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REVISED TECHNIQUES FOR ESTIMATING MAGNITUDE AND FREQUENCY OF FLOODS IN MONTANA

By Charles Parrett and R. J. Omang

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JAMES G. WATT, Secretary
GEOLOGICAL SURVEY
Doyle G. Frederick, Acting Director

For more information write to:

District Chief
U.S. Geological Survey
428 Federal Building
301 South Park
Drawer 10076
Helena, MT 59626

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METRIC CONVERSION FACTORS

For those readers who may prefer to use the International System (SI) of metric units rather than inch-pound units, the conversion factors for the terms used in this report are listed below.

Multiply inch-pound unit	By	To obtain metric unit
cubic foot per second	0.02832	cubic meter per second
cubic foot per second per square mile	0.01093	cubic meter per second per square kilometer
foot	0.3048	meter
inch	25.40	millimeter
mile	1.609	kilometer
square mile	2.590	square kilometer

Temperature in degrees Fahrenheit (°F) can be converted to degrees Celsius (°C) by the equation:

$$°C = 0.556\ (°F - 32)$$

National Geodetic Vertical Datum of 1929 (NGVD of 1929): A geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called "mean sea level." NGVD of 1929 is referred to as sea level in this report.

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ABSTRACT

Relations for estimating the flood magnitudes for ungaged sites in Montana have been updated. The State was divided into eight regions and separate multiple-regression equations for each region were developed that relate logarithms of annual flood magnitude to logarithms of basin characteristics for exceedance probabilities of 50, 20, 10, 4, 2, and 1 percent. The standard errors of estimate for an exceedance probability of 1 percent ranged from 39 to 58 percent in the western and central parts of the State and from 47 to 83 percent in the eastern part. The standard errors of estimate indicate a substantial improvement over previous studies. Techniques for transferring annual flood-frequency information at gaged sites to ungaged sites on the same stream have been updated. Included are curves relating flood-frequency information to drainage area for eight major streams in the State. Maximum known flood peaks in Montana are compared with estimated 1-percent-chance flood peaks and with national maximum known flood peaks.

Values of flood discharges for selected exceedance probabilities and values of significant basin characteristics for all gaging stations used in the analysis are tabulated. Included are data for 339 stations in Montana and 34 nearby stations in Canada and adjoining States.

INTRODUCTION

Reliable estimates of flood magnitude and frequency are essential for the economic design of hydraulic structures such as levees, bridges, and culverts. In addition, the recent increased emphasis on flood-plain land-use management and flood insurance has expanded the need for updated flood-frequency information. Although several previous studies (Berwick, 1958; Bodhaine and Thomas, 1964; Patterson, 1966; Boner and Omang, 1967; Boner and Buswell, 1970; Dodge, 1972; and Johnson and Omang, 1976) have provided techniques for estimating flood magnitude and frequency, streamflow-gaging records for small streams generally were not available.

The purpose of this report is to present updated techniques for estimating flood magnitude for exceedance probabilities of 50, 20, 10, 4, 2, and 1 percent for unregulated streams in Montana. The relations presented herein provide more reliable predictions than those in previous studies because of more extensive streamflow-gaging records and improved analytical procedures.

The report is based on gaging data from unregulated streams having at least 10 years of streamflow record. Included in the analysis are 339 streamflow-gaging

sites in Montana, 8 in Canada, 14 in North Dakota, 4 in South Dakota, and 8 in Wyoming. Locations and station numbers of all gages used in the analysis are shown in figure 1. Some streamflow-gaging sites having more than 10 years record were excluded from the analysis because the data were considered to be unreliable or unrepresentative of the region.

This report was prepared in cooperation with the Montana Department of Highways; the U.S. Department of Transportation, Federal Highway Administration; the U.S. Department of Agriculture, Forest Service; and the U.S. Department of the Interior, Bureau of Land Management.

GENERAL DESCRIPTION OF THE AREA

Montana, the fourth largest State, has widely varying geographic and climatic conditions. The western one-half is generally mountainous and forested with large intermontane valleys. The eastern one-half is generally flat or rolling prairie land with deeply incised larger streams.

The Rocky Mountains generally trend northward through the western one-third of the State, forming the Continental Divide. The northern parts of the divide are particularly steep and rugged. Smaller mountain ranges east and west of the divide are also prominent geographic features, and, in some instances, are as steep and rugged as the mountains along the divide.

The climate of the State is affected largely by the topography. Thus, in the western mountains, annual precipitation is significant and occurs mostly as snow. Most precipitation in western Montana originates in the Pacific Ocean. Peak runoff from mountain streams can result from either spring snowmelt or spring snowmelt mixed with rain. Along the east slope of the Continental Divide, severe flooding has resulted from rains produced from humid air masses originating in the Gulf of Mexico. Mountains along the west slope of the divide are generally protected from storms moving northward along the east slope. However, intense rainstorms sometimes cross the divide and cause severe flooding along the west slope (Boner and Stermitz, 1967, p. B16-B44).

In the eastern plains region, precipitation is more variable, more intense, and generally less, on an annual basis, than in the mountains. Runoff from the plains streams is also more variable than in the mountains and results from either snowmelt or rainfall. In some areas of the eastern plains, extreme flood peaks commonly are caused by intense summer thunderstorms. Although the entire eastern one-half of the State is probably susceptible to intense thunderstorms, the streamflow-gaging-station records collected thus far indicate that severe floods caused by thunderstorms occur in an area bounded approximately by the Missouri River on the north and the Yellowstone River on the south.

Because of the diverse topography and climate, the State was divided into eight regions for the flood-frequency analysis. The boundaries of the regions conform generally to the different physiographic areas described above and are illustrated in figure 1.

The West Region (fig. 1) includes the mountainous area west of the Continental Divide where annual precipitation is significant and runoff generally results from snowmelt. The Northwest Region includes the northern part of the Continental

Divide where severe floods are produced by intense rainfall from air masses originating in the Gulf of Mexico. The Southwest Region is also a mountainous region, but precipitation is generally less than in the West Region, and unit flood discharges, in cubic foot per second per square mile, are consequently smaller.

The Upper Yellowstone-Central Mountain Region is a mountainous, generally forested area similar to the West Region. Precipitation in this region also is significant, but generally more variable than in the West Region. Storms in the Upper Yellowstone-Central Mountain Region may originate from the north or south as well as from the west.

The Northwest-Foothills Region is an area of mostly rolling plains just east of the mountains of the Northwest Region. Unit flood discharges in this region tend to be larger than in similar plains areas farther east, apparently because the area is partly affected by intense rainfall that causes large floods in the Northwest Region.

The Northeast Plains Region is predominantly flat, plains land north of the Missouri River. Runoff is variable with most smaller streams flowing only intermittently. Floods are produced by snowmelt and rainfall.

The East-Central Plains Region is also predominantly flat plains but is the area most affected by intense summer thunderstorms. Thus, flood discharges tend to be even more variable than in the Northeast Plains Region, with annual unit flood discharges ranging from zero or near-zero to several hundred cubic feet per second per square mile of drainage area.

The Southeast Plains Region is similar in topography to both the Northeast Plains Region and the East-Central Plains Region. Flood peaks from intense thunderstorms are not as prevalent in the Southeast Plains Region as in the East-Central Plains Region. Annual precipitation is generally more variable and somewhat greater in the Southeast Plains Region than in the Northeast Plains. Unit flood discharges in the Southeast Plains Region thus tend to be higher and more variable than in the Northeast Plains, but not as variable or as high as in the East-Central Plains Region.

FLOOD-FREQUENCY ANALYSIS

In describing flood frequency in this report, the term "exceedance probability" is used rather than the term "recurrence interval." Both terms are used, however, in illustrative examples. Exceedance probability is the percentage chance that a flood will exceed a given magnitude in any 1 year. Recurrence interval is the reciprocal of the exceedance probability times 100 and is the average time interval, in years, between occurrences of a flood of equal or greater magnitude. For example, a 1-percent-chance flood has an exceedance probability of 1 percent and a recurrence interval of 100 years.

Flood magnitudes for selected exceedance probabilities were determined at each streamflow-gaging site by using a log-Pearson type III probability distribution to develop a flood-frequency curve. Techniques recommended by the U.S. Water Resources Council (1977) were used to fit the log-Pearson type III distribution to the annual peak discharges at each site. Historic adjustments to the recorded station data were used where applicable, and skew coefficients were taken from a regional map

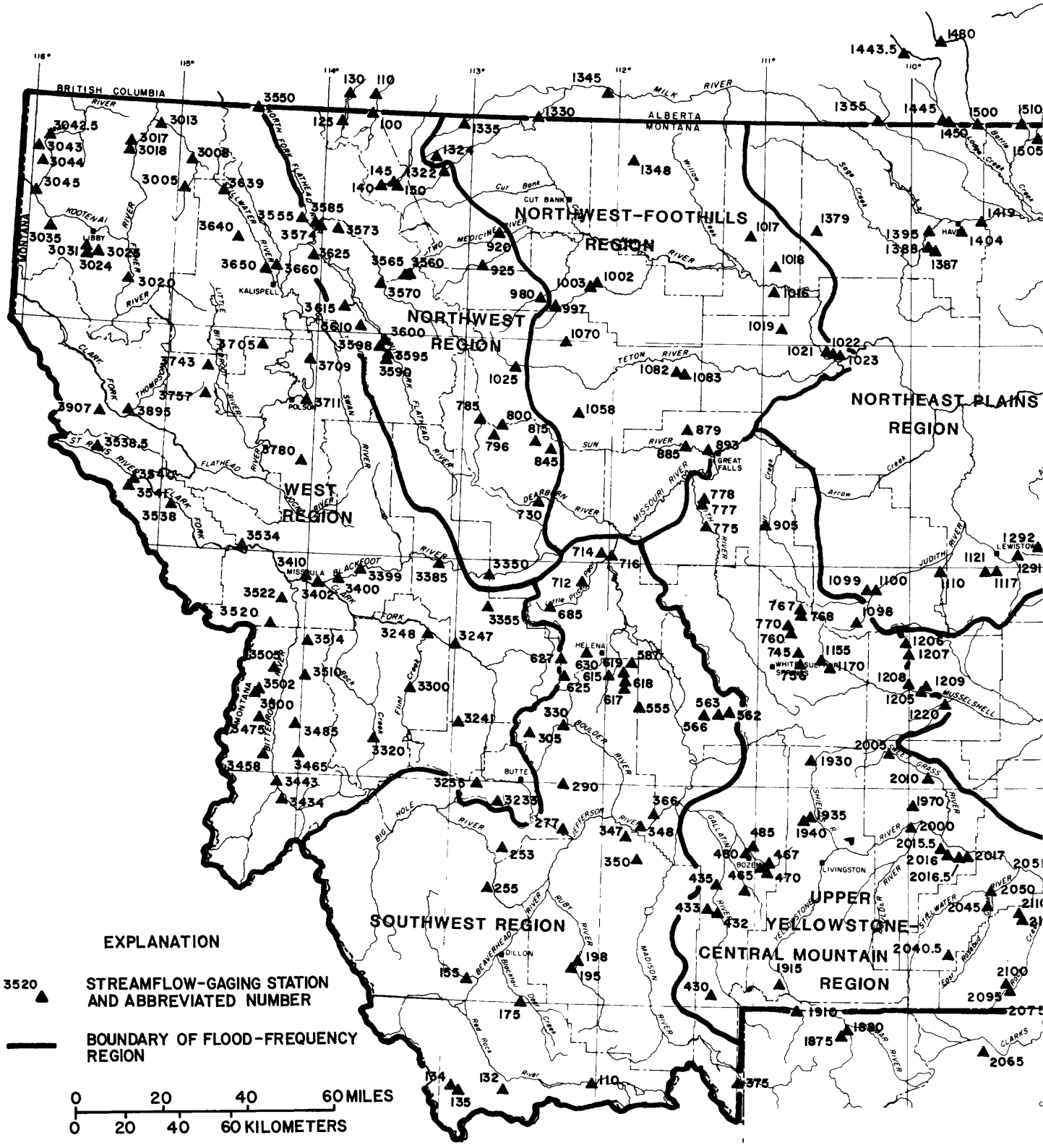
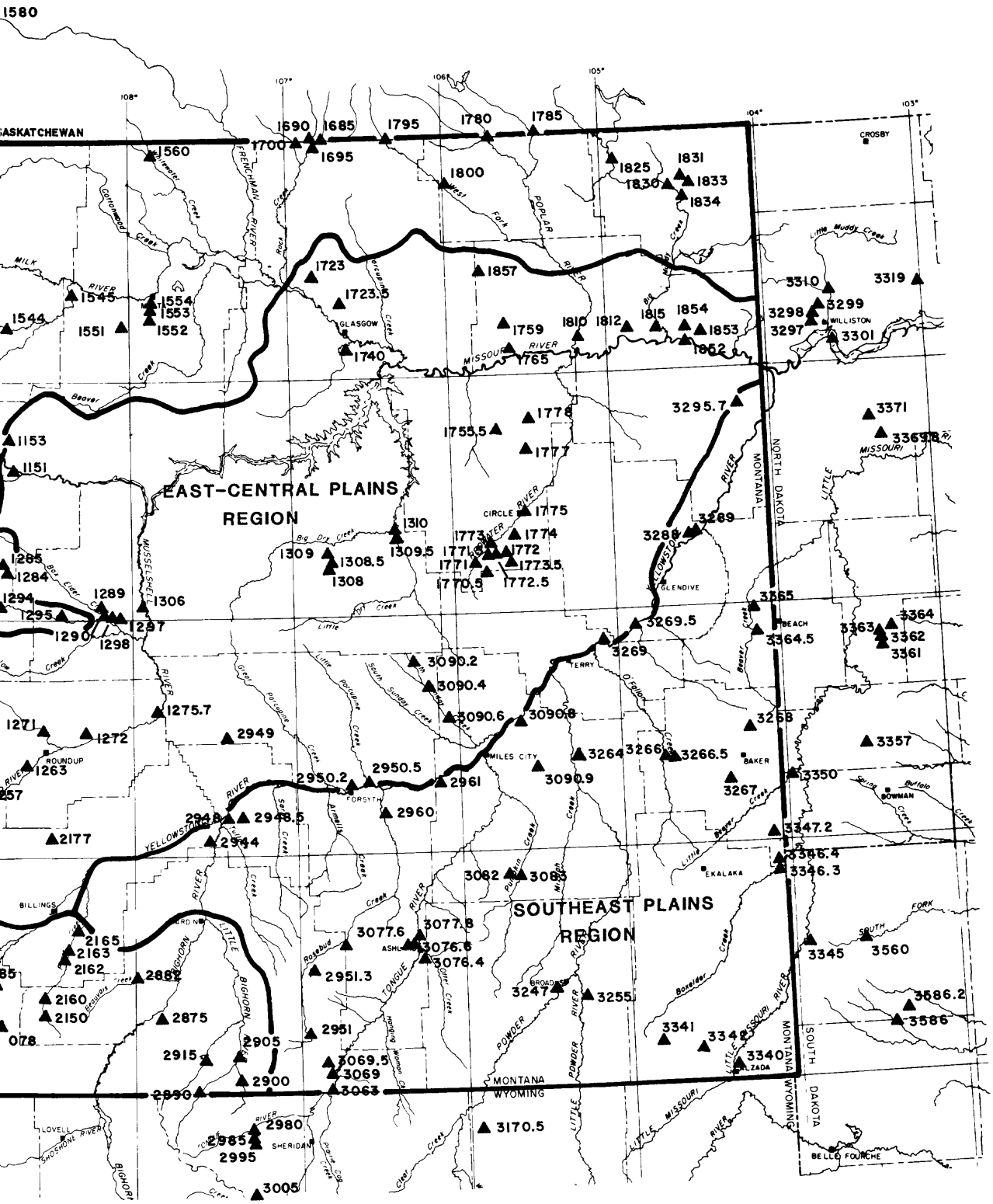


Figure 1.--Locations of selected streamflow-gaging stations



and boundaries of flood-frequency regions.

developed for this report. Flood-frequency data thus derived for each station used in the analysis are listed in table 1.

Although flood estimates are sometimes required for exceedance probabilities less than 1 percent, the reliability of such estimates is poor. Consequently, flood magnitudes greater than the 1-percent-chance flood were not used in the analysis.

