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[Wyoming:

TECHNIQUES FOR ESTIMATING FLOW CHARACTERISTICS OF WYOMING STREAMS]

Water-Resources Investigations 76-112

U. S. GEOLOGICAL SURVEY [redacted]

Prepared in cooperation with the
Wyoming Highway Department

BIBLIOGRAPHIC DATA SHEET

BIBLIOGRAPHIC DATA SHEET	1. Report No.	2.	3. Recipient's Accession No.

4. Title and Subtitle
Techniques for estimating flow characteristics of Wyoming streams.

5. Report Date November 1976

6.

7. Author(s)
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8. Performing Organization Rept. No. WRI 76-112

9. Performing Organization Name and Address
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10. Project/Task/Work Unit No.

11. Contract/Grant No.

12. Sponsoring Organization Name and Address
U.S. Geological Survey, Water Resources Division
4015 Warren Avenue
Cheyenne, Wyoming 82001

13. Type of Report & Period Covered
Final

14.

15. Supplementary Notes
Prepared in cooperation with the Wyoming Highway Department.

16. Abstracts
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Development of the channel-geometry method showed channel width to be the most significant channel dimension for estimating flow characteristics. Use of this method requires that a field measurement be made of channel width.

Development of the basin-characteristics method showed drainage-area size to be the most significant basin feature for estimating streamflow. In the mountainous areas, basin elevation also affects streamflow. Because these basin features can be determined from maps, this method does not require a field visit to the site.

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

*Design flow, Design data, Design flood, Historic flood, Regional flood, *Peak discharge, Floods, Runoff, Natural flow, *Average flow, Discharge (water), Flow, *Channel morphology, Channels, Alluvial channels, Banks, Shape, Width, *Wyoming, Crest-stage gage, Gaging stations.

17b. Identifiers/Open-Ended Terms

Formative discharge, Main-channel width.

17c. COSATI Field/Group

18. Availability Statement
No restriction on distribution.

19. Security Class (This Report) UNCLASSIFIED

20. Security Class (This Page) UNCLASSIFIED

21. No. of Pages

22. Price

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UNITED STATES DEPARTMENT OF THE INTERIOR

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GLOSSARY

Annual peak. The highest peak discharge during a water year.

Bank. The margins of a channel. Banks are called right or left as viewed facing downstream.

Bankfull discharge. Discharge at which a stream first overflows onto its flood plain.

Basin characteristics. Includes physical and climatic conditions of a drainage basin. The basin characteristics defined for this study include:

Drainage area (A), in square miles, as measured by a planimeter on the best available topographic maps.

Main-channel slope (S), in feet per mile, determined from elevations at points 10 and 85 percent of the distance along the channel from the gaging station to the drainage divide.

Main-channel length (L), in miles, determined from topographic maps as the distance along the channel from the gaging station to the basin divide.

Area of lakes and ponds (St), expressed as a percentage of the drainage area. One percent was added to all values to avoid zeros in the logarithmic transformation.

Mean basin elevation (E), in thousands of feet above mean sea level, measured on 1:250,000 U.S. Geol. Survey maps by laying a grid over the map, determining the elevation at each grid intersection within the basin, and averaging those elevations. The grid spacing was selected to give at least 25 intersections within the basin boundary.

Forest cover (F), expressed as the percentage of the drainage area covered by forests as shown on topographic maps. One percent was added to all values to avoid zeros in the logarithmic transformation.

Mean annual precipitation (P), in inches, determined from Wyoming Water Planning isohyetal map (1965).

The maximum 24-hour rainfall having a recurrence interval of 2 years ($I_{24,2}$), in inches. This variable is an index of rainfall intensity. The values were determined from a U.S. Department of Commerce publication (1968).

Soils infiltration index (Si), in inches. This variable is an index of the infiltration capacity of the soil cover. The values were determined from data provided by the Soil Conservation Service (1964).

Latitude of the center of the drainage basin (Lat), in decimal form, less 40.0°.

Aspect (Ap), expressed as 2.0 + cos θ, where θ is the angle, from south, of a line passing in the direction of flow through the 85 and 10 percent distance points used in determining S. The constant of 2.0 was added to avoid the possibility of zero or negative values. This definition results in the aspect ranging from 1.0 to 3.0, with 1.0 designating a stream flowing directly north and 3.0 designating a stream flowing directly south.

Average growing season (AGS), in days, as determined from Wyoming Water Planning isohyetal map (1965) showing average number of days between last spring occurrence and first fall occurrence of 28°F.

Braided river channels. Successive division and rejoining (of riverflow) with accompanying islands. Channels are unstable and are constantly shifting during high flows.

Channel-geometry. The main-channel features defined for this study are:

Width (W), in feet, is the horizontal distance between the tops of the banks of the main channel. The measurement is made at or near the upstream end of the crossover and perpendicular to the direction of bankfull flow. The measurement designates width of the water surface at bankfull stage.

Depth (D), in feet, is the maximum depth of the channel. The measurement designates the vertical distance between the tops of the banks and the lowest spot in the channel.

Depth/width ratio ($^D/_W$) is the maximum depth divided by the main-channel width. This variable is an index of the channel shape.

Coefficient of variation (C_v). A dimensionless dispersion parameter, determined as the ratio of the standard deviation to the mean. The coefficient of variation is used extensively in hydrology as a dimensionless regionalization parameter, as it can be used to show relative variation over an area.

Correlation. Degree of linear association of two or more random variables.

Correlation coefficient. A mathematical definition of the degree of linear association between two variables. The degree of correlation may range from zero (no correlation) to plus or minus one (total correlation). The plus or minus sign indicates whether the variables are directly (plus) or inversely (minus) related.

The correlation coefficient partly explains the total variation of a variable by the variation of other random variables involved in the regression equation. The remaining or unexplained part of the variation is due to unaccounted for or neglected random variables and errors.

Crest-stage gage. An installation at a particular site on a stream where periodic observations of gage height and discharge are obtained to determine the annual peak discharge. Peak stages only are obtained by these gages as opposed to the continuous records of stage obtained at continuous-recording gages.

Ephemeral stream. A stream that usually flows only in direct response to precipitation. Such a stream receives no water from springs and no long continued supply from melting snow or other surface source. Its channel is above the water table.

Flood plain. That part of a river valley that is covered with water when the river overflows its banks at flood stages; was built and is being reworked under the channel conditions presently prevailing. This plain has been built up by stream-deposited alluvium.

Frequency. The number of occurrences of a certain phenomenon in a given period of time.

Geometric mean of annual peak flows (P_{gm}). A descriptor of central tendency of the logarithmic distribution of annual peak flows. The geometric mean is defined as

$$P_{gm} = \sqrt[N]{P_1 * P_2 * P_3 \ldots . P_n}.$$

The geometric mean can also be determined by taking the antilog of the mean of the logarithms.

The geometric mean is useful in hydrology because the logarithms of hydrologic observations often possess a symmetrical distribution; whereas, the values themselves may show an asymmetrical distribution.

Intermittent stream. A stream or reach of a stream that flows but part of the year when it receives water from springs or from surface flows during wet weather or from melting snow.

Mean. Unless otherwise stated, mean refers to the arithmetic mean of the values.

Mean annual flow (Qa). Annual discharge expressed as an average rate, such as cubic feet per second. Annual discharge can also be expressed in units of volume, such as acre-feet.

P_2, P_5, P_{10}, P_{25}, P_{50}, P_{100}. Abbreviations for annual peak flows. The subscript refers to the average recurrence interval in years.

Perennial stream. A stream that flows continuously during all seasons of the year and during dry as well as wet years. Such a stream is usually fed by ground water.

Recurrence interval. The average interval of time within which the given flood will be equalled or exceeded once.

Significance. Determined by a statistical test of the hypothesis that a dependent variable is sufficiently explained by an independent variable at a certain predetermined level of significance.

Skew. Skewness coefficients are descriptors of asymmetry of a distribution. The skewness coefficients used in this study refer to the logarithmic distribution of annual peaks.

Standard deviation (S.D.). Descriptor of dispersion of values about a central value. The standard deviation is an indicator of the variability of the observed values.

Standard error of estimate. Standard deviation of data points about the regression line used to predict the dependent variable. Approximately two-thirds of the data values for the dependent variable are included within plus and minus one standard error of the estimate made by the regression equation.

Station number. Each gaging station has a station number. The complete 8-digit number, such as 06320500, includes the part number "06" and a 6-digit station number. The first two digits designate the part number, which refers to the major drainage basin involved. The last six digits refer to individual station location with increasing numbers referring to locations progressively farther downstream.

Stepforward regression. A multiple regression technique that tests all independent variables for significance with respect to the dependent variable and adds the most significant variable to the regression equation. The process is then repeated with the independent variables remaining and others are likewise added to the regression equation. The significance of each variable in the regression equation changes as each new variable is added, so all variables in the regression equation are again tested and may be dropped if deemed insignificant. This process continues until an equation is derived with all variables significant at some predetermined confidence level.

Water year. The 12-month period, October 1 through September 30. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the water year ending September 30, 1973, is called the "1973 water year."

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ABSTRACT

This report presents relations for estimating peak flows and mean annual flow for natural streams in Wyoming. Two separate techniques for estimating flow characteristics are presented: 1) The channel-geometry method, whereby flow characteristics are related to channel dimensions; and 2) the basin-characteristics method, whereby flow characteristics are related to physiographic and climatic features of the drainage basin.

Development of the channel-geometry method showed channel width to be the most significant channel dimension for estimating flow characteristics. The principle underlying this method is that channel size is influenced by some formative or dominant discharge, to which other flow characteristics are related. Use of the channel-geometry method requires that a field measurement be made of channel width.

Development of the basin-characteristics method showed drainage-area size to be the most significant basin feature for estimating streamflow. In the mountainous areas, basin elevation also affects streamflow. Because these basin features can be determined from maps, this method would not require a field visit to the site.

An analysis of maximum observed peak flows and their seasonal occurrence showed that high peak flows are most likely to occur during the months of May, June, or July.

INTRODUCTION

This report provides methods for estimating peak flows and mean annual flow for natural streams in Wyoming. This information is essential to planning and design activities whenever streams are involved.

Gaging stations are operated at only a few of the many sites where streamflow information is needed. Data collected at gaging stations must therefore be analyzed to provide information at ungaged sites. The specific purpose of this report is to provide methods of estimating peak flows and mean annual flow at ungaged sites. The estimating relations of this report are based upon updated data and are thus considered to be more reliable than relations for peak flows and mean annual flow of previous reports.

This report was prepared by the U.S. Geological Survey in cooperation with the Wyoming Highway Department. The opinions, findings, and conclusions presented herein are those of the U.S. Geological Survey and are not necessarily those of the cooperating agency.

For the convenience of users, the technical terms and abbreviations as used in this report are defined in the Glossary (p. vii).

Use of Metric Units of Measurement

The analyses and compilations in this report were made with English units of measurement. The equivalent metric units are given in the text and illustrations, where appropriate. English units only are shown in tables where, because of space limitations, the dual system of English and metric units would not be practicable. For those readers who may prefer to use metric units rather than English units, conversion factors for terms used in this report are listed in the following table:

English units		Conversion factor		Metric units
Length in inches (in)	X	25.40	=	millimeters (mm)
in feet (ft)	X	.305	=	meters (m)
in miles (mi)	X	1.609	=	kilometers (km)
Area in square miles (mi^2)	X	2.590	=	square kilometers (km^2)
Slope in feet per mile (ft/mi)	X	.189	=	meters per kilometer (m/km)
Runoff rate in cubic feet per second (ft^3/s)	X	.0283	=	cubic meters per second (m^3/s)
Unit runoff in cubic feet per second per square mile [$(ft^3/s)/mi^2$]	X	.0109	=	cubic meters per second per square kilometer [$(m^3/s)/km^2$]

DEVELOPMENT OF ESTIMATING RELATIONS

Two separate methods of estimating streamflow characteristics are presented in this report: 1) The channel-geometry method, developed by relating channel dimensions to flow characteristics; and 2) the basin-characteristics method, developed by relating physiographic and climatic characteristics of the drainage basin to flow characteristics. The methods were analyzed and developed separately due to the inherent differences between channel-geometry features and basin characteristics. Channel-geometry features are considered to be resultant-effect variables; that is, the dimensions of a channel are the result of past flows. In contrast, basin characteristics are considered to be cause-effect variables because they produce or affect the outcomes of flows. The advantage of presenting two different methods is that the designer may select the method he feels to be most suitable for his purpose. If both methods are used, a comparison may be made of the results.

Analytic Technique

Relations for estimating flow characteristics are presented in this report in the form of graphs and mathematical equations. These relations were developed by using a statistical technique known as multiple regression, with computations being made by a digital computer. The relations express flow characteristics (dependent variables) as being correlated to either channel-geometry features or to basin characteristics (independent variables).

All data were transformed to base 10 logarithms before developing the relations because past experience has shown that linear relations can be approached by logarithmic transformation of hydrologic variables.

After taking antilogs, the resulting equations have the form

$$Q = aA^bB^cC^d.....,$$

where Q is the flow characteristic (a dependent variable); A, B, and C are channel features or basin characteristics (independent variables); a is the regression constant; and b, c, and d are regression exponents. For the convenience of the user, the equations are also presented in graphical form.

Graphical regression was used to determine the estimating relations in a few cases when only small numbers of stations were available for analysis. Relations determined by this method are based on small amounts of data, and are therefore considered to have low reliability. Estimates of streamflow from these relations should be considered to be very approximate.

Relations for the plains areas of the State were developed with the aid of results from a concurrent study of the U.S. Geological Survey conducted by Gordon S. Craig, Jr. and James G. Rankl (written commun.). Their study of flood hydrographs on small drainage basins in Wyoming provided detailed information on peak flows from drainage areas of less than 11 mi^2 (28 km^2).

Hydrologic Regions

Certain orographic and climatic conditions cause differences in flow variabilities such that a unique set of estimating relations could not be developed on a statewide basis. Therefore, the State was divided into four regions of hydrologic homogeneity and separate relations were developed for each region. The hydrologic regions are shown in figure 1. Region 1 contains mountainous areas of the State where peak flows are primarily the result of snowmelt runoff. Region 2 is plains areas where peak flows occur primarily from rainstorm runoff. Region 3 also contains plains areas but, due to certain orographic effects, these areas are especially prone to intense thunderstorm activity. Region 4 contains subdued mountain areas where peak flows occur from both snowmelt and rainfall runoff.

Data Used

Data from continuous-record, crest-stage, and stage-rainfall gages were used in this study. The continuous-record stations are operated by the Geological Survey in cooperation with other Federal and State agencies; they provide information concerning annual runoff as well as peak flows. The crest-stage gages are operated in cooperation with the Wyoming Highway Department with the objective of acquiring knowledge of peak flows for small streams. The stage-rainfall gages were operated during 1963-73 in cooperation with the Federal Highway Administration and the Wyoming Highway Department as part of a program to determine rainfall-runoff relations for small drainage basins.

Figure 2 shows the locations and types of gaging stations from which data were used. Station data were used provided there were at least 9 years of record and the flows were virtually natural events unaffected by the works of man. It was further required that gages on ephemeral streams, which have no flow during some years, have at least 8 years of record for which nonzero flow events were recorded. Data up to and including the 1973 water year were used in the study. Records were not adjusted to a base period.

Figure 3 shows a plot of drainage area versus length of record for the 243 stations used in this study. In general, longer records are available for larger streams than for smaller streams. Unfortunately, until the crest-stage gage program was initiated in 1958, little attention had been given to gaging small streams, especially in the plains areas of the State.

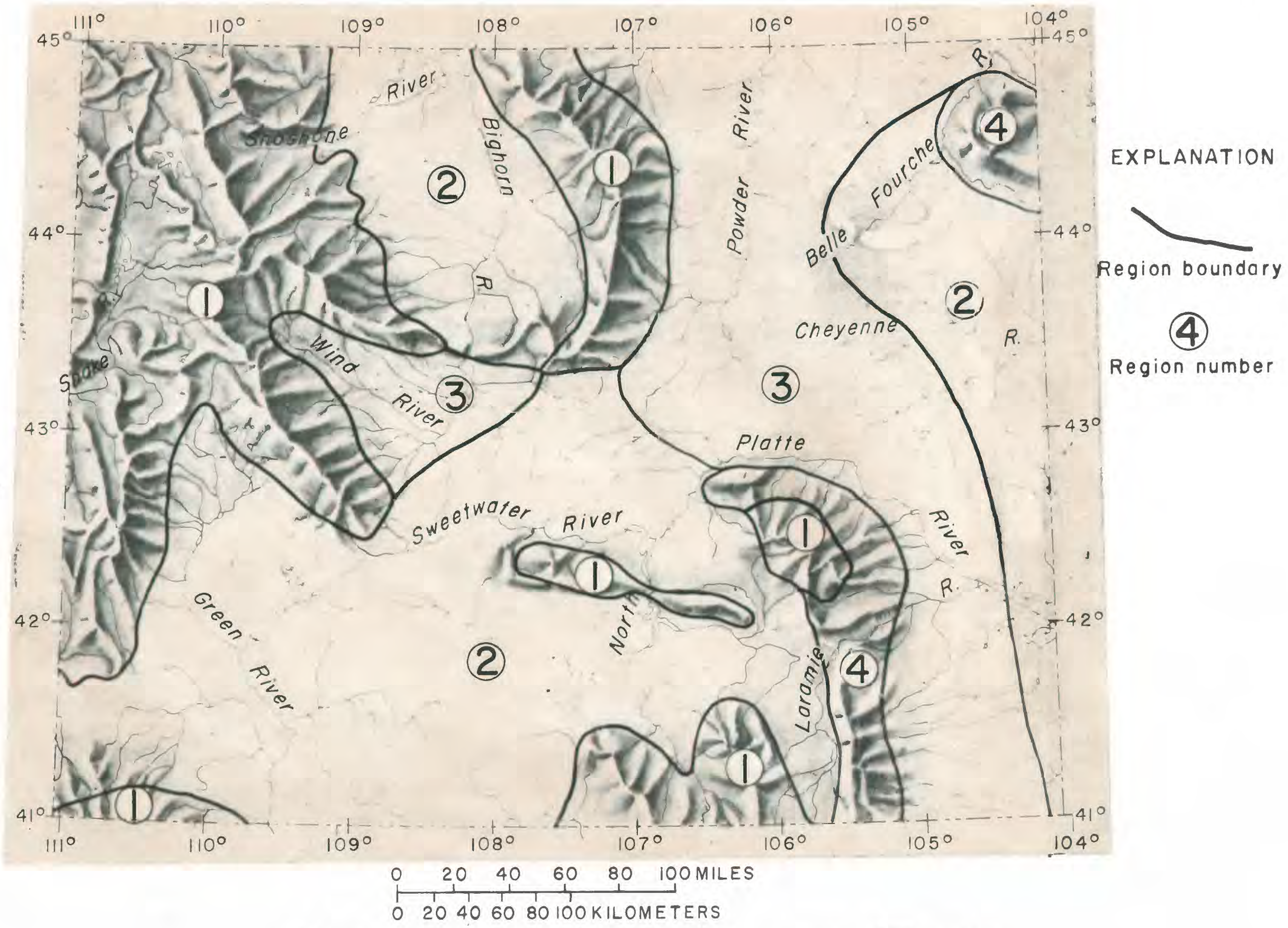


Figure 1.-Major streams and hydrologic regions of Wyoming.

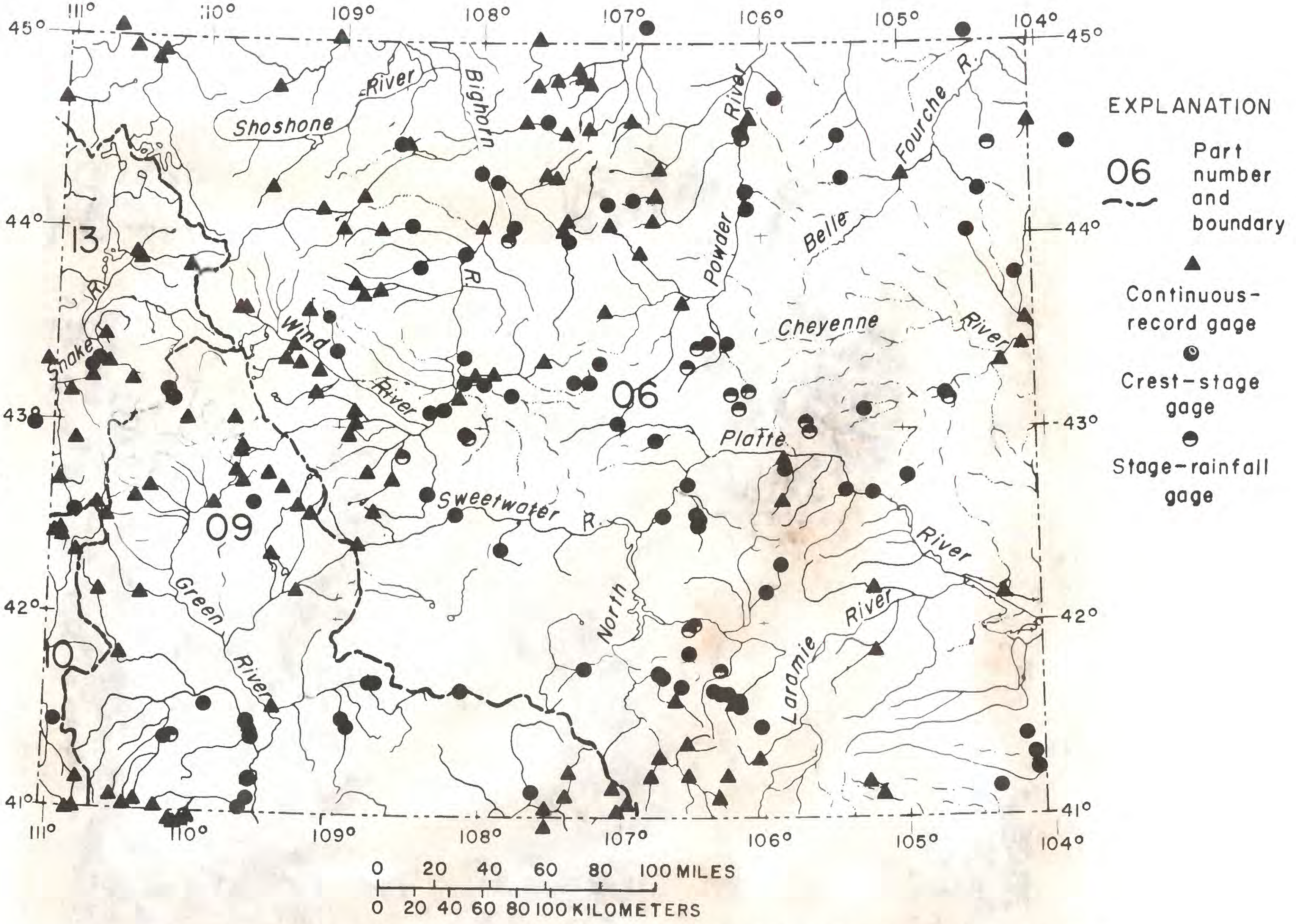


Figure 2.-Locations and types of gaging stations used in the analyses.

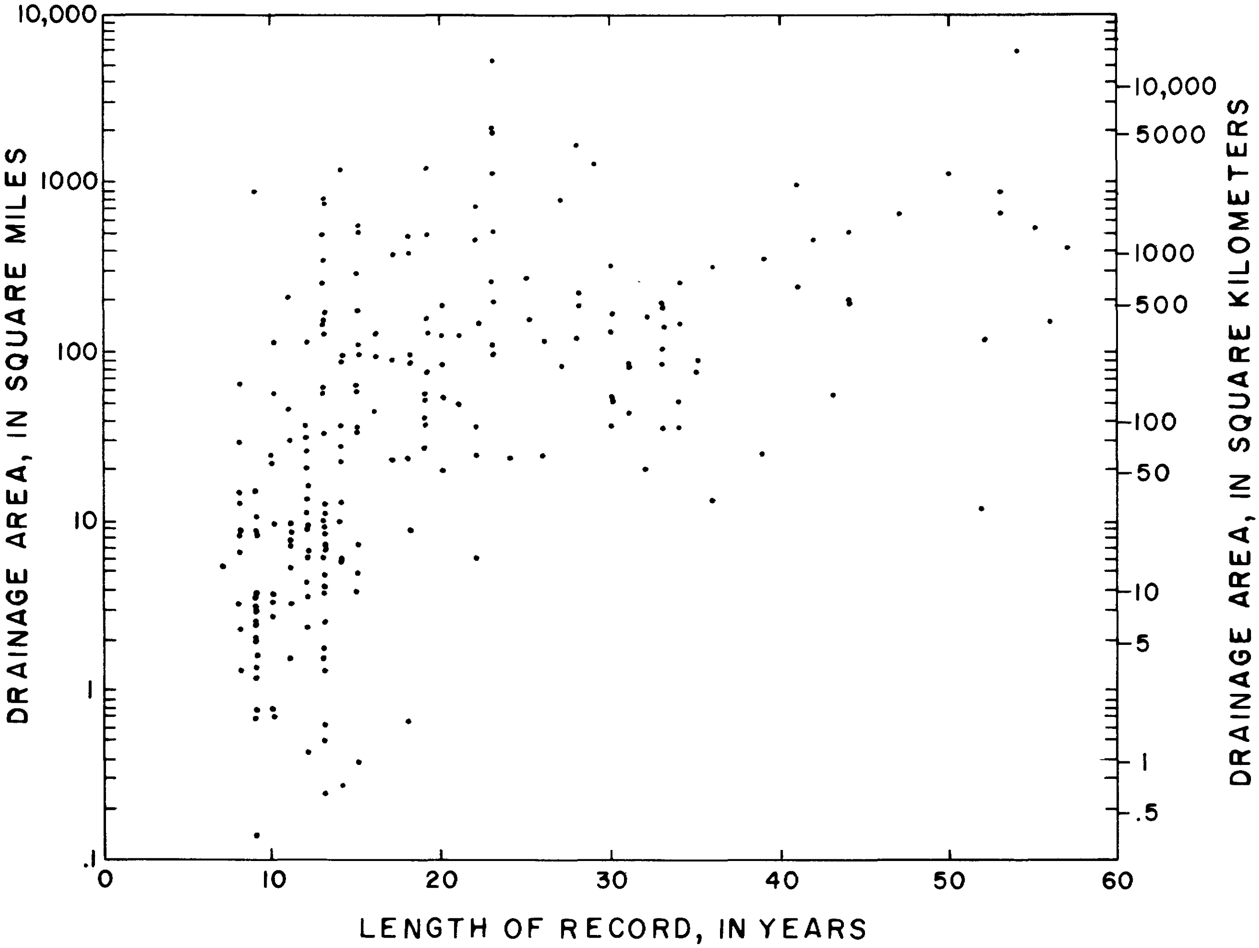


Figure 3.-Distribution of drainage areas and lengths of record for the gaging stations used in the analyses.

Table 1 lists the streamflow stations used in the analyses. The table also shows: 1) For continuous-record stations, the type of stream (perennial, intermittent, or ephemeral), 2) the hydrologic region where the stream is located, 3) the years for which records are available, and 4) the maximum peak flow recorded at each site.

Table 2 lists the streamflow characteristics for the gaged sites. Mean annual flow is listed for the continuous-record stations. Peak-flow data are listed for all stations. The peak-flow data include: 1) Number of years non-zero flood events were recorded; 2) peak discharges to be expected for various recurrence intervals, as determined by the log-Pearson Type III method (Water Resources Council, 1976); 3) statistics of the logarithmic array of annual peaks; and 4) geometric mean of annual peak flows.

Table 3 lists channel-geometry features and basin characteristics for the gaged sites. These data were considered to be the independent variables in the regression analyses.

The channel-geometry features were measured in the field during 1973 and 1974 by personnel of the Geological Survey. The basin characteristics were determined from topographic and climatologic maps. Descriptions of the variables are contained in the Glossary (p. vii).

CHANNEL-GEOMETRY METHOD

It has long been recognized that stream channels are formed by their flows, but techniques for estimating flow characteristics from channel dimensions have been developed only recently. The principle underlying the method is that channel size is influenced by some formative or dominant discharge, to which other flow characteristics are related. Channel formation takes place mainly during high flows when the stream has high energy and is transporting large amounts of sediment. Erosion and deposition occur as the stream sculptures its channel to a size large enough to accommodate its flow.

