharge in cubic feet per second	Maximum observed flood: Peak discharge in cubic feet per second per square mile contributing
810200	1950-67	....	18	3	05-09-50	47,600	799
810300	1950-67	....	18	3	05-09-50	16,000	527
810400	1950-72	....	23	3	05-09-50	1,280	1,903
810500	1950-69	....	20	3	05-09-50	225,000	1,061
811500	1950-72	....	23	3	05-09-50	164,000	207
813700	1957-72	....	16	3	05-30-59	1,220	1,356
814000	1949-72	....	24	3	06-29-65	20,400	74
814500	1953-72	....	20	3	07-10-58	51,000	93
815000	1941,1944-72	....	30	3	06-17-54	51,400	38
815500	1953-72	....	20	3	07-10-58	31,900	172
815700	1957-72	....	16	3	10-12-61	5,060	1,353
821500	1932-72	....	41	2	05-31-35	50,000	51
822000	1937-46,1952-57,1963-64	....	18	2	08-11-56	283	7.1
823000	1931-72	....	42	2	04-28-47	2,110	21
823500	1941-72	....	32	2	06-27-48	140	11
824000	1941-72	....	32	2	07-05-65	493	29
824500	1895,1903-06,1935,1947-72	....	32	2	[c]05-31-35	50,000	41
827500	1903-06,1931-32,1935,1938-72	1950-72	23	a/	08-16-58	19,600	....
828000	1929-35,1937-46	....	17	b/	05-31-35	190,000	53
828500	1935,1950-72	1950-72	23	a/	07-31-62	26,800	....

Table 3.--Period of record and maximum observed peak discharges at gaging stations--Continued

Station number 06-	Period of record of peak discharges observed, water years	Peak-discharge record used if different from observed, water years	Number of years used in analysis	Flood region	Maximum observed flood: Date	Maximum observed flood: Peak discharge in cubic feet per second	Maximum observed flood: Peak discharge in cubic feet per second per square mile contributing
829500	1935,1946-72	1954-72	19	a/	05-24-67	4,000	....
830000	1915,1931-50	....	21	b/	05-31-35	200,000	49
831000	1935-56	....	22	2	06-07-40	2,850	6.9
831500	1941-72	....	32	2	03-22-60	2,340	3.2
832500	1946-72	....	27	a/	08-20-53	763	....
833500	1929-56	....	28	2,a/	06-17-56	7,000	7.5
834000	1895-96,1951-72	1951-72	22	a/	06-17-56	5,560	....
835000	1950-72	....	23	2	06-17-56	3,030	8.0
835500	1914,1931-72	1914,1931-50	21	2	05-31-35	15,000	10
835500	1914,1931-72	1951-72	22	a/	06-17-51	5,260	....
836000	1935,1946-72	....	28	2	c 05-31-35	5,300	20
836500	1946-72	....	27	1	08-07-50	4,740	14
837000	1931-32,1935,1955-72	1955-72	18	a/	03-21-60	5,890	....
837500	1935,1941-47,1958-72	1962-72	11	a/	06-23-67	368	....
838000	1940-72	1940-61	22	2	06-22-47	30,000	73
838000	1940-72	1962-72	11	a/	07-18-62	2,210	....
839000	1951-58,1960-72	....	21	2	07-17-62	2,650	34
839200	1952-72	....	21	1	06-10-69	3,370	500
839400	1952-70	....	19	1	07-05-56	8,660	656
839500	1935,1947,1951-58,1960-72	....	23	2	c 06-21-47	70,000	986

Table 3.--Period of record and maximum observed peak discharges at gaging stations--Continued

Station number 06-	Period of record of peak discharges observed, water years	Peak-discharge record used if different from observed, water years	Number of years used in analysis	Flood region	Maximum observed flood: Date	Peak discharge in cubic feet per second	Peak discharge in cubic feet per second per square mile contributing
839600	1952-70	....	19	1	07-05-56	11,200	991
839700	1952-72	....	21	1	06-21-67	731	1,015
839850	1952-70	....	19	1	05-19-59	2,080	151
839900	1951-72	....	22	1	05-20-51	2,810	88
839950	1951-72	....	22	1	07-14-52	1,560	61
840000	1951-58,1960-70	....	18	1	05-31-51	3,340	45
840500	1947,1951-58,1960-70	....	20	1	[c]06-21-47	25,900	1,199
841000	1950-72	....	23	2	06-21-67	11,600	22
841500	1950-72	....	23	1	05-20-51	5,230	101
842500	1950-72	....	23	a/	03-23-60	1,300	....
843000	1937-43,1945-57	1950-57	8	a/	05-28-53	1,950	....
843500	1935,1946-72	1953-72	20	a/	03-22-60	9,080	....
844000	1951-72	....	22	1	06-16-57	7,280	30
844500	1947-72	1953-72	20	a/	06-17-57	12,300	....
845000	1929-32,1944-72	....	33	1	07-16-44	10,600	12
845100	1957-72	....	16	1	06-15-57	2,680	85
845200	1937-72	....	36	1	06-23-66	9,500	7.0
846000	1929-32,1946-53,1961-72	....	24	1	05-24-65	3,800	3.4
846200	1957-72	....	16	1	06-11-70	850	83
846500	1946-72	....	27	1	06-11-60	7,940	6.0