Mixed-population analysis

In the Northwest Region, frequency-curve determination was complicated by a few extreme floods caused by rain within a population of smaller floods caused by snowmelt or snowmelt mixed with rain. Because the rain-caused floods are significantly larger than the more prevalent snowmelt-type floods, the log-Pearson type III distribution did not fit the data well when all floods were considered together. Accordingly, the peak discharges at each site in the region were separated by cause -- those caused by intense rains and those caused by snowmelt or snowmelt mixed with rain. Frequency curves were then fitted to each set of peak discharges, and the separate frequency curves were combined using procedures developed by the U.S. Army Corps of Engineers (1958). Fitting a frequency curve to the rain-caused flood peaks was complicated by the paucity of events. Rainfall-frequency curves were prepared for all long-term rain gages in the area and were used as a guide in assigning reasonable probabilities of occurrence to the few rain-caused flood peaks. Flood reports documenting the severity and rarity of the large rain-caused floods were also used to help assign probabilities of occurrence to rain-caused peaks (Boner and Stermitz, 1967; U.S. Army Corps of Engineers, 1969 and 1973). A sample frequency curve determined by this method is shown in figure 2.

Peak-flow records in the East-Central Plains Region also were examined to determine if thunderstorm-caused floods should be separated from snowmelt-caused floods. In this instance, the two types of flood peaks were not clearly distinct nor sufficiently independent, and separation was not warranted.

Regional skew

As recommended by the U.S. Water Resources Council (1977), generalized skew coefficients were used in the log-Pearson type III curve-fitting procedure. Because of the mixed-population frequency analysis made in the Northwest Region, generalized skew coefficients developed by the Water Resources Council were not applicable in that area. In addition, two large floods that occurred (1975 and 1978) after the completion of the Water Resources Council generalized skew map resulted in significantly larger station skew coefficients in the central and south-central parts of the State (Southwest and Upper Yellowstone-Central Mountain Regions). For example, 22 streamflow-gaging sites in the affected area have 35 or more years of record. Of these, 11 show a significant increase (0.10 or greater) in station skew coefficient when the additional record since the completion of the Water Resources Council skew map is considered. Only one site shows a significant decrease (0.10 or greater) in station skew as a result of the additional record, and 10 sites show no significant change in station skew. Consequently, a new generalized skew map for Montana was prepared (fig. 3). Skew coefficients for areas other than the Northwest, Southwest, and Upper Yellowstone-Central Mountain Regions are the same as shown on the U.S. Water Resources Council map.

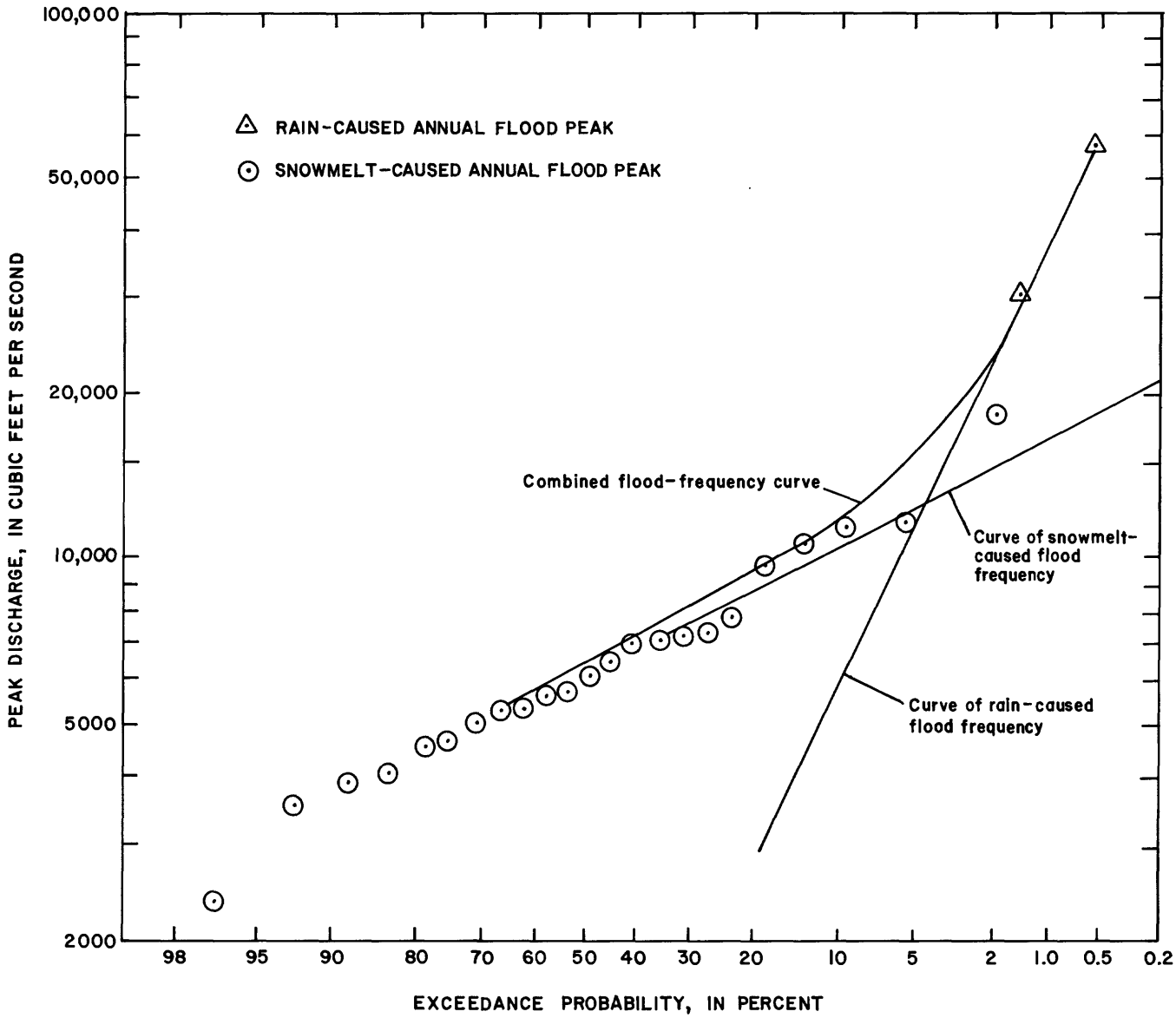


Figure 2.--Flood-frequency curve for Sun River near Augusta, Mont. (station 06080000).

REGIONAL FLOOD-FREQUENCY RELATIONS

Flood-frequency characteristics developed for streamflow-gaging stations were related to drainage-basin characteristics using multiple-regression techniques to define regional flood-frequency relations.

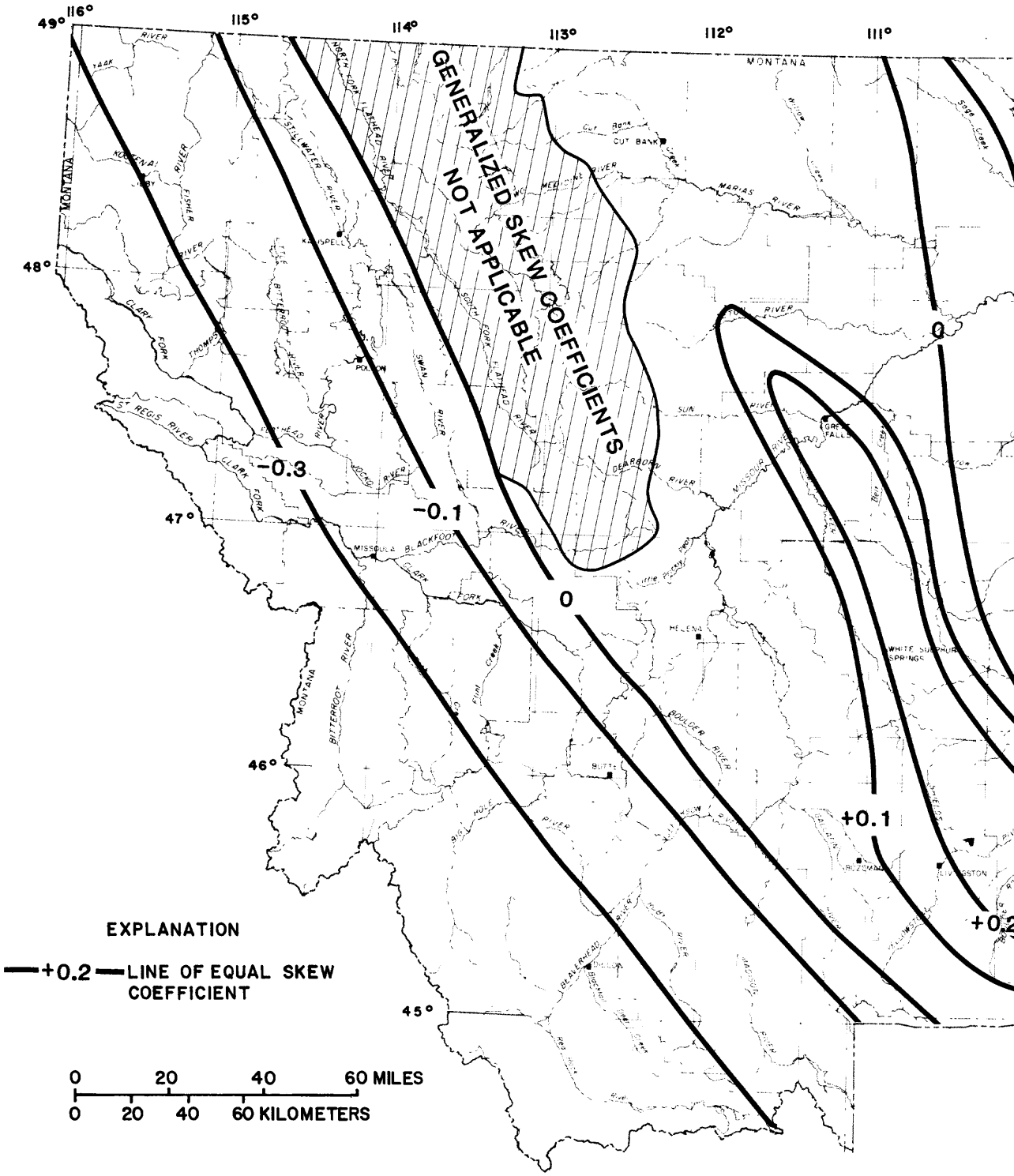
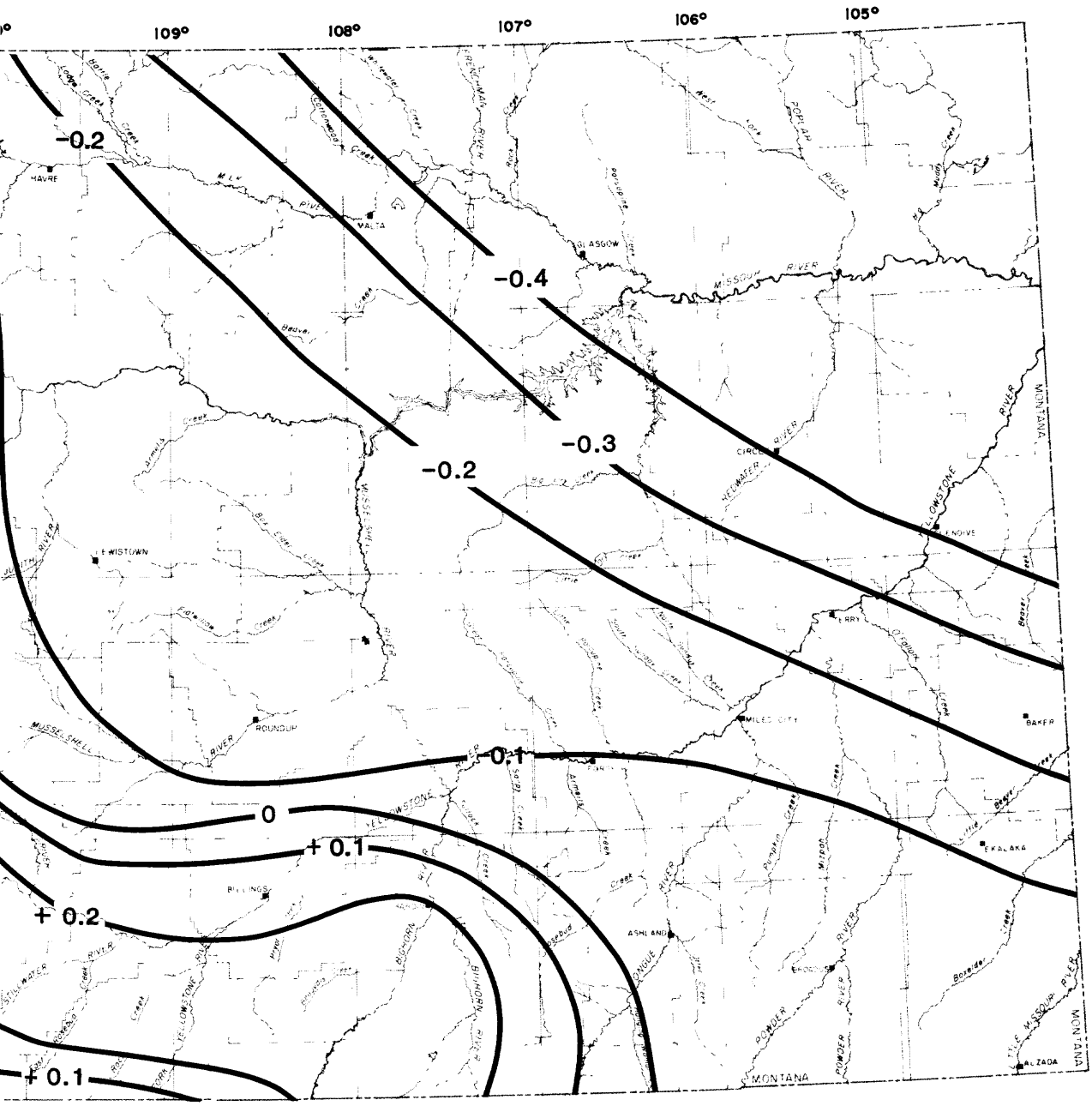


Figure 3.--Generalized skew



coefficients.

Basin characteristics used

Basin characteristics tested for inclusion as independent variables in the regression equations include:

A	drainage area,
P	mean annual precipitation,
F+10	forest cover index;
E/1000	mean basin elevation index;
HE+10	basin high-elevation index;
TI+10	temperature index;
LAT-44	site latitude index,
LNG-100	site longitude index,
S	main channel slope,
L	mean channel length,
*I*24	precipitation intensity for a storm of 24 hours duration having an exceedance probability of 50 percent, and
LAKE	percentage of basin covered by lakes and ponds.

Basin characteristics determined to be important in the regression equations were drainage area, mean annual precipitation, forest cover index, mean basin elevation index, basin high-elevation index, and temperature index. Drainage area is expressed in square miles, and is determined for ungaged sites by planimetering the area outlined on the largest scale topographic map available. Mean annual precipitation is the basin average, in inches, and can be determined from the average annual precipitation map (pl. 1). Forest cover index is the percentage of basin area covered by forest plus 10. The value 10 is added to the percentage of forest cover to ensure that a value of zero does not occur in the equations. The percentage of forest cover is determined by planimetering the forested areas shown on the best scale U.S. Geological Survey topographic maps, multiplying by 100, and dividing the result by the total basin drainage area.

Mean basin elevation index is the mean basin elevation, in feet above sea-level datum, divided by 1,000. Mean basin elevation can be determined by using a transparent grid overlay on a topographic map. The basin elevation at each grid intersection is determined, and the mean basin elevation is calculated by averaging. The basin high-elevation index is the percentage of the total basin area above 6,000 feet sea-level datum plus 10. Again, the value 10 is added to ensure that zero values do not occur in the equations. The percentage of basin area above 6,000 feet elevation can be determined by planimetering the drainage area above the 6,000-foot contour on a topographic map, multiplying by 100, and dividing the result by the total drainage area. The temperature index is the mean basin January minimum temperature, in degrees Fahrenheit plus 10. Values of *TI* for the Northeast Plains Region are shown in figure 4. Values of the basin characteristics used for each station are given in table 2.