The channel-geometry features investigated in this study include width, maximum depth, and the depth-width ratio of the main channel. Results of the regression study showed width to be the most significant variable for estimating flow characteristics; the other features were not found significant enough to warrant inclusion in the estimating relations. A summary of the regression results for peak-flow relations is given in the following table:

Summary of regression equations for determining peak flows, using the channel-geometry method

(Relations are presented in graphical form, p. 16-19)

Region	Regression equation (English units)	Number of stations	Correlation coefficient	Standard error Log units	Standard error Percent (average)
1 Peak flows	$P_2 = 2.31\ W^{1.54}$	93	0.97	0.147	35
	$P_5 = 4.34\ W^{1.47}$	93	.97	.145	34
	$P_{10} = 6.02\ W^{1.43}$	93	.96	.153	36
	$P_{25} = 8.53\ W^{1.39}$	93	.95	.169	40
	$P_{50} = 10.7\ W^{1.36}$	93	.94	.182	43
	$P_{100} = 13.1\ W^{1.34}$	93	.93	.195	47
2 Peak flows	$P_2 = 5.50\ W^{1.30}$	33	.83	.300	75
	$P_5 = 16.4\ W^{1.22}$	33	.83	.272	67
	$P_{10} = 29.0\ W^{1.18}$	33	.82	.268	66
	$P_{25} = 53.7\ W^{1.13}$	33	.81	.276	68
	$P_{50} = 79.9\ W^{1.10}$	33	.79	.287	71
	$P_{100} = 114\ W^{1.08}$	33	.76	.300	75
3 Peak flows	$P_2 = 5.08\ W^{1.32}$	19	.92	.204	49
	$P_5 = 14.0\ W^{1.30}$	19	.95	.164	39
	$P_{10} = 24.2\ W^{1.28}$	19	.94	.172	41
	$P_{25} = 43.6\ W^{1.26}$	19	.92	.200	47
	$P_{50} = 64.2\ W^{1.24}$	19	.90	.226	54
	$P_{100} = 91.4\ W^{1.22}$	19	.88	.252	62
4 Peak flows	$P_2 = 2.32\ W^{1.55}$	8	*	*	*
	$P_5 = 11\ W^{1.32}$	8	*	*	*
	$P_{10} = 23\ W^{1.23}$	8	*	*	*
	$P_{25} = 50\ W^{1.18}$	8	*	*	*
	$P_{50} = 86\ W^{1.11}$	8	*	*	*
	$P_{100} = 130\ W^{1.06}$	8	*	*	*

* Graphical regression was performed due to the small number of stations.

Although annual runoff as well as peak flows can be related to channel dimensions, the reliability of the channel-geometry method for estimating annual runoff is dependent on the correlation of annual runoff with peak flows. This correlation is generally high because most of the annual runoff of a stream occurs during its floodflows. Figure 4 shows relations of mean annual flow to the median of the annual peak flows. Separate relations exist for perennial and for intermittent and ephemeral streams due to inherent differences in their runoff characteristics. Realizing the differences between stream types as shown by figure 4, estimating relations for mean annual flow were developed using channel width. A summary of the regression results for these relations is given in the following table:

Summary of regression equations for determining mean annual flow, using the channel-geometry method

(Relations are presented in graphical form, p. 20)

Region	Regression equation (English units)	Number of stations	Correlation coefficient	Standard error	
				Log units	Percent (average)
1-4	$Qa = 0.06 \ W^{1.9}$ (perennial streams)	92	0.96	0.21	50
Mean annual flow	$Qa = 0.003 \ W^{2.2}$ (intermittent and ephemeral streams)	10	*	*	*

* Graphical regression was performed due to the small number of stations.

The use of the channel-geometry technique requires some experience, although measuring channel features is fairly simple. A field visit is necessary to obtain the channel width (W). The width measurement should be made of the main channel at the narrowest section of a straight reach. The section should have a stable appearance; that is, it should be one that has been fairly permanent for several years. It is a good practice to measure the width at several sections and average the results. The measurement is made between the tops of the banks of the main channel. The top of the bank is defined as that spot where the flood plain and channel meet, and it is distinguished by a break in slope. If a person were climbing out of a stream channel, he would generally have to dig in his toes to get up the bank, but could begin walking flat-footed when he reached the break in slope at the top of the bank.

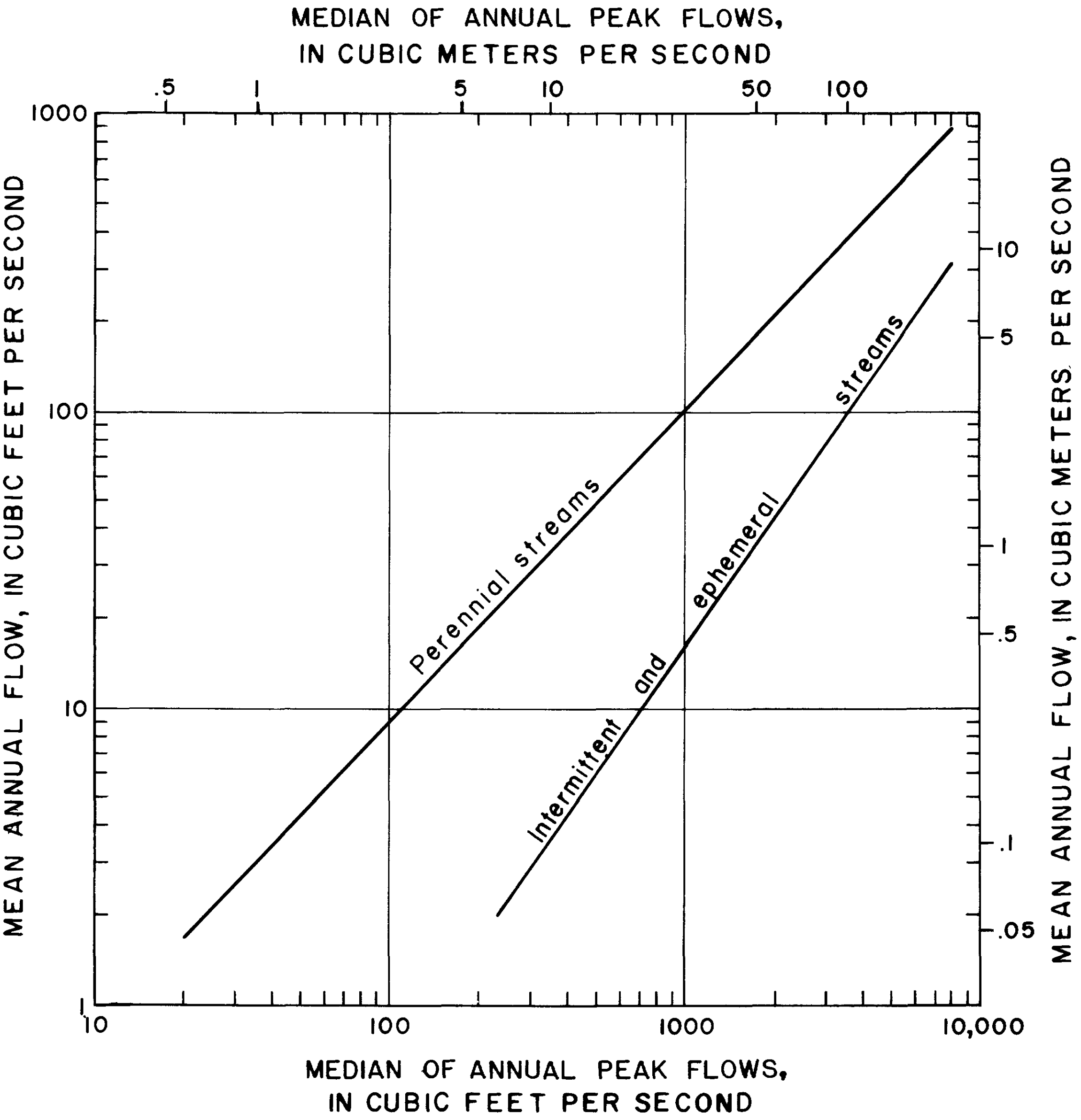


Figure 4.-Relations of mean annual flow to median of annual peak flows.

Figure 5 is a sketch showing where the main channel should be measured. As shown in the sketch, the narrowest, most stable section of the channel often occurs just downstream from a curve. This section, which is at the end of the point bar and at the beginning of a straight reach, is sometimes referred to as the crossover (of flow), or the start of the crossover.

Figures 6-9 are photographs showing where width was measured for various channels. Due to publication limitations, it was necessary to use black and white photographs in this report. A large collection of color slides that gives a much better picture of channel features is on file in the Geological Survey office in Cheyenne. Persons who expect to use the method should view such slides, as well as make a field visit to several streams with someone who is experienced with the method.

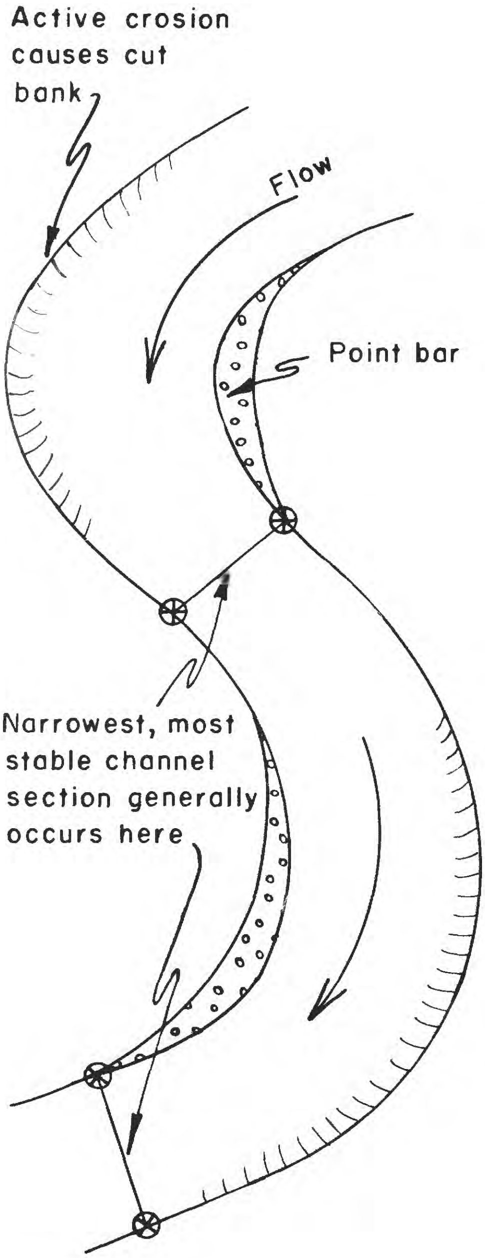
Limitations

There are some stream reaches where the channel-geometry method cannot be used. These include:

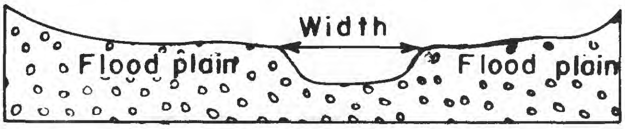
1. Small streams whose flows are not frequent enough to form and maintain a channel. Flow is conveyed in a grassed swale, which does not have definite banks.
2. Braided channel reaches. It may be possible to find a stable channel reach either upstream or downstream from the braided reach.
3. Potholes. On some intermittent streams the ground-water level is near the streambed elevation, but inflow to the stream channel is insufficient to cause perennial flow. During most of the year, evaporation equals or exceeds the seepage inflow; thus, although the channel contains ponded water, there is no flow in the stream. The dissolved-solids concentration of the ponded water gradually increases to the level where vegetation cannot survive. Because the bed material of the channel has been loosened by the buoyant forces of ground-water seepage, subsequent flow in the channel erodes the bed material and forms a pothole. Care should be taken that channel width is measured between banks formed by the hydraulic forces of streamflow, rather than banks formed by the above process.
4. Streams whose channels or basins have been significantly altered by the works of man (major dams, reservoirs, diversions, or urbanization).
5. Stream reaches at or near bedrock outcrops.

Graphs

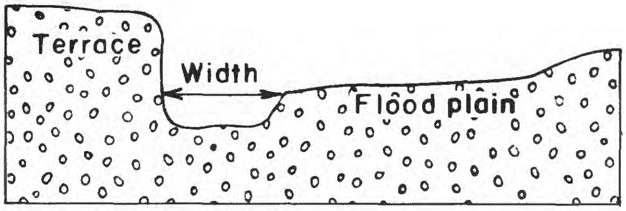
Relations for estimating peak flows and mean annual flow using the channel-geometry method are presented in graphical form in figures 10-14.



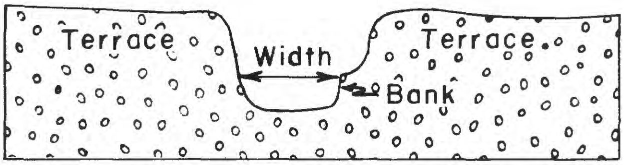
PLAN VIEW OF STREAM



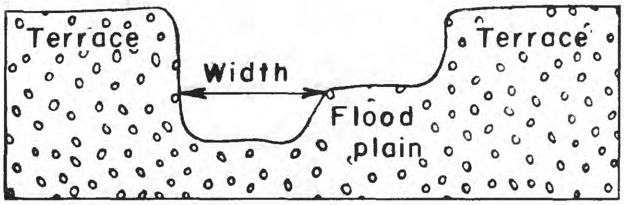
Channel with well-developed flood plain.



Meandering channel whose lateral movement causes it to be eroding the valley terrace.



Channel whose streambed has lowered in recent past due to a change in hydrologic conditions. Banks will be present if the channel has stabilized to existing conditions.



Channel whose streambed has lowered in past. The channel has stabilized and a flood plain is developing.

CROSS SECTIONS OF VARIOUS TYPES OF STREAM CHANNELS

Figure 5.-Location of main-channel section for various types of streams.

Figure 6.--Main-channel section on North Fork Crazy Woman Creek (perennial stream), looking downstream. Width = 24 ft (7.3 m).

Figure 7.--Main-channel section on Cache Creek (perennial stream), looking downstream. Width = 12 ft (3.7 m).

Figure 8.--Main-channel section on Salt Wells Creek (intermittent stream), looking downstream. Width = 48 ft (14.6 m).

Figure 9.--Main-channel section on unnamed tributary (ephemeral stream) to New Fork River, looking downstream. Width = 12 ft (3.7 m).

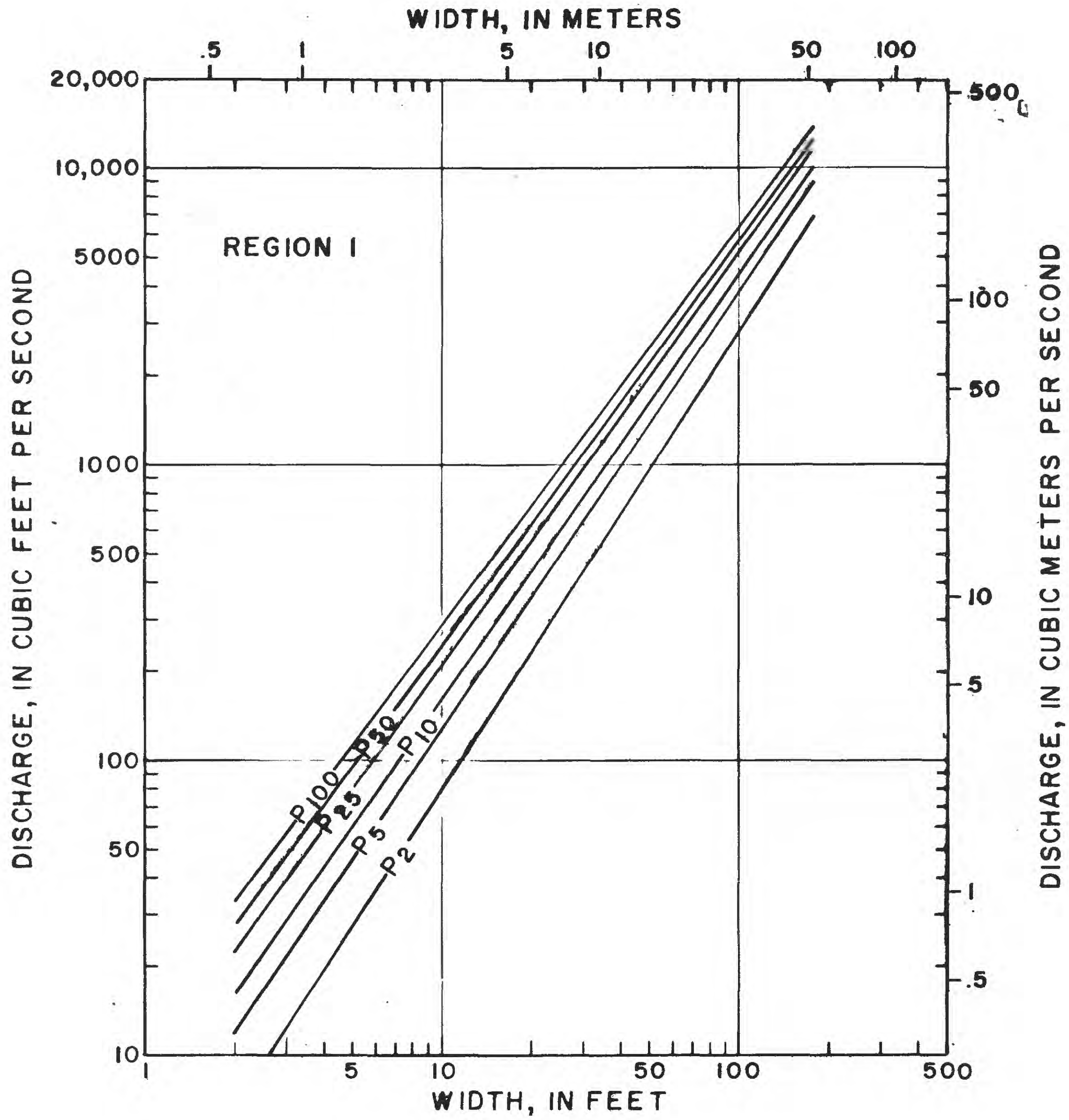


Figure 10.-Relations for estimating peak flows in region I by using main-channel width.

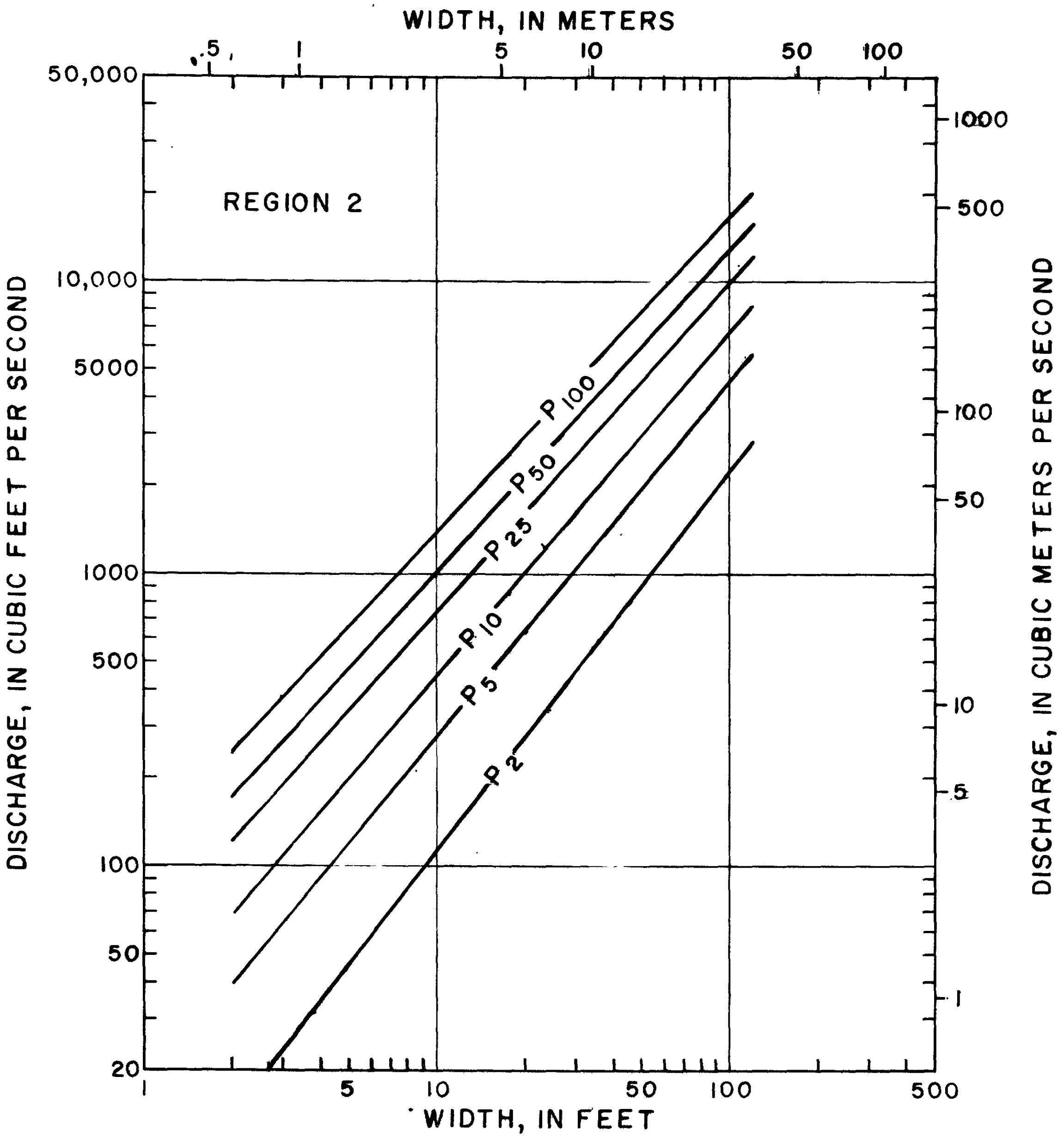


Figure 11.—Relations for estimating peak flows in region 2 by using main-channel width.

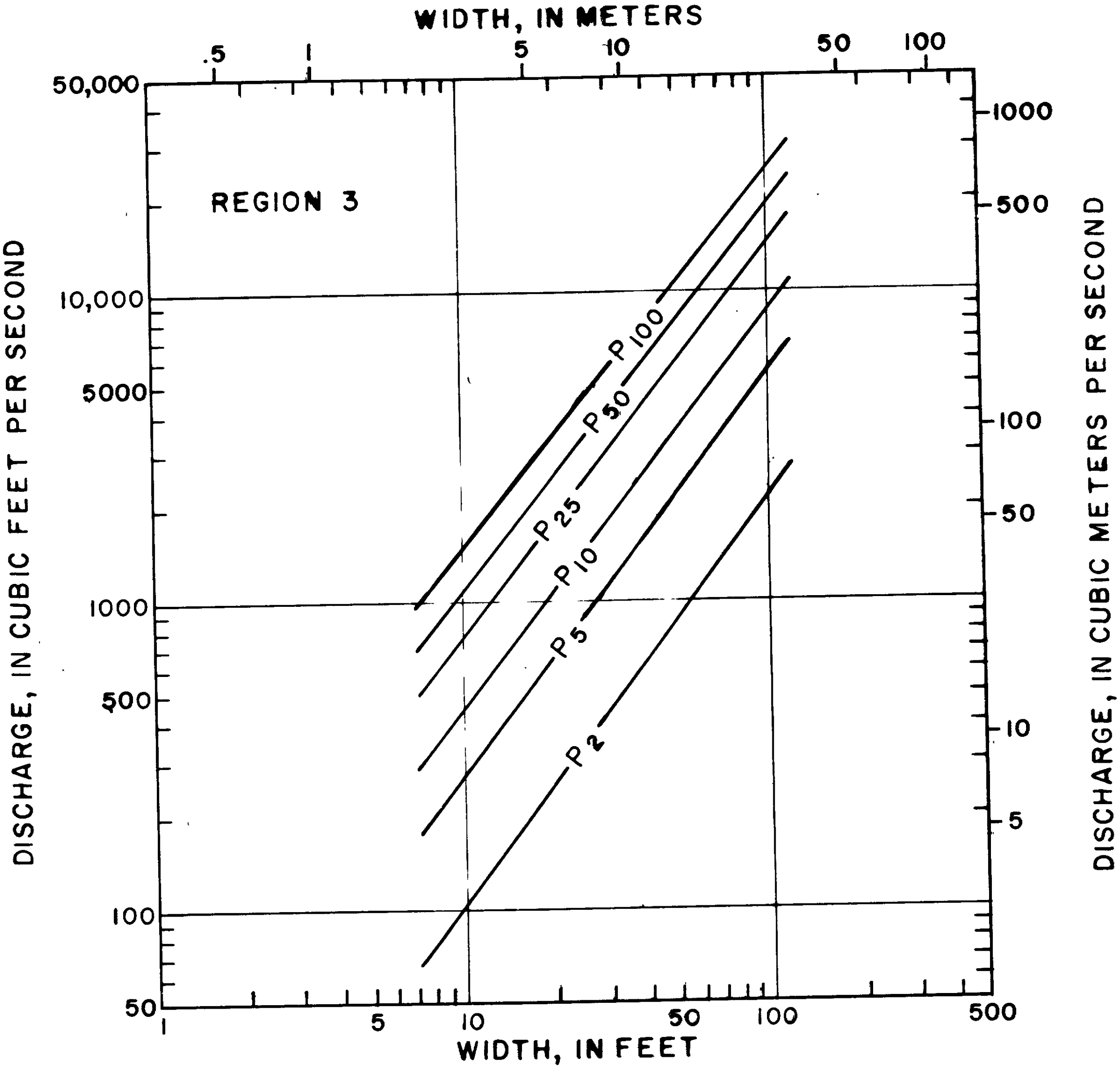


Figure 12.–Relations for estimating peak flows in region 3 by using main-channel width.

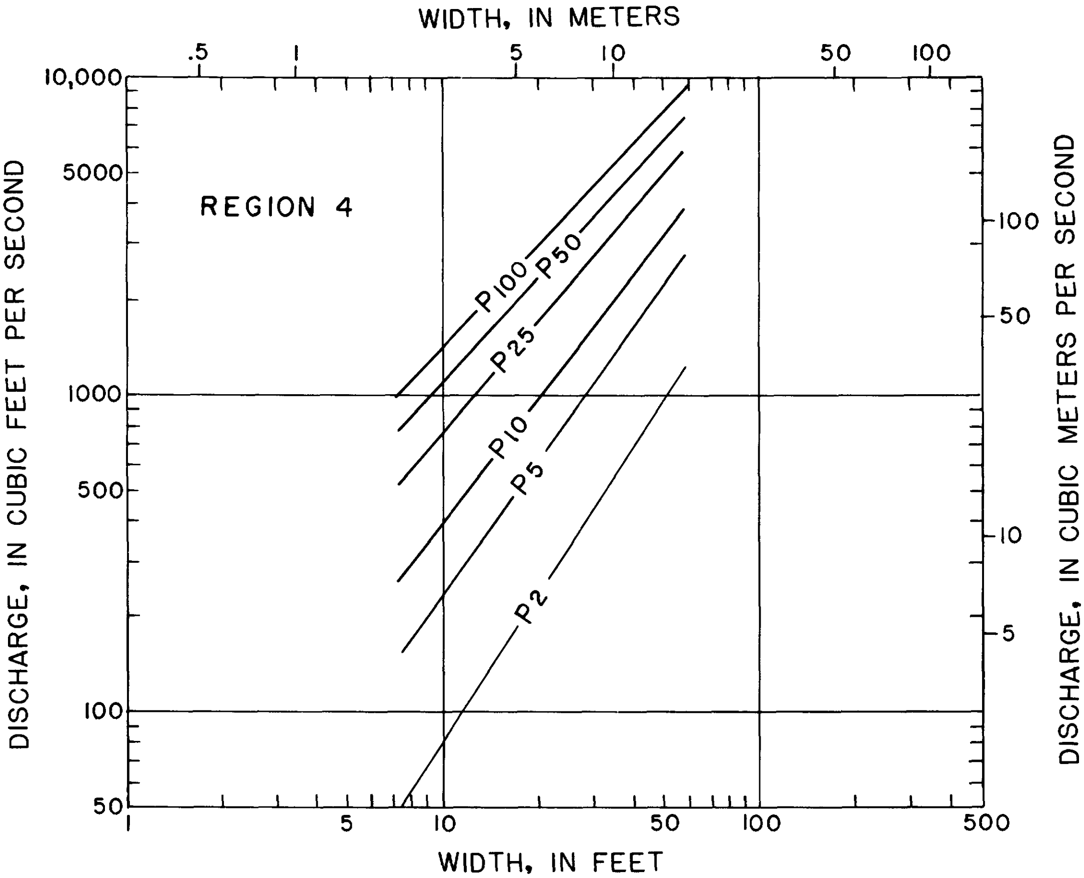


Figure 13.—Relations for estimating peak flows in region 4 by using main-channel width.