Table 3.--Period of record and maximum observed peak discharges at gaging stations--Continued

Station number 06-	Period of record of peak discharges observed, water years	Peak-discharge record used if different from observed, water years	Number of years used in analysis	Flood region	Maximum observed flood: Date	Maximum observed flood: Peak discharge in cubic feet per second	Maximum observed flood: Peak discharge in cubic feet per second per square mile contributing
847000	1937-72	....	36	1	07-19-44	3,800	2.3
847500	1944,1946-72	....	28	1	06-24-66	43,400	13
848000	1944-72	1944-64	21	1	05-28-53	37,500	55
848000	1944-72	1965-72	8	a/	05-18-66	149	....
848200	1957-72	....	16	1	06-15-57	620	608
848500	1929-32,1945-72	1929-32,1945-64	24	1	06-23-47	15,000	15
848500	1929-32,1945-72	1965-72	8	a/	06-24-66	7,030	....
849500	1953-72	....	20	a/	06-25-57	4,320	....
850000	1948-53,1962-72	....	17	1	06-21-67	2,050	16
850200	1948-56,1962-72	....	20	1	06-04-55	1,100	71
850500	1929-57	1929-52	24	b/	06-01-35	260,000	19
851000	1948-56,1963-72	....	19	1	09-20-50	3,150	56
851100	1953-70	....	18	1	08-15-58	1,290	70
851200	1953-70	....	18	1	06-15-57	1,670	61
851300	1953-72	....	20	1	06-15-57	907	111
851400	1953-72	....	20	1	06-15-57	2,040	43
851500	1949-56,1962-72	....	19	1	07-09-50	12,200	64
852000	1948-53,1959,1961-72	....	19	1	07-04-59	6,000	153
853000	1950-72	1953-72	20	a/	06-16-57	29,200	....
853100	1939-72	....	34	1	07-03-59	970	1,293

Table 3.--Period of record and maximum observed peak discharges at gaging stations--Continued

Station number 06-	Period of record of peak discharges observed, water years	Peak-discharge record used if different from observed, water years	Number of years used in analysis	Flood region	Maximum observed flood: Date	Maximum observed flood: Peak discharge in cubic feet per second	Maximum observed flood: Peak discharge in cubic feet per second per square mile contributing
853500	1903-15,1931-72	1953-72	20	a/	06-17-57	38,900	....
853800	1958-72	....	15	1	06-06-61	4,940	22
856100	1941,1957-72	....	17	1	c 06- -41	15,000	357
872100	1946,1957-63,1965-72	....	16	1	06-16-57	11,000	187
880000	1954-72	....	19	5	06-17-57	10,100	23
880500	1954-72	....	19	5	06-18-57	15,300	14
880710	1952-70	....	19	5	05-21-61	999	68
880720	1953-72	....	20	5	05-21-61	2,690	52
880730	1953-72	....	20	5	06-06-61	1,120	81
880740	1952-70	....	19	5	03-27-60	3,720	75
880800	1950,1958-72	....	16	5	c 07-10-50	49,400	43
881000	1945-72	....	28	5	07-10-50	27,600	10
881200	1960-72	....	13	5	06-10-67	6,110	13
881450	1960-72	....	13	5	03-28-60	2,200	29
881500	1902-03,1906-72	....	69	5	06-04-51	34,000	9
882000	1903,1919-25,1929-72	....	52	5	06-09-41	57,700	13
883000	1951-72	....	22	5	08-31-69	25,100	26
883570	1959-72	....	14	5	03-28-60	25,600	16
883600	1953-70	....	18	5	03-16-65	765	74
883700	1950,1952-72	....	22	5	03-27-60	1,870	66