Regression analysis

Mathematical equations expressing flood magnitude as a function of drainage-basin parameters were derived by multiple-regression techniques. A linear relationship between the logarithms of the variables was assumed so the general form of the mathematical model used is:

$$\text{Log } Q_t = \log K + a \log A + b \log B + \ldots + n \log N \quad (1)$$

or

$$Q_t = K A^a B^b \ldots N^n \quad (2)$$

where Q_t, the dependent variable, is a flood magnitude having exceedance probability t; K is a regression constant; A, B,. . . . N, the independent variables, are drainage-basin characteristics; and a, b,. . . .n are regression coefficients.

The multiple-regression analyses were performed using a computer program (SAS Institute, Inc., 1979) with a "maximum R^2 improvement" routine for adding or deleting independent variables (drainage-basin characteristics) to the model. R is the coefficient of correlation. This procedure determines the "best" one-variable model (largest R^2), the "best" two-variable model (greatest increase in R^2), and so forth until the specified maximum number of independent variables has been included. In this study, independent variables were examined, and the computer routine was run until six of the independent variables were included in the equations. The equations thus derived were examined, and, in all instances, the standard error of estimate for the best three-variable model was only slightly larger than for the best four-, five-, or six-variable model. In fact, in four regions the best two-variable model had a standard error of estimate as small as any of the models having more variables. Consequently, the final estimating equations were limited to a maximum of three independent variables.

An initial multiple-regression analysis was made for the entire State. The regression residuals (difference between the predicted Q_t from the regression equa-

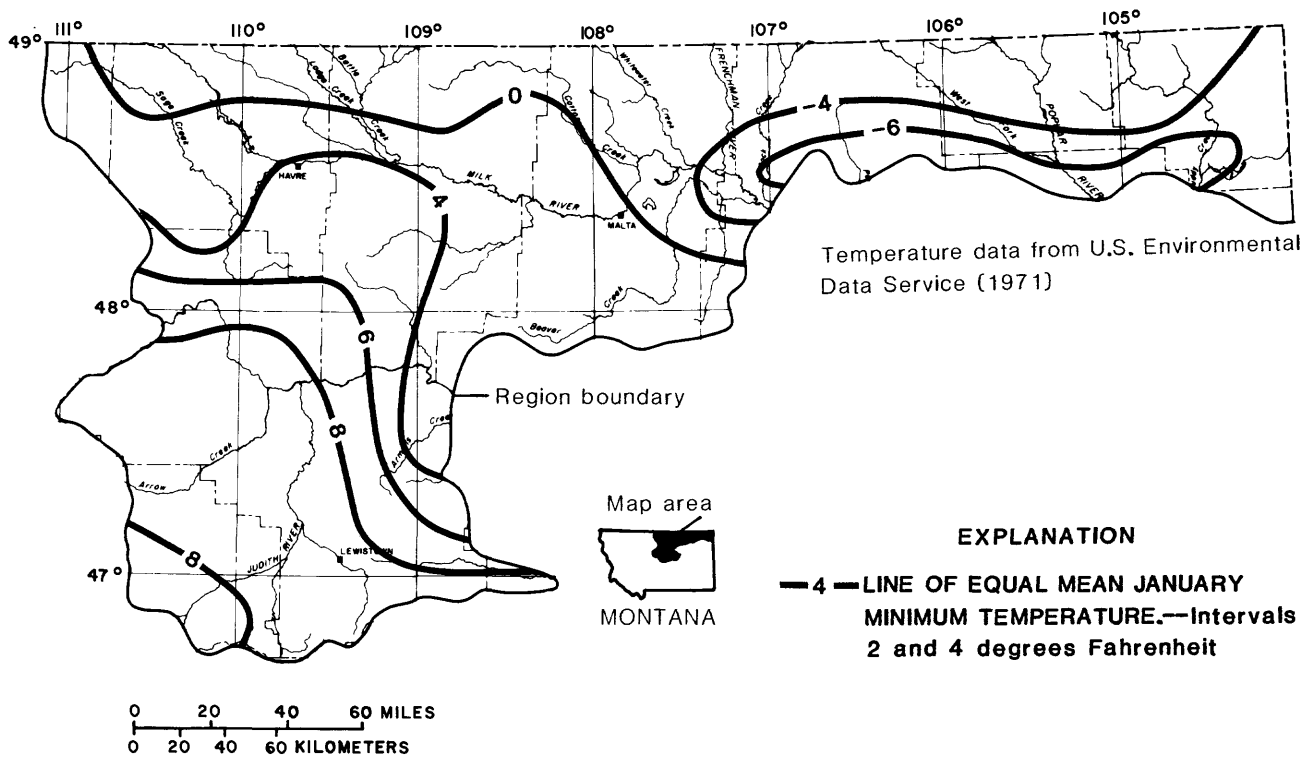


Figure 4.--Mean January minimum temperature (TI) for Northeast Plains Region.

tion and the Q_t determined from the station data-frequency curve) were plotted on a map and used, together with topographic maps, to delineate the eight regions finally used. Drainage divides were used as regional boundaries where feasible. Separate multiple-regression analyses were then made for each of the eight regions. A further refinement of the final equations was made by plotting antilogarithms of

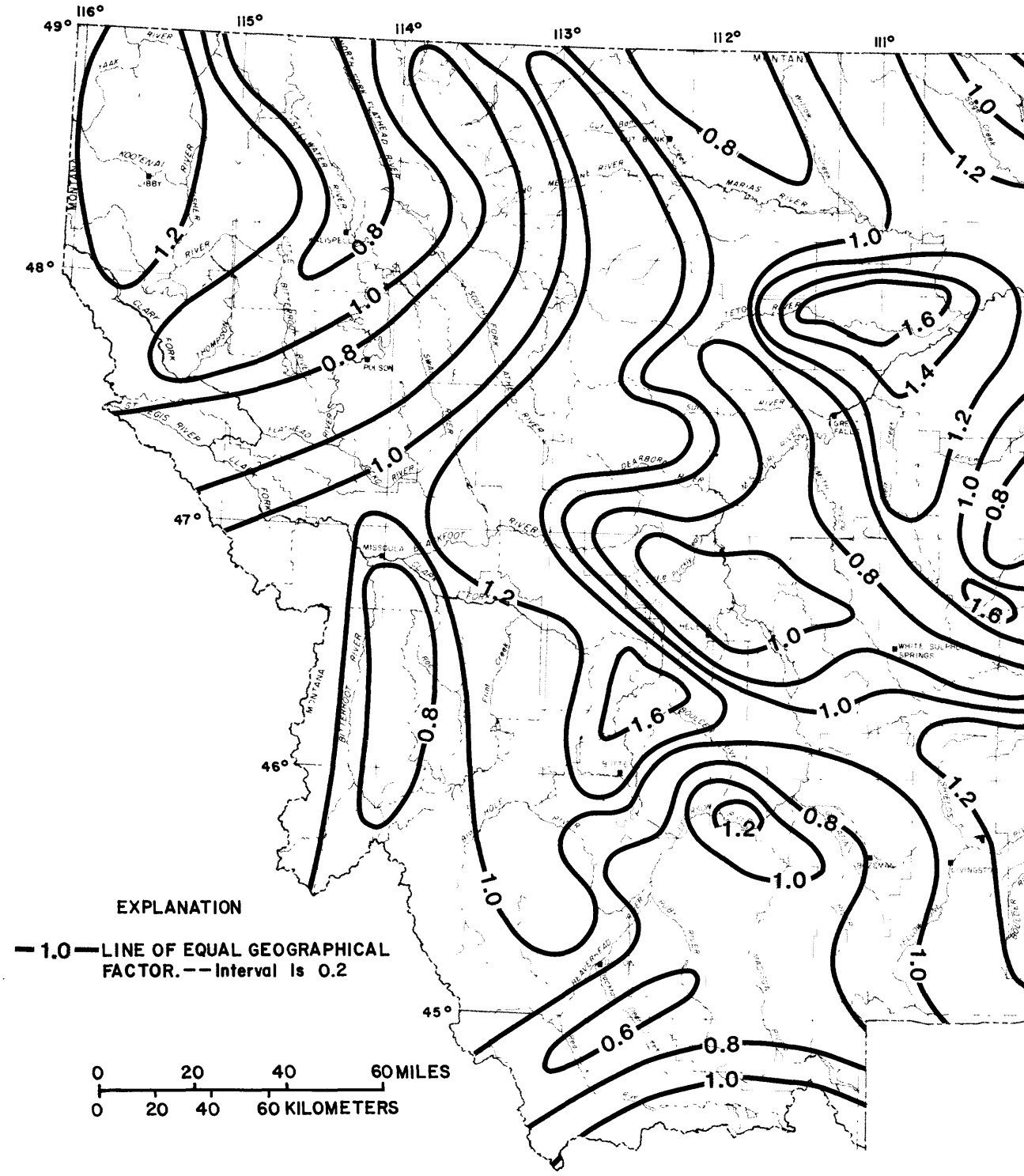
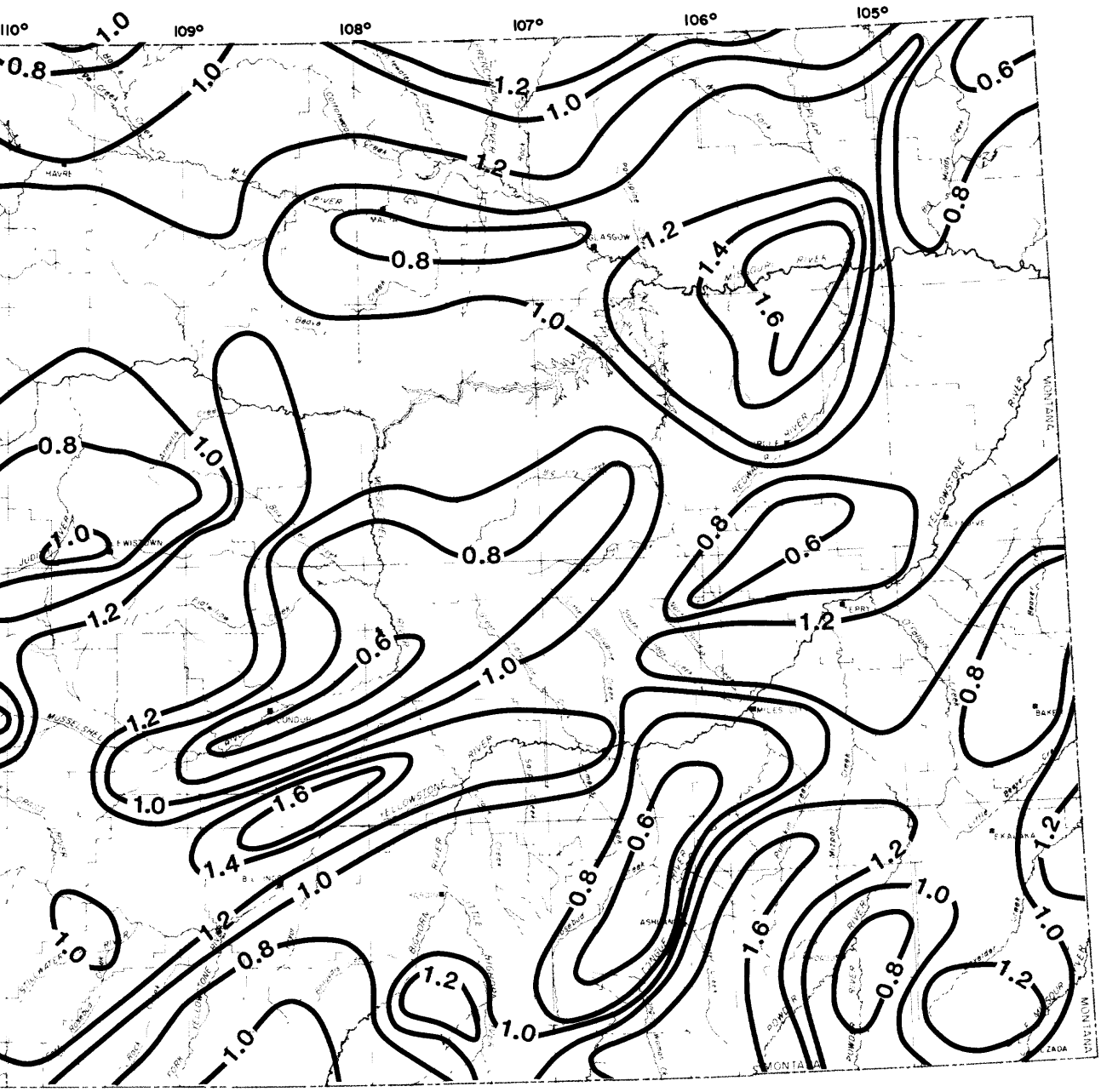


Figure 5.--Geographical

regression residuals for $Q_{1\%}$ on a State map and drawing lines through equal values. The lines thus drawn represent a geographical factor, G_f, that is used as a multiplier in the mathematical model. The geographical factor (fig. 5) may be considered as an additional basin characteristic that, for large drainage areas, may have to be determined by the grid-sampling method described earlier.



factors, G_f.

The final regression equations developed for each region and the standard errors of estimate with and without the geographical factor are given in table 3. The use of the geographical factor substantially improved the standard error of estimate for most exceedance probabilities in all regions.

Table 3.--*Regional flood-frequency equations*

Discharge (cubic feet per second for given exceedance probability)	Equations	Recurrence interval (years)	Standard error of estimate (percent) With G_f	Standard error of estimate (percent) Without G_f
	West Region (57 stations)			
$Q_{50\%}$	$= 0.080\ A^{0.94}\ P^{1.29}\ G_f$	2	55	62
$Q_{20\%}$	$= 0.279\ A^{0.90}\ P^{1.11}\ G_f$	5	49	57
$Q_{10\%}$	$= 0.537\ A^{0.87}\ P^{1.02}\ G_f$	10	48	56
$Q_{4\%}$	$= 1.03\ A^{0.85}\ P^{0.93}\ G_f$	25	49	57
$Q_{2\%}$	$= 1.61\ A^{0.83}\ P^{0.86}\ G_f$	50	49	58
$Q_{1\%}$	$= 2.80\ A^{0.81}\ P^{0.77}\ G_f$	100	46	55
	Northwest Region (34 stations)			
$Q_{50\%}$	$= 0.105\ A^{0.97}\ P^{1.33}\ G_f$	2	56	47
$Q_{20\%}$	$= 0.999\ A^{0.90}\ P^{0.93}\ G_f$	5	45	40
$Q_{10\%}$	$= 3.49\ A^{0.86}\ P^{0.72}\ G_f$	10	44	38
$Q_{4\%}$	$= 11.4\ A^{0.83}\ P^{0.54}\ G_f$	25	38	36
$Q_{2\%}$	$= 18.3\ A^{0.80}\ P^{0.54}\ G_f$	50	32	36
$Q_{1\%}$	$= 23.4\ A^{0.77}\ P^{0.61}\ G_f$	100	39	48
	Southwest Region (36 stations)			
$Q_{50\%}$	$= 1.91\ A^{0.92}\ (HE+10)^{0.12}\ G_f$	2	58	73
$Q_{20\%}$	$= 22.3\ A^{0.85}\ (HE+10)^{-0.24}\ G_f$	5	45	56
$Q_{10\%}$	$= 78.6\ A^{0.82}\ (HE+10)^{-0.43}\ G_f$	10	42	56
$Q_{4\%}$	$= 328\ A^{0.77}\ (HE+10)^{-0.65}\ G_f$	25	45	62
$Q_{2\%}$	$= 815\ A^{0.74}\ (HE+10)^{-0.79}\ G_f$	50	51	70
$Q_{1\%}$	$= 1,890\ A^{0.72}\ (HE+10)^{-0.92}\ G_f$	100	58	78
	Upper Yellowstone-Central Mountain Region (71 stations)			
$Q_{50\%}$	$= 0.146\ A^{0.87}\ (E/1000)^{3.88}\ (HE+10)^{-0.78}\ G_f$	2	57	60
$Q_{20\%}$	$= 1.08\ A^{0.82}\ (E/1000)^{3.56}\ (HE+10)^{-0.93}\ G_f$	5	47	51
$Q_{10\%}$	$= 3.22\ A^{0.80}\ (E/1000)^{3.39}\ (HE+10)^{-1.02}\ G_f$	10	45	49
$Q_{4\%}$	$= 10.6\ A^{0.77}\ (E/1000)^{3.20}\ (HE+10)^{-1.12}\ G_f$	25	42	48
$Q_{2\%}$	$= 23.6\ A^{0.75}\ (E/1000)^{3.06}\ (HE+10)^{-1.18}\ G_f$	50	43	48
$Q_{1\%}$	$= 48.8\ A^{0.73}\ (E/1000)^{2.95}\ (HE+10)^{-1.24}\ G_f$	100	44	49