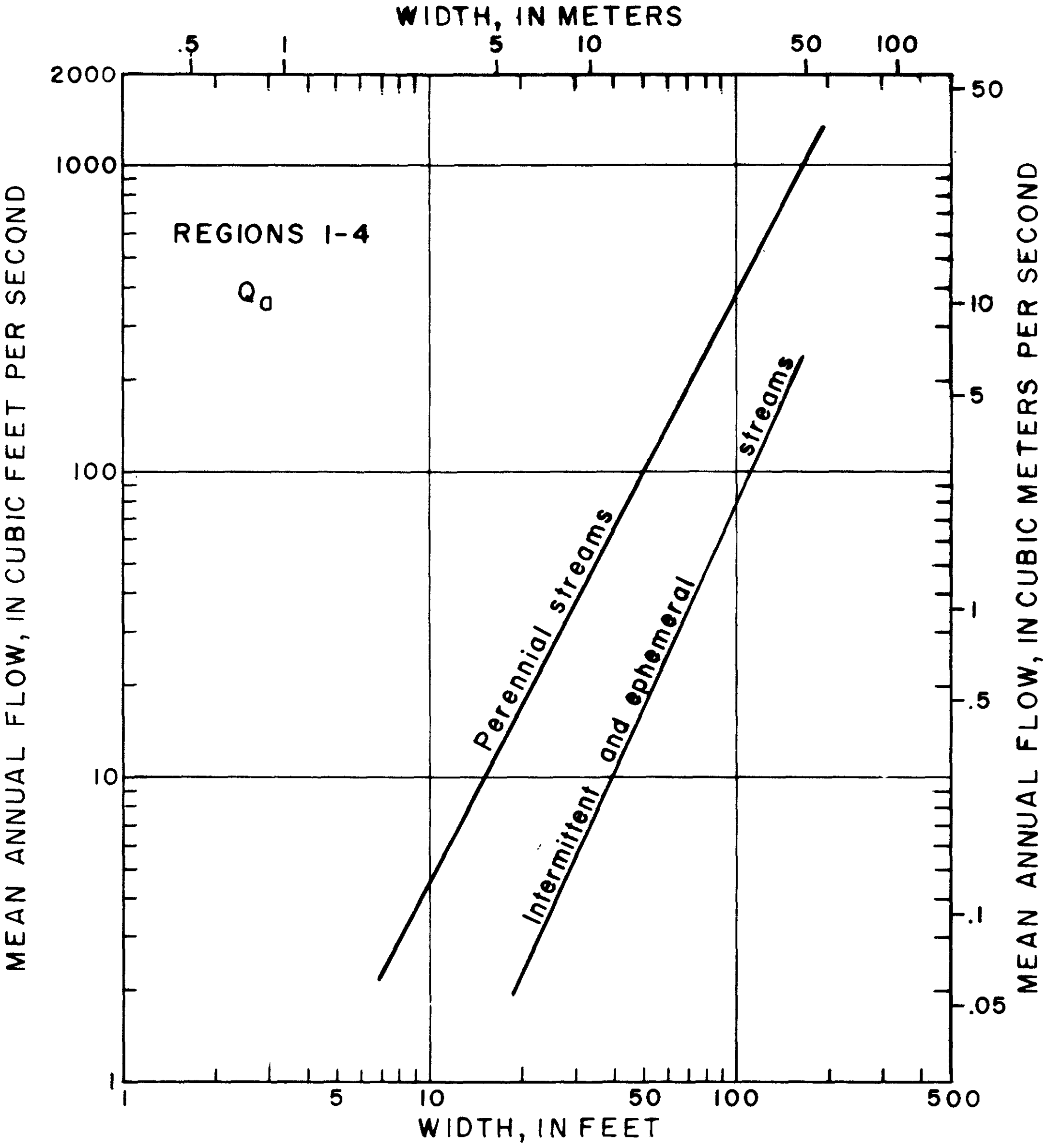


Figure 14.-Relations for estimating mean annual flow in regions 1-4 by using main-channel width.

BASIN-CHARACTERISTICS METHOD

Multiple regression of basin characteristics versus flow characteristics is a widely used technique that has been particularly successful for developing estimating relations in humid regions. The technique is based on the assumption that certain physiographic and climatic variables produce or affect streamflow from a basin. The method has the advantage of being mainly an office technique. The basin characteristics are determined from maps of the drainage basin, and a field visit is not required.

The physiographic variables measured in this study include drainage area; slope, length, and aspect of the main channel; area of lakes and ponds; soils infiltration rate; mean basin latitude and elevation; and percent forest cover. The climatic variables include mean annual precipitation, intensity of precipitation, and average length of growing season.

Drainage area was found to be the most significant variable for estimating flows. For the mountainous areas of region 1, elevation was also found to be significant. The other basin characteristics were not found to be significant enough to warrant inclusion in the estimating relations.

Drainage area is significant to streamflow because more precipitation is intercepted by large areas than by small areas. Elevation is significant in the mountainous areas because greater snowfalls occur at higher elevations.

Results of the regression study for peak flows and mean annual flow are summarized in the following tables:

Summary of regression equations for determining peak flows, using the basin-characteristics method

(Relations are presented in graphical form, p. 25-34)

Region	Regression equation (English units)	Number of stations	Correlation coefficient	Standard error: Log units	Standard error: Percent (average)
1	$P_{2} = 0.009\ A^{0.85}\ E^{3.44}$	131	0.93	0.223	54
	$P_{5} = .070\ A^{0.81}\ E^{2.75}$	131	.93	.211	51
	$P_{10} = .203\ A^{0.79}\ E^{2.39}$	131	.93	.213	51
	$P_{25} = .634\ A^{0.77}\ E^{2.00}$	131	.92	.221	53
	$P_{50} = 1.32\ A^{0.76}\ E^{1.76}$	131	.91	.229	55
	$P_{100} = 2.57\ A^{0.75}\ E^{1.53}$	131	.90	.238	58
2*	$P_{2} = 56.8\ A^{0.38}$	53	.78	.333	84
	$P_{5} = 146\ A^{0.35}$	53	.80	.297	74
	$P_{10} = 239\ A^{0.34}$	53	.80	.295	73
	$P_{25} = 406\ A^{0.33}$	53	.76	.315	79
	$P_{50} = 572\ A^{0.32}$	53	.73	.333	84
	$P_{100} = 779\ A^{0.31}$	53	.70	.354	91
3*	$P_{2} = 93.8\ A^{0.36}$	42	.73	.344	88
	$P_{5} = 252\ A^{0.36}$	42	.82	.266	65
	$P_{10} = 425\ A^{0.37}$	42	.83	.256	62
	$P_{25} = 742\ A^{0.37}$	42	.81	.275	67
	$P_{50} = 1,070\ A^{0.37}$	42	.78	.300	75
	$P_{100} = 1,480\ A^{0.37}$	42	.76	.330	84
4	$P_{2} = 12.0\ A^{0.65}$	11	.86	.325	82
	$P_{5} = 36.3\ A^{0.61}$	11	.84	.324	82
	$P_{10} = 63.3\ A^{0.60}$	11	.83	.335	85
	$P_{25} = 115\ A^{0.58}$	11	.81	.352	90
	$P_{50} = 170\ A^{0.58}$	11	.79	.367	95
	$P_{100} = 242\ A^{0.57}$	11	.78	.382	99

* Regression equations given for regions 2 and 3 apply from 5 to 5,300 mi^2 (13 to 13,700 km^2). Graphical review showed curvilinear relations exist from 0.5 to 5 mi^2 (1.3 to 13 km^2).

Summary of equations for determining mean annual flow, using the basin-characteristics methods

(Relations are presented in graphical form, p. 31-34)

Region	Regression equation (English units)	Number of stations	Correlation coefficient	Standard error	
				Log units	Percent (average)
1	$Q_a = 0.0036\ A^{0.96}\ E^{2.57}$ (perennial streams)	100	0.88	0.244	59
2	$Q_a = 0.244\ A^{0.56}$ (intermittent and ephemeral streams)	9	*	*	*
3	$Q_a = 0.518\ A^{0.53}$ (intermittent and ephemeral streams)	8	*	*	*
4	$Q = 0.162\ A^{0.98}$ (perennial streams)	7	*	*	*

* Graphical regression was performed due to the small number of stations.

NOTE: Insufficient data concerning mean annual flow existed for intermittent and ephemeral streams in regions 1 and 4, and for perennial streams in regions 2 and 3; hence, no relations could be developed for these cases.

Drainage area (A) is determined by using a planimeter to measure the area from the best available topographic maps. For rough estimates, area can be determined by laying a transparent grid with squares of known size over a map and counting the number of squares within the basin outline.

Mean basin elevation (E), in thousands of feet above mean sea level, is measured by laying a transparent grid on a contour map and recording the elevations of the intersections. The grid spacing should be such that a minimum of 25 intersections fall within the basin. The arithmetic average of these altitudes is determined, and the figure is divided by 1,000 to convert it to thousands of feet.

Limitations

The basin-characteristics method is applicable only to sites where streamflows are virtually natural. It should not be used where flows are significantly affected by manmade works (major dams, reservoirs, diversions, or urbanization).

Graphs

Relations for estimating peak flows and mean annual flow using the basin-characteristics method are presented in graphical form in figures 15-24.

MAXIMUM FLOODS OF RECORD

Table 1 lists the maximum peak flows that have occurred at each gaged site. In addition to the floods recorded at gaging stations, the Geological Survey makes indirect measurements of significant high-water events that occur at miscellaneous ungaged sites. Table 4 is a listing of peak flows measured at miscellaneous sites.

Figures 25-28 are graphs of maximum observed peak flows versus drainage area. The graphs include data from the miscellaneous-site measurements, as well as from the gaging stations. The regression lines for peak flows with an average recurrence interval of 100 years are shown on the figures. The points lying above the lines represent outstanding peak flows with recurrence intervals greater than 100 years. Floods of similar magnitude, as well as higher values, are expected to occur in the future. As the length of gaged record increases, the number of peak flows above the lines will also increase.

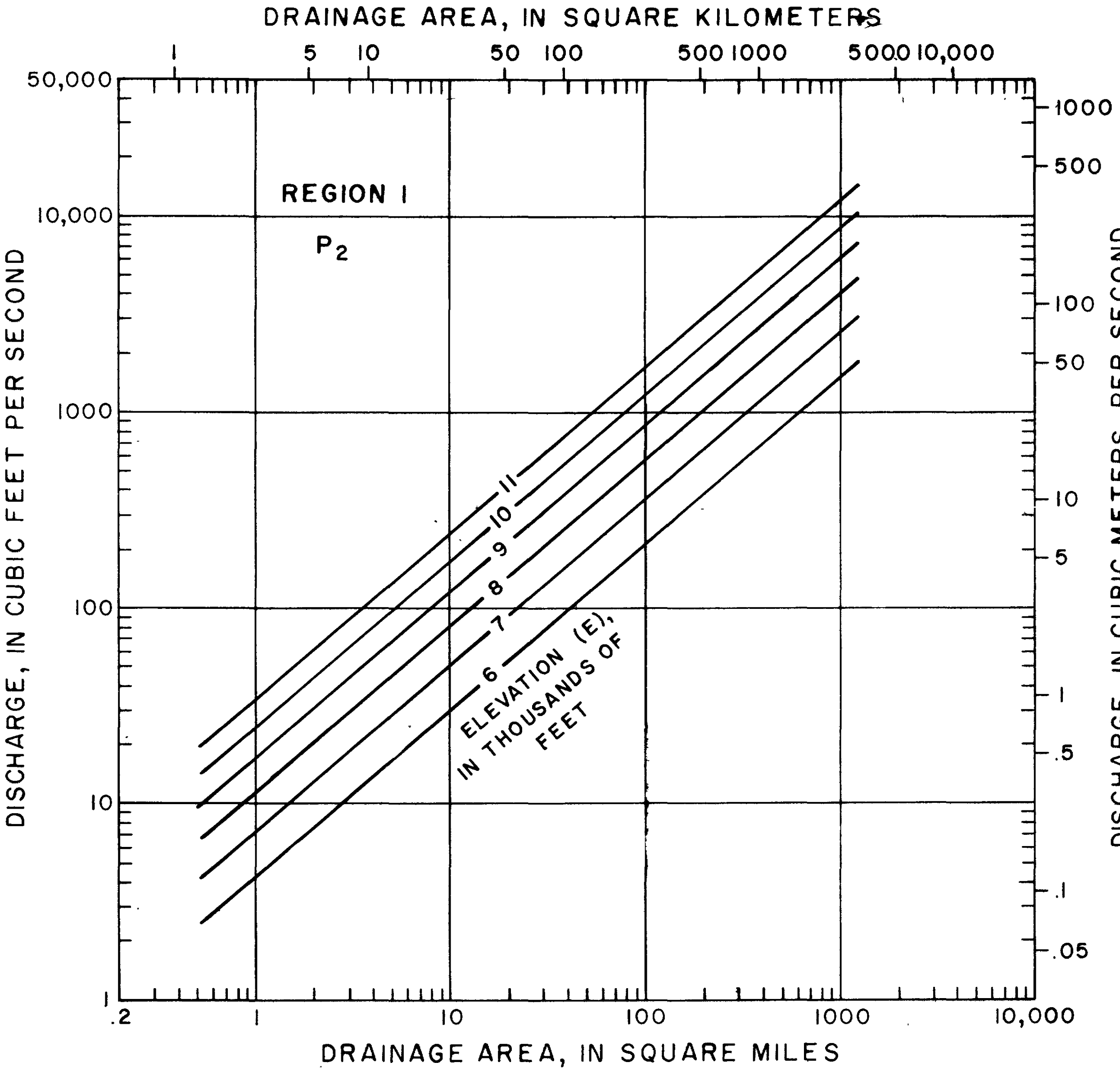


Figure 15.—Relations for estimating 2-year peak flow in region I by using drainage area and mean basin elevation.

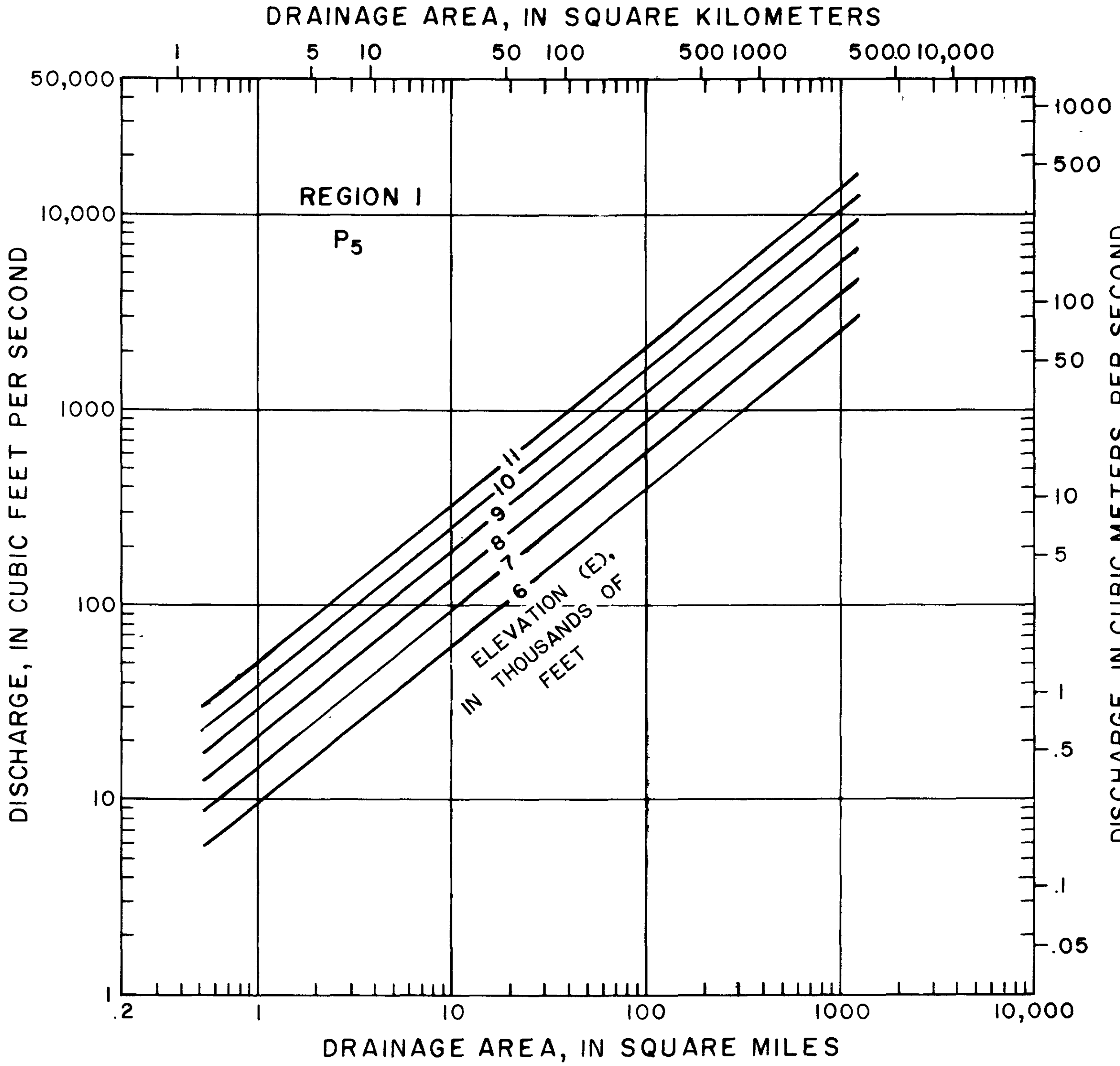


Figure 16.—Relations for estimating 5-year peak flow in region I by using drainage area and mean basin elevation.

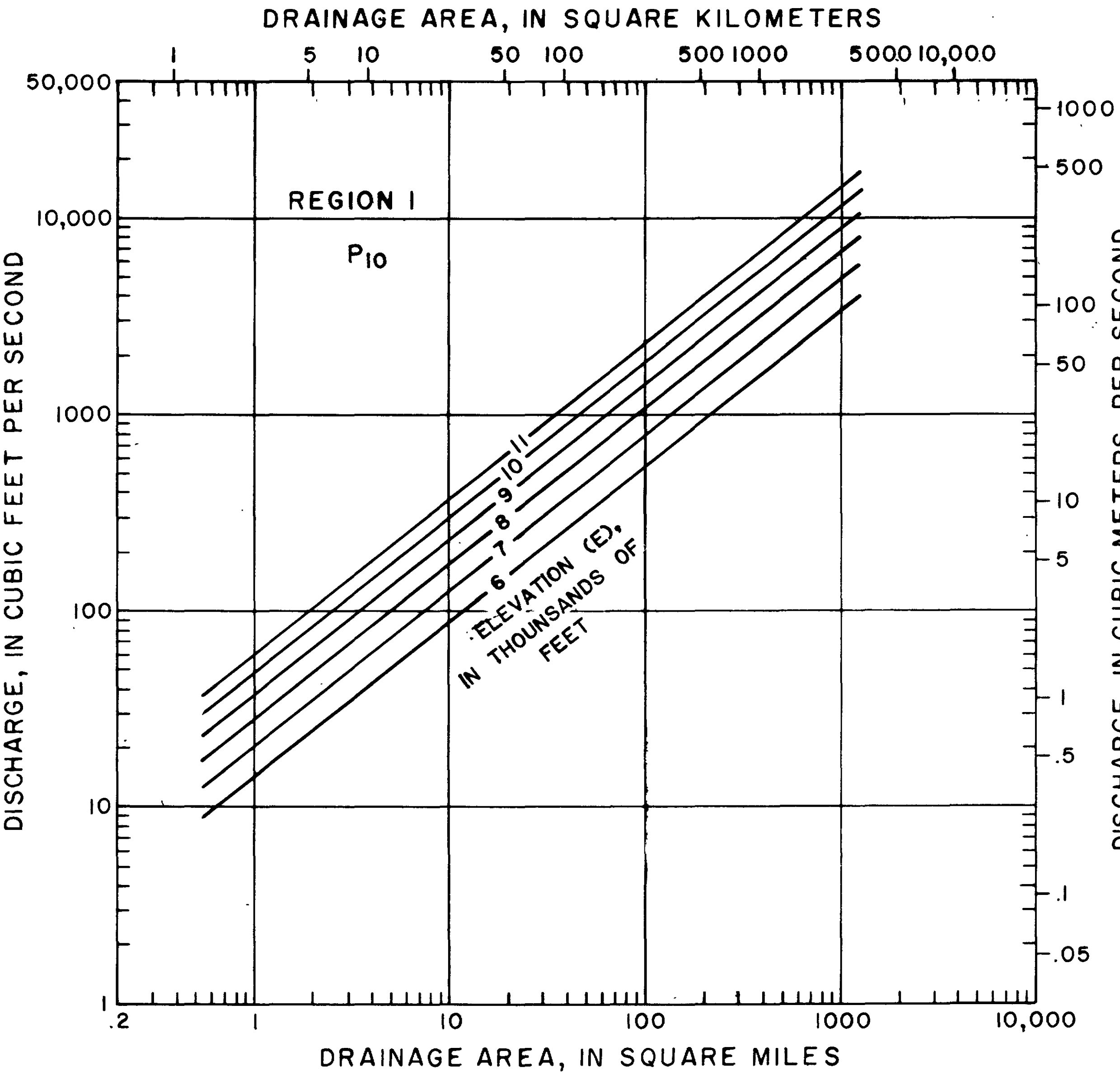


Figure 17.—Relations for estimating 10-year peak flow in region I by using drainage area and mean basin elevation.

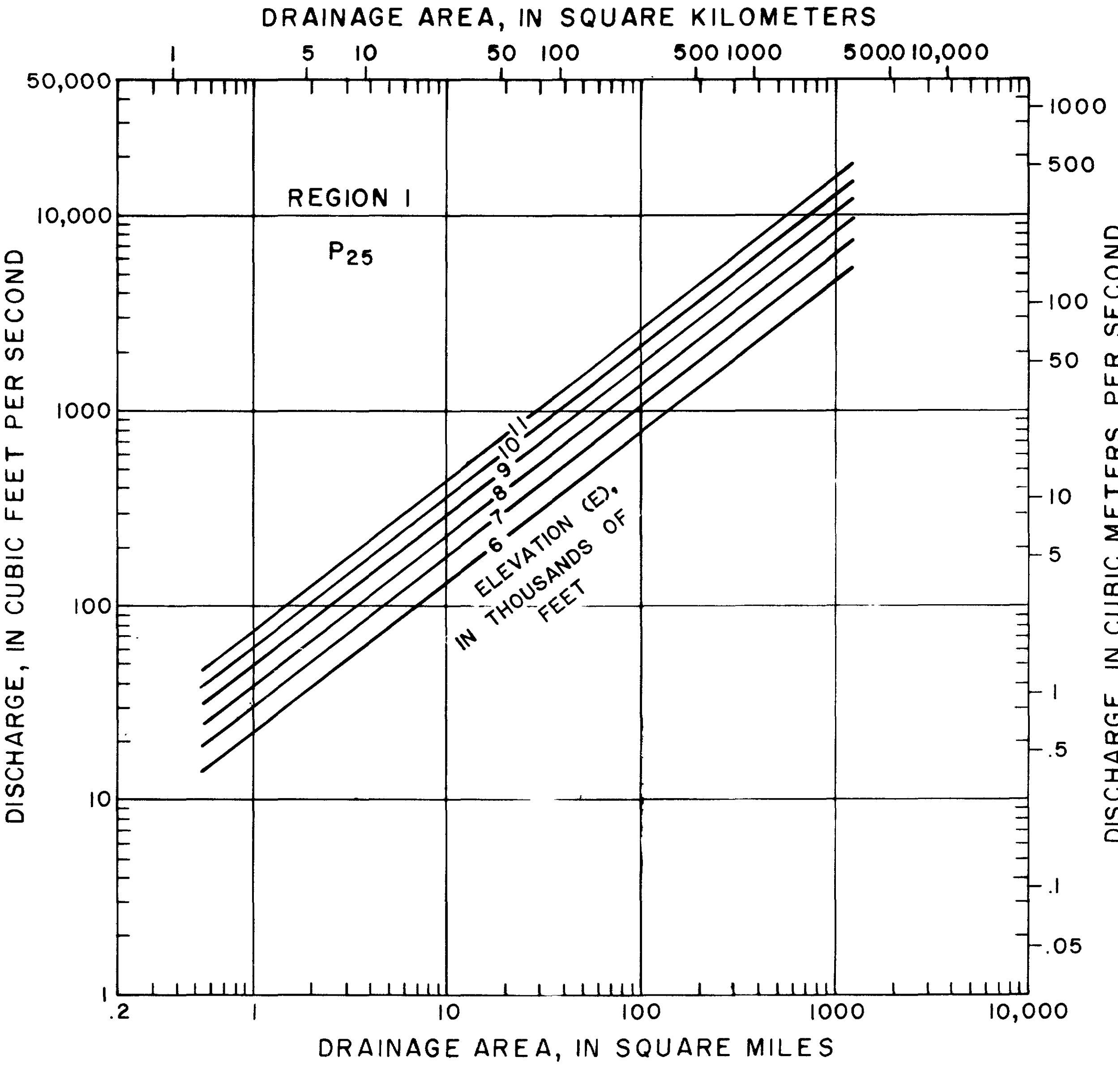


Figure 18.—Relations for estimating 25-year peak flow in region I by using drainage area and mean basin elevation.

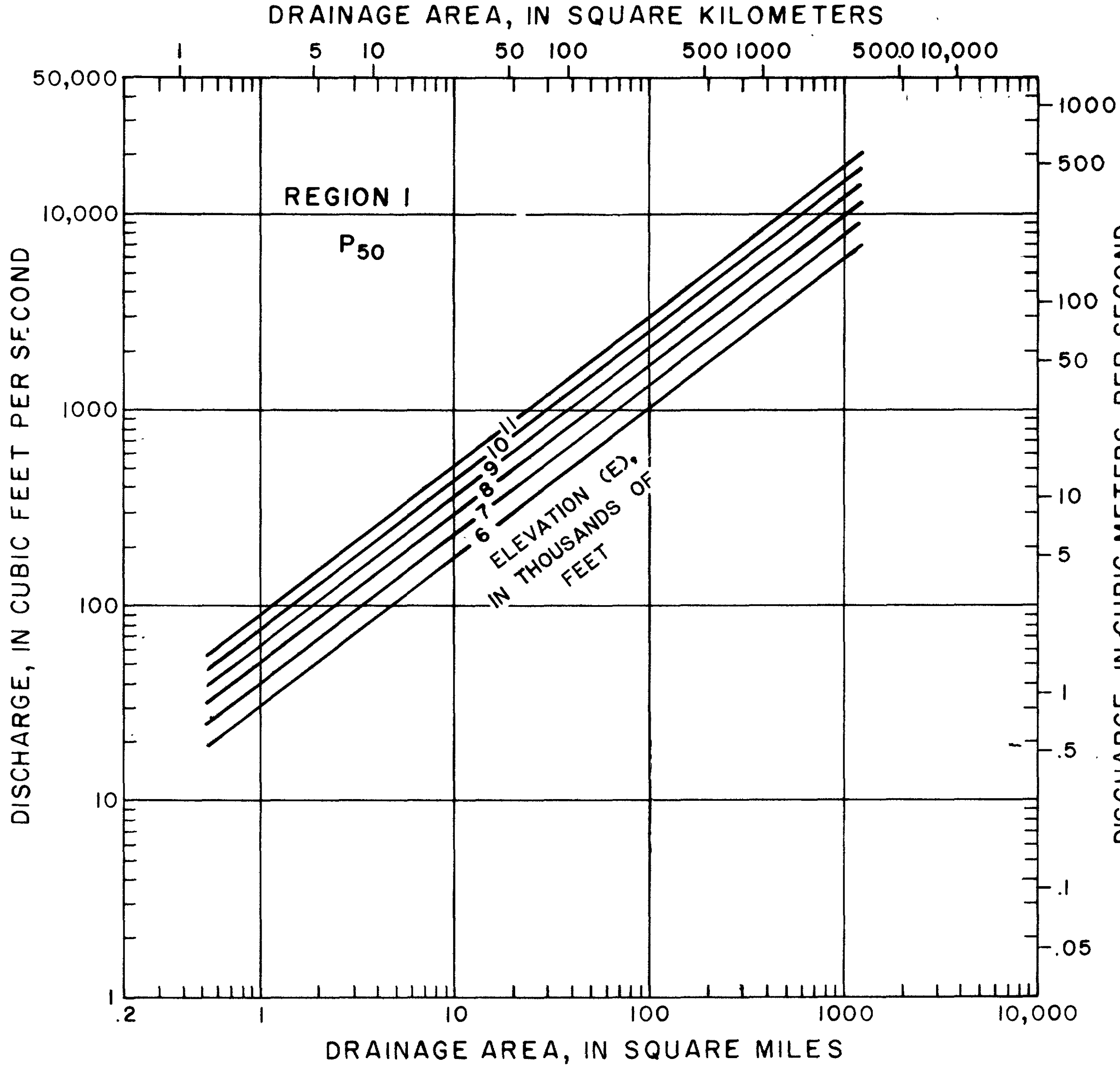


Figure 19.—Relations for estimating 50-year peak flow in region I by using drainage area and mean basin elevation.