Table 3.--Period of record and maximum observed peak discharges at gaging stations--Continued

Station number 06-	Period of record of peak discharges observed, water years	Peak-discharge record used if different from observed, water years	Number of years used in analysis	Flood region	Maximum observed flood: Date	Maximum observed flood: Peak discharge in cubic feet per second	Maximum observed flood: Peak discharge in cubic feet per second per square mile contributing
883800	1952-70	....	19	5	03-27-60	3,690	73
883900	1952-70	....	19	5	03-27-60	3,220	36
884000	1908-15,1929-72	....	52	5	06-27-51	36,800	16
884100	1957-63,1965-72	....	15	5	08-09-68	2,000	1,220
884200	1960-72	....	13	5	06-16-67	10,700	31
884300	1957-72	....	16	5	09-06-72	1,800	563
884900	1957-72	....	16	5	03-27-60	6,200	155
885500	1951,1954-72	....	20	5	05-30-59	38,300	93

a/ Controlled discharge station.

b/ Probably natural discharge record, but station is not assigned to a region because its drainage area is large and consists of conglomerate soil.

c Historical flood.

Table 4.--Significant observed peak discharges at short-term gaging stations in Nebraska

Station number 06-	Station name	County location	Flood region	Period of record of peak discharges observed, water years	Drainage area, in square miles: Total	Drainage area, in square miles: Contributing	Maximum observed flood: Date	Maximum observed flood: Peak discharge in cubic feet per second
459200	Snake R abv Merritt Reservoir	Cherry	2	1962-72	440	28	06-30-62	820
463200	Bone Cr trib No 2 nr Ainsworth	Brown	1	1958-68	2.18	2.18	06-30-62	640
465200	Honey Cr nr O'Neill	Holt	1	1958-68	2.54	2.54	06-26-65	294
465400	Blackbird Cr trib nr O'Neill	Holt	1	1958-68	.60	.60	07-26-58	94
466950	Weigand Cr nr Crofton	Knox	3	1968-72	3.5	3.5	05-11-70	928
478520	West Bow Cr nr Fordyce	Cedar	3	1964-65,1967-72	52.8	52.8	06-19-67	3,150
678750	Dry Spottedtail Cr trib nr Mitchell	Sioux	2	1971-73	15.0	15.0	08-02-73	1,660
687600	Ash Hollow nr Oshkosh	Garden	1	1968,1970-72	54.9	54.9	08-15-68	3,440
763200	Lodgepole Cr trib nr Sunol	Cheyenne	1	1968,1970-72	15.6	15.6	08-15-68	820
768050	Buffalo Cr trib No 1 nr Buffalo	Dawson	4	1965-72	2.08	2.08	06-24-68	243
769500	Elm Cr nr Overton	Dawson	4	1947-58	31	31	06-22-47	8,000
773000	Dry Cr at Cairo	Hall	4	1949-53	22.2	22.2	06-06-49	1,100
782000	South Loup R nr Cumro	Buffalo	2	1946-53	1,340	700	06-22-47	7,200
783000	Mud Cr nr Broken Bow	Custer	2	1945,1949-56	126	81	05-27-45	5,000
784800	Turkey Cr nr Dannebrog	Howard	4	1965-70	66.2	66.2	06-14-67	2,680

Table 4.--Significant observed peak discharges at short-term gaging stations in Nebraska--Continued