Table 3.--*Regional flood-frequency equations*--Continued

Discharge (cubic feet per second for given exceedance probability)	Equations	Recurrence interval (years)	Standard error of estimate (percent)	
			With G_f	Without G_f
Northwest-Foothills Region (21 stations)				
$Q_{50\%}$	$= 0.342\ A^{0.52}\ (E/1000)^{2.96}\ G_f$	2	105	101
$Q_{20\%}$	$= 1.65\ A^{0.47}\ (E/1000)^{2.76}\ G_f$	5	64	61
$Q_{10\%}$	$= 3.87\ A^{0.45}\ (E/1000)^{2.63}\ G_f$	10	48	51
$Q_{4\%}$	$= 9.68\ A^{0.43}\ (E/1000)^{2.48}\ G_f$	25	42	48
$Q_{2\%}$	$= 17.7\ A^{0.42}\ (E/1000)^{2.37}\ G_f$	50	44	60
$Q_{1\%}$	$= 30.7\ A^{0.40}\ (E/1000)^{2.27}\ G_f$	100	50	70
Northeast Plains Region (51 stations)				
$Q_{50\%}$	$= 26.3\ A^{0.65}\ (E/1000)^{0.53}\ (TI+10)^{-0.62}\ G_f$	2	61	61
$Q_{20\%}$	$= 114\ A^{0.61}\ (E/1000)^{0.09}\ (TI+10)^{-0.52}\ G_f$	5	43	46
$Q_{10\%}$	$= 214\ A^{0.59}\ (E/1000)^{-0.11}\ (TI+10)^{-0.44}\ G_f$	10	39	45
$Q_{4\%}$	$= 377\ A^{0.56}\ (E/1000)^{-0.28}\ (TI+10)^{-0.33}\ G_f$	25	40	49
$Q_{2\%}$	$= 519\ A^{0.55}\ (E/1000)^{-0.38}\ (TI+10)^{-0.26}\ G_f$	50	43	53
$Q_{1\%}$	$= 667\ A^{0.53}\ (E/1000)^{-0.46}\ (TI+10)^{-0.18}\ G_f$	100	47	59
East-Central Plains Region (54 stations)				
$Q_{50\%}$	$= 117\ A^{0.56}\ (E/1000)^{-1.50}\ G_f$	2	77	85
$Q_{20\%}$	$= 402\ A^{0.52}\ (E/1000)^{-1.42}\ G_f$	5	58	72
$Q_{10\%}$	$= 681\ A^{0.50}\ (E/1000)^{-1.31}\ G_f$	10	58	77
$Q_{4\%}$	$= 1{,}100\ A^{0.48}\ (E/1000)^{-1.13}\ G_f$	25	66	87
$Q_{2\%}$	$= 1{,}460\ A^{0.47}\ (E/1000)^{-0.99}\ G_f$	50	74	102
$Q_{1\%}$	$= 1{,}750\ A^{0.45}\ (E/1000)^{-0.82}\ G_f$	100	83	106
Southeast Plains Region (49 stations)				
$Q_{50\%}$	$= 360\ A^{0.59}\ (F+10)^{-0.98}\ G_f$	2	105	116
$Q_{20\%}$	$= 1{,}010\ A^{0.58}\ (F+10)^{-0.99}\ G_f$	5	77	90
$Q_{10\%}$	$= 1{,}320\ A^{0.56}\ (F+10)^{-0.91}\ G_f$	10	72	88
$Q_{4\%}$	$= 1{,}890\ A^{0.54}\ (F+10)^{-0.85}\ G_f$	25	68	87
$Q_{2\%}$	$= 2{,}340\ A^{0.54}\ (F+10)^{-0.81}\ G_f$	50	69	88
$Q_{1\%}$	$= 2{,}770\ A^{0.53}\ (F+10)^{-0.76}\ G_f$	100	71	91

Limitations of regression equations

The regression equations provide a means for determining flood peaks for selected exceedance probabilities for ungaged streams in Montana. The equations were developed from gaging-station data on virtually unregulated streams where significant urbanization or other major basin changes have not occurred. Thus, the equations may not be valid where regulation is a factor or where a drainage basin has been altered by urbanization.

The regression equations also will not be valid where unique, localized geologic features affect floods. Such areas would include those where a substantial part of the streamflow results from springs or seeps and areas where soils are so permeable that unusual amounts of runoff are absorbed.

The regression equations are also not generally usable for determining $Q_{2\%}$ and $Q_{1\%}$ in the Northwest-Foothills Region for any stream that originates in the Northwest Region. Streams that originate in the Northwest Region have a large $Q_{2\%}$ and $Q_{1\%}$ as a result of intense rains from southern sources. As these streams drain from the mountains and enter the relatively flat plains area of the Northwest-Foothills Region, the high flows are largely attenuated by valley storage. Thus, the peak discharges at downstream points commonly are the same as or less than the peak discharges at upstream locations. The $Q_{2\%}$ and $Q_{1\%}$ contribution from the Northwest Region can be calculated by using basin characteristics at the region boundary, but determining whether $Q_{2\%}$ and $Q_{1\%}$ increase, stay constant, or decrease with increasing downstream drainage area requires careful, individual study of the stream in question.

Flood discharges for streams that cross other regional boundaries can be determined by a weighting procedure as discussed in the "Weighting of Independent Estimates" section of this report. The procedure also applies to determining flood discharges for exceedance probabilities other than 2 percent and 1 percent for streams that drain from the Northwest to the Northwest-Foothills Regions.

As with any regression analysis, the derived equations are defined only within the range of the independent variables used. For this study, the range of values of the basin charateristics used is listed in table 4. Extrapolation beyond the range of values given in table 4 is not recommended.

The indiscriminate use of regression equations is no substitute for sound hydrologic judgment. The designer or hydrologist responsible for making flood estimates needs to be aware of situations where the regression equations may, perhaps inexplicably, provide unreliable results. In these instances, additional study, including perhaps onsite visits and conversations with long-time residents, is needed to decide between alternative estimating techniques and to determine when an estimate is sufficiently accurate.

Accuracy appraisal

The accuracy of a multiple-regression equation is most commonly measured by the standard error of estimate (SE_R). The standard error of estimate is the standard deviation of the distribution (assumed normal) of residuals about the regression line and is usually expressed in percentage of the estimated value when log-transformed variables are used. Thus, if the standard error of estimate of a

regression equation is 50 percent, about two-thirds of all observed values of the dependent variable will be within 50 percent of the estimated values.

The standard error of estimate for each regression equation is given in table 3. The largest standard errors occur generally in the East-Central Plains and the Southeast Plains Regions. Conversely, the smallest standard errors occur in the Northwest Region. In all regions, except the Southwest and East-Central Plains Regions, the largest standard error occurs in the $Q_{50\%}$ prediction equation. In the Southwest and East-Central Plains Regions, the largest standard errors occur in the $Q_{1\%}$ prediction equation.

The standard errors of estimate in table 3 represent a substantial improvement over results in previous studies. Johnson and Omang (1976), for example, show a standard error of estimate for the $Q_{50\%}$ equation ranging from 66 to 150 percent and a standard error of estimate for the $Q_{1\%}$ equation ranging from 70 to 106 percent. Boner and Buswell (1970) likewise reported a standard error of estimate for a $Q_{4\%}$ prediction equation ranging from 37 to 91 percent.

Table 4.--*Range of basin characteristics used*

Region	Drainage area (*A*) (square miles)	Mean annual precip-itation (*P*) (inches)	Forest cover (*F*) (percent)	Mean basin elevation (*E*) (feet)	Basin above 6,000 feet elevation (*HE*) (percent)	Mean minimum January temper-ature (*TI*) (degrees Fahrenheit)
West	0.86-2,290	12-79	--	--	--	--
Northwest	0.14-1,660	15-105	--	--	--	--
Southwest	0.48-2,480	--	--	--	0-100	--
Upper Yellow-stone-Central Mountain	1.44-2,620	--	--	3,780-9,560	0-100	--
Northwest-Foothills	0.25-1,040	--	--	2,750-5,130	--	--
Northeast Plains	0.11-1,810	--	--	2,110-6,540	--	(-5)-(+10)
East-Central Plains	0.22-3,170	--	--	2,090-5,400	--	--
Southeast Plains	0.04-1,970	--	0-64	--	--	--

Maximum known floods

Floods of record and the corresponding drainage areas for each gaging station within each region are displayed in figures 6-13. Also shown in these figures are curves relating the maximum known floods in the United States to drainage areas and curves relating the 1-percent-chance flood peaks to drainage areas. The 1-percent-chance flood relation was determined from regression equations using drain-

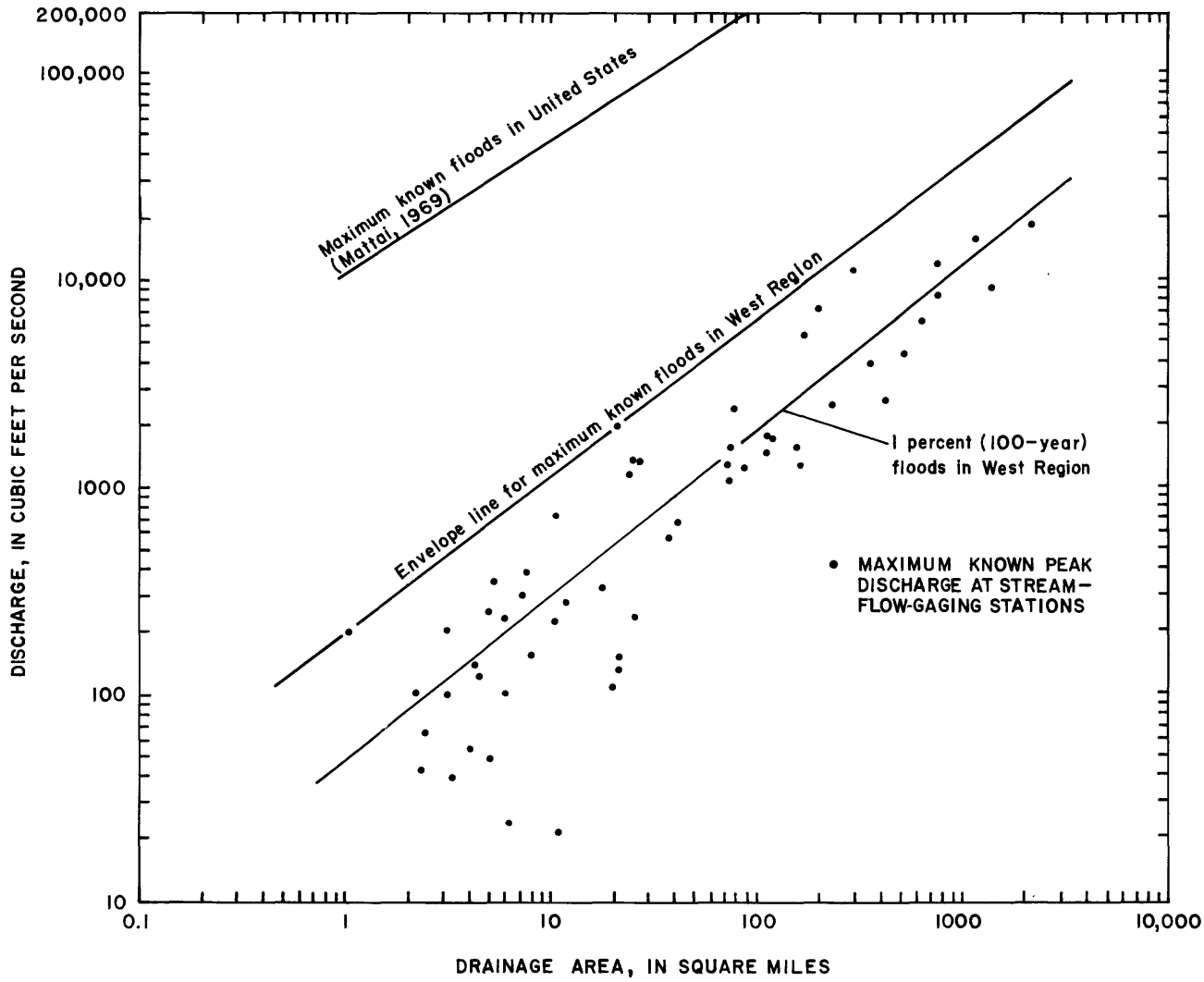


Figure 6.--Relation of maximum known peak discharge to drainage area in the West Region.

age area as the only independent variable. The data in figures 6 through 13 provide a comparison of Montana flood experience with the national flood experience. For example, the envelope line for the maximum known floods in the Northwest Region is near the national maximum relation in figure 7. The illustration also shows that the maximum known floods for most of the streamflow-gaging stations in the region are substantially above the 1-percent-chance flood relation, indicating that the Northwest Region has been subjected to occasional extreme floods.

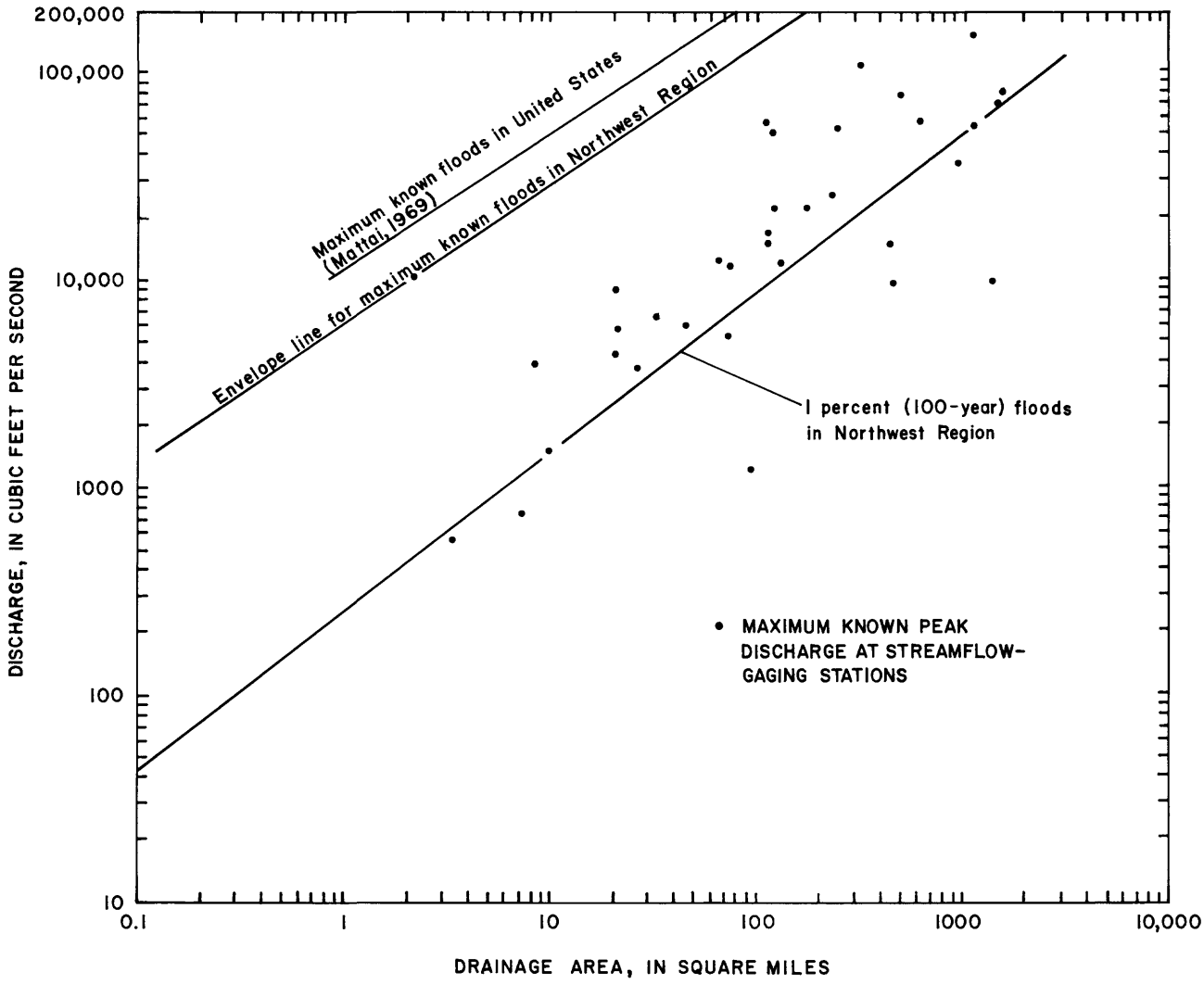


Figure 7.--Relation of maximum known peak discharge to drainage area in the Northwest Region.