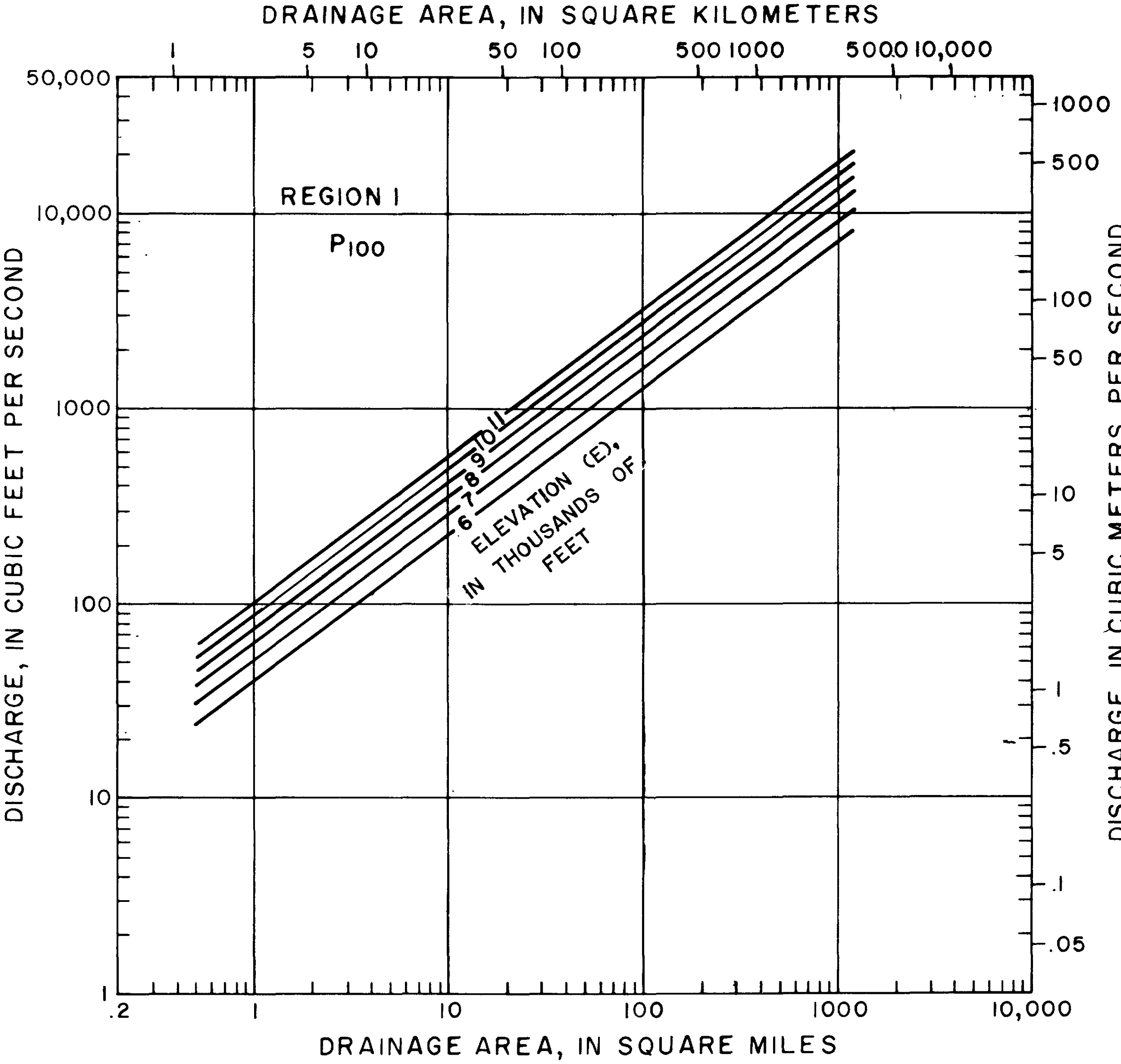


Figure 20.—Relations for estimating 100-year peak flow in region I by using drainage area and mean basin elevation.

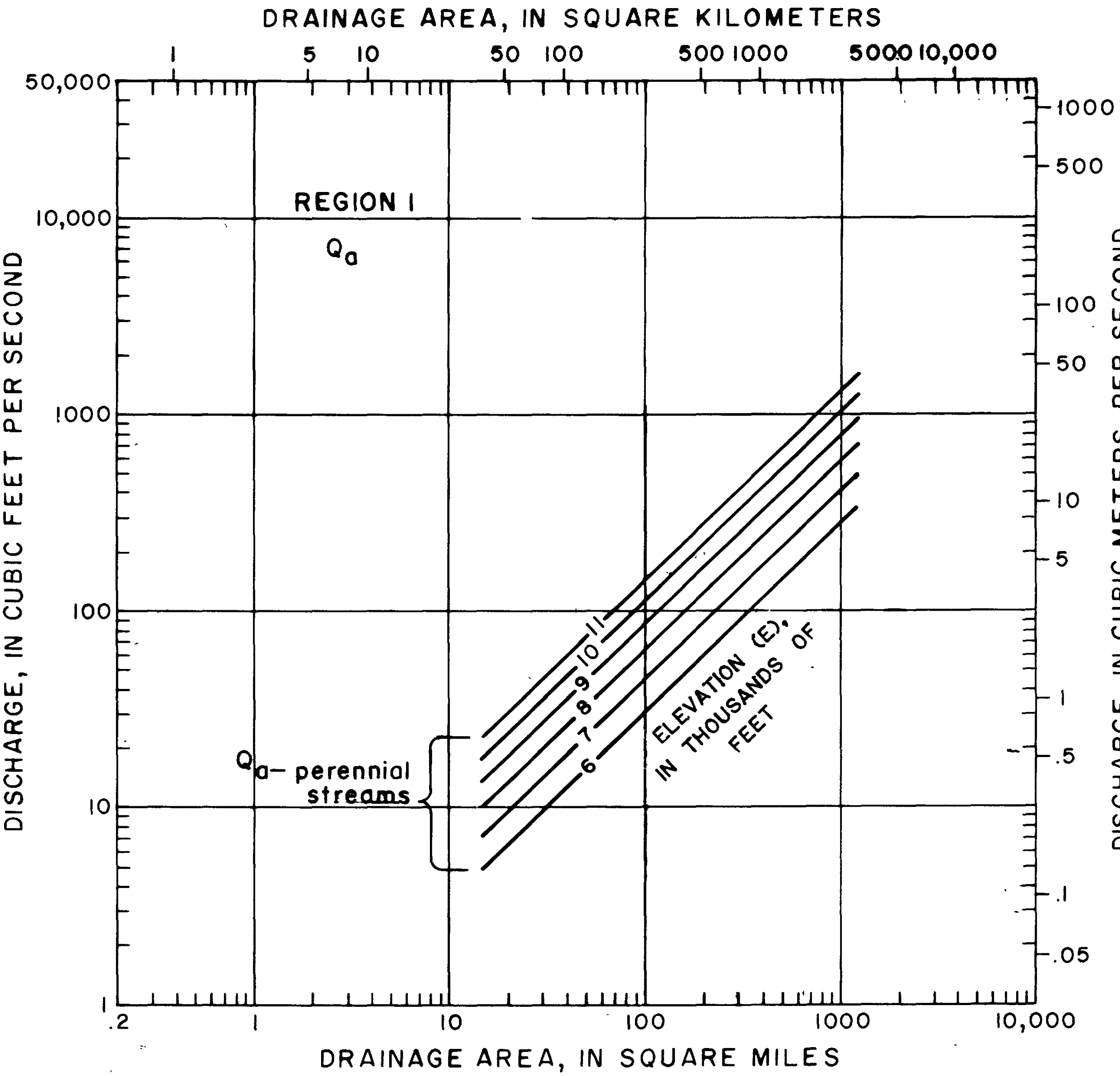


Figure 21.—Relations for estimating mean annual flow in region I by using drainage area and mean basin elevation.

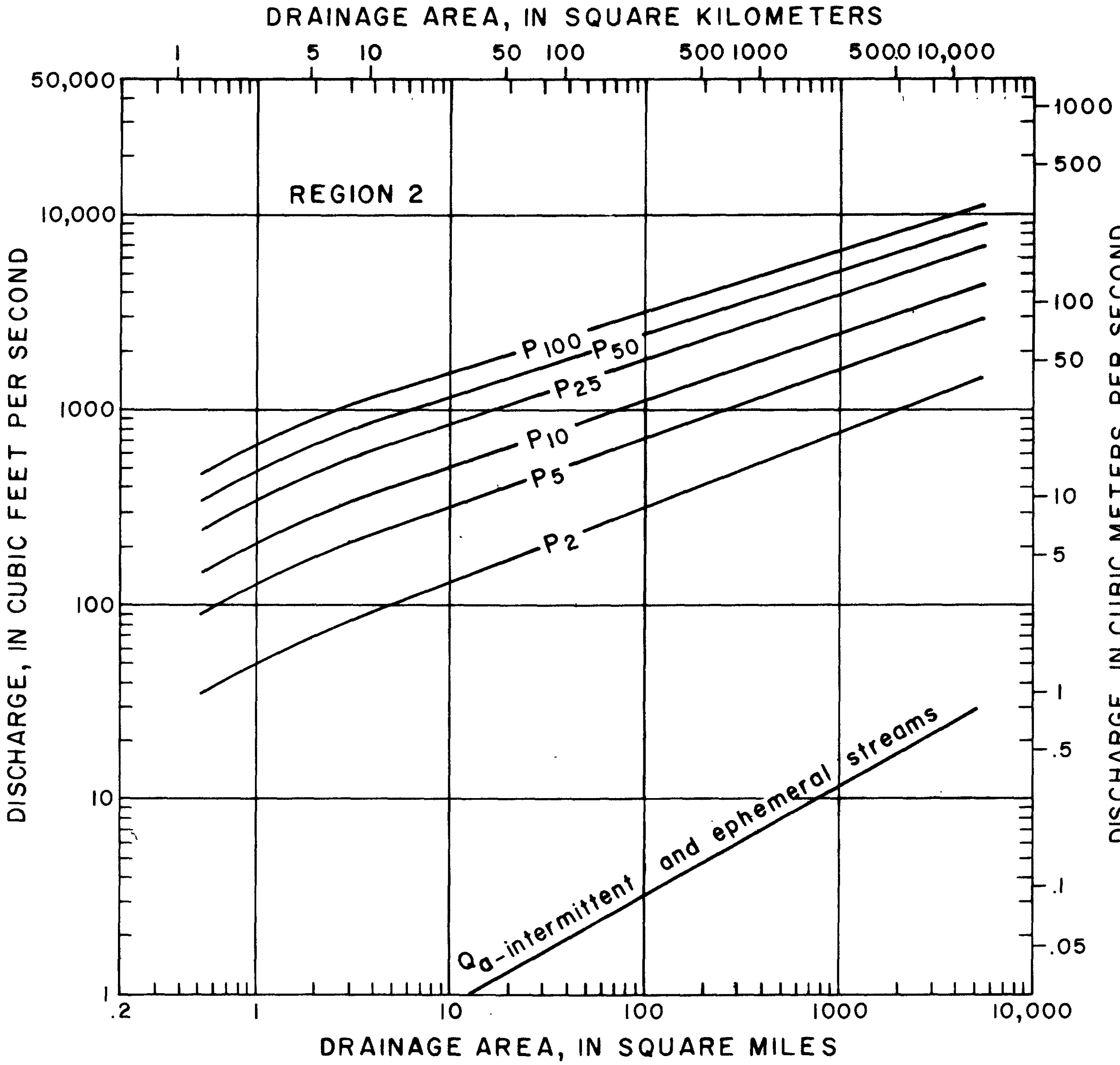


Figure 22.-Relations for estimating flow characteristics in region 2 by using drainage area.

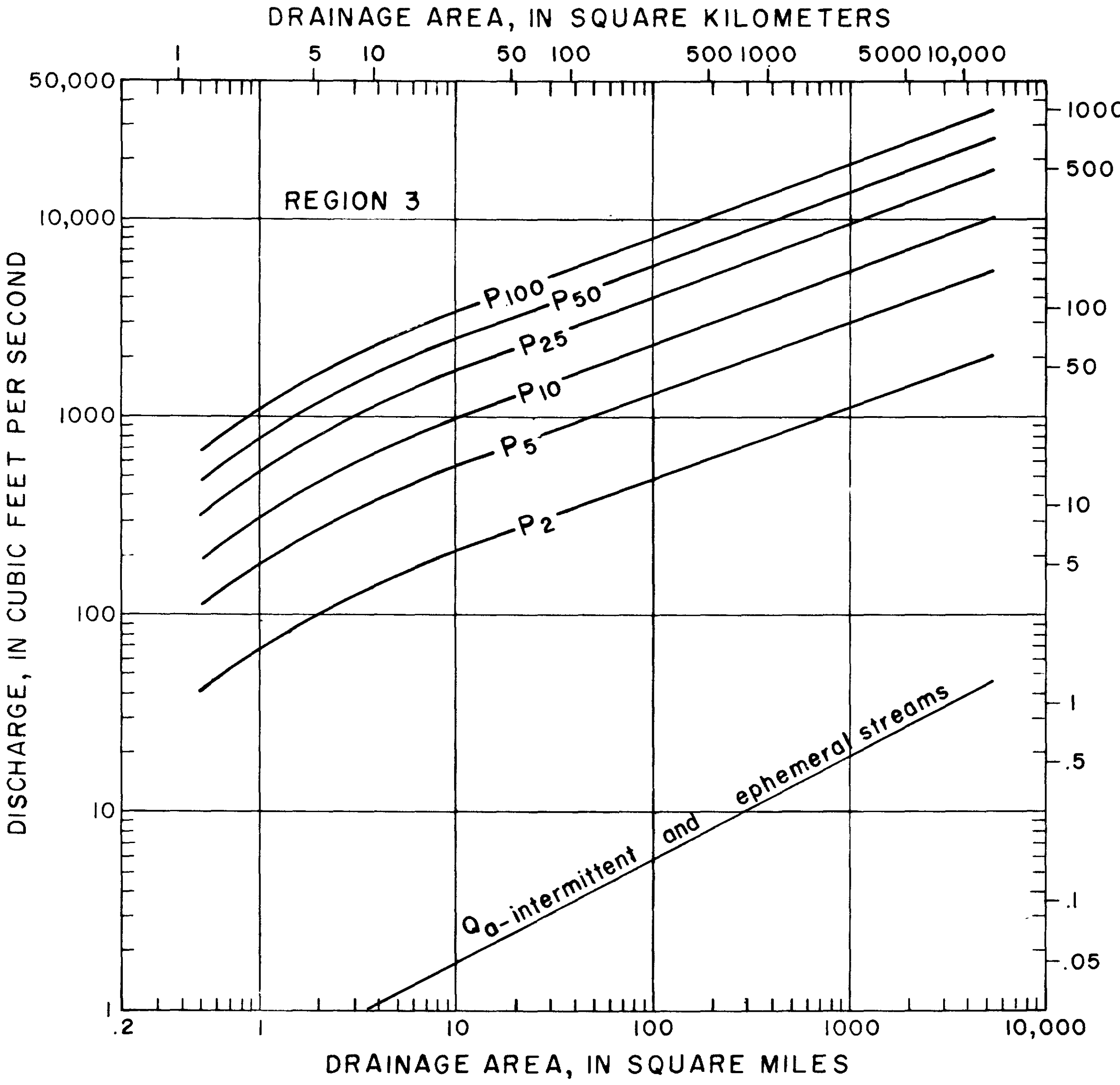


Figure 23.–Relations for estimating flow characteristics in region 3 by using drainage area.

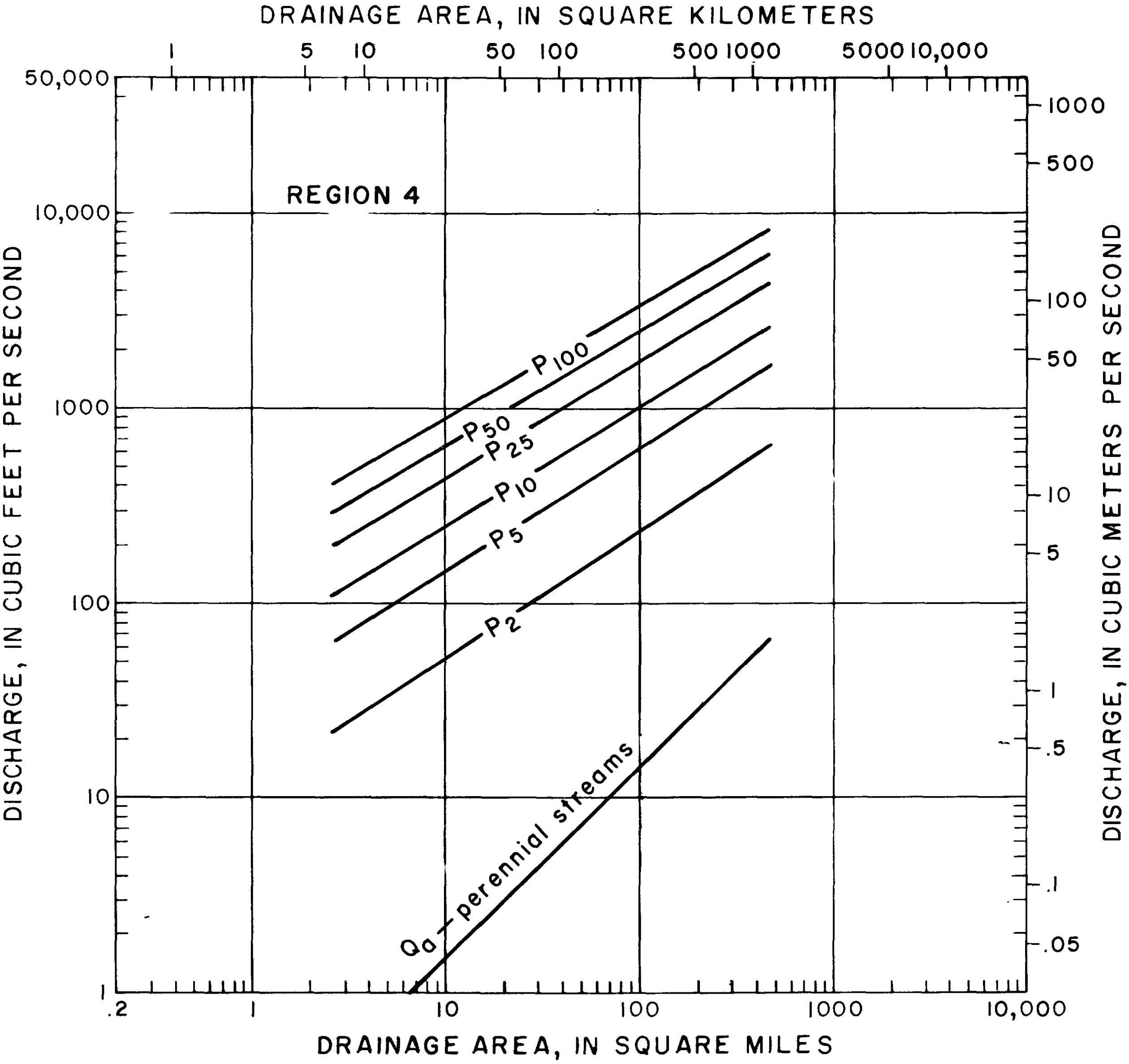


Figure 24.–Relations for estimating flow characteristics in region 4 by using drainage area.

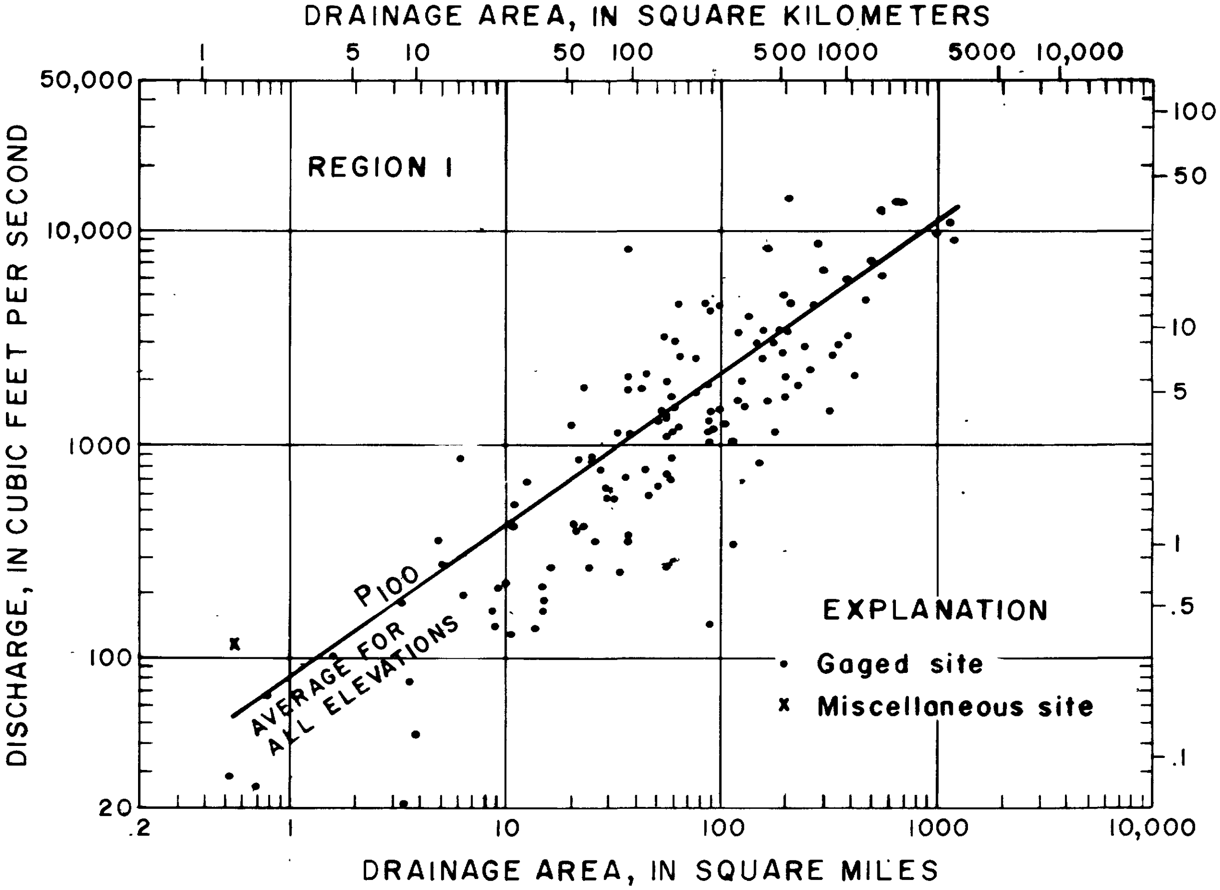


Figure 25.-Maximum observed peak flows versus drainage area for region I.

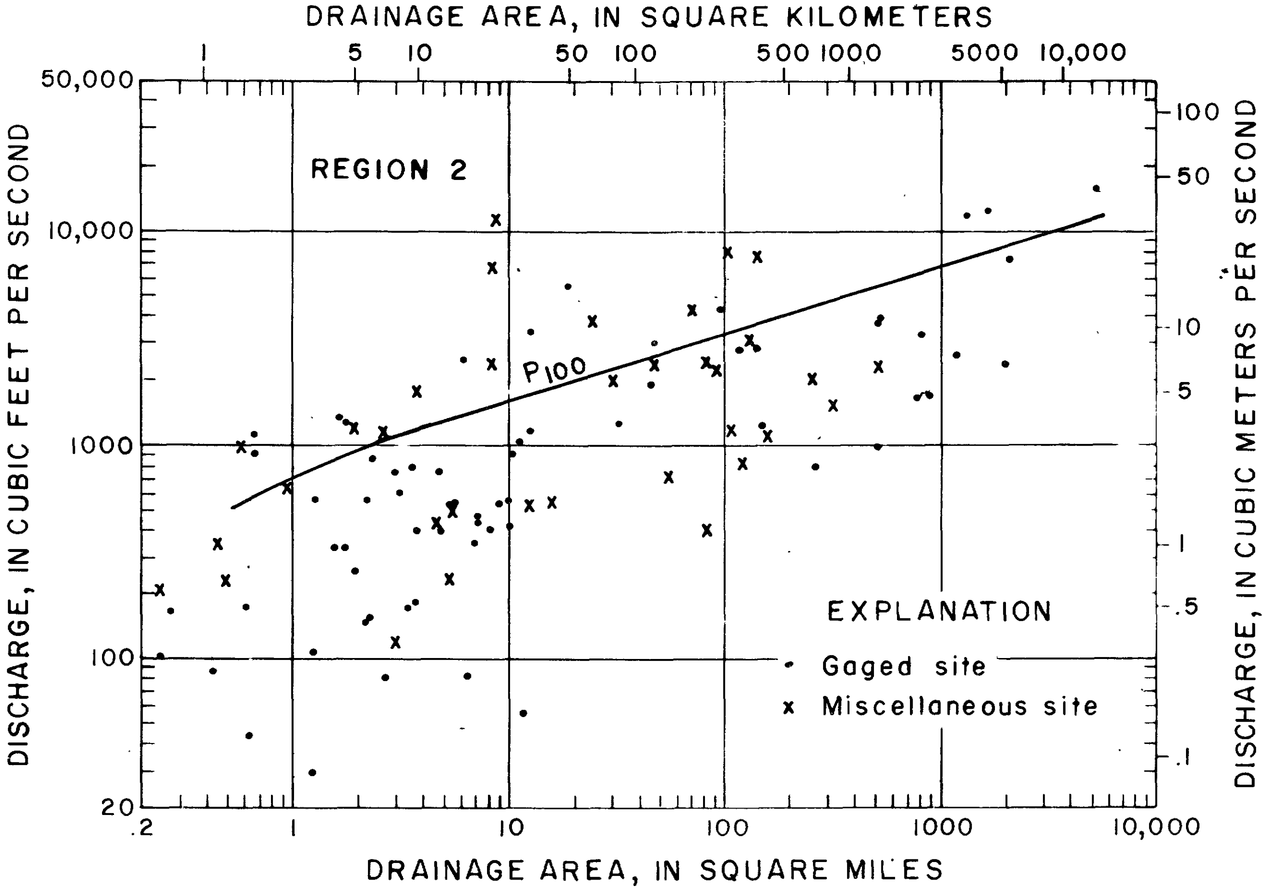


Figure 26.–Maximum observed peak flows versus drainage area for region 2.

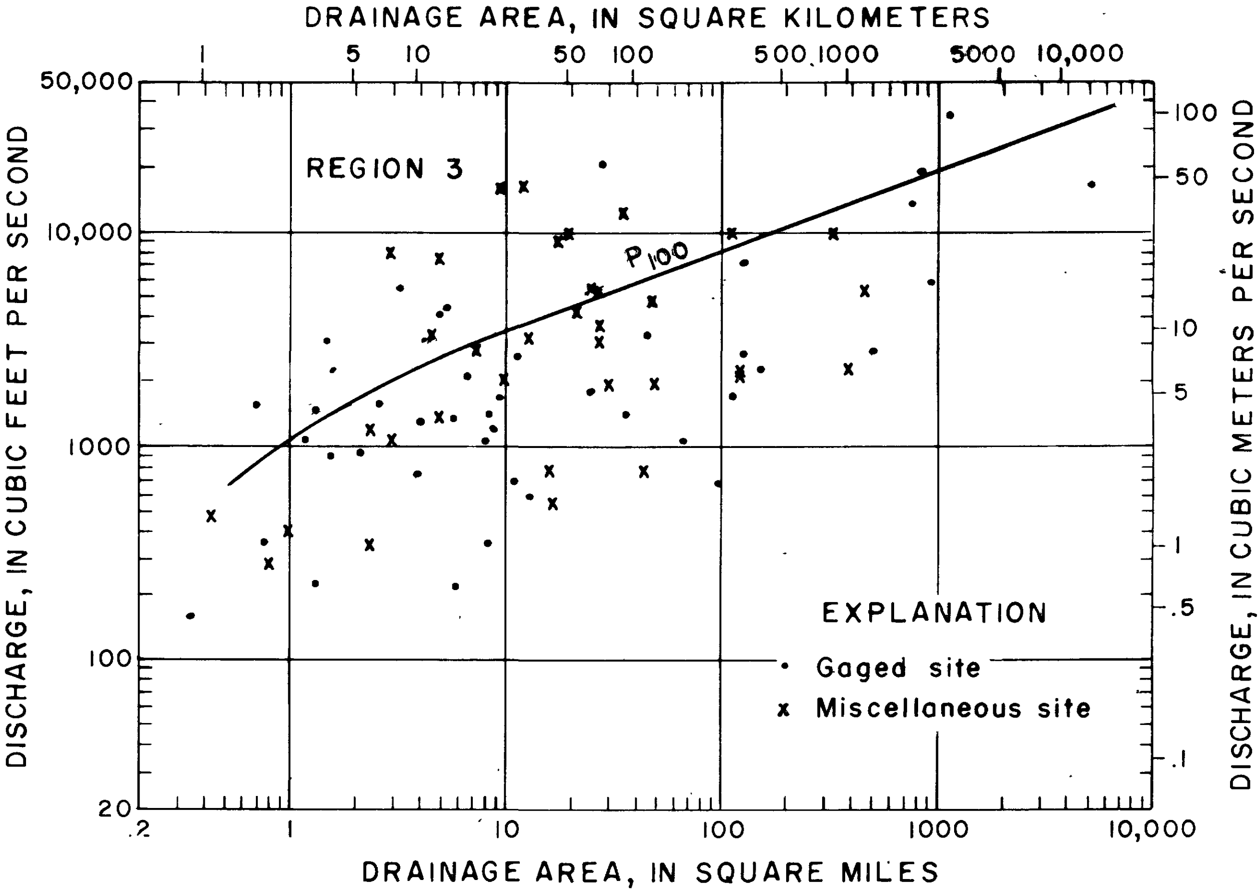


Figure 27.–Maximum observed peak flows versus drainage area for region 3.