Station number 06-	Station name	County location	Flood region	Period of record of peak discharges observed, water years	Drainage area, in square miles: Total	Drainage area, in square miles: Contributing	Maximum observed flood: Date	Maximum observed flood: Peak discharge in cubic feet per second
791750	Cedar R at Primrose	Boone	2	1960-64,1966	870	130	08-12-66	34,100
791800	Cedar R at Belgrade	Nance	2	1960-66	1,060	320	08-13-66	55,000
793500	Beaver Cr at Loretto	Boone	2	1945-53	311	100	06-02-50	4,570
793595	Skeedee Cr trib nr Genoa	Nance	4	1964,1968-72	.59	.59	05-25-64	985
794710	Bone Cr nr David City	Butler	3	1963,1968-72	8.75	8.75	06-24-63	20,900
798800	Elkhorn R at Meadow Grove	Madison	2	1960-65	2,500	1,500	03-30-60	12,000
799100	N Fk Elkhorn R nr Pierce	Pierce	3	1961-72	700	670	02-19-71	15,200
799190	S Fk Union Cr trib nr Cornlea	Platte	3	1967-73	6.54	6.54	05-26-73	1,310
799410	Middle Logan Cr at Laurel	Cedar	3	1967	110	110	06-19-67	6,610
799423	North Logan Cr nr Laurel	Cedar	3	1965,1967-72	25.3	25.3	02-19-71	3,020
799450	Logan Cr at Pender	Thurston	3	1966-72	731	731	02-19-71	36,900
799850	Pond Cr nr Schuyler	Colfax	3	1968-72	.54	.54	09-11-72	500
801320	Salt Cr blw Sprague	Lancaster	3	1956-61	82.4	82.4	03-27-60	5,700
801340	Hickman Br abv Hickman	Lancaster	3	1956-61	14.7	14.7	07-10-58	9,000
801360	Hickman Br at Hickman	Lancaster	3	1956-61	42.8	42.8	07-10-58	12,800
801400	Salt Cr Subwatershed No 1 nr Roca	Lancaster	3	1955-61	1.33	1.33	07-02-56	610
801500	Salt Cr Subwatershed No 12 nr Roca	Lancaster	3	1954-61	1.11	1.11	07-10-58	528

Table 4.--Significant observed peak discharges at short-term gaging stations in Nebraska--Continued

Station number 06-	Station name	County location	Flood region	Period of record of peak discharges observed, water years	Drainage area, in square miles: Total	Drainage area, in square miles: Contributing	Maximum observed flood: Date	Maximum observed flood: Peak discharge in cubic feet per second
802500	Salt Cr Subwatershed No 34 nr Roca	Lancaster	3	1954-61	5.91	5.91	08-18-56	2,600
803200	Antelope Cr at 48th Street, Lincoln	Lancaster	3	1951,1958-62	7.14	7.14	06-14-51	4,930
803300	Antelope Cr at 27th Street, Lincoln	Lancaster	3	1957-62	10.6	10.6	07-10-58	2,570
803540	Dee Cr nr Alvo	Cass	3	1962-72	7.88	7.88	07-19-65	2,570
810060	Honey Cr nr Peru	Nemaha	3	1968-72	3.43	3.43	03-01-70	975
815510	Temple Cr nr Falls City	Richardson	3	1968-73	2.99	2.99	08-12-73	1,050
828100	N Br Indian Cr nr Max	Dundy	1	1962,1970-72	4.76	4.76	07-31-62	12,900
829700	Thompson Canyon nr Trenton	Hitchcock	1	1966-72	10	10	08-28-68	1,230
835100	Bobtail Cr nr Palisade	Hitchcock	1	1966-72	41	41	06-17-72	15,200
837100	Ash Cr nr Red Willow	Red Willow	1	1966-72	22	22	07-22-68	530
837300	Red Willow Cr abv Hugh Butler Lake	Hayes	2	1961-72	600	200	06-16-72	4,020
837500	Red Willow Cr nr McCook	Red Willow	2	1935,1941-47, 1958-61	740	320	06-01-35	45,000
838200	Coon Cr at Indianola	Red Willow	1	1961-72	69	69	06-24-68	900

Table 4.--Significant observed peak discharges at short-term gaging stations in Nebraska--Continued

Station number 06-	Station name	County location	Flood region	Period of record of peak discharges observed, water years	Drainage area, in square miles: Total	Drainage area, in square miles: Contributing	Maximum observed flood: Date	Maximum observed flood: Peak discharge in cubic feet per second
838550	Dry Cr at Bartley	Red Willow	1	1961-72	42	42	06-12-65	712
839800	Fox Cr trib nr Curtis	Lincoln	1	1952-60	6.55	6.55	05-19-59	2,980
843000	Medicine Cr at Cambridge	Furnas	2	1937-43,1945-49	909	671	06-22-47	120,000
849600	Turkey Cr nr Holdrege	Harlan	1	1960-72	27.8	27.8	06-21-67	1,750
879851	Big Blue R trib nr Hordville	Hamilton	5	1968-72	4.07	4.07	06-29-71	550
879900	Big Blue R at Surprise	Butler	5	1964-72	345	345	06-19-65	10,700
880508	Plum Cr nr Seward	Seward	5	1963,1968-72	85.5	85.5	06-24-63	20,200
881530	Big Blue R trib nr Beatrice	Gage	5	1971-74	1.86	1.86	10-11-73	993
882900	Little Blue R blw Pawnee Cr nr Pauline	Clay	5	1963-69	881	881	08-31-69	27,000
883540	Spring Cr trib nr Ruskin	Nuckolls	5	1967-72	2.11	2.11	05-09-71	340
883955	Little Sandy Cr nr Ohiowa	Fillmore	5	1968-74	11.6	11.6	10-10-73	1,330
884005	Dry Branch trib nr Fairbury	Jefferson	5	1968-74	4.51	4.51	07-20-73	1,270