WEIGHTING OF INDEPENDENT ESTIMATES

The U.S. Water Resources Council (1977, p. 8-1) has suggested that flood-frequency characteristics at gaged sites could be estimated better by weighting the station characteristics with characteristics defined by regional (regression) equations. The Water Resources Council further suggests that the weight given to each estimate should be inversely proportional to its variance.

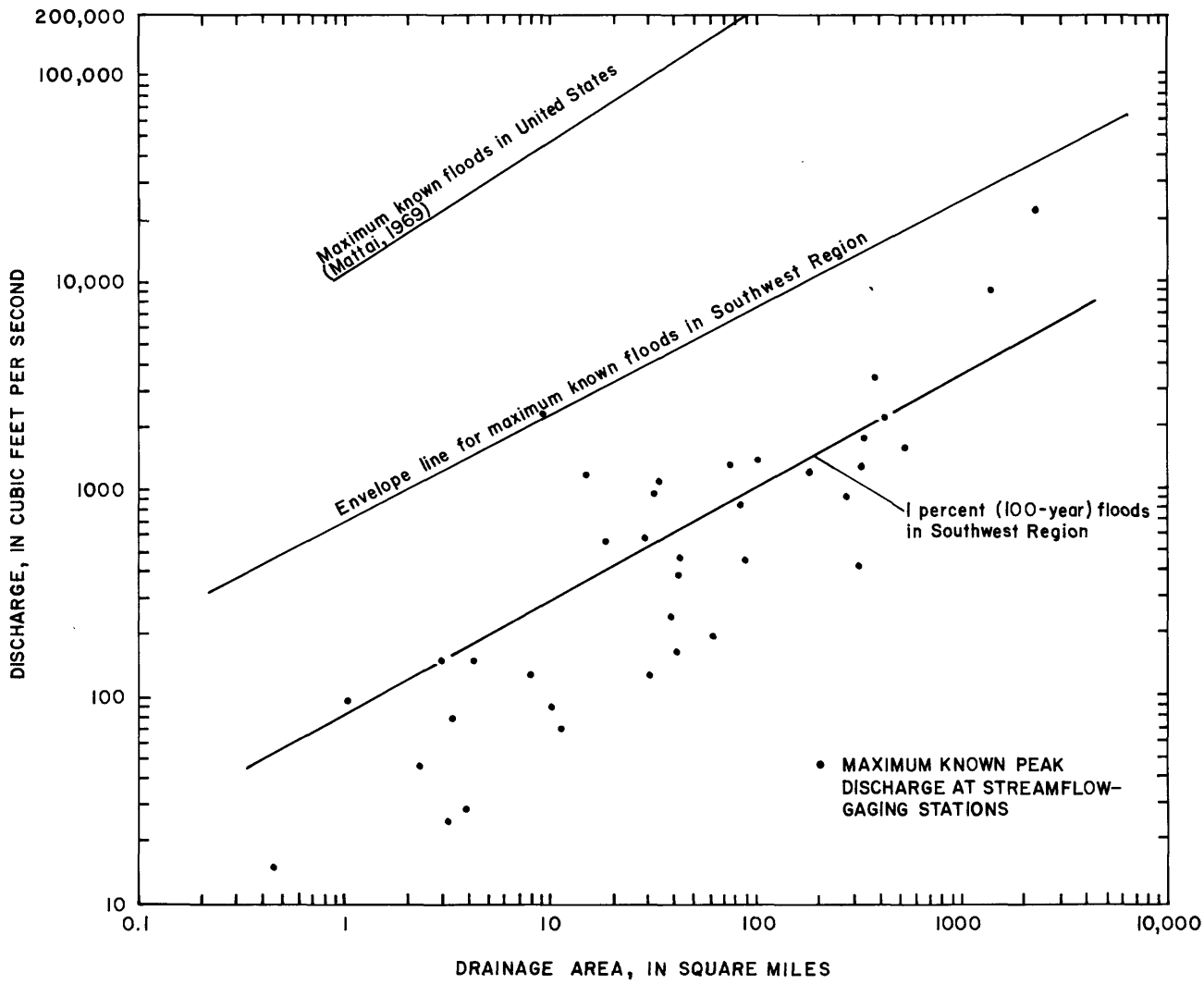


Figure 8.--Relation of maximum known peak discharge to drainage area in the Southwest Region.

The variance of a regional flood-frequency estimate is the square of the standard error of estimate, $(SE_R)^2$. Hardison (1971) has proposed that the average variance of a station flood frequency estimate, $\overline{V}_T$, be defined as:

$$\overline{V}_T = \frac{R^2(\overline{I}_V)^2}{N} \tag{3}$$

where R is a function of the average regional skew and the exceedance probability, $\overline{I}_V$ is the regional average standard deviation of the logs of the annual peak flows, and N is the length of record at the station.

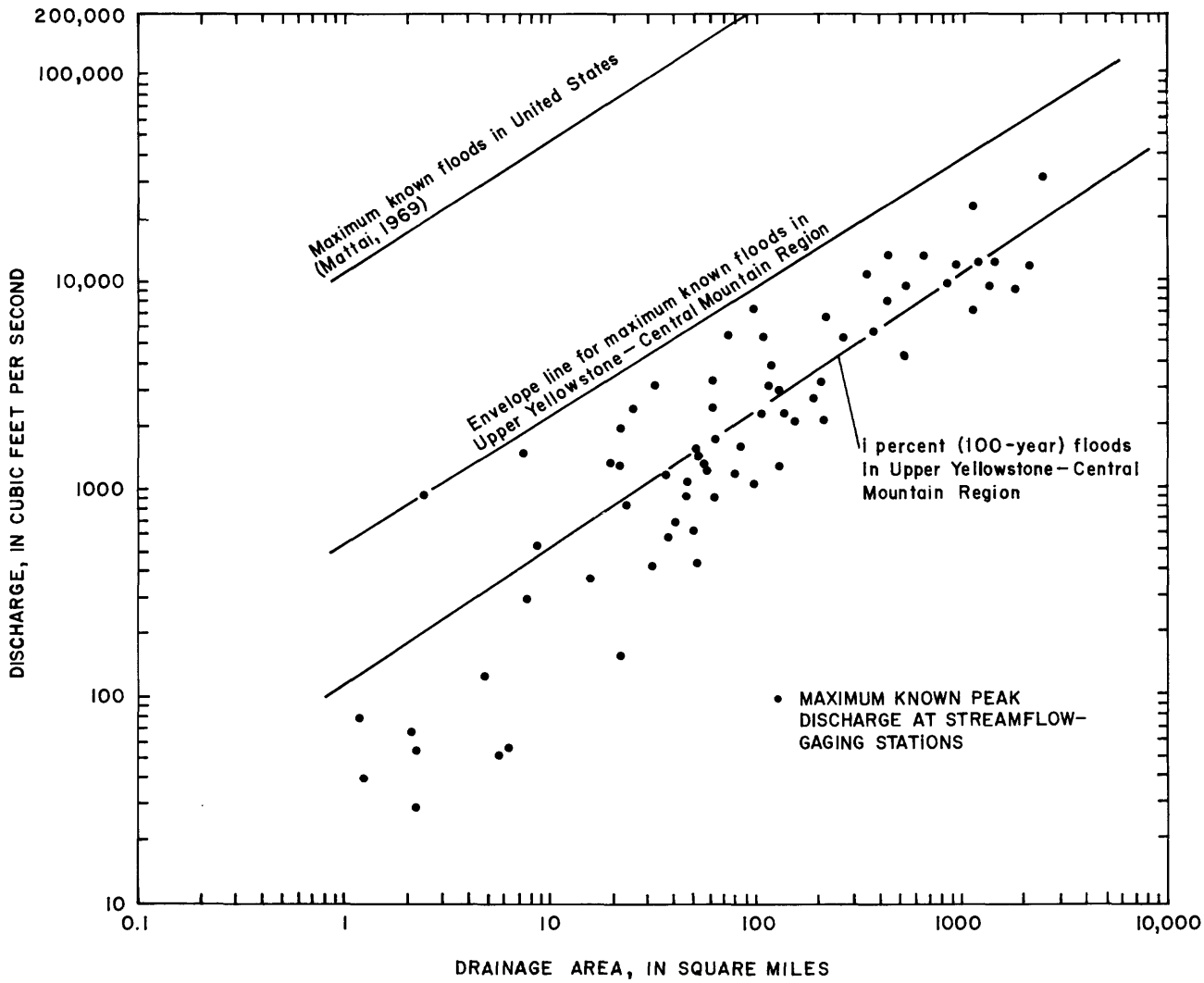


Figure 9.--Relation of maximum known peak discharge to drainage area in the Upper Yellowstone-Central Mountain Region.

Assuming independence of the two estimates, the final weighted value of the flood-frequency characteristic, Q_W, is then determined as:

$$Q_W = \frac{Q_R \overline{V}_T + Q_S \, (SE_R)^2}{\overline{V}_T + (SE_R)^2} , \qquad (4)$$

where Q_R is the flood-frequency characteristic obtained from the regional equation, and Q_S is the flood-frequency characteristic obtained from the station data.

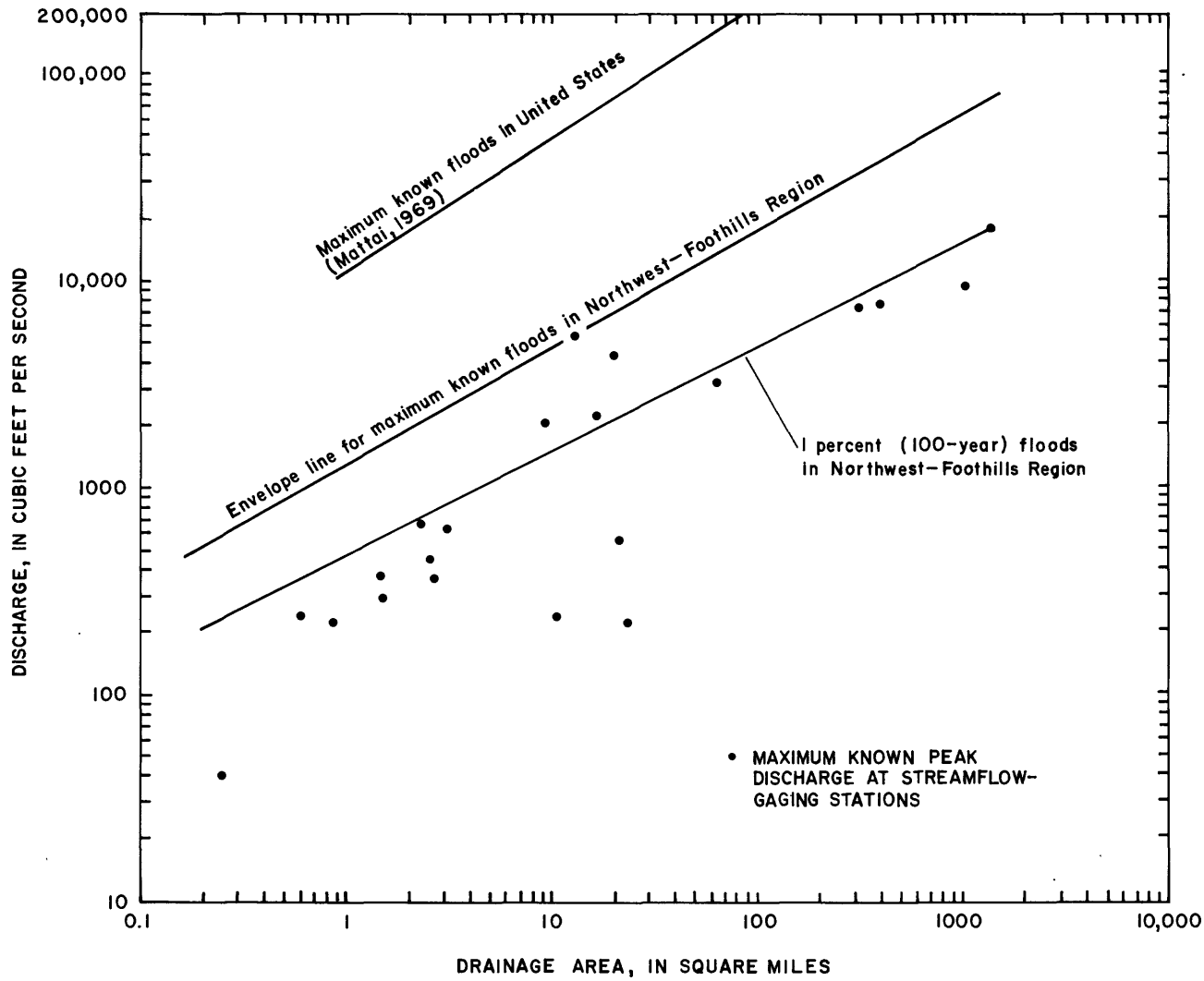


Figure 10.--Relation of maximum known peak discharge to drainage area in the Northwest-Foothills Region.

As indicated by equation 4, more weight is given to the station data when the standard error of estimate is large. Also, because $\overline{V}_T$ is inversely proportional to the record length, N, more weight is given to the station data as the record length increases.

Weighted values of the flood magnitude for exceedance probabilities of 1, 2, 4, 10, 20, and 50 percent were computed for all stations used in the regression analyses and are given with the station values and the regional estimates in table 1. The weighted values are considered to be the best available estimates at the gaged sites.

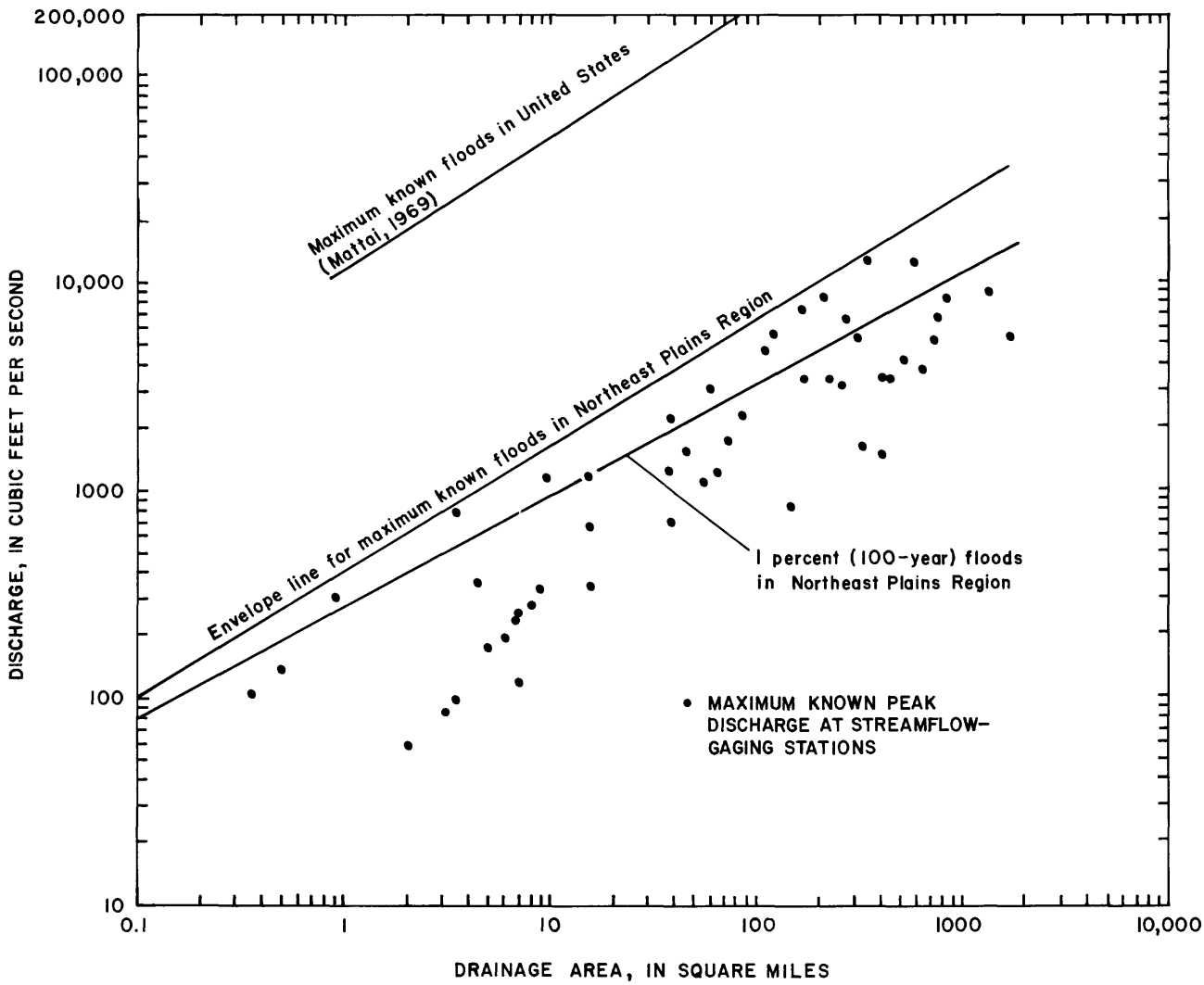


Figure 11.--Relation of maximum known peak discharge to drainage area in the Northeast Plains Region.