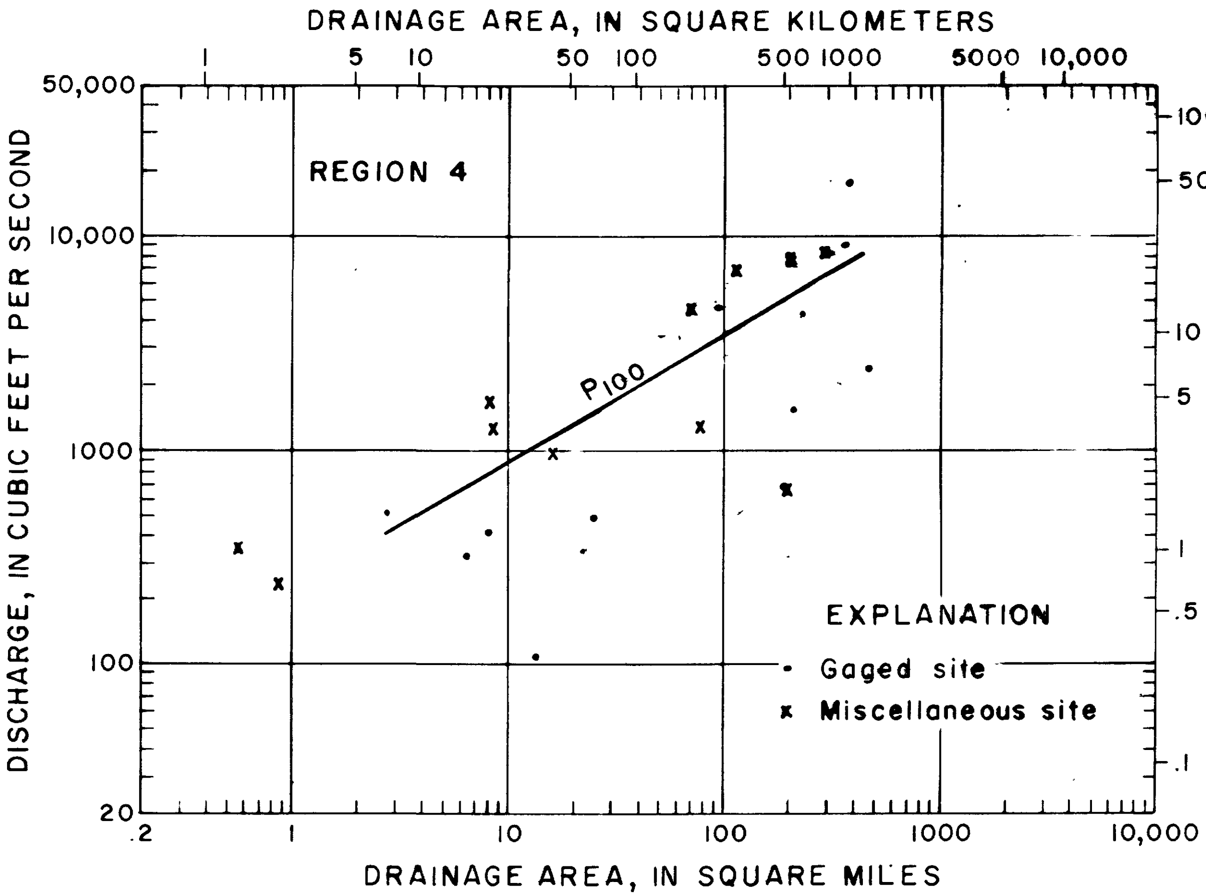


Figure 28.–Maximum observed peak flows versus drainage area for region 4.

SEASONAL OCCURRENCE OF PEAK FLOWS

The seasonal occurrence of the maximum observed peak flows was analyzed for each of the four regions. Figure 29 shows the relative percentage of peak flows that occurred during each month. The figures may be used to determine when high peak flows are most likely to occur. It should be realized that the figures represent peak flows, rather than floods. Floods sometimes occur as a result of backwater from ice jams. During these occurrences, the actual flow of the stream may be only moderately high.

APPLICATION OF RELATIONS

The graphs and equations of this report should be considered as defining relations only within the range of data used for their development. The estimating relations are shown on the graphs only for the ranges of data used in the regression analyses. Extension of the relations to estimate flow characteristics outside their defined range is discouraged.

The use of relations in this report for estimating mean annual flow requires that a determination be made as to whether the stream is perennial, intermittent, or ephemeral. It is advised that a field visit be made to aid in this determination. The field visit should include an inspection of the stream, as well as discussion with local long-time residents who are familiar with the nature of the flow of the stream.

Examples of Using Relations

Example 1.--Consider a situation where a hydraulic structure is to be built on the unnamed stream shown in figure 9. This is an ungaged stream, located in region 2 about 16 mi (25.8 km) east of Big Piney. Figure 30 is a map of the drainage basin. The channel width was measured at several sections, and the average of these measurements was 12 ft (3.7 m). Using the channel-geometry method, the following peak-flow characteristics are estimated from figure 11:

P_2 = 140 ft^3/s (3.96 m^3/s)
P_5 = 340 ft^3/s (9.62 m^3/s)
P_{10} = 540 ft^3/s (15.3 m^3/s)
P_{25} = 890 ft^3/s (25.2 m^3/s)
P_{50} = 1,200 ft^3/s (34.0 m^3/s)
P_{100} = 1,700 ft^3/s (48.1 m^3/s).

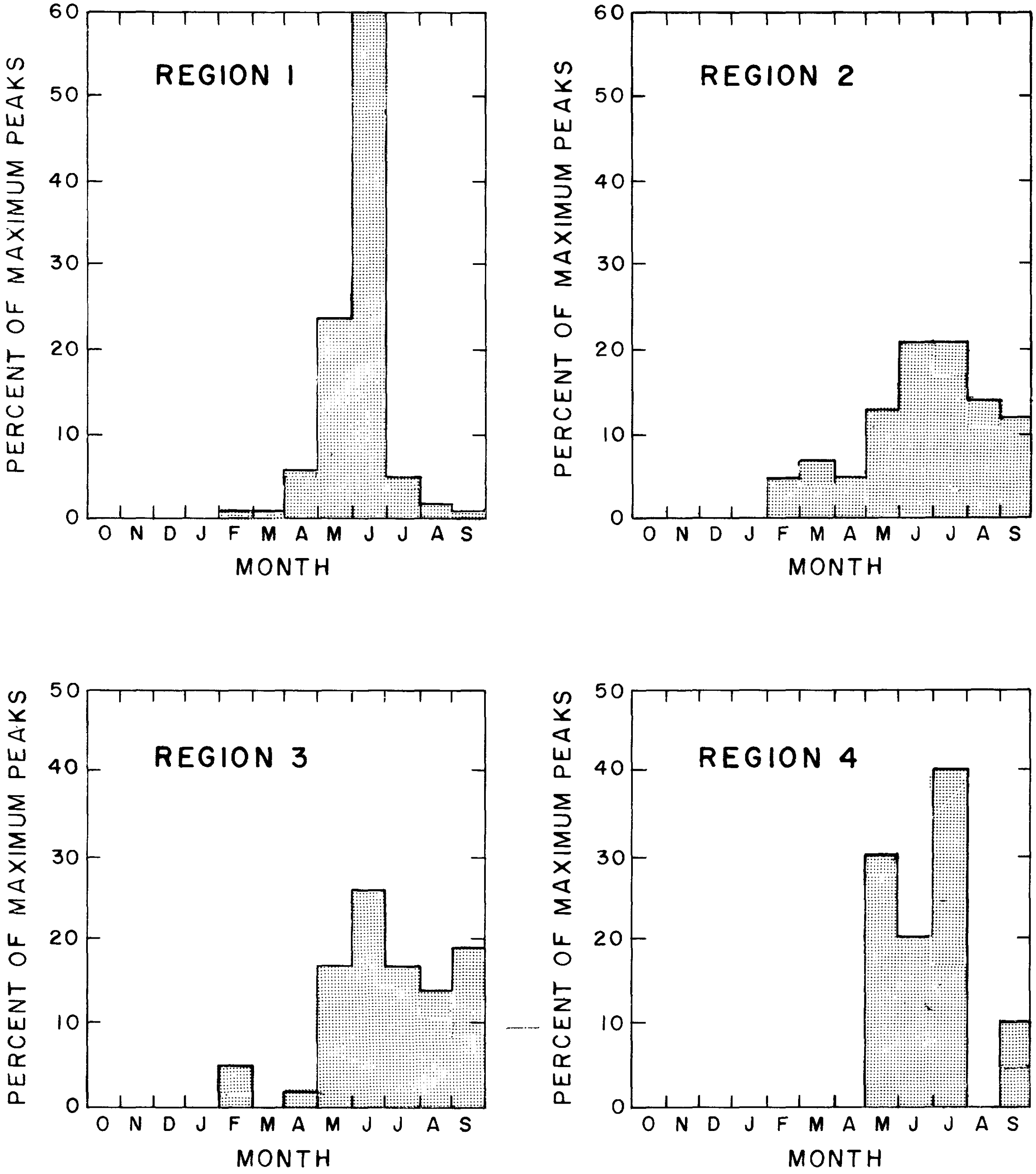


Figure 29.-Seasonal occurrence of maximum peak flows for regions 1, 2, 3, and 4.

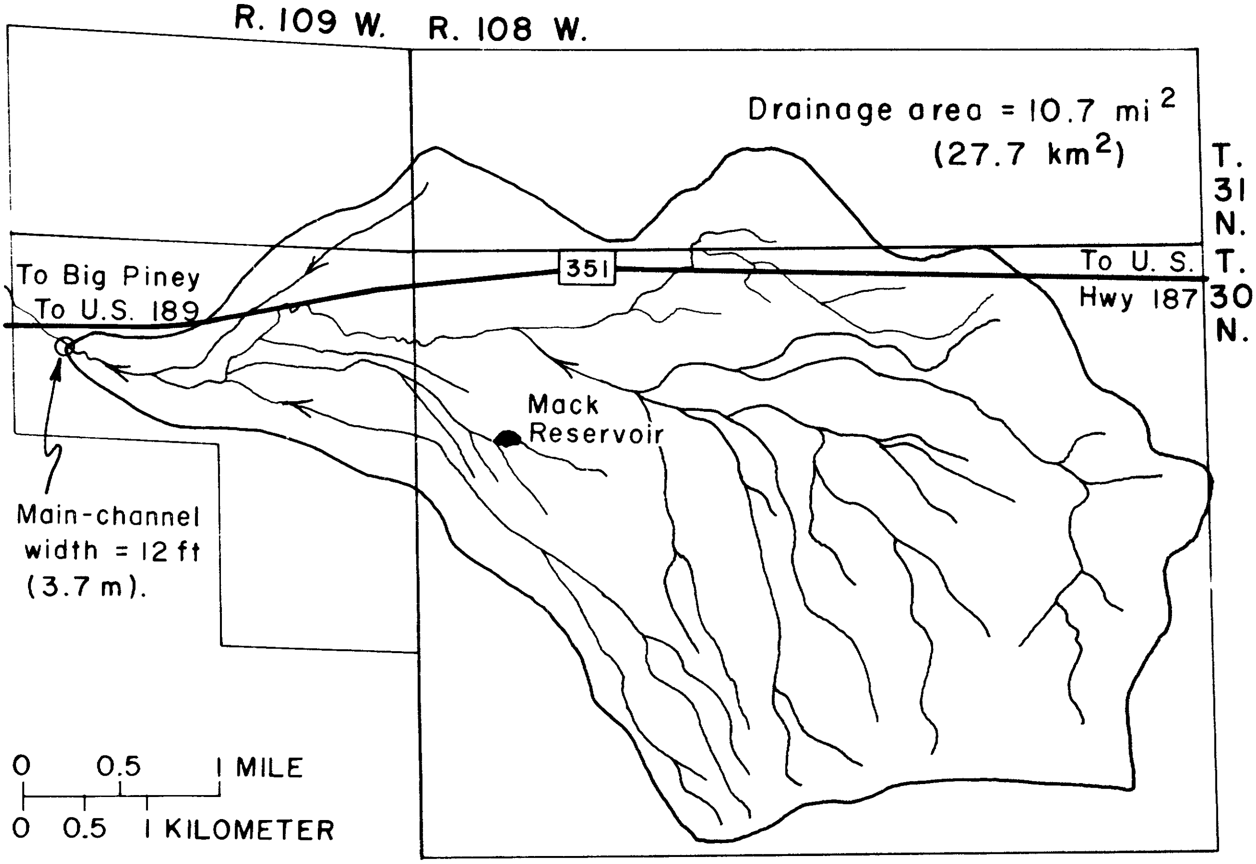


Figure 30.-Unnamed tributary to New Fork River.

The drainage area of the site is 10.7 mi^2 (27.7 km^2). Using the basin-characteristics method, the following values are determined from figure 22:

$$
\begin{aligned}
P_2 &= 140 \text{ ft}^3/\text{s } (3.96 \text{ m}^3/\text{s})\\
P_5 &= 330 \text{ ft}^3/\text{s } (9.34 \text{ m}^3/\text{s})\\
P_{10} &= 540 \text{ ft}^3/\text{s } (15.3 \text{ m}^3/\text{s})\\
P_{25} &= 890 \text{ ft}^3/\text{s } (25.2 \text{ m}^3/\text{s})\\
P_{50} &= 1{,}200 \text{ ft}^3/\text{s } (34.0 \text{ m}^3/\text{s})\\
P_{100} &= 1{,}600 \text{ ft}^3/\text{s } (45.3 \text{ m}^3/\text{s}).
\end{aligned}
$$

Figure 29 shows that high peak flows are most likely to occur during the months of June or July, but a fair chance also exists for their occurrence during the months of May, August, and September.

Estimates of peak flows from the two methods are nearly identical in this example, and it makes little difference which set of estimates is used.

Mean annual flow of the stream cannot be determined from either figure 14 or 22 because both its width and drainage area are less than the lower defined limits of the relations for intermittent and ephemeral streams.

Example 2.--A bridge is planned for construction on the stream shown in figure 31. This stream is located in region 3 about 5 mi (8 km) northeast of Glenrock. The bridge will be designed on the basis of the peak flow having an average recurrence interval of 50 years (P_{50}).

A field visit to the site shows the stream to be ephemeral. There is evidence of large floods. The channel is relatively wide; many large cottonwood trees have fallen and are lying in the main channel and on the flood plain. Five stable-appearing channel sections are measured. The widths vary between 42 and 47 ft (12.8 and 14.3 m) with an average of 45 ft (13.7 m). Using the channel-geometry method, figure 12 shows P_{50} = 7,200 ft^3/s (204 m^3/s).

The drainage area of the site is about 65 mi^2 (168 km^2). Using the basin-characteristics method, figure 23 shows P_{50} = 5,000 ft^3/s (142 m^3/s). Because the field visit indicated that the stream is susceptible to large floods, a decision is made to use the higher figure provided by the channel-geometry method.

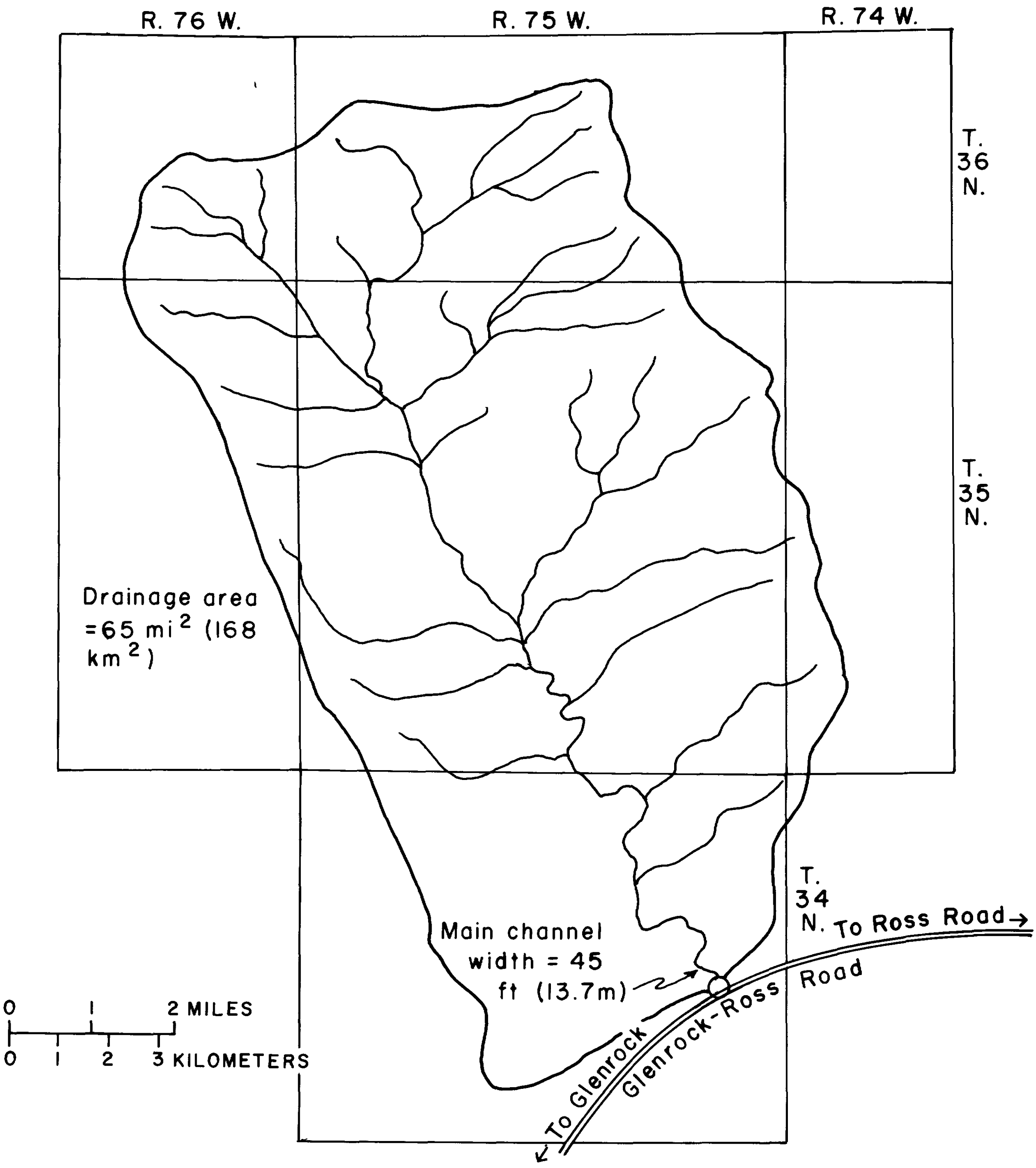


Figure 31.—Sand Creek near Glenrock, Wyoming.

Example 3.--The drainage of a site may lie in more than one hydrologic region. When this occurs, a weighted averaging technique should be used to determine the flow characteristics. Assume the drainage is wholly contained in each of the regions and determine estimates for each region. Then compute the average by weighting each estimate with the proportion of drainage area contained in the corresponding hydrologic area.

Consider a stream with a drainage area of 30 mi^2 (78 km^2), of which 20 mi^2 (52 km^2) lie in region 1 and 10 mi^2 (26 km^2) in region 2. Economic considerations require that the structure be designed to withstand a flood with an average recurrence interval of 100 years (P_{100}).

A field visit to the site shows that the channel is very steep and braided. The banks are very unstable, thus the channel-geometry method is not applicable.

The mean basin elevation is determined to be 8,200 ft (2,500 m), which is used in the regression relations as 8.2 thousand feet. Assuming the drainage area to be wholly contained in region 1, figure 20 shows P_{100} = 824 ft^3/s (23.3 m^3/s). Assuming the drainage to be wholly contained in region 2, figure 22 shows P_{100} = 2,240 ft^3/s (63.3 m^3/s). The weighted average of P_{100} is determined as:

$$20/30\ (824) + 10/30\ (2{,}240) = 1{,}300\ ft^3/s\ (36.8\ m^3/s).$$

Similar solutions may be determined for streams in other areas of the State. If both methods of estimating flows are used, an inspection of the stream drainage may be necessary to explain why possible differences occur. Many conditions, which cannot be explained through the use of mathematical relations, may affect flow from a drainage. Some examples are: Loss of flow in sinkholes when stream crosses karst limestone outcrops, reduction of flows due to storage structures, and increase in flows due to release of production waters from industry or agriculture. An accurate estimate of flow characteristics requires that an observation of these conditions be made by a field inspection.

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Table 1.--Streamflow stations used in analyses.

Station name: (p) perennial stream; (i) intermittent stream; (e) ephemeral stream.

Station no.	Station name	Region	Records available (years)	Peak discharge for period of record: Date	Discharge (ft^3/s)	Unit discharge [$(ft^3/s)/mi^2$]
06037500	Madison River near West Yellowstone, Mont.(p)	1	1914-17, 1919-72	5-24-56	2,150	5.12
06187500	Tower Creek at Tower Falls, Yellowstone National Park (p)	1	1923-43	5-30-25	642	12.7
06188000	Lamar River near Tower Falls ranger station, YNP (p)	1	1922-69	5-25-28	13,600	20.6
06189000	Blacktail Deer Creek near Mammoth, YNP (p)	1	1938-45	6- 1-43	168	11.2
06191000	Gardner River near Mammoth, YNP (p)	1	1938-72	6- 4-56	2,080	10.3
06206500	Sunlight Creek near Painter (p)	1	1918, 1930-32, 1946-71	- -18	4,000	29.6
06207500	Clarks Fork Yellowstone River at Chance, Mont.(p)	1	1921-72	5-26-28	10,900	9.45
06218500	Wind River near Dubois (p)	1	1945-	6- 8-72	1,940	8.36
06218700	Wagon Gulch near Dubois	1	1961-72	6- 4-61	360	73.6
06221400	Dinwoody Creek above lakes, near Burris (p)	1	1918, 1956, 1958-	6-18-71	1,400	15.0
06221500	Dinwoody Creek near Burris	1	1909, 1918-30, 1950-1958	6-12-21	1,460	14.6
06222500	Dry Creek near Burris (p)	1	1921-40	6-12-21	1,400	26.3
06222700	Crow Creek near Tipperary (p)	1	1962-	6-16-65	568	18.9
06223500	Willow Creek near Crowheart (p)	1	1909, 1921-23, 1925-40	5-31-39	1,100	19.9
06224000	Bull Lake Creek above Bull Lake (p)	1	1941-53, 1967-	6-18-71	3,420	18.3
06226200	Little Dry Creek near Crowheart	3	1961-	8-29-71	731	69.6
06226300	Dry Creek near Crowheart	3	1959, 1961-	--------	700	7.15
06229000	North Fork Little Wind River at Fort Washakie (p)	3	1921-40	7-19-26	2,640	20.8

Table 1.--Streamflow stations used in analyses--continued

Station no.	Station name	Region	Records available (years)	Peak discharge for period of record: Date	Discharge (ft^3/s)	Unit discharge [$(ft^3/s)/mi^2$]
06229700	Norkok Meadows Creek near Fort Washakie	1	1965-	4-12-69	186	12.1
06229900	Trout Creek near Fort Washakie	1	1961-68, 1970-	5-29-71	260	16.1
06231600	Middle Popo Agie River below The Sinks, near Lander	1	1960-	6-16-63	4,180	47.8
06232000	North Popo Agie River near Milford (p)	1	1946-63	6-16-63	4,500	45.7
06233000	Little Popo Agie River near Lander (p)	1	1946-	6-16-63	2,010	16.1
06233360	Monument Draw at lower station, near Hudson	3	1965-73	9-10-73	387	46.2
06234700	South Fork Hall Creek near Lander	2	1960-	5-30-71	185	47.7
06235700	Haymaker Creek near Riverton	3	1961-64, 1966-	8-29-71	1,770	186
06236000	Kirby Draw near Riverton	3	1951-53, 1961-	6- 2-61	7,390	57.3
06238760	W. F. Dry Cheyenne Creek at upper station, near Riverton	2	1965-	6- 5-72	706	1,020
06238780	W. F. Dry Cheyenne Creek tributary near Riverton	2	1965-73	6- 5-72	1,260	681
06239000	Muskrat Creek near Shoshoni (e)	2,3	1923, 1951-53, 1955-58, 1960-	2-10-62	13,300	18.1
06255200	Dead Man Gulch near Moneta	3	1958-69	9-22-62	1,330	298
06255300	Poison Creek tributary near Shoshoni	3	1959-	8-31-63	165	423
06255500	Poison Creek near Shoshoni	3	1950-53, 1956, 1961-68	6- 5-67	2,950	5.90
06256000	Badwater Creek at Lybyer Ranch, near Lost Cabin	1 (i)	1949-67	6-20-67	708	5.40
06256550	E-K Creek tributary near Arminto	2	1960-68	4- -65	------	

Table 1.--Streamflow stations used in analyses--continued

Station no.	Station name	Region	Records available (years)	Peak discharge for period of record: Date	Discharge (ft^3/s)	Unit discharge [$(ft^3/s)/mi^2$]
06256600	Red Creek near Arminto	2	1963-	9-16-65	347	48.5
06256670	Badwater Creek tributary	3	1965-73	6- 8-68	1,460	249
06256700	South Bridger Creek near Lysite	2	1960-72	9-22-62	540	5.4
06257000	Badwater Creek at Bonneville (e)	1,2,3	1923, 1947-49, 1951-	7-24-23	18,600	23.0
06257500	Muddy Creek near Pavillion (i)	1	1949-53, 1955-	6- 5-49	2,300	8.61
06258400	Birdseye Creek near Shoshoni	3	1959-	9-21-63	568	43.0
06260000	South Fork Owl Creek near Anchor (p)	1	1932, 1940-43, 1959-	7-25-41	1,940	22.3
06262000	North Fork Owl Creek near Anchor (p)	1	1941-45, 1947-62	7-23-55	3,200	58.4
06265200	Sand Draw near Thermopolis	2	1960-	6- 9-60	2,490	393
06265600	Tie Down Gulch near Worland	2	1961-	8-31-63	328	184
06265800	Gooseberry Creek at Dickie (p)	1	1958-	6-15-63	1,130	11.9
06266320	Gillies Draw tributary	2	1965-73	5-31-67	103	79.2
06266460	Murphy Draw near Grass Creek	2	1965-	6-11-67	560	241
06267260	North Prong E. F. Nowater Creek near Worland	2	1964-	9-18-67	394	104
06267270	North Prong East Fork Nowater Creek tributary near Worland	2	1965-73	6- 6-67	158	75.2
06268500	Fifteen Mile Creek near Worland (e)	2	1951-72	5-22-52	3,300	637
06269700	Spring Creek near Ten Sleep	1	1961-	6-16-65	265	4.58
06270000	Nowood River near Ten Sleep (p)	1,2	1938-43, 1950-55	6-16-55	3,330	4.15
06270200	Leigh Creek near Ten Sleep	1	1962-	6-25-65	250	98.4
06270300	Canyon Creek tributary Ten Sleep	1	1961-	6-25-65	28	53.8

Table 1.--Streamflow stations used in analyses--continued

Station no.	Station name	Region	Records available (years)	Peak discharge for period of record: Date	Discharge (ft^3/s)	Unit discharge [(ft^3/s)/mi^2]
06271000	Tensleep Creek near Ten Sleep (p)	1	1911-12, 1915-24, 1944-72	6-15-24	2,890	11.7
06272500	Paintrock Creek near Hyattville (p)	1	1921-26, 1941-53	6-24-45	8,200	50
06273000	Medicine Lodge Creek near Hyattville (p)	1	1943-	6-24-45	1,160	13.4
06274200	Nowood River tributary No. 2 near Manderson	2	1961-70	8-10-62	329	207
06274250	Elk Creek near Basin	2	1959-	6- 6-67	4,260	44.0
06274500	Greybull River near Pitchfork (p)	1	1946-49, 1949-71	6-15-63	8,610	30.5
06275000	Wood River at Sunshine (p)	1	1946-	6-15-63	5,080	26.2
06276500	Greybull River at Meeteetse (p)	1	1921-	6-15-63	13,600	20.0
06277700	Twentyfour Mile Creek near Emblem	2	1960-	8-20-65	1,160	90.6
06277750	Dry Creek tributary near Emblem	2	1960-68, 1970-72	9- 1-73	43	66.1
06278300	Shell Creek above Shell Reservoir (p)	1	1957-	6-15-63	1,870	81.0
06278400	Granite Creek near Shell Creek ranger station, near Shell	1	1961-68, 1970-	6-10-68	415	37.4
06278500	Shell Creek near Shell (p)	1	1941-	6-24-45	3,020	20.8
06280300	South Fork Shoshone River near Valley (p)	1	1957-58, 1960-	6-15-63	6,610	22.3
06289000	Little Bighorn River at State line, near Wyola, Mont. (p)	1	1939-72	6- 3-44	2,730	14.1
06296500	North Tongue River near Dayton (p)	1	1946-57	5-21-48	560	17.3
06297000	South Tongue River near Dayton (p)	1	1946-72	6- 4-68	1,910	22.4
06298000	Tongue River near Dayton (p)	1	1919-29, 1940-	6- 3-44	3,400	16.7
06298500	Little Tongue River near Dayton (p)	1	1951-53, 1955-	6- 9-64	850	34.0
06299500	Wolf Creek at Wolf (p)	1	1944-	6-15-63	1,130	29.9