Table 5.--Outstanding peak discharges observed at miscellaneous sites in Nebraska

Site number	Stream name	County location	Flood region	Drainage area, in square miles		Date of flood peak	Peak discharge in cubic feet per second	Discharge in cubic feet per second per square mile
				Total	Contributing			
1	Fish Cr nr Scotia	Greeley	4	8.37	8.37	05-22-72	12,100	1,446
2	Crooked Cr at Red Cloud	Webster	1	25.6	25.6	07-11-72	8,130	318
3	Rush Cr south of Rushville	Sheridan	1	161.6	161.6	05-20-62	17,400	108
4	Rush Cr at Rushville	Sheridan	1	26.8	26.8	05-20-62	7,580	283
5	Dry Cr nr Johnstown	Brown	2	32.8	13	07-12-62	880	27
6	Schlagel Cr nr Valentine	Cherry	2	25.0	6.85	07-15-62	130	5
7	Skull Cr nr Linwood	Butler	3	72.0	72.0	06-24-63	74,800	1,039
8	Skull Cr at Bruno	Butler	3	8.25	8.25	06-24-63	20,400	2,473
9	East Skull Cr nr Abie	Butler	3	26.3	26.3	06-24-63	32,400	1,232
10	North Oak Cr at Agnew	Lancaster	3	88.4	88.4	06-24-63	27,800	314
11	Kezan Cr nr Garrison	Butler	5	43.5	43.5	06-24-63	43,600	1,002
12	Hell Cr at "L" St nr Millard	Douglas	3	4.13	4.13	06-16-64	4,920	1,191
13	West Papillion Cr nr Millard	Sarpy	3	60.2	60.2	06-16-64	45,200	751
14	Skeedee Cr nr Genoa	Nance	4	18.0	18.0	05-25-64	21,300	1,183
15	Sappa Cr trib nr Hendley	Furnas	1	1.10	1.10	06-23-66	4,450	4,045
16	Deer Cr nr Beaver City	Norton, Ks.	1	6.47	6.47	06-23-66	7,020	1,085
17	North Br Timber Cr nr Cedar Rapids	Boone	4	23.5	23.5	08-12-66	9,730	414
18	Lores Branch trib nr Dubois	Pawnee	3	.46	.46	07-16-68	943	2,050
19	Dry Branch trib nr Pawnee City	Pawnee	3	.11	.11	07-16-68	205	1,934
20	O'Neill Draw trib nr Chappell	Deuel	1	2.07	2.07	08-15-68	302	146

Table 5.--Outstanding peak discharges observed at miscellaneous sites in Nebraska--Continued

Site number	Stream name	County location	Flood region	Drainage area, in square miles: Total	Drainage area, in square miles: Contributing	Date of flood peak	Peak discharge in cubic feet per second	Discharge in cubic feet per second per square mile
21	Dead Horse Cr trib at Loup City	Sherman	4	3.2	3.2	06-17-54	944	295
22	Dead Horse Cr at Loup City	Sherman	4	6.2	6.2	06-17-54	2,410	389
23	Elm Cr nr Fremont	Saunders	3	4.7	4.7	08-02-59	2,840	604
24	Union Cr trib nr Madison	Madison	3	2.5	2.5	06-02-50	2,560	1,024
25	Union Cr at Madison	Madison	3	167	167	06- -40	16,300	976
26	East Fork Maple Cr nr Howells	Colfax	3	67.1	67.1	06-11-44	22,000	328
27	North Fork Cottonwood Cr nr Prague	Saunders	3	5.2	5.2	08-02-59	4,780	919
28	Unnamed Cr at McCool Junction	York	5	17.2	17.2	07-09-50	15,200	884
29	Unnamed Cr near York	York	5	6.9	6.9	07-09-50	23,000	3,330
30	Indian Cr nr Max	Dundy	1	81.8	81.8	07-31-62	27,000	330
31	Indian Cr blw Kelly Gulch nr Max	Dundy	1	72.6	72.6	07-31-62	13,300	183

☆ U. S. GOVERNMENT PRINTING OFFICE: 1976--766084/3 REGION NO. 6