TRANSFERRING GAGE DATA

If an estimate of a flood-frequency characteristic is required at a site a short distance upstream or downstream from a gaged site, the weighted value of the characteristic at the gaged site can usually be transferred with good reliability. This transfer technique is based on the drainage-area ratio of the ungaged site to the gaged site as follows:

$$Q_t = (A_u/A_g)^a \, Q_{w,t} \tag{5}$$

where Q_t is the flood magnitude being estimated with exceedance probability t,

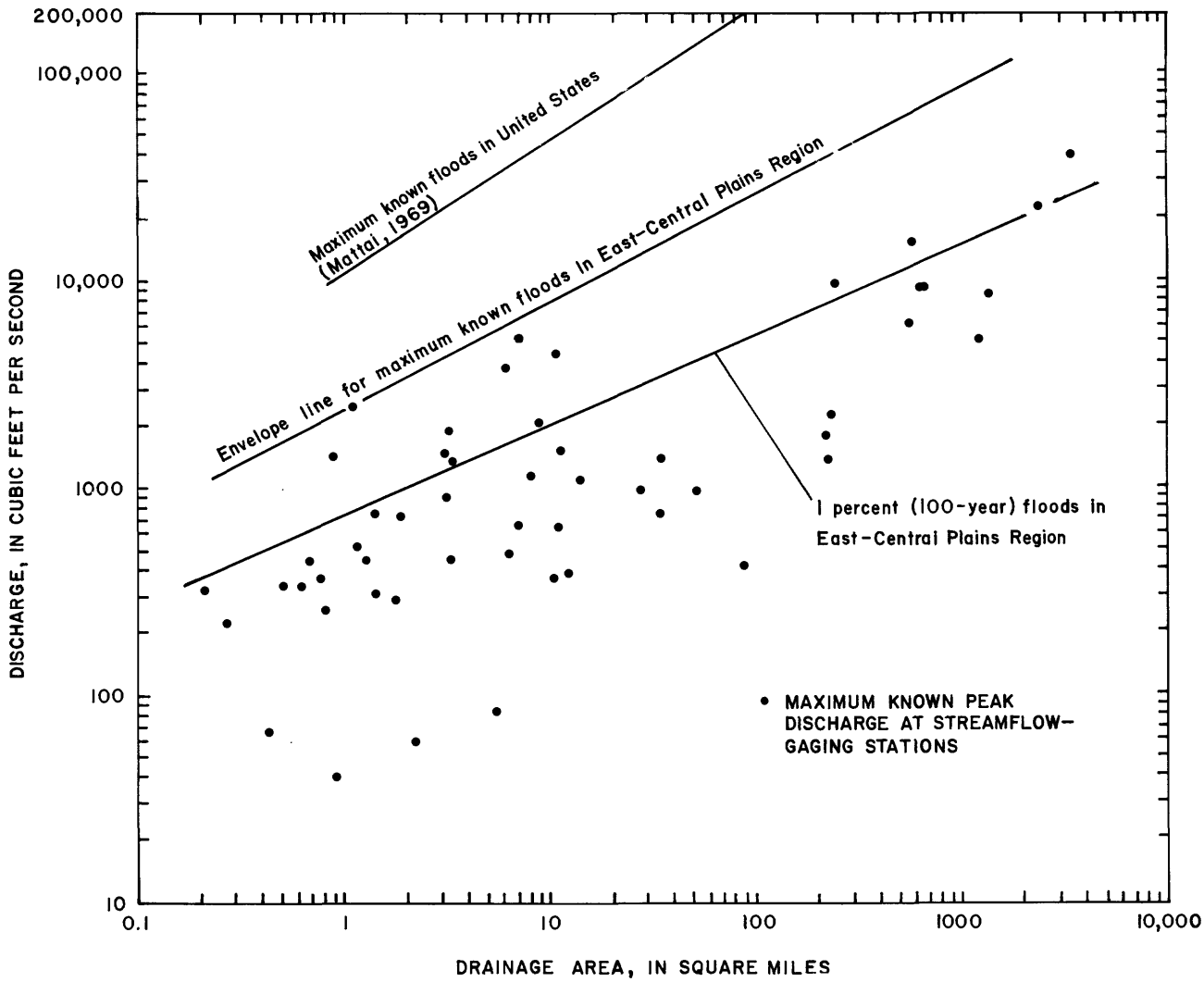


Figure 12.--Relation of maximum known peak discharge to drainage area in the East-Central Plains Region.

A_u is the drainage area at the ungaged site, A_g is the drainage area at the gaged site, a is the exponent of drainage area for the appropriate region and desired exceedance probability as given in table 3, and $Q_{w,t}$ is the weighted value of the station flood magnitude with exceedance probability obtained from table 1. This transfer technique is reliable only when the ungaged drainage area does not differ from the gaged drainage area by more than about 50 percent. Also, the transfer relation will be unreliable if used to predict $Q_{1\%}$ and $Q_{2\%}$ for streams where the ungaged site is in the Northwest-Foothills Region and the gaged site is in the Northwest Region.

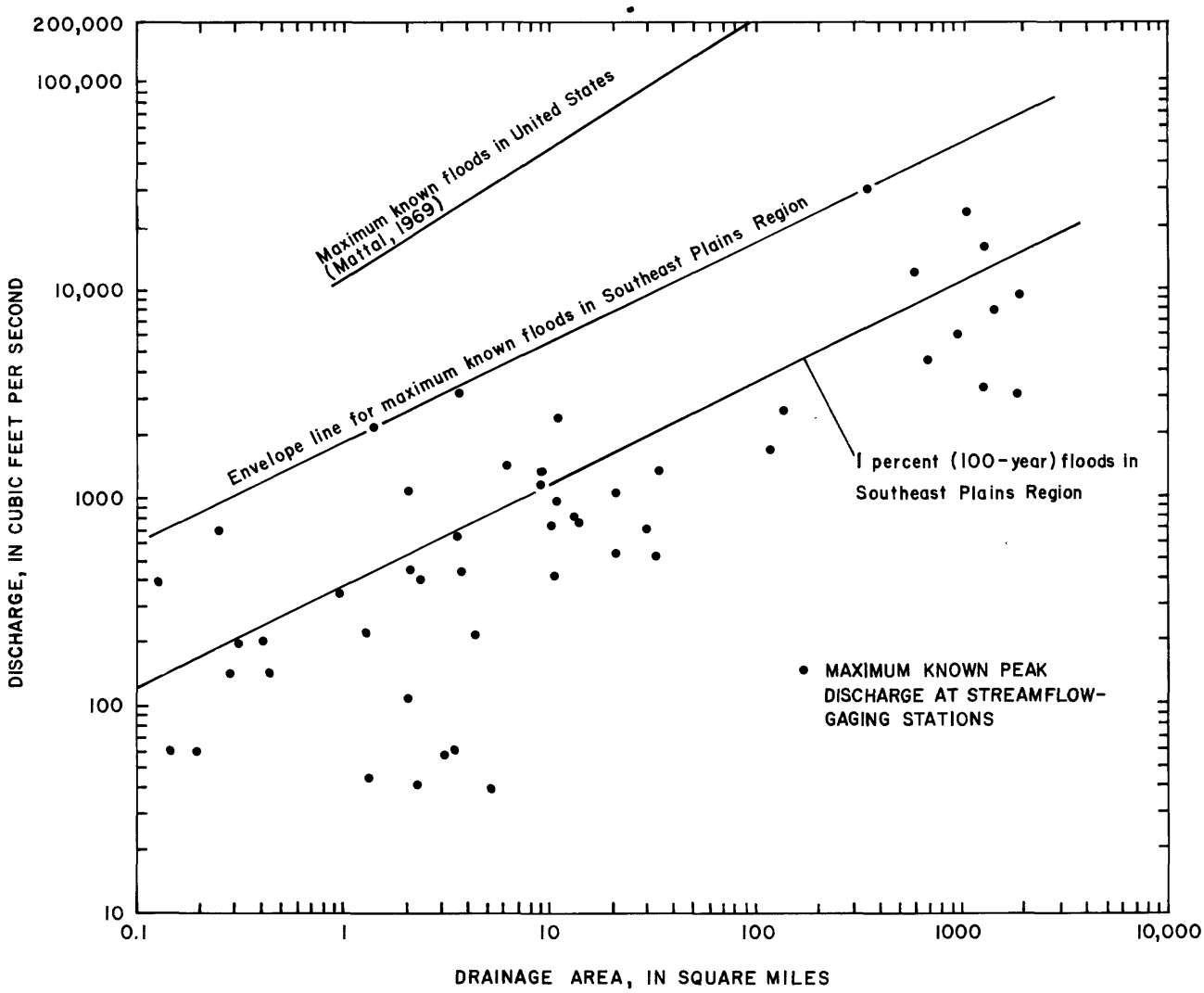


Figure 13.--Relation of maximum known peak discharge to drainage area in the Southeast Plains Region.

On large streams having several gaged sites or sites where flood-magnitude estimates have been made for National Flood Insurance Studies, flood magnitudes between the sites can be interpolated from curves relating flood magnitude to drainage-area size. Relationships of flood magnitude to drainage area for all major streams in Montana where interpolation was considered to be applicable are presented in figures 14-21. For ungaged sites with drainages smaller than those shown in figures 14-21, the appropriate regression equation should be used to estimate flood magnitude. Diversions and regulation that occur between some sites may significantly affect $Q_{50\%}$. For example, on the Milk (fig. 16) and Musselshell (fig. 18) Rivers, $Q_{50\%}$ decreases between two sites having increasing drainage area. $Q_{1\%}$ also decreases between two sites having increasing drainage area on the Musselshell River -- apparently as a result of valley storage.

To determine flood magnitudes for selected exceedance probabilities for any ungaged site in Montana, locate the site on the map (fig. 1) and determine in which region it is located and if it is on a gaged stream.

1. If the site is on the Bitterroot, Clark Fork, Milk, Missouri, Musselshell, Powder, Sun, or Yellowstone Rivers, interpolate the desired flood magnitudes from the discharge versus drainage-area curves in figures 14-21.
2. If the site is on a gaged stream and has a drainage area within 5 percent of that of the nearest gage, use the weighted-flow magnitudes for the gage given in table 1.
3. If the site is on a gaged stream and has a drainage area within 50 percent of that at the gage, use equation 5 to determine the desired flood magnitudes.

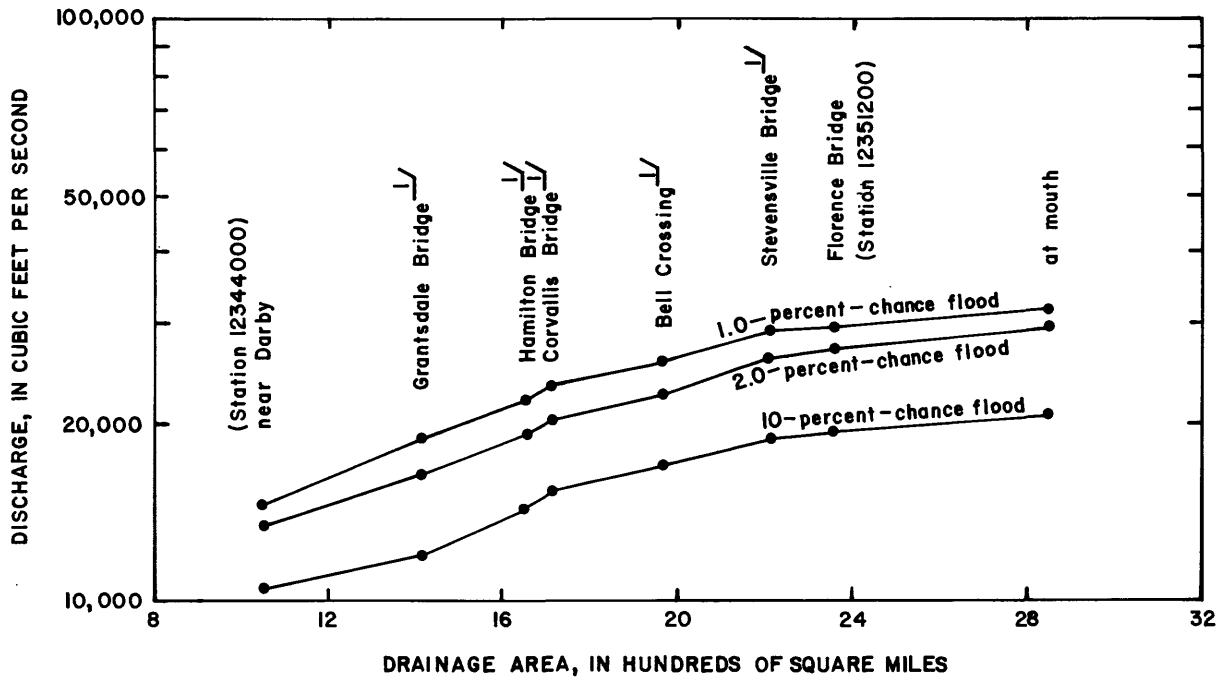


Figure 14.--Flood frequency for the Bitterroot River.

4. If the site is on an ungaged stream or on a gaged stream where the drainage area at the site differs from the drainage area at the gage by more than 50 percent, use the appropriate regression equation to calculate flood magnitudes as follows:

   a. Select the appropriate regression equation from table 3, based on the region the site is in; and

   b. Determine the required basin characteristics from illustrations in this report or the best available topographic map as required.

5. If the drainage basin for the site in question lies in two regions, determine a weighted average flood magnitude as follows:

   a. Using the total drainage area and the appropriate regression equation, determine the flood-magnitude that would result if the entire drainage were located within each of the 2 regions;

   b. Measure that part of the total drainage area that lies in each of the two adjoining regions;

   c. Multiply the flood magnitude determined in step a. for each region by the ratio of the drainage area within that region to the total drainage area and add the two results to obtain a weighted average flood magnitude.