Table 1.--Streamflow stations used in analyses--continued

Station no.	Station name	Region	Records available (years)	Peak discharge for period of record: Date	Discharge (ft^3/s)	Unit discharge [(ft^3/s)/mi^2]
06300500	East Goose Creek near Big Horn (p)	1	1954-	6-15-63	1,230	60.6
06306900	Spring Creek near Decker, Mont.	3	1958-65	2-14-71	1,400	38.6
06306950	Leaf Rock Creek near Kirby, Mont.	3	1958, 1960-65	6- 7-58 6-15-63	222	36.8
06309200	Middle Fork Powder River near Barnum (p)	1	1962-	6-15-63	7,110	
06311000	North Fork Powder River near Hazelton (p)	1	1947-	6-15-53	886	35.4
06311500	North Fork Powder River near Mayoworth (p)	1	1941-	8-11-41	1,270	12.0
06312700	S. F. Powder River near Powder River	2	1961-	2-10-62	790	3.02
06312910	Dead Horse Creek tributary near Midwest	3	1965-73	6-20-69	3,020	2,000
06312920	Dead Horse Creek tributary No. 2 near Midwest	3	1965-	6- 4-72	1,470	1,100
06313000	South Fork Powder River near Kaycee (i)	2,3	1938-40, 1950-69	5-22-62	35,500	30.9
06313020	Bobcat Creek near Edgerton	3	1965-	9-11-73	1,070	129
06313050	East Teapot Creek near Edgerton	3	1965-	6-10-65	4,450	818
06313100	Coal Draw near Midwest	3	1961-	6-22-64	2,620	230
06313180	Dugout Creek tributary near Midwest	3	1965-	7-15-64	1,590	2,240
06313200	Hay Draw near Midwest	3	1958-70	7-15-67	900	562
06313700	Dead Horse Creek near Buffalo	3	1959-72	5-26-62	2,300	14.8
06313900	Caribou Creek near Buffalo	1	1961-66, 1968-	4-11-66	275	54.1
06314500	N. F. Crazy Woman Creek below Spring Draw, near Buffalo	1	1949-72	6- 9-68	1,290	25.0
06315500	Middle Fork Crazy Woman Creek near Grueb (p)	1	1942-72	5- 2-47	4,520	54.6
06316480	Headgate Draw at upper station, near Buffalo	3	1965-66, 1968-	6-15-65	5,490	1,650

Table 1.--Streamflow stations used in analyses--continued

Station no.	Station name	Region	Records available (years)	Peak discharge for period of record: Date	Discharge (ft^3/s)	Unit discharge [$(ft^3/s)/mi^2$]
06316700	Powder River tributary near Buffalo	3	1965-72	6-16-65	2,290	1,400
06317000	Powder River at Arvada(i)	1,2, 3	1919-	9-29-23	100,000	16.5
06317050	Spotted Horse Creek tributary near Spotted Horse	3	1961-	6-13-62	3,120	729
06318500	Clear Creek near Buffalo (p)	1	1894, 1896-99, 1917-27, 1938-	6-15-63	3,420	28.5
06321500	North Piney Creek near Story (p)	1	1952-	6-15-63	1,820	49.4
06324900	Little Powder River tributary No. 2 near Gillette	3	1959-	6-22-64	758	192
06325500	Little Powder River near Broadus, Mont. (p)	2	1947-53, 1957-	3-21-69	2,440	1.24
06332900	North Clear Creek near Alzada, Mont.	3	1951, 1956-70	5-21-62	1,100	1,620
06334000	Little Missouri River near Alzada, Mont. (i)	3	1912-25, 1929-32, 1935-69	4- 4-44	6,000	6.64
06334100	Wolf Creek near Hammond, Mont.	3	1955-70	8-22-65	1,170	129
06378640	Lance Creek tributary near Lance Creek	3	1965-	9- 3-68	1,060	883
06379600	Box Creek near Bill	3	1957, 1959, 1961-	5- 5-71	1,720	15.4
06382200	Pritchard Draw near Lance Creek	3	1964-	9- 3-68	4,050	794
06386000	Lance Creek at Spencer(e)	2,3	1948-54, 1957-	5-24-71	7,410	358
06386500	Cheyenne River near Spencer (e)	2,3	1949-	5-27-62	16,000	3.04
06388800	Blacktail Creek tributary near Newcastle	2	1961-	6-17-65	102	408
06394000	Beaver Creek near Newcastle (i)	2	1943, 1945-	6-16-62	11,900	9.02

Table 1.--Streamflow stations used in analyses--continued

Station no.	Station name	Region	Records available (years)	Peak discharge for period of record: Date	Discharge (ft³/s)	Unit discharge [(ft³/s)/mi²]
06426200	Donkey Creek tributary near Gillette	2	1960-	7-22-66	165	589
06426500	Belle Fourche River below Moorcroft (i)	2,3	1924, 1944-1970	4- 7-24	12,500	7.49
06427700	Inyan Kara Creek near Upton	4	1959-	7- 1-59	4,660	48.3
06429300	Ogden Creek near Sundance	4	1965-	5- 6-67	423	50.2
06430500	Redwater Creek at Wyoming-S.Dakota State line (p)	4	1929-31, 1936-37, 1955	6-16-62	2,440	4.97
06432230	Miller Creek near Whitewood, S. Dakota	4	1956-68	5-14-65	330	49.1
06620400	Douglas Creek above Keystone (p)	1	1956-65	6- 7-57	865	39.1
06621000	Douglas Creek near Foxpark (p)	1	1947-72	6- 7-57	1,630	136
06622500	French Creek near French (p)	1	1911-24	6-10-21	1,680	28.2
06622700	North Brush Creek near Saratoga (p)	1	1960-	5-13-60	8,060	215
06624500	Encampment River at Encampment (p)	1	1900, 1911-1920	5-29-00	4,680	22.2
06625000	Encampment River at mouth, near Encampment (p)	1	1940-	6- 1-43	4,510	17.0
06628900	Pass Creek near Elk Mountain (p)	1	1957-	6-13-57	1,180	9.3
06629100	Rattlesnake Creek near Walcott	1	1962-	6-10-65 4- 5-70	140	5.75
06629150	Coal Bank Draw tributary near Walcott	2	1962-	7- 8-68	787	216
06629200	Coal Bank Draw tributary No. 2 near Walcott	2	1962-	8-24-72	839	348
06629800	Coal Creek near Rawlins	2	1959-	9-21-63	436	59.4
06629850	Delaney Draw near Red Desert	2	1961-	6-10-65	1,260	38.4
06630200	Big Ditch tributary near Hanna	2	1959-	7-21-61	470	63.3
06630800	Bear Creek near Elk Mountain	1	1962-	4- 5-70	141	15.8

Table 1.--Streamflow stations used in analyses--continued

Station no.	Station name	Region	Records available (years)	Peak discharge for period of record: Date	Discharge (ft^3/s)	Unit discharge [$(ft^3/s)/mi^2$]
06631100	Wagonhound Creek near Elk Mountain	1	1962-	6- 8-68	350	12.9
06631150	Third Sand Creek near Medicine Bow	2	1965-	7- 8-68	910	84.2
06631260	Foote Creek tributary near Arlington	1	1962-65	5-11-66		
06632400	Rock Creek above King Canyon Canal, near Arlington (p)	1	1966	6-19-71	2,590	40.2
06632600	Threemile Creek near Arlington	1	1962-	8- 6-70	863	137
06634200	Sheep Creek near Marshall	1	1961-	7- 7-61	1,500	24.6
06634300	Sheep Creek near Medicine Bow	1,2	1961-	7- 7-61	1,900	10.9
06634910	Medicine Bow River tributary near Hanna	2	1965-	7-23-65	748	107
06634950	Willow Springs Draw tributary near Hanna	2	1965-	7-15-67	255	129
06637550	Sweetwater River near South Pass City (p)	1	1959-	6-10-65	1,150	6.50
06637750	Rock Creek above Rock Creek Reservoir (p)	1	1962-	6- 9-65	214	23
06638100	Sweetwater River at Sweetwater Station, near Lander	1,2	1965-	5- 9-65	1,700	1.54
06638300	West Fork Crooks Creek near Jeffrey City	1	1961-	3- -62	128	11.0
06641400	Bear Springs Creek near Alcova	2	1960-66, 1968-	10- 6-62	533	56.2
06642700	Lawn Creek near Alcova	2	1961-	7-20-61	1,030	89.6
06642730	Stinking Creek tributary near Alcova	2	1961-65	7-20-61	561	419
06642760	Stinking Creek near Alcova	2	1961-68, 1970-	8-12-63	2,750	23.5
06643300	Coal Creek near Goose Egg	2	1961-67, 1970	6-12-70	514	95.4
06644200	Clarks Gulch near Natrona	3	1961-69	7- 4-67	1,570	595
06644840	McKenzie Draw tributary near Casper	3	1965-	9- -73	970	480

Table 1.--Streamflow stations used in analyses--continued

Station no.	Station name	Region	Records available (years)	Peak discharge for period of record		
				Date	Discharge (ft^3/s)	Unit discharge [(ft^3/s)/mi^2]
06646500	Deer Creek at Glenrock(p)	1,4	1924, 1928-33, 1935-60	6-12-70	14,200	67.0
06646700	E. F. Dry Creek tributary near Glenrock	4	1961-	5-14-65	550	212
06647500	Box Elder Creek at Boxelder (p)	1	1946-51, 1962-67	5-14-65	4,530	71.7
06648720	Frank Draw tributary, near Orpha	3	1965-	8-19-66	342	433
06648780	Sage Creek tributary, near Orpha	3	1965-	7-25-65	229	166
06649000	La Prele Creek near Douglas (p)	1,4	1919-	6-12-70	17,300	128
06649900	North Platte River tributary near Douglas	3	1961-	5-22-61	1,400	164
06651800	Sand Creek near Orin	3	1955, 1961-	8- 7-55	20,700	745
06652400	Watson Draw near Lost Springs	3	1960-	5-28-61	2,100	302
06661000	Little Laramie River near Filmore (p)	1	1902-03, 1926, 1911-	6-10-65	3,450	22.1
06661580	Sevenmile Creek near Centennial	1	1962-	6-10-65	528	47.1
06664500	Sybille Creek above Bluegrass Creek, near Wheatland (p)	4	1941-50	7-24-63	4,300	19.1
06667500	North Laramie River near Wheatland (p)	4	1915-20, 1922, 1940-	7-27-51	9,260	25.0
06671000	Rawhide Creek near Lingle	2	1929-	9- 7-46	3,970	7.60
06754500	Middle Crow Creek near Hecla	4	1902-03, 1933-69	9- 8-33	495	19.2
06755000	South Crow Creek near Hecla (p)	4	1933-59, 1961-69	7-21-45	110	7.91
06761700	Muddy Creek tributary near Burns	3	1961, 1963, 1965-	9- 1-66	1,810	73.0
06761900	Lodgepole Creek tributary near Pine Bluffs	2	1960-	7- 6-60	86	195

Table 1.--Streamflow stations used in analyses--continued

Station no.	Station name	Region	Records available (years)	Peak discharge for period of record: Date	Discharge (ft^3/s)	Unit discharge [$(ft^3/s)/mi^2$]
06762600	Lodgepole Creek tributary	2	1960-	5-29-67	528	92.8
09188500	Green River at Warren Bridge, near Daniel (p)	1	1932-	6- 9-72	4,840	10.3
09189500	Horse Creek at Sherman ranger station (p)	1	1955-	6- 1-56	1,860	43.2
09196500	Pine Creek above Fremont Lake, near Pinedale (p)	1	1955-	6-16-59	2,550	33.6
09198500	Pole Creek below Little Half Moon Lake, near Pinedale (p)	1	1939-71	6-17-59	1,300	14.8
09199500	Fall Creek near Pinedale (p)	1	1939-71	6-15-53	707	19.0
09201000	New Fork River near Boulder (p)	1	1915-69	6-17-18	12,300	22.3
09203000	East Fork River near Big Sandy (p)	1	1939-	6-11-65	1,790	22.6
09204000	Silver Creek near Big Sandy (p)	1	1939-45, 1947, 1949-71	6- 9-69	2,130	46.9
09204500	East Fork at Newfork (p)	1	1905-06, 1915-18, 1920-24, 1931-32	6-19-17	2,940	8.45
09204700	Sands Springs Draw tributary near Boulder	2	1961-62, 1965-66, 1968-	7-20-73	82	15.9
09205000	New Fork River near Big Piney (p)	1	1955-	6-10-72	9,170	7.46
09205500	North Piney Creek near Mason (p)	1	1915-16, 1932-72	6-22-71	747	12.9
09206000	Middle Piney Creek below S. F., near Big Piney (p)	1	1940-54	6-29-43	254	7.40
09208000	La Barge Creek near La Barge Meadows ranger station (p)	1	1941-42, 1951-	6-16-72	196	31.1
09210500	Fontenelle Creek near Herschler Ranch, near Fontenelle (p)	1	1952-	6-13-65	821	5.40

Table 1.--Streamflow stations used in analyses--continued

Station no.	Station name	Region	Records available (years)	Peak discharge for period of record: Date	Discharge (ft^3/s)	Unit discharge [$(ft^3/s)/mi^2$]
09212500	Big Sandy River at Leckie Ranch, near Big Sandy (p)	1	1911, 1940-	6-10-65	2,030	21.6
09213500	Big Sandy River near Farson (p)	1	1915-17, 1921-24, 1927-34, 1953-	6- 9-72	1,480	4.60
09214000	Little Sandy Creek near Elkhorn (p)	1	1940-71	6-16-63	425	20.3
09215000	Pacific Creek near Farson (i)	2	1955-	3-27-71	972	1.94
09216550	Deadman Wash near Point of Rocks	2	1961-	8-13-63	1,240	8.16
09216560	Bitter Creek near Point of Rocks	2	1961-	3-27-62	1,650	2.17
09216600	Salt Wells Creek tributary near Rock Springs	2	1959-	--------	------	--------
09216700	Salt Wells Creek near Rock Springs	2	1959	2-11-62	3,750	7.28
09218500	Blacks Fork near Millburne (p)	1	1940-	6- 7-57	2,530	16.2
09220000	E. F. of Smith Fork near Robertson, Wyo. (p)	1	1940-	6-10-65	1,450	27.4
09220500	W. F. of Smith Fork near Robertson, Wyo. (p)	1	1940-	6-10-65	2,100	56.4
09221680	Mud Spring Hollow near Church Butte, near Lyman	2	1965-	6-11-65	367	41.6
09221700	Mud Spring Hollow near Lyman	2	1959-71	3-27-62	406	39.8
09223000	Hams Fork below Pole Creek near Frontier (p)	1	1953-	5-28-71	1,520	11.9
09224000	Hams Fork at Diamondville (p)	1	1919-32, 1946-49	5-11-23	3,250	8.42
09224600	Blacks Fork tributary near Granger	2	1959-	8- 3-66	390	77.5
09224820	Blacks Fork tributary No. 3 near Green River	2	1965-	7-23-70	170	41.8
09225200	Squaw Hollow near Burntfork	2	1965-	--------	83	

Table 1.--Streamflow stations used in analyses--continued

Station no.	Station name	Region	Records available (years)	Peak discharge for period of record: Date	Discharge (ft^3/s)	Unit discharge [$(ft^3/s)/mi^2$]
09225300	Green River tributary No. 2 near Burntfork	2	1959, 1961-	7-15-59	3,360	258
09226000	Henrys Fork near Lonetree (p)	1	1943-	6-10-65	2,010	35.9
09226500	M. F. Beaver Creek near Lonetree (p)	1	1949-67	6-11-65	775	27.7
09227500	W. F. Beaver Creek near Lonetree (p)	1	1949-62	6-13-53	417	18.1
09228500	Burnt Fork near Burntfork (p)	1	1944-	6-10-65	3,200	60.6
09229450	Henrys Fork tributary near Manila, Utah	2	1965-	8-19-68	588	187
09251800	N. F. Little Snake River near Encampment	1	1956-65	6-27-67	628	65.1
09251900	N. F. Little Snake River near Slater, Colo. (p)	1	1956-63	6- 7-57	628	21.4
09253400	Battle Creek near Encampment (p)	1	1956-63	5-29-58	670	52.3
09255500	Savery Creek at upper station near Savery (p)	1	1941-42, 1944, 1953-70	4-15-62	1,680	8.40
09256000	Savery Creek near Savery (p)	1	1942-	5- 4-52	2,670	8.09
09257000	Little Snake River near Dixon (p)	1	1917, 1920-23, 1938-	5-26-20	9,600	9.72
09258000	Willow Creek near Dixon(p)	1	1954-	5- 6-70	267	11.1
09258900	Muddy Creek above Baggs	2	1958-71	2-27-62	2,650	2.25
10011500	Bear River near Utah-Wyo State line (p)	1	1943-	6- 6-68	2,980	16.9
10012000	Mill Creek at Utah-Wyo State line (p)	1	1943-48, 1950-62	6- 7-57	690	11.7
10015700	Sulfur Creek above reservoir, near Evanston (p)	1	1958-	4-21-65	1,220	191
10019700	Whitney Canyon Creek near Evanston	1	1965-	4- -71	160	17.9
10032000	Smiths Fork near Border(p)	1	1942-	6-18-71	1,610	9.76
10040000	Thomas Fork near Geneva, Idaho (p)	1	1940-51	5- 1-65	776	17.1

Table 1.--Streamflow stations used in analyses--continued

Station no.	Station name	Region	Records available (years)	Peak discharge for period of record: Date	Discharge (ft³/s)	Unit discharge [(ft³/s)/mi²]
10040500	Salt Creek near Geneva, Idaho (p)	1	1940-51	5-18-50	382	10.1
10041000	Thomas Fork near Wyo-Idaho State line (p)	1	1950-	5-14-71	1,040	9.20
13011500	Pacific Creek near Moran (p)	1	1918, 1945-		3,470	21.7
13011800	Blackrock Creek tributary near Moran	1	1964-	6- 9-72	66	82.5
13012000	Buffalo Fork near Moran(p)	1	1918, 1945-60	6-27-54	5,960	15.8
13018300	Cache Creek near Jackson (p)	1	1963-	6-24-71	225	22.5
13019210	Rim Draw near Bondurant	1	1964-	5- -71	18	5.28
13019220	Sour Moose Creek near Bondurant	1	1964-	5- -69	25	35.7
13019400	Cliff Creek near Bondurant	1	1964-	6- 9-72	1,150	19.6
13019500	Hoback River near Jackson (p)	1	1918, 1945-58	6-16-18	6,160	10.9
13020000	Fall Creek near Jackson	1	1918, 1964-	5-30-71	580	12.4
13021000	Cabin Creek near Jackson	1	1918, 1964-	5-16-72	167	19.2
13022550	Red Creek near Alpine	1	1964-	6-12-70	44	11.3
13023000	Greys River above reservoir near Alpine (p)	1	1918, 1937-38, 1959-72	6-19-71	7,230	14.8
13023800	Fish Creek near Smoot	1	1965-	5-29-67	77	21.4
13025500	Crow Creek near Fairview (p)	1	1946-49, 1962-67	2- 1-63	346	3.01
13027000	Strawberry Creek near Bedford (p)	1	1932-43	6-27-43	396	18.6
13027200	Bear Canyon near Freedom	1	1961-	4-25-62	180	44.5
13030000	Indian Creek above reservoir, near Alpine, Idaho (p)	1	1918, 1954-61	6-14-18	350	9.51
13030500	Elk Creek above reservoir near Irwin, Idaho (p)	1	1918, 1954-61	6-15-18	870	14.7

Table 2.--Streamflow characteristics at gaging stations.

Station no.	Qa Mean annual flow (ft^3/s)	Number of non-zero events	Peak flows: Log-Pearson Type III calculations (ft^3/s) P_2	P_5	P_{10}	P_{25}	P_{50}	P_{100}	Logarithmic array of annual events: Mean	S.D.	Skew	C_v	P_{gm} (ft^3/s)
06037500	488	57	1,310	1,610	1,790	1,990	2,140	2,270	3.116	0.108	-0.12	0.03	1,310
06187500	47.2	21	325	470	560	660	724		2.493	.210	- .55	.08	311
06188000	829	47	8,510	10,500	11,600	12,800	13,600	14,400	3.922	.116	- .39	.03	8,360
06189000	7.25	8	49	77	107				1.756	.209	1.90	.12	57
06191000	220	33	1,230	1,550	1,750	1,980	2,150	2,310	3.087	.123	- .10	.04	1,220
06206500	126	30	1,100	1,480	1,830	2,440	3,020	3,730	3.084	.137	1.90	.04	1,210
06207500	944	50	7,620	9,060	9,850	10,720	11,300	11,800	3.877	.094	- .33	.02	7,530
06218500	177	28	1,220	1,540	1,740	1,990	2,170	2,340	3.085	.121	.02	.04	1,220
06218700		13	99	171	225				1.992	.283	- .09	.14	98
06221400	144	18	912	1,100	1,230	1,410			2.971	.090	.73	.03	935
06221500		23	990	1,210	1,350	1,520	1,640		3.001	.100	.19	.03	1,000
06222500	44.5	19	416	697	907	1,190	1,420		2.614	.270	- .11	.10	411
06222700	23.2	11	326	443	506				2.490	.183	- .76	.07	309
06223500	15.7	20	212	410	593	897	1,180		2.346	.325	.36	.14	222
06224000	308	20	2,350	2,790	3,010	3,230	3,360		3.360	.100	- .68	.03	2,290
06226200		13	64	260	489				1.727	.804	- .62	.47	53
06226300		14	298	540	714	939			2.449	.331	- .46	.14	281
06229000	115	20	1,100	1,710	2,120	2,650	3,030		3.027	.241	- .30	.08	1,060
06229700		9	35	90	156				1.581	.462	.84	.29	38
06229900		12	104	179	238				2.020	.278	.05	.14	105
06231600		14	1,320	2,170	2,830	3,760			3.124	.244	.09	.08	1,330
06232000	122	18	1,140	1,820	2,400	3,320	4,150		3.083	.223	.68	.07	1,210

06233000	80.3	28	642	1,060	1,340	1,680	1,930	2,170	2.786	.278	- .47	.10	611
06233360		8	56	231	425				1.641	.847	- .80	.52	44
06234700		13	54	100	140				1.747	.306	.28	.18	56
06235700		12	319	837	1,380				2.499	.502	- .05	.20	280
06236000		16	389	1,110	2,000	3,820			2.615	.524	.29	.20	412
06238760		9	51	204	433				1.726	.701	.18	.41	53
06238780		8	46	341	905				1.848	.924	- .08	.50	70
06239000	3.53	22	855	2,520	4,610	9,010	14,100		2.960	.537	.31	.18	912
06255200		12	327	708	1,040				2.498	.414	- .23	.17	315
06255300		15	32	70	109	174			1.725	.296	.85	.17	53
06255500		13	570	1,870	3,220				2.691	.678	- .57	.25	491
06256000	7.79	19	146	312	468	727	969		2.171	.387	.10	.18	148
06256550		9	28	66	105				1.476	.417	.36	.28	30
06256600		11	130	264	369				2.082	.398	- .47	.19	121
06256670		8	134	390	775				2.217	.502	1.07	.23	165
06256700		14	92	213	324				1.945	.451	- .25	.23	88
06257000	20.4	27	1,620	4,140	6,820	11,700	16,600	22,800	3.216	.480	.07	.15	1,640
06257500	4.81	23	402	1,988	1,530	2,380	3,140		2.579	.487	- .31	.19	379
06258400		14	263	505	638				2.416	.226	- .13	.09	260
06260000	35.3	20	446	780	1,090	1,620	2,130		2.681	.268	.72	.10	480
06262000	13.4	20	320	805	1,370	2,520	3,810		2.543	.449	.50	.18	349
06265200		13	347	769	1,260				2.633	.362	.92	.14	430
06265600		13	123	237	319				2.147	.305	- .30	.14	140
06265800	13.0	16	244	461	632	876			2.374	.341	- .23	.14	237
06266320		8	55	99	132				1.718	.325	- .37	.19	52
06266460		8	86	273	452				1.858	.674	- .71	.36	72
06267260		9	94	273	461				1.944	.578	- .30	.30	88
06267270		8	31	87	147				1.469	.556	- .21	.38	29
06268500	10.9	23	1,190	1,870	2,360	3,010	3,510		3.072	.237	- .11	.08	1,180
06269700		13	110	211	279				1.983	.401	- .80	.20	96
06270000	106	13	1,250	2,140	2,770				3.096	.295	- .57	.10	1,250
06270200		9	52	120	288				1.730	.420	.14	.24	54
06270300		13	20	24	27				1.271	.134	- .80	.11	19

Table 2.--Streamflow characteristics at gaging stations--continued

Station no.	Qa Mean annual flow (ft^3/s)	Number of non-zero events	Log-Pearson Type III calculations (ft^3/s) P_2	P_5	P_{10}	P_{25}	P_{50}	P_{100}	Logarithmic array of annual events Mean	S.D.	Skew	C_v	P_{gm} (ft^3/s)
06271000	146	41	1,640	2,170	2,510	2,930	3,230	3,520	3.212	0.148	-0.08	0.05	1,630
06272500	149	19	2,230	3,380	4,430	6,170	7,820		3.385	.195	1.10	.06	2,430
06273000	39.6	31	454	629	758	935	1,080	1,230	2.669	.160	.43	.06	467
06274200		11	68	170	253				1.760	.551	- .79	.31	58
06274250		15	1,080	2,140	3,130	4,780			3.052	.339	.31	.11	1,130
06274500	182	25	2,030	3,260	4,320	6,010	7,540	9,340	3.331	.229	.66	.07	2,140
06275000	118	28	1,210	1,990	2,560	3,320	3,910	4,520	3.078	.261	- .16	.08	1,200
06276500	347	53	3,550	5,940	7,760	10,300	12,400	14,600	3.549	.267	- .04	.08	3,540
06277700		13	98	369	739				1.988	.688	- .01	.35	97
06277750		13	82	149	206				1.926	.298	.21	.15	84
06278300	36.8	17	731	940	1,140	1,460			2.900	.119	2.00	.04	794
06278400		12	246	309	355				2.404	.110	.75	.05	254
06278500	119	33	1,360	1,790	2,120	2,580	2,950	3,360	3.149	.133	.74	.04	1,410
06280300	426	15	4,030	4,880	5,390	6,010			3.607	.101	.04	.03	4,050
06289000	150	33	1,000	1,420	1,730	2,150	2,480	2,850	3.011	.172	.34	.06	1,030
06296500	32.3	12	250	372	470				2.417	.192	.59	.08	261
06297000	78.8	27	890	1,190	1,380	1,610	1,780	1,950	2.945	.153	- .10	.05	881
06298000	187	44	1,680	2,230	2,550	2,910	3,150	3,380	3.214	.156	- .42	.05	1,640
06298500	12.9	22	124	239	341	502	648		2.093	.339	.22	.16	124
06299500	29.3	30	299	492	664	945	1,210	1,520	2.503	.238	.73	.10	318
06300500	32.6	20	491	699	875	1,150	1,400		2.719	.166	1.24	.06	524
06306900		15	134	456	829	1,500			2.160	.619	- .22	.29	145
06306950		14	66	200	322	498			1.731	.667	- .80	.39	54
06309200	34.3	11	650	1,320	2,310				2.926	.341	2.21	.12	843

06311000	14.3	26	315	451	555	704	828	965	2.513	.174	.52	.07	326
06311500	32.7	33	426	678	862	1,110	1,300	1,500	2.625	.244	-.10	.09	422
06312700		13	569	782	934				2.766	.156	.40	.06	583
06312910		8	388	1,130	2,170				2.657	.508	.81	.19	454
06312920		8	226	550	922				2.393	.431	.54	.18	247
06313000	36.2	23	2,630	8,150	14,900	28,600	43,800		3.430	.575	.10	.17	2,690
06313020		8	38	325	959				1.558	1.125	-.14	.80	36
06313050		8	408	1,480	3,060				2.653	.632	.40	.29	450
06313100		13	653	1,750	2,510				2.678	.673	1.30	.25	476
06313180		9	215	550	938				2.364	.461	.41	.20	231
06313200		13	300	634	920				2.461	.400	-.23	.16	289
06313700		13	822	1,560	2,040				2.860	.338	.35	.12	724
06313900		12	73	133	182				1.859	.313	-.03	.17	72
06314500		24	260	582	915	1,520	2,130	2,920	2.438	.399	.34	.16	274
06315500	22.3	31	277	614	1,020	1,870	2,890	4,390	2.506	.374	1.00	.15	321
06316480		8	301	1,720	3,920				2.411	.962	-.42	.40	258
06316700		9	174	900	2,070				2.221	.865	-.14	.39	166
06317000	274	54	7,260	14,500	22,000	35,600	50,000	68,800	3.900	.330	.72	.08	7,940
06317050		13	98	416	941				2.039	.711	.39	.35	109
06318500	62.5	52	673	1,070	1,380	1,830	2,210	2,630	2.838	.230	.27	.08	689
06321500	37.9	22	481	808	1,100	1,570	2,010		2.709	.250	.65	.09	512
06324900		15	162	333	478	693			2.198	.383	-.20	.17	158
06325500	39.6	23	1,090	1,650	2,010	2,440	2,750		3.019	.232	-.44	.08	1,040
06332900		18	269	655	963	1,370			2.362	.531	-.77	.22	230
06334000	77.2	53	1,940	3,300	4,230	5,390	6,230	7,040	3.262	.300	-.50	.09	1,830
06334100		18	324	607	825	1,120			2.492	.342	-.32	.14	310
06378640		9	53	274	612				1.680	.889	-.30	.53	49
06379600		15	153	677	1,460	3,260			2.254	.727	.40	.32	179
06382200		10	820	2,120	3,210				2.848	.557	-.71	.20	705
06386000	26.6	23	2,040	3,690	4,840	6,300	7,370		3.281	.334	.53	.07	1,910
06386500	59.8	25	3,290	6,780	9,810	14,900	19,300	24,500	3.518	.373	.02	.11	3,300
06388800		13	65	84	94				1.788	.160	-.88	.09	61

Table 2.--Streamflow characteristics at gaging stations--continued

Station no.	Qa Mean annual flow (ft^3/s)	Number of non-zero events	Peak flows: Log-Pearson Type III calculations (ft^3/s) P_2	P_5	P_{10}	P_{25}	P_{50}	P_{100}	Logarithmic array of annual events: Mean	S.D.	Skew	C_v	P_{gm} (ft^3/s)
06394000	32.7	29	1,020	2,030	3,190	5,580	8,370	12,400	3.075	0.320	1.26	0.10	1,190
06426200		14	38	68	102	165			1.660	.270	1.37	.16	45.7
06426500	21.0	28	898	2,040	3,050	4,600	5,950	7,440	2.934	.440	- .26	.15	859
06427700		14	215	616	1,220	2,830			2.427	.492	1.20	.20	267
06429300		9	25	92	182				1.405	.667	.01	.47	25.4
06430500	35.8	22	258	712	1,220	2,190	3,210		2.420	.517	.09	.21	263
06432230		12	133	157	310				1.859	.669	- .80	.36	72.3
06620400	33.0	10	544	697	804				2.745	.121	.47	.04	556
06621000	78.7	26	981	1,290	1,470	1,670	1,790	1,910	2.978	.156	- .52	.05	951
06622500	89.4	15	1,000	1,360	1,560	1,770			2.983	.175	- .65	.06	962
06622700	52.4	14	574	1,060	1,840	1,050			2.882	.319	2.84	.14	762
06624500	295	11	2,950	3,860	4,500				3.478	.133	.38	.04	3,010
06625000	236	34	2,150	2,880	3,370	4,000	4,460	4,940	3.336	.148	.06	.04	2,170
06628900	39.5	17	530	756	901	1,030			2.708	.199	- .37	.07	511
06629100		12	52	76	96				1.747	.175	.99	.10	55.8
06629150		12	121	338	590				2.095	.521	.16	.25	124
06629200		12	97	337	612				1.945	.682	- .37	.35	38.1
06629800		15	24	677	125	266			1.445	.489	.85	.34	27.9
06629850		13	88	242	439				1.997	.485	.64	.24	99.3
06630200		13	182	339	450				2.226	.356	- .60	.16	168
06630800		12	55	88	109				1.715	.270	- .61	.16	51.9
06631100		12	246	304	336				2.381	.120	- .53	.05	240
06631150		9	294	595	866				2.473	.361	.08	.15	297
06631260		9	9	14	19				.974	.222	.73	.23	9.42
06632400	80.9	8	1,730	2,430	2,820				3.211	.205	- .80	.06	1,630

06632600		12	86	167	281				2.042	.318	2.20	.16	110
06634200		13	759	1,170	1,270				2.877	.179	- .13	.06	753
06634300		13	657	1,140	1,490				2.798	.304	- .38	.11	628
06634910		9	57	262	550				1.713	.826	- .31	.48	52
06634950		9	94	188	256				1.919	.417	- .76	.22	83
06637550	65.4	15	586	863	1,030	1,230			2.749	.219	- .54	.08	561
06637750	9.21	12	127	166	187				2.085	.157	- .67	.08	122
06638100		9	1,130	1,430	1,600				3.049	.124	- .22	.04	1,120
06638300		13	79	111	149				1.784	.285	- .44	.16	61
06641400		13	131	304	436				2.048	.508	- .81	.25	112
06642700		13	106	277	517				2.150	.436	.12	.20	141
06642730		11	154	344	488				2.132	.472	- .73	.22	136
06642760		12	765	1,850	2,900				2.876	.462	- .10	.16	752
06643300		11	98	237	357				1.944	.503	- .55	.26	88
06644200		9	75	260	591				1.993	.581	1.30	.29	99
06644840		9	49	356	928				1.626	1.084	- .35	.66	42
06646500	56.8	44	797	1,760	2,980	5,730	10,000	14,600	2.978	.370	1.30	.12	951
06646700		13	39	106	205				1.683	.463	1.20	.28	48
06647500	40.5	13	507	1,060	1,780				2.796	.343	1.67	.12	625
06648720		9	62	233	410				1.687	.794	- .80	.47	49
06648780		9	22	94	181				1.262	.831	- .61	.66	18
06649000	40.4	56	570	1,300	2,060	3,450	4,850	6,660					
06649900		13	143	458	868				2.180	.581	.25	.27	151
06651800		14	599	1,980	4,370	11,700			2.893	.558	1.30	.19	782
06652400		13	40	128	311				1.779	.550	2.10	.31	60
06661000	103	56	1,130	1,610	1,910	2,260	2,520	2,760	3.042	.189	- .30	.06	1,100
06661580		12	71	159	277				1.938	.378	1.40	.20	87
06664500	28.8	28	396	1,090	1,820	3,110	4,370	5,910	2.587	.530	- .12	.20	386
06667500	38.8	39	670	1,820	3,070	5,380	7,730	10,700	2.828	.514	.02	.18	673
06671000		44	197	515	936	1,910	3,160	5,130	2.364	.454	.92	.19	231
06754500	4.27	39	53	114	172	269	361	472	1.736	.386	.14	.22	54
06755000	1.36	36	22	51	82	137	193	264	1.348	.433	.21	.32	22
06761700		10	25	276	704				2.125	.731	.01	.34	133

Table 2.--Streamflow characteristics at gaging stations--continued

Station no.	Qa Mean annual flow (ft^3/s)	Number of nonzero events	Log-Pearson Type III calculations (ft^3/s) P_2	P_5	P_{10}	P_{25}	P_{50}	P_{100}	Logarithmic array of annual events Mean	S.D.	Skew	C_v	P_{gm} (ft^3/s)
06761900		12	32	50	64				1.555	0.194	0.69	0.12	36
06762600		14	33	171	400	978			1.502	.865	-.08	.58	32
09188500	513	42	2,950	3,680	4,060	4,450	4,690	4,900	3.456	.129	-.67	.04	2,860
09189500	68.3	19	1,050	1,350	1,570	1,870			3.038	.118	.79	.04	1,090
09196500	180	19	1,680	2,000	2,210	2,470			3.232	.086	.38	.03	1,710
09198500	178	33	945	1,130	1,230	1,330	1,400	1,450	2.966	.104	-.58	.04	925
09199500	40.0	33	432	551	613	679	719	755	2.619	.142	-.68	.05	416
09201000	392	55	2,670	3,920	4,790	5,940	6,820	7,720	3.426	.199	-.01	.06	2,670
09203000	103	35	1,270	1,560	1,690	1,810	1,880	1,940	3.101	.108	-.80	.03	1,260
09204000	44.1	31	719	969	1,150	1,380	1,570	1,770	2.865	.148	.35	.05	733
09204500	171	13	2,170	2,850	3,200				3.316	.162	-.80	.05	2,070
09204700		10	29	52	67				1.440	.324	-.57	.22	28
09205000	724	19	5,280	6,970	7,940	9,010			3.710	.156	-.48	.04	5,130
09205500	57.1	43	401	535	606	680	726	766	2.582	.170	-.74	.07	382
09206000	28.2	15	144	202	235	271			2.137	.196	-.64	.09	137
09208000	14.2	22	134	169	190	215	233		2.134	.115	-.09	.05	136
09210500	70.8	22	474	644	743	854	927		2.661	.173	-.51	.07	458
09212500	86.0	35	888	1,210	1,400	1,630	1,780	1,920	2.943	.171	-.44	.06	877
09213500	86.5	36	830	1,140	1,320	1,520	1,650	1,770	2.901	.184	-.59	.06	796
09214000	21.2	32	201	260	295	335	363	388	2.297	.139	-.30	.06	198
09215000	4.99	19	273	557	765	1,030			2.390	.415	-.67	.17	245
09216550		13	365	680	962				2.577	.308	.33	.12	378
09216560		13	499	1,030	1,490				2.688	.385	-.16	.14	488
09216600		11	89	218	362				1.976	.444	.37	.22	95

09216700		15	1,310	2,420	3,180	4,120			3.076	.359	- .67	.12	1,190
09218500	160	34	1,430	1,810	2,050	2,350	2,560	2,770	3.158	.120	.07	.04	1,440
09220000	47.1	34	481	720	920	1,220	1,500	1,820	2.708	.190	.81	.07	511
09220500	21.5	34	414	680	909	1,270	1,600	2,000	2.641	.239	.60	.09	438
09221680		8	113	236	333				2.020	.411	- .46	.20	105
09221700		13	91	180	258	383			1.969	.342	.14	.17	93
09223000	99.6	21	853	1,070	1,190	1,320	1,410		2.923	.124	- .41	.04	838
09224000	163	18	1,450	2,280	2,770	3,310			3.125	.273	- .80	.09	1,330
09224600		15	131	266	390	593			2.130	.355	.18	.17	135
09224820		9	26	104	197				1.334	.797	- .58	.60	22
09225200		8	87	253	434				1.925	.563	- .15	.29	84
09225300		14	246	898	1,650	3,000			2.336	.722	- .46	.31	217
09226000	40.4	30	562	883	1,160	1,600	2,000	2,470	2.776	.216	.74	.08	597
09226500	22.8	19	317	489	606	753	863		2.491	.234	- .27	.09	310
09227500	16.2	14	163	252	320	420			2.226	.213	.34	.10	168
09228500	31.1	30	251	472	731	1,270	1,920	2,870	2.472	.295	1.53	.12	296
09229450		9	20	114	257				1.401	.843	- .28	.60	25
09251800		10	419	533	603				2.619	.127	- .15	.05	416
09251900	44.2	8	439	539	605				2.650	.100	.45	.04	447
09253400	102	8	305	439	555				2.515	.171	1.10	.07	327
09255500	43.6	23	460	837	1,140	1,590	1,970	2,380	2.661	.311	- .03	.12	458
09256000	104	30	1,190	1,690	1,950	2,220	2,370	2,510	3.043	.216	- .92	.07	1,100
09257000	514	41	4,610	6,110	7,050	8,190	9,000	9,790	3.660	.149	- .14	.04	4,570
09258000	9.19	18	129	197	241	295			2.097	.230	- .37	.11	125
09258900		14	666	1,340	1,880	2,630			2.801	.382	- .36	.14	632
10011500	192	30	1,840	2,330	2,630	2,980	3,230	3,470	3.263	.124	- .11	.04	1,830
10012000	32.0	19	389	544	644	766	856		2.585	.178	- .18	.07	385
10015700	15.6	15	323	487	648	933			2.557	.191	1.60	.07	361
10019700		9	45	85	116				1.640	.338	- .19	.21	43
10032000	197	32	946	1,210	1,360	1,530	1,630	1,730	2.964	.140	- .50	.05	920
10040000	16.1	16	203	420	588	816			2.272	.410	- .52	.18	187

Table 2.--Streamflow characteristics at gaging stations--concluded

Station no.	Streamflow characteristics: Qa Mean annual flow (ft^3/s)	Peak flows: Number of non-zero events	Log-Pearson Type III calculations (ft^3/s): P_2	P_5	P_{10}	P_{25}	P_{50}	P_{100}	Logarithmic array of annual events: Mean	S.D.	Skew	C_v	P_{gm} (ft^3/s)
10040500	19.0	12	169	294	377	476			2.194	0.320	-0.65	0.15	156
10041000	54.6	23	436	753	954	1,190	1,340		2.598	.326	- .76	.13	396
13011500	266	25	2,480	3,000	3,270	3,550	3,730	3,880	3.385	.108	- .58	.03	2,430
13011800		10	37	51	61				1.592	.154	.28	.10	39
13012000	597	17	4,150	4,870	5,340	5,910			3.622	.080	.35	.02	4,190
13018300	14.3	11	85	134	175				1.954	.219	.61	.11	90
13019210		10	14	16	17				1.163	.058	.28	.05	15
13019220		10	16	22	24				1.204	.147	- .36	.12	16
13019400		10	554	780	960				2.766	.161	.84	.06	583
13019500	706	15	3,900	5,030	5,730	6,580			3.590	.132	- .05	.04	3,890
13020000		11	363	452	513				2.564	.102	.68	.04	366
13021000		11	127	160	176				2.085	.138	- .80	.07	122
13022550		10	20	32	40				1.298	.239	- .03	.18	20
13023000	652	18	3,380	4,580	5,400	6,470			3.534	.153	.18	.04	3,420
13023800		9	38	75	101				1.524	.412	- .80	.27	33
13025500	60.4	10	230	294	330				2.349	.140	- .55	.06	223
13027000	62.4	12	267	324	359	401			2.428	.099	.05	.04	268
13027200		11	45	84	112				1.629	.343	- .44	.21	43
13030000	13.7	19	204	267	306	354			2.309	.139	- .07	.06	204
13030500	69.0	19	472	617	707	815			2.671	.141	- .13	.05	469

Table 3.--Channel-geometry features and characteristics of gaged drainage basins.

Station no.	Channel geometry			Physical and climatic characteristics											
	Main channel														
	W	D	D/W	A	S	L	St	E	F	P	$I_{24,2}$	Si	Lat	Ap	AGS
06037500	92	6.0	0.06	420	34.2	38.9	1.5	7.92	95	24.0	1.4	9.0	4.6	1.1	60
06187500				50.4	165	12.9	1.0	8.34	97	16.0	1.4	9.0	4.8	1.4	60
06188000	128	5.2	.04	660	17.2	42.6	1.0	7.40	79	24.0	1.4	9.0	4.9	1.3	60
06189000	8.5	2.5	.29	15.0	384	7.7	1.1	7.85	76	15.0	1.4	9.0	4.9	1.0	60
06191000	56	3.7	.07	202	176	14.9	1.2	7.94	80	19.0	1.4	9.0	4.9	1.1	60
06206500	53	5.0	.09	135	73.9	22.0	1.5	8.50	64	18.0	1.7	5.5	4.7	1.6	80
06207500	180	6.0	.03	1,154	76.3	75.6	1.5	7.43	61	17.0	1.7	5.5	4.9	2.0	95
06218500	54	4.0	.07	232	73.5	26.7	1.5	8.92	63	21.5	1.3	5.5	3.7	2.5	65
06218700	14	2.0	.14	4.89	134	40.0	1.0	7.60	1.0	12.0	1.0	3.7	3.6	3.0	70
06221400	74	3.0	.04	88.2	206	18.6	2.4	10.50	31	16.0	2.5	4.1	3.3	1.3	70
06221500				100	151	27.1	3.3	10.20	27	15.2	2.3	4.2	3.3	1.3	80
06222500				53.2	202	21.1	2.3	10.10	35	14.3	2.5	5.8	3.3	1.3	90
06222700	24	4.5	.19	30	123	13.0	1.0	9.95	48	11.0	1.5	6.0	3.7	3.0	85
06223500				55.4	277	17.3	1.0	8.72	47	12.4	2.4	5.1	3.2	1.4	110
06224000				187	226	25.2	2.8	10.30	27	19.0	2.4	5.4	3.1	1.6	70
06226200	11	2.5	.23	10.5	280	7.4	1.0	8.12	1.0	12.0	1.4	3.7	3.5	2.9	95
06226300	18	4.0	.22	97.9	248	17.6	1.0	7.67	12	10.0	1.3	4.0	3.5	2.9	110
06229000				127	163	32.1	4.2	9.62	32	17.5	2.3	5.4	3.0	1.7	90
06229700				15.4	183	9.3	1.0	5.92	1.0	11.0	1.6	3.7	3.1	1.7	130
06229900				16.1	416	10.4	1.0	8.13	48	16.0	2.4	4.6	2.5	1.4	110
06231600				87.5	299	15.2	2.5	9.92	68	18.0	2.5	4.9	2.7	1.7	75
06232000				98.4	220	21.3	2.3	9.89	61	19.4	2.5	5.8	2.8	1.6	75

Table 3.--Channel-geometry features and characteristics of gaged drainage basins--continued

Station no.	Channel geometry			Physical and climatic characteristics											
	Main channel														
	W	D	D/W	A	S	L	St	E	F	P	$I_{24,2}$	Si	Lat	Ap	AGS
06233000				125	234	23.4	2.3	8.02	44	14.2	1.9	4.9	2.6	1.6	90
06233360				8.38	59.1	8.0	2.0	5.56	1.0	9.5	1.4	3.7	2.8	2.2	140
06234700				3.88	299	3.4	1.0	6.37	2.0	10.0	1.3	3.5	2.6	1.2	135
06235700	22	4.5	0.20	9.52	91.9	4.9	1.0	5.32	1.0	8.0	1.1	3.7	3.1	2.3	145
06236000	43	.8	.02	129	34.3	26.4	2.0	5.33	1.0	9.0	1.2	3.7	3.0	1.1	145
06238760				.69	77.5	1.9	1.0	5.49	1.0	8.1	1.1	3.7	2.9	1.1	145
06238780				1.85	77.0	2.2	1.0	5.47	1.0	8.1	1.1	3.7	2.9	1.5	145
06239000				733	27.1	59.2	1.2	5.85	1.0	7.4	1.2	3.7	2.9	1.2	145
06255200	35	2.0	.06	4.46	80.4	4.2	1.0	5.62	1.0	7.0	1.0	3.7	3.2	2.7	140
06255300				.39	282	1.1	1.0	5.30	1.0	7.0	1.0	3.7	3.2	3.0	140
06255500				500	29.4	49.8	2.0	6.00	1.0	7.0	1.1	3.7	3.0	1.8	140
06256000				131	107	23.8	1.1	7.32	9.0	10.0	1.3	3.7	3.4	2.4	120
06256550				.14	169	.82	1.0	6.23	1.0	8.5	1.1	3.7	3.2	2.7	135
06256600				7.15	125	5.4	1.0	6.69	1.0	8.0	1.2	3.7	3.4	3.0	135
06256670				5.86	85.6	4.8	1.5	5.45	1.0	7.5	1.1	3.7	3.2	1.0	140
06256700				10.0	165	9.9	1.0	6.58	1.0	13.0	1.2	3.7	3.4	2.1	110
06257000	86	4.5	.05	808	41.3	61.1	1.1	6.20	7.0	9.4	1.1	3.7	3.4	2.2	130
06257500				267	74.5	45.5	1.2	6.86	6.0	11.0	1.3	3.7	3.5	2.6	120
06258400				13.2	202	9.4	1.0	5.95	1.0	9.0	1.2	3.7	3.4	3.0	130
06260000	37	4.5	.12	87	98.7	24.5	1.0	9.53	31	11.0	2.1	4.7	4.7	2.4	90
06262000	44	3.0	.07	54.8	231	12.8	1.0	8.84	46	10.8	1.9	5.2	3.8	2.7	95
06265200	20	5.0	.25	6.33	139	4.6	1.0	5.10	1.0	10.0	1.2	3.7	3.8	1.5	145
06265600				1.78	112	2.7	1.0	4.39	1.0	8.0	1.0	3.7	3.9	2.6	150
06265800	17	4.0	.24	95.0	94.2	25.5	1.0	7.10	39	13.1	1.6	4.6	4.0	1.4	120
06266320				1.30	204	1.4	1.0	5.61	1.0	7.6	1.4	3.7	4.1	2.9	140

06266460				2.32	129	3.1	1.0	5.34	1.0	7.5	1.3	3.7	4.3	2.7	145
06267260	9.0	3.0	.33	3.77	70.2	3.0	1.0	4.42	1.0	7.6	.8	3.7	4.4	3.0	155
06267270				2.11	71.2	3.5	2.0	4.52	1.0	7.6	.8	3.7	4.0	2.9	155
06268500	28	4.5	.16	518	23.6	56.6	1.2	4.94	1.0	7.2	1.2	3.2	4.2	2.2	155
06269700	10	3.0	.30	57.9	213	19.8	1.0	5.8	9.0	13	1.4	3.7	3.9	2.1	140
06270000	52	10	.19	803	38.1	49.0	1.1	6.05	2.0	12.0	1.3	3.2	3.7	1.0	140
06270200				2.54	241	2.3	1.0	9.51	56	16.0	1.7	6.7	4.2	2.3	130
06270300	2.0	1.3	.65	.52	530	1.4	1.0	9.60	29	20.0	2.0	3.7	4.2	2.9	80
06271000	50	4.0	.08	247	231	26.7	1.7	8.19	83	16.7	1.7	5.4	4.2	2.9	90
06272500	71	4.0	.06	164	262	22.9	2.3	9.12	37	16.2	1.8	5.3	4.3	2.4	90
06273000	30	5.0	.17	86.8	316	18.8	1.6	8.07	52	12.9	1.6	4.9	3.4	2.7	90
06274200	10	2.3	.23	1.59	133	2.9	1.0	4.18	1.0	6.0	.8	3.7	4.3	3.0	160
06274250				96.9	34.0	23.6	2.0	4.30	1.0	6.0	1.1	2.8	4.3	2.0	160
06274500	80	4.0	.05	282	107	31.5	1.1	9.74	25	24.0	2.2	5.0	4.0	1.1	80
06275000	50	4.0	.08	194	144	24.5	1.0	9.10	49	17.4	2.1	5.6	3.9	1.5	80
06276500				681	87.4	47.7	1.1	7.07	25	19.3	2.0	4.8	4.0	1.6	95
06277700	17	3.0	.18	12.8	77.5	10.3	1.0	5.25	1.0	6.0	1.2	3.7	4.4	1.2	155
06277750	6.0	2.7	.45	.65	182	2.6	1.0	4.92	1.0	6.0	1.1	3.7	4.4	1.0	160
06278300	32	4.2	.13	23.1	190	8.2	2.0	10.03	46	24.0	2.1	4.6	4.5	1.5	80
06278400	24	2.0	.08	11.1	325	7.0	2.0	8.95	37	24.0	2.0	6.7	4.6	2.4	80
06278500	60	6.0	.10	145	213	28.1	1.3	8.81	52	21.6	2.0	6.7	4.6	1.6	80
06280300	107	6.5	.06	297	90.1	33.6	1.1	9.25	60	34.2	1.9	4.8	4.0	1.1	65
06289000	49	2.2	.04	193	196	24.8	1.0	7.83	88	20.0	2.3	6.7	4.9	1.1	90
06296500	26	3.0	.12	32.4	128	9.2	1.0	9.27	52	23.0	2.4	6.7	4.7	2.1	80
06297000	47	4.0	.08	85.0	91.0	18.5	1.1	8.92	77	27.0	2.5	6.7	4.7	2.0	80
06298000	54	3.6	.07	204	159	31.2	1.0	8.33	64	25.5	2.4	6.7	4.7	1.3	90
06298500	16	.7	.04	25.1	543	8.6	1.0	7.56	80	20.0	2.3	6.7	4.8	1.3	110
06299500	30	4.0	.13	37.8	350	13.7	1.0	7.70	79	23.5	2.4	6.7	4.7	1.5	110
06300500	34	4.0	.12	20.3	200	8.0	1.5	9.56	52	27.0	2.5	6.7	4.5	1.1	80
06306900				36.3	15.8	12.7	1.0	4.16	1.0	15.0	1.5	3.7	5.1	2.4	150
06306950				6.04	125	3.8	1.0	4.23	1.0	15.0	1.5	3.7	5.2	2.4	150
06309200				46	133	10.0	1.0	8.00	15	15.0	1.6	3.7	3.5	1.3	90
06311000	25	2.5	.10	25.0	103	10.9	1.0	8.99	70	20.0	2.1	6.5	4.1	3.0	80
06311500	23	3.9	.17	106	143	26.9	1.0	7.99	39	16.6	1.9	5.2	4.0	2.8	90
06312700				262	32.2	29.1	2.0	6.31	2.0	8.0	1.2	3.6	3.0	1.6	145

Table 3.--Channel-geometry features and characteristics of gaged drainage basins--continued

Station no.	Channel geometry			Physical and climatic characteristics											
	Main channel														
	W	D	D/W	A	S	L	St	E	F	P	$I_{24,2}$	Si	Lat	Ap	AGS
06312910	11	4.5	0.41	1.53	69.1	3.28	1.0	5.39	1.0	11.0	1.1	1.9	3.3	1.3	130
06312920				1.34	74.0	2.25	1.0	5.39	1.0	11.0	1.1	1.9	3.3	1.4	150
06313000	92	3.0	.03	1,150	17.6	102	1.2	5.76	2.0	8.8	1.1	2.6	3.2	1.2	145
06313020				8.29	36	5.84	1.0	5.78	1.0	11.0	1.4	3.7	3.2	1.0	150
06313050	19	3.0	.16	5.44	89	2.7	1.0	5.70	1.0	11.0	1.2	3.7	3.2	1.2	150
06313100	43	5	.12	11.4	76.6	8.3	1.0	5.24	1.4	12.0	1.4	3.7	3.5	2.3	150
06313180				.71	95.0	1.4	1.0	5.04	1.0	11.0	1.1	1.9	3.4	1.3	150
06313200	13	2.0	.15	1.60	100	1.4	1.0	5.10	1.0	12.0	1.2	1.9	3.4	1.1	150
06313700	38	6.0	.16	155	38	24.6	2.0	4.60	1.0	13.0	1.5	3.7	4.2	1.6	150
06313900				5.08	270	5.2	1.0	8.40	95	16.0	2.4	6.7	4.2	1.9	110
06314500	24	2.5	.09	51.7	240	17.0	1.0	7.83	77	15.6	1.9	5.5	4.2	1.8	120
06315500	35	2.9	.08	82.7	269	13.9	1.0	8.01	64	15.6	1.9	5.6	4.1	2.4	110
06316480				3.32	96.7	3.66	1.0	4.14	1.0	12.0	1.2	3.7	4.5	2.8	150
06316700	20	4.5	.22	1.64	121	3.2	1.0	4.08	1.0	12.0	1.2	3.7	4.5	2.9	150
06317000	160	6.5	.04	6,050											130
06317050				4.28	175	3.2	1.0	4.20	1.0	12.0	1.5	3.7	4.7	1.1	150
06318500	62	6.0	.10	120	211	23.3	1.7	8.86	57	16.0	2.3	6.0	4.3	2.0	110
06321500	46	4.0	.09	36.8	262	13.8	1.0	7.92	88	22.5	2.4	6.7	4.5	1.2	120
06324900	21	1.5	.07	3.95	160	3.3	1.0	4.30	14	14.0	1.7	3.7	4.5	1.1	145
06325500	30	2.7	.09	1,974	8.00	129	1.1	3.93	8.0	15.0	1.7	3.3	4.8	1.0	145
06332900				.68	76.9	1.8	1.0	3.55	1.0	16.0	1.7	1.9	5.1	2.8	145
06334000	46	11	.24	904	9.27	86.2	1.1	3.91	9.0	16.0	1.8	3.2	4.8	1.3	145
06334100				9.09	30.8	5.2	1.7	3.71	1.0	16.0	1.8	1.9	5.2	2.8	145
06378640				1.2	165	1.9	1.0	4.30	1.0	12.0	1.4	3.7	3.2	2.2	145
06379600				112	36.6	20.3	1.0	5.10	1.0	12.0	1.7	3.7	3.0	1.7	150
06382200				5.1	92.4	3.7	1.0	4.40	1.0	12.0	1.4	3.7	3.2	1.0	140