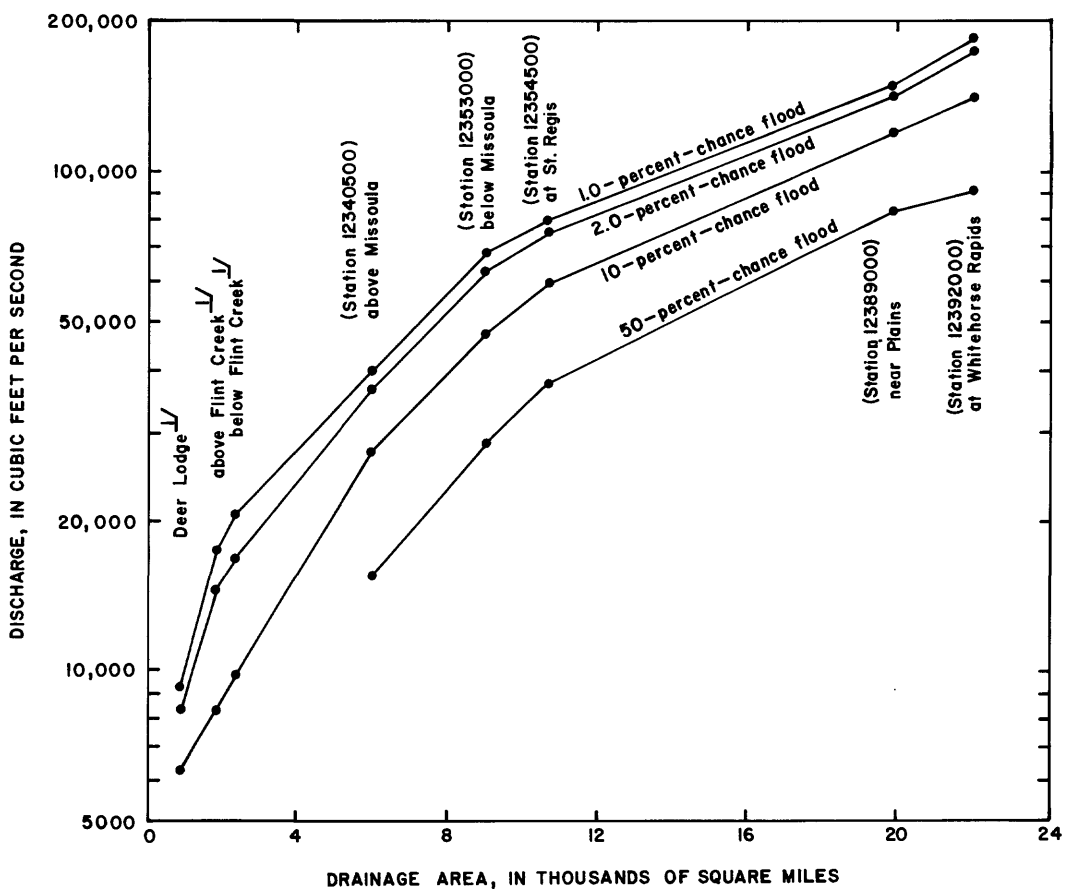


Figure 15.--Flood frequency for the Clark Fork River.

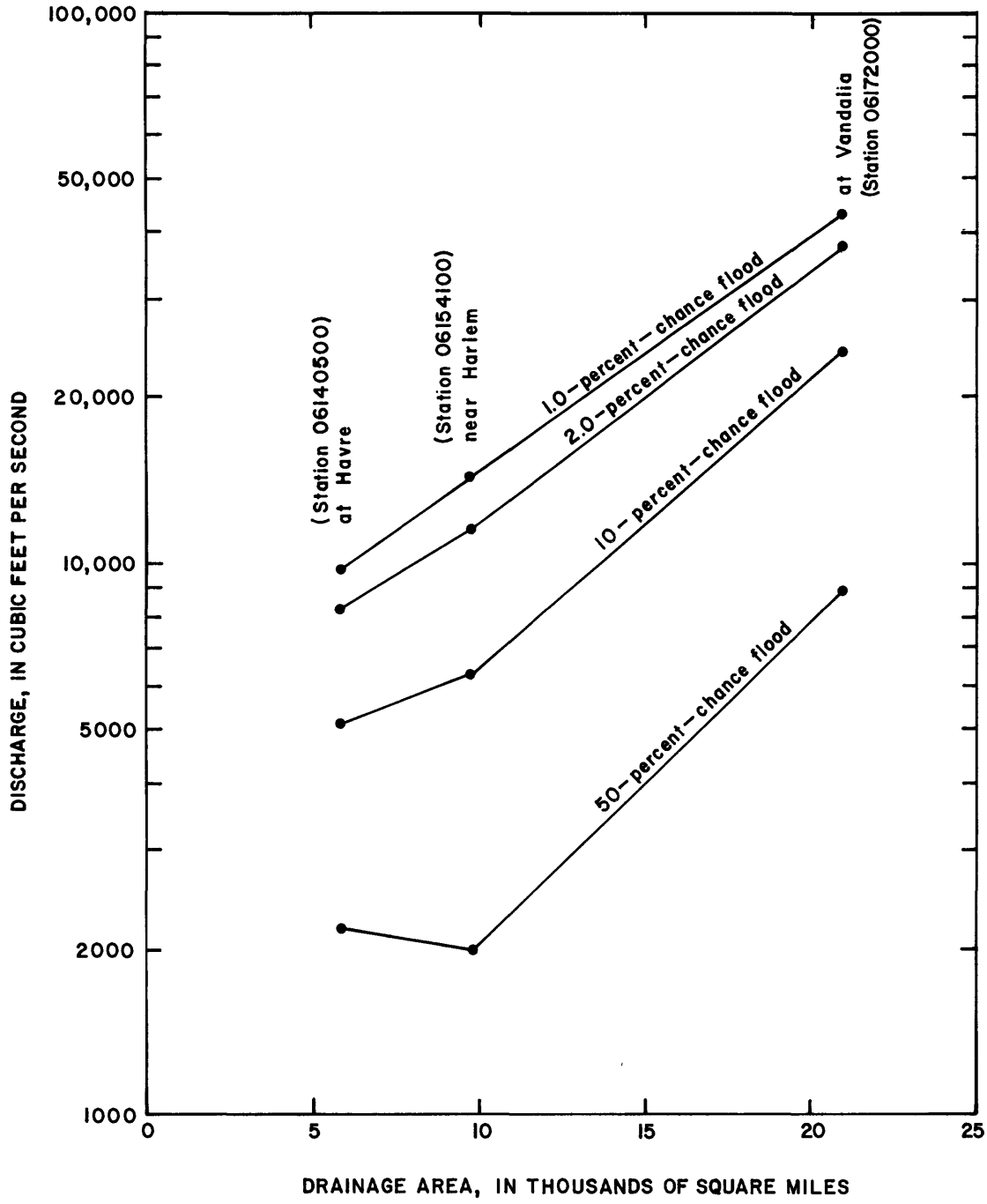


Figure 16.--Flood frequency for the Milk River.

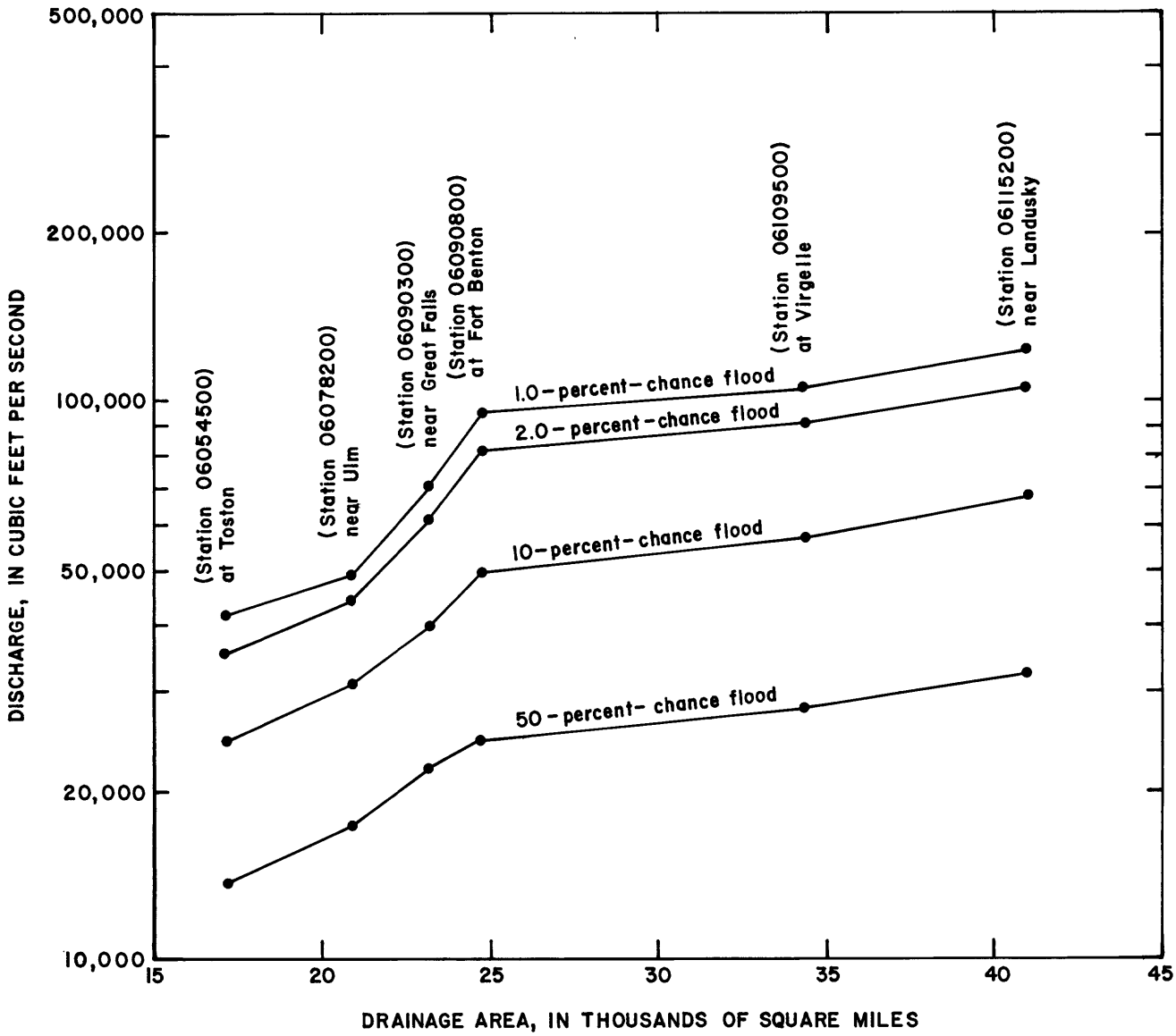


Figure 17.--Flood frequency for the Missouri River.

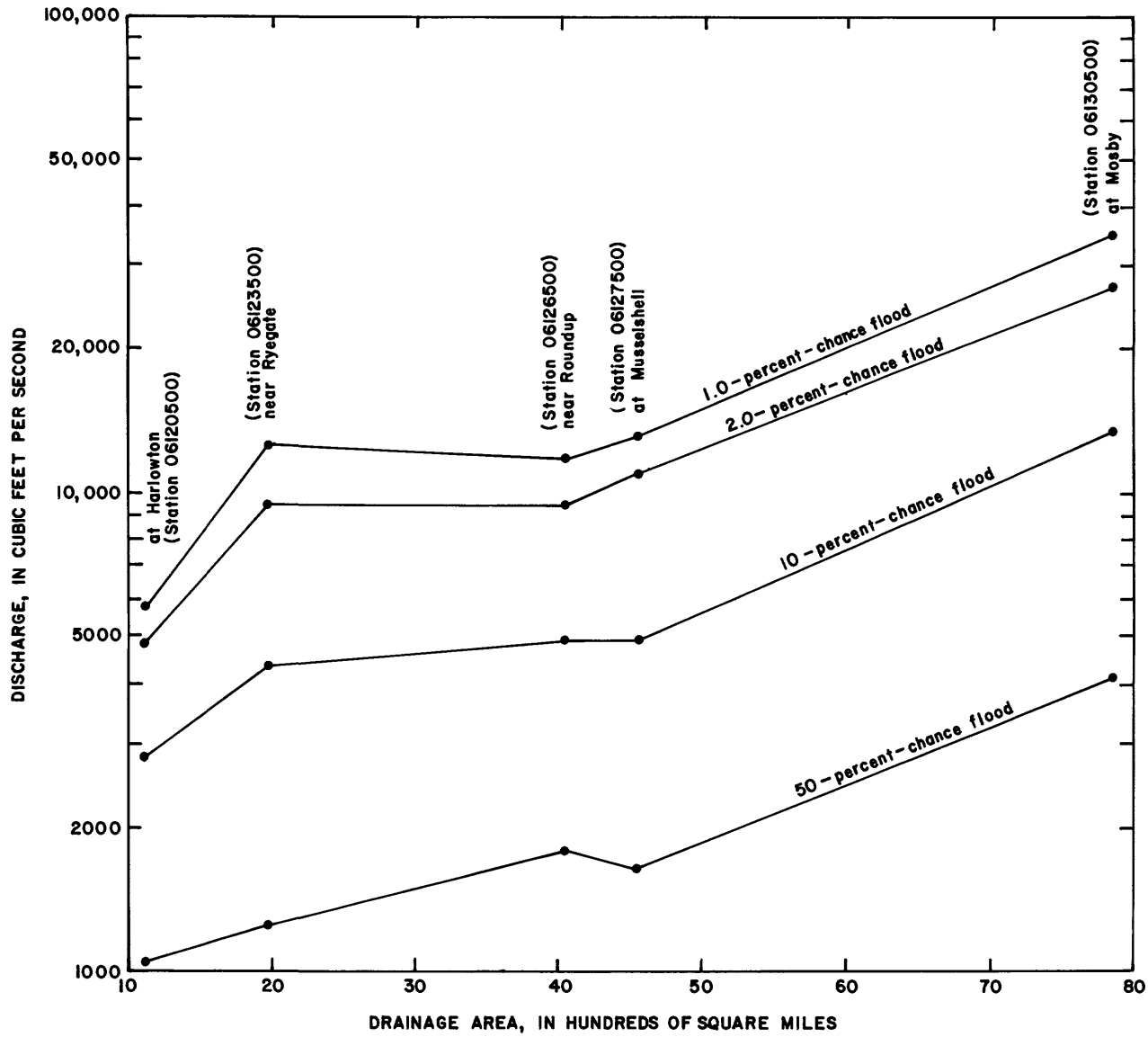


Figure 18.--Flood frequency for the Musselshell River.

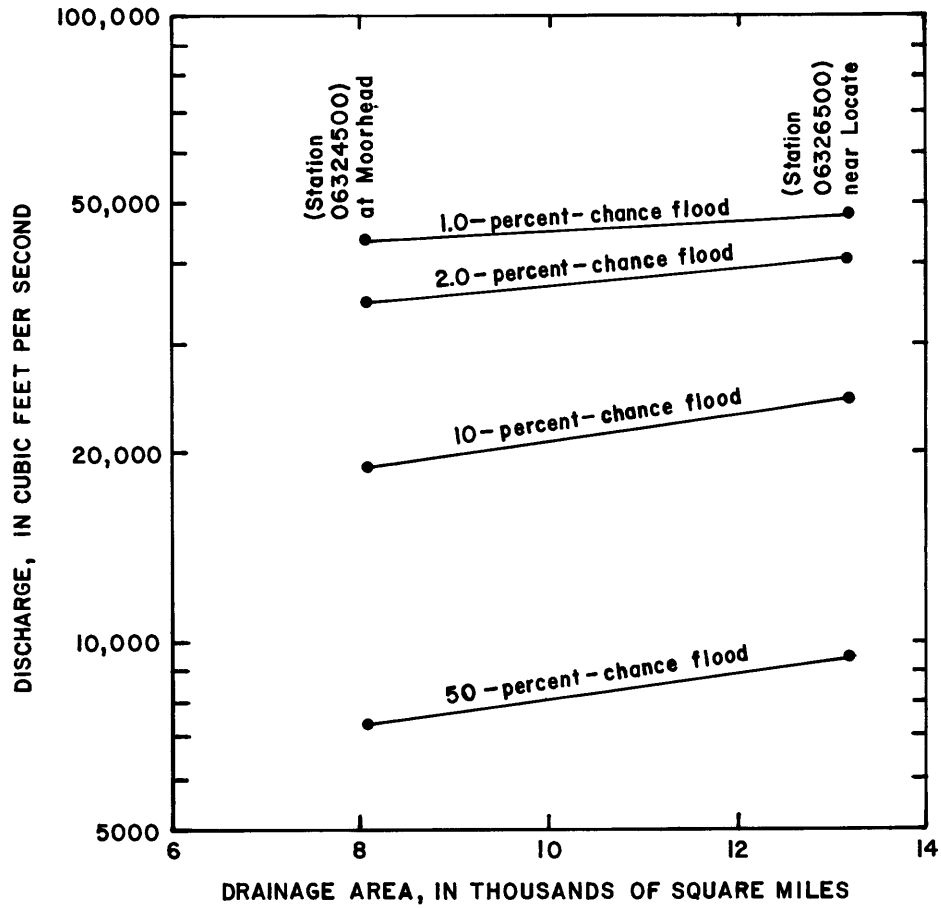


Figure 19.--Flood frequency for the Powder River.