06386000	85	3.7	.04	2,070	15.5	95	2.5	4.67	4.0	12.0	1.6	3.5	3.1	1.7	140
06386500	120	3.0	.02	5,270	11.4	140	2.5	4.71	3.0	13.0	1.6	3.5	3.4	2.0	140
06388800				.25	170	.6	1.0	4.24	1.0	14.0	1.6	1.9	3.8	2.4	150
06394000	24	5.0	.21	1,320	8.78	68.4	1.2	4.65	26	13.9	1.6	3.6	3.8	2.8	150
06426200				.28	100	.6	1.0	4.50	1.0	14.0	1.7	3.7	4.3	1.0	145
06426500	27	4.8	.18	1,670	8.68	78.0	1.3	4.81	3.0	14.0	1.7	3.7	4.0	1.3	145
06427700	15	2.6	.17	96.5	69.3	26.5	1.0	5.45	47.0	16.0	1.9	4.9	4.2	1.5	130
06429300				8.42	480	5.2	1.0	5.69	61	18.0	1.8	6.7	4.5	2.2	130
06430500	30	7.0	0.23	471	60.6	57.2	1.0	5.00	49	20.0	1.8	5.5	4.4	1.0	130
06432230				6.72	233	4.2	1.0	4.20	71	21.0	1.9	6.7	4.5	1.2	130
06620400				22.1	66.7	9.6	1.0	9.74	90	27.0	1.3	6.7	1.2	3.0	110
06621000	44	3.0	.07	120	77.2	22.2	1.0	9.19	91	26.6	1.3	6.7	1.3	3.0	90
06622500	43	3.0	.07	59.6	158	17.9	1.3	9.46	82	25.7	1.4	6.7	1.3	2.6	90
06622700	40	3.0	.08	37.4	190	11.6	1.5	9.48	92	24.0	1.4	6.7	1.4	2.2	90
06624500				211	100	29.9	1.0	8.95	82	17.1	1.5	6.1	1.0	1.0	100
06625000	85	4.2	.05	265	70.7	38.7	1.0	8.90	67	15.6	1.4	5.7	1.1	1.0	110
06628900	30	4.5	.15	91.5	84.8	19.3	1.0	8.56	47	14.2	1.3	4.6	1.5	1.2	90
06629100	11	3.2	.29	13.9	293	9.2	1.0	8.22	33	11.0	1.1	3.7	1.7	1.2	110
06629150	12	4.0	.33	3.65	205	2.8	1.0	7.10	1.0	10.0	.9	3.7	1.8	2.8	125
06629200	7	2.5	.36	2.41	241	2.5	1.0	7.14	1.0	10.0	.9	3.7	1.8	2.9	130
06629800	5.8	1.0	.17	7.34	127	9.2	1.0	7.40	1.0	10.0	1.2	3.7	1.7	1.0	130
06629850	11	3.4		32.8	44	13.4	1.0	7.04	1.0	7.0	1.0	2.7	1.6	1.6	120
06630200	15	4.0	.31	7.42	70	3.8	1.0	7.03	1.0	11.0	1.0	3.7	1.8	1.2	120
06630800	8.0	2.0	.25	8.93	120	4.7	2.0	7.80	4.0	12.0	1.2	3.7	1.6	2.1	100
06631100	20	3.0	.15	25.6	158	11.8	3.0	8.50	61	13.0	1.4	5.2	1.6	1.0	110
06631150	18	2.0	.11	10.8	70.8	6.6	1.0	7.20	1.0	11.0	1.0	3.7	1.8	2.0	110
06631260	3.4	1.0	.29	2.10	378	2.6	2.0	8.03	18	12.0	1.4	3.7	1.6	1.1	110
06632400	62	3.0	.05	64.5	136	16.8	2.3	9.68	87	13.9	1.6	6.4	1.5	1.0	115
06632600	13	2.8	.22	6.31	213	5.0	1.0	8.98	45	12.0	1.3	6.7	1.5	1.3	120
06634200	44	3.0	.07	61.0	87	14.6	2.0	8.00	27	13.0	1.5	5.2	2.4	3.0	120
06634300	46	4.0	.09	174	31	366	2.0	7.50	19	12.0	1.2	4.6	2.3	2.9	120
06634910	5.0	1.5	.30	3.01	181	3.79	1.0	6.80	1.0	11.0	.9	3.7	2.0	2.6	120
06634950	2.0	1.0	.50	1.98	165	2.39	1.0	6.93	1.0	11.0	1.0	3.7	2.0	2.0	120
06637550	33	5.0	.15	177	77.8	29	1.2	8.66	43	12.0	1.3	5.2	2.5	2.9	75

Table 3.--Channel-geometry features and characteristics of gaged drainage basins--continued

Station no.	Channel geometry			Physical and climatic characteristics											
	Main channel														
	W	D	D/W	A	S	L	St	E	F	P	$I_{24,2}$	Si	Lat	Ap	AGS
06637750				9.2	169	6.5	1.0	8.99	87	15.0	1.7	6.3	2.6	2.3	90
06638100				889											110
06638300	4.8	1.2	0.25	11.6	60.0	7.8	2.0	7.01	1.0	9.0	1.2	5.0	2.4	1.0	130
06641400	13.0	2.0	.15	9.48	194	7.7	2.0	6.43	1.0	10.0	1.0	5.0	2.5	1.6	140
06642700	26	4	.15	11.5	129	8.2	2.0	6.87	2.0	11.0	1.2	3.7	2.5	1.7	140
06642730				1.34	146	2.5	2.0	6.17	1.0	11.0	1.1	3.7	2.5	1.0	130
06642760	60	4.0	.07	117	56	19.0	2.0	6.80	1.0	10.0	1.2	3.7	2.5	1.0	130
06643300	17	4.0		5.39	206	7.2	2.0	5.91	18	12.0	1.1	3.7	2.5	2.0	120
06644200				2.64	132	2.1	1.0	6.15	1.0	9.0	1.1	1.9	2.9	1.4	150
06644840	8.0	1.5	.19	2.02	103	2.2	1.0	5.85	1.0	11.0	1.3	3.7	3.1	2.6	150
06646500	58			212	64.2	51.4	1.0	6.79	2.5	13.5	1.5	4.6	2.6	1.1	90
06646700				2.60	246	3.2	1.0	5.74	1.0	13.0	1.4	3.7	2.8	1.1	130
06647500				63.2	95.2	18.4	1.0	7.96	83	13.8	1.6	6.7	2.5	1.1	80
06648720				.79	127	2.01	1.0	5.42	1.0	12.0	1.5	3.7	3.0	2.5	150
06648780				1.38	100	2.92	1.0	5.42	1.0	12.0	1.5	3.7	3.0	1.8	150
06649000	28			135											
06649900	14	3.0	.21	8.53	120	6.6	5.0	5.24	1.0	13.0	1.4	3.7	1.0	1.8	125
06651800	46	2.0	.04	27.8	48.1	8.6	3.0	5.00	1.0	13.0	1.4	3.7	2.7	3.0	140
06652400	7.0	1.5	.21	6.95	86	4.7	1.0	5.20	1.0	13.0	1.7	3.7	2.8	2.9	150
06661000	58	4.0	.07	156	101	26.8	1.4	9.11	59	16.6	1.3	5.0	1.3	2.1	115
06661580	12	1.2	.10	11.2	249	10.3	2.0	8.79	46	12.0	1.5	5.5	1.4	1.8	125
06664500	38			225	63.1	36.5	1.2	6.7	1.0	15.3	1.5	3.7	1.7	1.4	100
06667500	38	2.3	.06	370	47.0	58.9	1.0	7.20	39	14.0	1.5	5.2	2.2	2.2	100
06671000	15	3.6	.24	522	25.6	4.7	1.5	4.70	4.0	12.0	1.8	3.7	2.4	2.9	145
06754500	10			25.8	53.6	24.6	1.2	8.14	28	15.0	1.8	6.4	1.2	2.3	100
06755000	7.3	1.5	.21	13.9	93.1	11.2	1.1	7.81	22	15.0	1.8	6.0	1.1	2.3	100
06761700				24.8	28	21.3	1.0	5.80	1.0	15.0	1.7	3.7	1.2	2.1	150

06761900				.44	55.8	1.2	1.0	5.30	1.0	16.0	1.8	3.7	1.3	2.1	150
06762600				5.69	26.5	6.6	1.0	5.33	1.0	16.0	1.8	3.7	1.3	2.3	150
09188500	110	7.0	.06	468	12.7	63.2	1.1	9.32	44	19.5	1.5	5.3	3.2	2.6	60
09189500	44	5.0	.11	43.0	66.7	15.0	1.0	8.88	53	21.5	1.6	6.7	3.0	2.2	60
09196500	67	4.7	.07	75.8	355	10.9	3.4	10.20	42	16.7	1.6	2.5	3.1	2.9	60
09198500	62	4.7	.08	87.5	197	17.6	5.7	10.00	59	14.6	1.6	3.9	3.0	2.8	60
09199500	34	4.5	.13	37.2	218	15.0	7.1	9.46	58	14.0	1.6	4.2	2.9	2.8	60
09201000	100	7	.07	552	37.6	53.5	5.1	8.64	35	13.6	1.3	4.8	3.0	3.0	60
09203000	56	5.0	.09	79.2	183	17.1	3.8	9.58	75	15.0	1.8	4.6	2.8	2.9	60
09204000	25	5.0	.20	45.4	235	14.0	3.4	9.75	79	13.0	1.5	5.6	2.8	2.4	60
09204500				348	62.4	53.1	2.2	8.38	63	11.8	1.4	4.3	2.7	2.2	70
09204700	8.0	.8	.10	2.77	50	2.7	1.0	7.30	1.0	8.0	1.1	3.7	2.6	1.5	75
09205000				1,230	15.3	79.2	3.9	8.37	47	12.5	1.2	4.6	2.9	3.0	75
09205500				58	78.3	18.6	1.2	8.92	61	18.5	1.7	5.5	2.7	2.2	60
09206000				34.3	123	9.7	1.8	9.23	62	18.5	1.7	6.1	1.6	1.9	60
09208000	14	3.0	.21	6.3	113	6.1	1.0	8.97	68	19.0	1.7	6.7	2.6	2.9	60
09210500	32	4.5	.14	152	60.2	28.8	1.0	8.16	35	13.1	1.5	3.1	2.2	2.9	65
09212500	49	3.0	.06	94	158	16.5	2.2	9.25	71	13.8	1.7	4.7	2.6	2.9	60
09213500				322	42.3	63.5	1.6	7.82	27	9.8	1.2	4.0	2.6	2.8	70
09214000	23	4.0	.17	20.9	150	14.8	3.6	9.82	51	14.0	1.9	4.6	2.6	2.9	65
09215000	15	1.6	.11	500	15.8	32.8	1.0	7.27	1.0	8.7	1.0	3.4	2.2	2.6	95
09216550	37	5.0	.14	152	36.7	23.7	1.0	7.00	1.0	7.0	1.0	2.8	1.7	2.6	120
09216560	25	7.5	.30	759	11.1	54.1	1.0	7.01	2.0	7.0	1.0	2.8	1.6	1.6	120
09216600	10	2.0	.20	7.88	123	6.6	1.0	6.92	14	8.0	1.0	2.8	1.5	2.9	120
09216700	48	3.0	.06	515	38.0	36.1	1.9	7.34	7.0	8.0	1.1	2.8	1.3	1.0	120
09218500	70	4.5	.06	156	76.0	24.7	1.8	10.27	62	30.4	1.5	5.5	.9	1.0	80
09220000	35	4.5	.13	53.0	109	20.0	3.2	10.25	71	28.4	1.5	6.0	.9	1.0	80
09220500	28	3.0	.11	37.2	156	11.2	1.8	9.79	90	25.2	1.4	5.5	1.0	1.0	80
09221680				8.83	66.5	8.1	1.0	6.80	1.0	9.5	.9	3.2	1.4	1.4	110
09221700	18	1.7	.09	10.2	67.0	8.1	1.0	6.77	1.0	9.0	.9	3.4	1.4	1.4	110
09223000	44	4.0	.09	128	62.5	22.4	1.0	8.38	70	13.9	1.4	6.1	2.2	3.0	65
09224000				386	22.6	60.8	1.1	7.91	33	12.5	1.3	4.6	2.1	3.0	80

Table 3.--Channel-geometry features and characteristics of gaged drainage basins--concluded

Station no.	Channel geometry			Physical and climatic characteristics											
	Main channel														
	W	D	D/W	A	S	L	St	E	F	P	$I_{24,2}$	Si	Lat	Ap	AGS
09224600	10	1.2	0.12	5.03	42.8	5.0	1.1	6.46	1.0	8.0	0.9	2.8	1.5	1.2	120
09224820				3.59	213	4.0	1.0	6.57	1.0	8.8	.9	3.7	1.4	2.0	130
09225200	15	1.3	.09	6.57	181	5.6	1.5	6.61	21	9.5	1.1	2.8	1.2	2.2	130
09225300	13	2.5	.19	13.0	103	8.0	2.0	6.54	3.0	11.0	1.0	3.1	1.1	2.3	130
09226000	40	4.0	.10	56	160	17.8	3.0	10.27	62	29.1	1.4	5.5	.9	1.1	80
09226500	24	3.0	.12	28	224	9.9	3.1	10.48	69	30.5	1.5	5.5	.9	1.1	80
09227500	19	2.5	.13	23	252	11.6	4.0	10.84	67	16.0	1.2	3.7	.9	1.2	80
09228500				52.8	209	11.1	2.2	10.30	70	29.3	1.6	6.0	.9	1.0	90
09229450				3.15	182	3.8	1.0	6.60	2.0	12.0	1.2	3.2	1.0	2.9	120
09251800	26	2.5	.10	9.64	342	5.5	1.0	9.47	84	32.0	1.6	6.7	1.1	2.4	90
09251900				29.3	192	10.8	1.0	9.01	91	35.0	1.5	6.7	1.0	2.6	90
09253400	26	2.5	.10	12.8	284	5.0	2.0	9.59	84	35.0	1.6	6.7	1.2	1.8	90
09255500	32	5.0	.16	200	50.2	21.8	1.2	7.79	21	14.5	1.3	4.4	1.3	2.7	110
09256000	54	5.0	.09	330	42.5	29.8	1.2	7.87	32	17.6	1.3	4.9	1.2	2.9	110
09257000				988	57.9	46.0	1.3	8.03	47	17.0	1.4	5.0	1.1	1.8	110
09258000				24	279	10.5	2.5	7.85	53	15.0	1.1	3.7	.8	1.4	110
09258900	34	6.0	.18	1,178	20.6	52	2.0	7.00	3.0	9.0	1.1	2.6	1.3	1.0	110
10011500	69	5.0	.07	176	98.0	19.6	6.0	9.77	62	31.7	1.6	6.0	.8	1.1	70
10012000	30	3.0	.10	59	170	13.7	4.0	9.32	73	24.0	1.5	6.7	.9	1.3	70
10015700	16	4.0	.25	64	92.8	11.5	3.0	8.20	39	14.0	1.2	4.8	1.1	1.0	80
10019700				8.93	148	6.2	1.0	7.30	16	10.0	1.0	4.3	1.4	2.1	90
10032000	47	9.0	.19	165	79.0	25.2	2.0	8.27	64	32.1	1.5	5.7	2.4	2.9	60
10040000				45.3	69.0	9.9	3.0	7.17	28	19.0	1.2	4.9	2.4	2.7	60
10040500				37.6	148	11.4	1.0	7.39	46	32.9	1.2	6.7	2.5	2.9	60
10041000	38	4.0	.11	113	127	11.8	2.0	7.29	40	29.0	1.2	5.9	2.4	2.5	60

13011500	85	5.0	.06	160	69.0	31.0	3.0	8.16	81	30.0	1.4	7.4	4.0	2.6	60
13011800	9.0	2.0	.22	.80	385	1.7	1.5	9.24	85	30.0	1.8	6.7	3.8	2.0	60
13012000	128	9.0	.07	378	58.0	45.0	1.0	8.85	61	31.5	1.5	6.7	3.9	2.1	60
13018300	12	2.0	.17	10	313	5.8	1.0	8.43	62	30.0	1.1	6.7	3.4	1.5	60
13019210	3.5	2.0	.57	3.41	198	4.7	2.0	8.20	72	18.0	1.3	6.7	3.2	3.0	60
13019220	3.0	2.0	.67	2.77	185	3.9	1.5	7.76	71	20.0	1.4	6.7	3.2	2.7	60
13019400	39	4.0	.10	58.6	190	14.0	1.5	8.20	83	24.0	1.6	6.7	3.2	1.1	60
13019500	100	7.0	.07	564	59.0	43.8	1.0	8.00	66	24.0	1.4	6.7	3.2	1.0	60
13020000	24	2.5	.10	46.8	91.0	13.0	1.0	7.50	61	28.0	1.4	6.7	3.4	2.4	60
13021000	12	1.7	.14	8.71	291	5.8	1.0	7.30	74	27.0	1.4	6.7	3.3	2.4	60
13022550				3.88	990	3.2	1.0	7.89	29	23.0	1.2	6.7	3.2	2.9	60
13023000	95	5.0	.05	488	46.0	55.2	1.0	8.08	76	24.0	1.5	6.7	2.8	1.0	60
13023800				3.6	200	3.0	1.0	7.60	91	18.0	1.2	6.7	2.5	1.1	60
13025500				115	76.0	20.9	1.0	7.42	36	18.0	1.2	5.5	2.6	1.1	60
13027000	20	2.5	.12	21.3	225	8.3	1.0	8.47	59	20.0	1.4	6.7	2.9	1.5	60
13027200				3.3	722	2.4	1.0	7.31	71	16.0	1.0	3.7	3.0	1.2	60
13030000	17	2.0	.12	36.8	336	9.8	1.0	7.79	66	20.0	1.2	6.3	3.4	2.1	60
13030500	26	3.0	.12	59.2	149	12.5	1.0	7.67	71	20.0	1.2	6.2	3.4	2.2	60

Table 4.--Measurements of peak discharges made by indirect measurements at miscellaneous sites.

Stream	Region	Drainage area (mi^2)	Peak discharge Date	(ft^3/s)	[(ft^3/s)/mi^2]
MISSOURI RIVER BASIN					
YELLOWSTONE RIVER BASIN					
Wind River					
Wiggins Fork					
Sand Coulee near Dubois	2	13	7-24-34	515	40.0
Popo Agie River					
Little Popo Agie River					
Devils Creek near Lander	2	4.9	6-10-65	425	87.0
Twin Creek near Lander	2	84	6- 7-69	2,360	280
Twin Creek near Lander	2	109	2-11-62	1,160	10.6
Kirby Draw east of Riverton	2	144	6- 2-61	7,290	51.0
Kirby Draw east of Riverton	2	89	2-11-62	2,200	25.0
Bighorn River					
Coal Draw					
tributary near Thermopolis	2	3.8	6-16-60	1,740	458
Cottonwood Creek					
Grass Creek					
tributary near Grass Creek	2	.25	7-21-70	201	804
tributary near Grass Creek	2	.94	7-21-70	602	640
Little Gooseberry Creek near Worland	2	30.2	8-23-68	1,980	65.6
Nowood River					
Sand Creek near Worland	2	24.4	9- -63	3,740	153
Dry Creek near Emblem	2	249	9-19-61	2,060	8.27
Shoshone River					
Whistle Creek near Emblem	2	70	9-19-61	4,260	61.0
Whistle Creek near Emblem	2	82.4	9-12-61	404	5.00
Whistle Creek near Lovell	2	102	9-19-61	7,910	77.5
Coon Creek near Emblem	2	47	9-19-61	2,360	50.2
Coon Creek near Lovell	2		9-19-61	2,000	
Powder River					
Salt Creek near Sussex	3		5-23-52	21,600	
Teapot Creek near Midwest	3	383	5-21-62	2,360	6.16
Bothwell Draw near Midwest	3		8- 2-53	5,820	
Crazy Woman Creek					
Buffalo Wallow near Buffalo	3	30.2	8-23-68	1,980	65.6

Table 4.--Measurements of peak discharges made by indirect measurements at miscellaneous sites--continued

Stream	Region	Drainage area (mi^2)	Peak discharge Date	(ft^3/s)	[(ft^3/s)/ mi^2]
MISSOURI RIVER BASIN--continued					
YELLOWSTONE RIVER BASIN--continued					
Powder River--continued					
Wild Horse Creek at Arvada	3	322	6-16-25	10,000	31.0
Deadman Creek near Arvada	3	12	6- -62	16,600	1,383
Clear Creek					
Rock Creek near Buffalo	1	109	6-15-63	1,410	12.9
Lone Tree Creek near Clearmont	3		6-25-42	6,800	
Little Powder River tributary near Gillette	2	.5	7-15-69	223	446
CHEYENNE RIVER BASIN					
Lance Creek					
Wyatte Creek					
tributary near Manville	2		6-27-52	181	
Old Woman Creek					
tributary	2		6-28-52	156	
tributary	2		6-28-52	1,140	
Beaver Creek					
Oil Creek					
Cambria Creek at Newcastle	4	16.2	6-15-62	1,020	63.0
Belle Fourche River					
Donkey Creek near Moorcroft	2	520	5-27-62	2,280	4.38
Rush Creek					
tributary near Moorcroft	2	.47	5-24-60	336	715
tributary near Moorcroft	2	.16	5-24-60	136	850
Wind Creek at Thornton	2	16.3	5- -62	531	32.6
West Fork Wind Creek					
Freda Creek nr Moorcroft	2	5.6	5- -62	232	41.4

Table 4.--Measurements of peak discharges made by indirect measurements at miscellaneous sites--continued

Stream	Region	Drainage area (mi^2)	Peak discharge Date	(ft^3/s)	[(ft^3/s)/mi^2]
MISSOURI RIVER BASIN--continued					
PLATTE RIVER BASIN					
North Platte River					
Medicine Bow River					
Rock Creek					
Threemile Creek near Arlington	4	8.30	8- 6-70	1,760	212
Little Medicine Bow River near Shirley Basin	2	160	5- 3-70	1,070	6.69
Sand Creek near Shirley Basin	2	3.11	5- 3-70	115	37.0
Sand Creek near Shirley Basin	2	56.7	5- 3-70	696	12.3
Blue Gulch near Alcova	2	5.7	6- 6-61	472	82.8
tributary near Casper	2	2.0	7- 6-61	1,140	570
Squaw Creek near Casper	3		7- 6-61	992	
Webb Draw near Casper	3	2.96	7- 6-61	8,040	2,716
Wolf Creek near Casper	3	3	7- 6-61	1,090	363
Casper Creek					
Middle Fork Casper Creek at Natrona	2	134	6-15-67	3,010	22.5
Muddy Creek near Glenrock	3	122	6-12-70	2,260	18.5
Box Elder Creek near Careyhurst	4	202	5-14-65	8,250	40.8
Box Elder Creek near Careyhurst	4	202	6-12-70	8,000	39.6
La Prele Creek					
Rabbit Creek near Douglas	4	8.65	6-12-70	1,330	154
Wagonhound Creek near La Bonte	4	112	6-12-70	7,140	63.7
La Bonte Creek near La Bonte	4	287	5-22-65	8,770	31.0
West Fork La Bonte Creek near Douglas	4	69.8	6-12-70	4,790	69.1
Sand Creek near Orin	3	27.8	8- 7-55	20,700	744
Shawnee Creek near Orin	3	110	8- 7-55	10,200	92.7
Shawnee Creek near Orin	3	110	- -59	865	7.86
Indian Creek near Orin	3	16.2	6-14-65	786	48.5

Table 4.--Measurements of peak discharges made by indirect measurements at miscellaneous sites--continued

Stream	Region	Drainage area (mi^2)	Peak discharge Date	(ft^3/s)	[(ft^3/s)/mi^2]
MISSOURI RIVER BASIN--continued					
PLATTE RIVER BASIN--continued					
North Platte River--continued					
Medicine Bow River--continued					
Elkhorn Creek near Glendo	3	27.2	6- 7-60	3,670	135
Elkhorn Creek near Glendo	3	35.3	6-14-65	12,600	357
North Elkhorn Cr nr Glendo	3	20.1	6- 7-60	9,940	495
North Elkhorn Cr nr Glendo	3	21.5	5-14-65	4,310	200
Elkhorn Creek near Glendo	3		5-30-35	3,690	
Whiskey Gulch at Glendo	3	9.53	6-14-65	16,100	1,690
tributary near Glendo	3		6-14-65	5,560	
Horseshoe Creek near Glendo	4	194	6- 7-60	680	3.50
Horseshoe Creek near Glendo	4	211	6-12-70	4,530	21.5
Spring Creek near Glendo	3	17.5	6-14-65	9,360	535
Bear Creek					
North Bear Creek tributary near Cassa	3	.44	7-19-70	482	1,095
Middle Bear Creek tributary near Cassa	3	.81	7-19-70	290	3.58
South Bear Creek nr Cassa	3	4.59	7-19-70	3,350	730
tributary near Cassa	3	4.59	7-19-70	3,350	730
Cottonwood Creek near Dwyer Junction	3	48.1	6-12-70	4,900	102
Whalen Canyon nr Guernsey	3	27.2	6-26-55	5,390	198
Whalen Canyon nr Guernsey	3	27.2	6- 9-65	3,150	116
County Line Draw nr Guernsey	3		6-26-55	2,820	
North Platte River over Whalen Dam			6-26-55	7,640	
Cottonwood Craw near Guernsey	3		6-26-67	21,600	
Molly Fork near Guernsey	3		6-26-55	14,000	

Table 4.--Measurements of peak discharges made by indirect measurements at miscellaneous sites--continued

Stream	Reg-ion	Drain-age area (mi^2)	Peak discharge Date	(ft^3/s)	$[(ft^3/s)/mi^2]$
MISSOURI RIVER BASIN--continued					
PLATTE RIVER BASIN--continued					
North Platte River--continued					
Laramie River					
Little Laramie River					
Dutton Creek					
Sleepage Creek					
Jimmie Creek near Arlington	4	0.57	8- 6-70	360	632
West Fork JM. Cr nr Arlington	4	.87	8- 6-70	250	287
West Fork Dutton Creek near Arlington	4		8- 6-70	306	
Laramie River near Wheatland			7- 8-69	13,400	
North Laramie R. nr Garrett	4	77.2	6-12-70	1,350	17.5
Fish Creek nr Wheatland	3	48.6	6-29-62	1,990	41.0
tributary at Dwyer Jct.	3	2.4	8-22-63	354	148
Rock Creek at Wheatland	3	10	5-29-38	2,060	206
Chugwater Creek					
Dry Creek nr Chugwater	2	5.5	6-25-55	2,660	484
Dry Creek nr Chugwater	3	5.0	- -65	7,550	1,510
Dry Creek nr Chugwater	3	5.0	7-14-66	1,400	280
tributary near Lingle	3		6-26-55	1,300	
Horse Creek					
Fourmile Draw nr La Grange	3	12.9	8-10-66	3,260	253
Bear Creek near La Grange	3	456	5-29-62	5,460	120
North Bear Creek near Chugwater	3	44.4	9- 1-66	790	17.8
tributary					
tributary nr Chuwater	3	2.4	7-14-66	1,190	496
tributary nr Chugwater	3	7.4	7-14-66	2,840	384
South Fork Bear Creek					
tributary nr Chugwater	3	1.0	7-14-66	408	408
tributary nr Chugwater	3	16.8	7-14-66	552	33.0
Badger Branch nr La Grange	2	8.7	5-29-62	6,550	753
tributary nr La Grange	2	.6	5-29-62	948	1,580
tributary near Hawk Springs	2	2.7	6-10-67	1,100	407

Table 4.--Measurements of peak discharges made by indirect measurements at miscellaneous sites--continued

Stream	Region	Drainage area (mi²)	Peak discharge Date	(ft³/s)	[(ft³/s)/mi²]
MISSOURI RIVER BASIN--continued					
PLATTE RIVER BASIN--continued					
North Platte River--continued					
South Platte River					
Crow Creek near Cheyenne	4	269	6- 2-29	8,200	30.5
Lodgepole Creek					
Muddy Creek					
N.F. Muddy Creek near Burns	3	25	9- 1-66	5,460	218
COLORADO RIVER BASIN					
GREEN RIVER BASIN					
Bitter Creek					
tributary near Rock Springs	2	8.6	7-31-59	2,290	2.66
Killpecker Creek near Rock Springs	2	326	8-13-63	1,520	4.7
Blacks Fork					
Smith Fork near Lyman	1		5-11-65	4,600	
Hams Fork					
tributary nr Diamondville	2	.55	6-15-59	114	207
Henrys Fork					
tributary near McKinnon	2	8.63	7-15-59	10,900	1,263
GREAT BASIN					
GREAT SALT LAKE BASIN					
Great Salt Lake					
Bear River Basin					
Bear River					
Yellow Creek nr Evanston	2	123	2-11-62	804	6.53

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