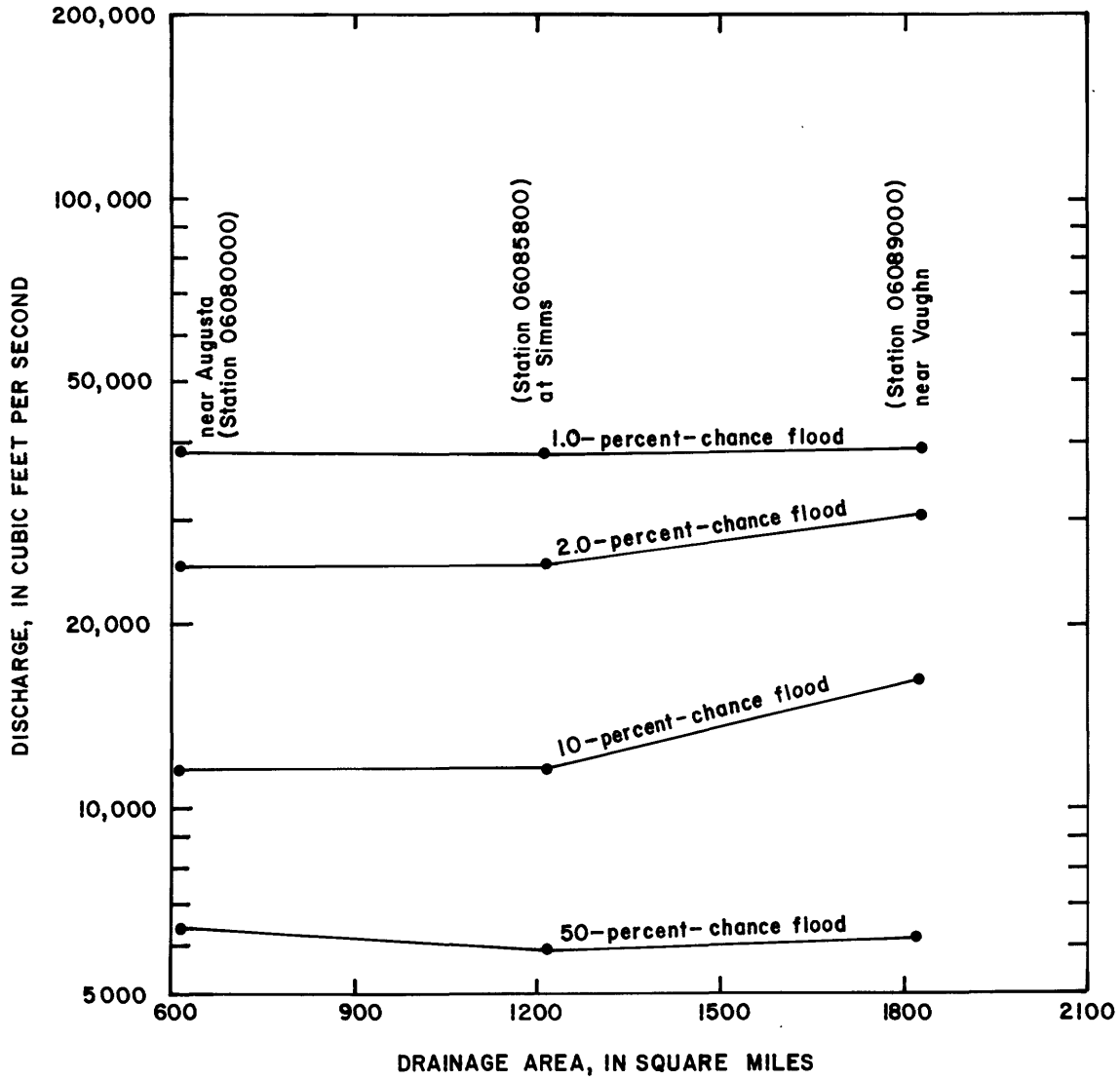


Figure 20.--Flood frequency for the Sun River.

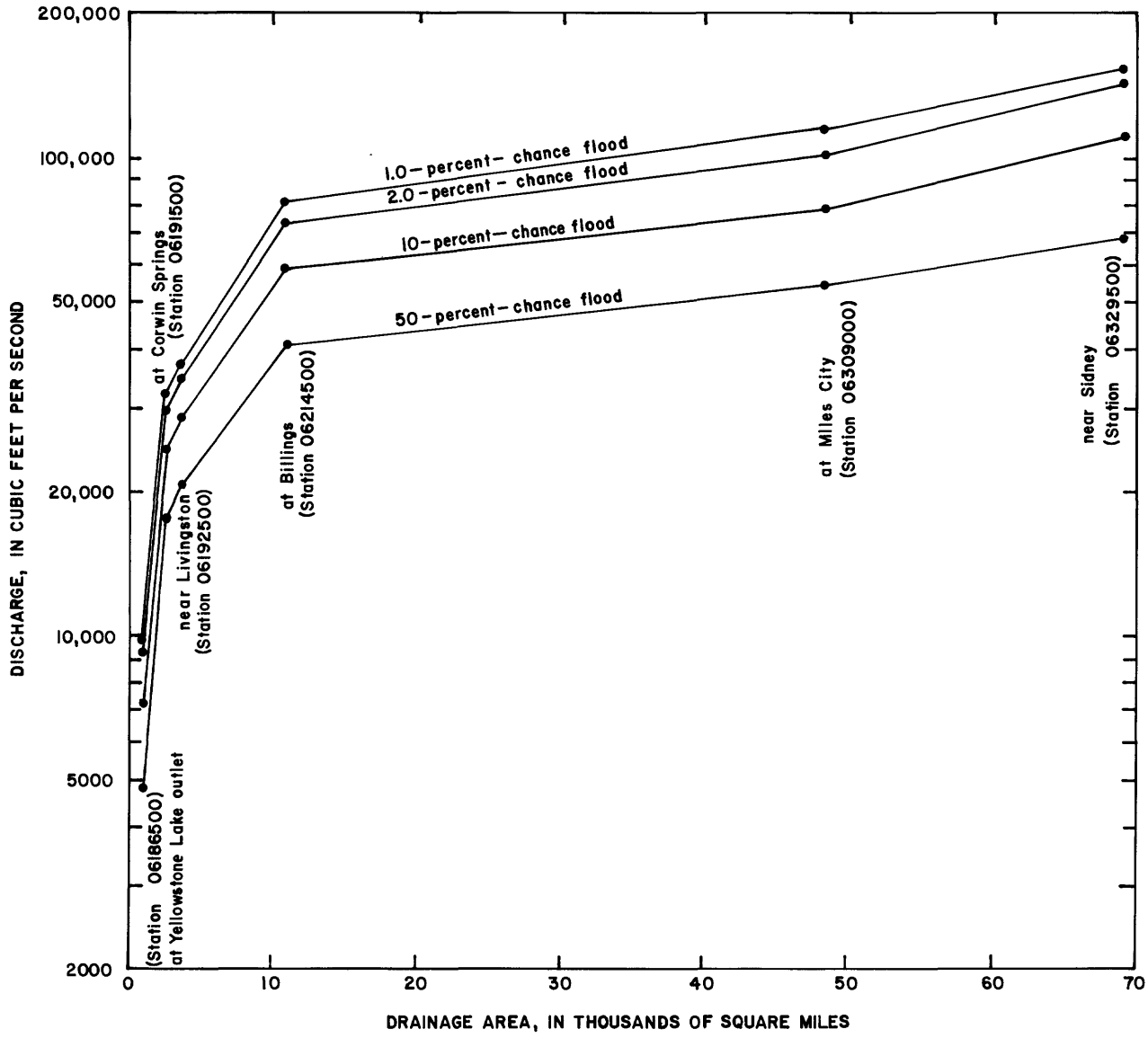


Figure 21.--Flood frequency for the Yellowstone River.

ILLUSTRATIVE EXAMPLES

The procedure for determining flood magnitudes at ungaged sites is shown by the following examples:

Example 1. (Using the regression equations)

Determine the flood magnitude for an exceedance probability of 1 percent (recurrence interval of 100 years) for an ungaged site in the Southeast Plains Region where the drainage area is 14.6 square miles, the percentage of forest cover (F) is 17, and the basin mean geographical factor (G_f) from figure 5 is 1.2.

From the Southeast Plains Region equations (table 3), the flood magnitude for a 1-percent exceedance probability is:

$$Q_{1\%} = 2{,}770\ A^{0.53}\ (F+10)^{-0.76} G_f$$

$$= (2{,}770)(14.6)^{0.53}\ (27)^{-0.76}(1.2)$$

$$= (2{,}770)(4.14)(0.0817)(1.2)$$

$$= 1{,}120 \text{ cubic feet per second}$$

Example 2. (Using the regression equations when the drainage basin is in two regions

Determine the flood magnitude for an exceedance probability of 2 percent (recurrence interval of 50 years) for a site in northeastern Montana where 10.5 square miles of the total drainage area is in the Northeast Plains Region and 32.2 square miles of the total drainage area is in the East-Central Plains Region. That part of the drainage basin in the Northeast Plains Region has a mean basin elevation (E) of 3,120 feet, an average January minimum temperature (TI) from figure 4 of -2 degrees Fahrenheit, and a basin mean geographical factor from figure 5 of 1.1.

From the Northeast Plains Region equations, the flood magnitude for a 2-percent exceedance probability is:

$$Q_{2\%} = 519\ A^{0.55}\ (E/1000)^{-0.38}\ (TI+10)^{-0.26}\ G_f$$

$$= (519)(42.7)^{0.55}\ (3.12)^{-0.38}\ (8.0)^{-0.26}\ (1.1)$$

$$= (519)(7.88)(0.649)(0.582)(1.1)$$

$$= 1{,}700 \text{ cubic feet per second}$$

That part of the drainage basin in the East-Central Plains has a mean basin elevation (E) of 2,980 feet and a basin mean geographical factor of 1.2. The flood magnitude for a 2-percent exceedance probability as determined from the East-Central Region equations is:

$$Q_{2\%} = 1{,}460\ A^{0.47}(E/1000)^{-0.99}\ G_f$$

$$= (1{,}460)(42.7)^{0.47}\ (2.98)^{-0.99}(1.2)$$

$$= (1{,}460)(5.84)(0.339)(1.2)$$

$$= 3{,}470 \text{ cubic feet per second}$$

The weighted average flood magnitude for a 2-percent exceedance probability is thus:

$$Q_{2\%} = 1{,}700 \left(\frac{10.5}{42.7}\right) + 3{,}470 \left(\frac{32.2}{42.7}\right)$$

$$= 3{,}030 \text{ cubic feet per second}$$

Example 3. (Transferring data from gaged site)

Determine the flood magnitude for a recurrence interval of 100 years (exceedance probability of 1.0 percent) for the Tobacco River near Eureka, Mont., at an ungaged site where the drainage area is 305 square miles. From table 2 (West Region), the drainage area of the gage site (12301300) is 440 square miles and from table 1 the weighted value for the 1-percent flood is 3,960 cubic feet per second. From the equations for the West Region where F is greater than 15 percent (table 3), the exponent on drainage area (A) for a 1-percent flood is 0.84. Using equation 5, the flood magnitude for a 1-percent exceedance probability at the site is:

$$Q_{1\%} = (305/440)^{0.84}\ (3{,}960)$$

$$= (0.735)\ (3{,}960)$$

$$= 2{,}910 \text{ cubic feet per second}$$

SUMMARY

Multiple-regression equations relating annual flood magnitude to various basin characteristics for exceedance probabilities of 50, 20, 10, 4, 2 and 1 percent were developed for eight regions in Montana. The maximum number of basin characteristics found to be significant in the equations in any region was four, including a geographical factor. The minimum number of basin characteristics included in any of the equations was two. The most significant basin characteristic in all regions was drainage area. The standard error of estimate for an exceedance probability of 1 percent ranged from 39 to 83 percent when using the geographical factor. For an exceedance probability of 50 percent, the standard error of estimate ranged from 52 to 105 percent considering the geographical factor. The standard error of estimate for all exceedance probabilities was improved significantly compared to previous regression analyses.

A technique for transferring gage data upstream or downstream from the gaged site using a drainage-area ratio adjustment was also presented. Curves relating flood magnitude to drainage area were prepared for the major streams having several gaged sites.

Flood magnitude-frequency data at streamflow-gaging stations were weighted with predicted values from the regression equations, and the results are presented in tabular form. The use of weighted values at the gaged sites provides more reliable flood magnitude estimates than the use of station data only.

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Table 1.--*Annual flood magnitude-frequency data for streamflow-gaging stations*

STATION		DISCHARGES, IN CUBIC FEET PER SECOND, FOR SELECTED EXCEEDANCE PROBABILITIES						
		Q(50%)	Q(20%)	Q(10%)	Q(4%)	Q(2%)	Q(1%)	MAXIMUM OF RECORD
				WEST REGION				
12300500	Q(STATION)	737	1130	1420	1820	2140	2480	1810
	Q(PREDICTED)	513	804	1010	1270	1480	1710	-
	Q(WEIGHTED)	725	1100	1370	1740	2030	2310	-
12300800	Q(STATION)	138	191	226	272	306	340	310
	Q(PREDICTED)	150	232	290	365	422	482	-
	Q(WEIGHTED)	139	195	235	287	328	374	-
12301300	Q(STATION)	1580	2190	2580	3070	3430	3780	2810
	Q(PREDICTED)	1740	2510	3010	3620	4080	4560	-
	Q(WEIGHTED)	1590	2220	2640	3150	3550	3960	-
12301700	Q(STATION)	6	10	14	19	24	29	14
	Q(PREDICTED)	6	11	15	21	27	34	-
	Q(WEIGHTED)	7	10	14	19	25	31	-
12301800	Q(STATION)	65	111	149	203	248	299	230
	Q(PREDICTED)	36	64	86	116	140	171	-
	Q(WEIGHTED)	62	103	135	181	216	252	-
12302000	Q(STATION)	3400	5150	6340	7830	8940	10000	8720
	Q(PREDICTED)	4050	5710	6780	8070	9040	10000	-
	Q(WEIGHTED)	3430	5190	6380	7860	8950	10000	-
12302400	Q(STATION)	12	30	48	78	106	139	200
	Q(PREDICTED)	22	38	50	66	79	93	-
	Q(WEIGHTED)	13	31	48	76	101	128	-
12302500	Q(STATION)	586	915	1160	1510	1790	2100	2000
	Q(PREDICTED)	439	635	766	931	1050	1160	-
	Q(WEIGHTED)	578	892	1110	1430	1670	1900	-
12303100	Q(STATION)	225	325	391	474	536	597	709
	Q(PREDICTED)	267	388	469	574	650	714	-
	Q(WEIGHTED)	228	332	402	491	559	628	-
12303500	Q(STATION)	2590	3240	3630	4110	4450	4780	7000
	Q(PREDICTED)	3420	4500	5140	5930	6460	6840	-
	Q(WEIGHTED)	2660	3400	3900	4500	4950	5430	-
12304250	Q(STATION)	29	46	58	74	87	100	100
	Q(PREDICTED)	25	44	59	80	97	118	-
	Q(WEIGHTED)	29	46	58	75	89	105	-
12304300	Q(STATION)	133	182	213	252	280	308	350
	Q(PREDICTED)	112	173	216	274	317	360	-
	Q(WEIGHTED)	132	181	213	256	287	321	-
12304400	Q(STATION)	164	248	306	382	439	497	400
	Q(PREDICTED)	158	240	297	372	428	481	-
	Q(WEIGHTED)	164	247	304	380	436	492	-
12304500	Q(STATION)	7590	9820	11200	12800	14000	15100	13400
	Q(PREDICTED)	6520	8770	10100	11700	12900	13900	-
	Q(WEIGHTED)	7540	9740	11100	12700	13800	14900	-
12323300	Q(STATION)	21	50	77	123	165	214	123
	Q(PREDICTED)	11	23	33	50	64	86	-
	Q(WEIGHTED)	20	47	71	111	146	183	-
12323500	Q(STATION)	188	295	370	469	545	623	692
	Q(PREDICTED)	135	245	323	436	531	658	-
	Q(WEIGHTED)	183	288	361	462	541	635	-
12324100	Q(STATION)	360	484	563	660	731	800	580
	Q(PREDICTED)	309	490	619	789	920	1070	-
	Q(WEIGHTED)	356	485	572	684	771	874	-
12324700	Q(STATION)	43	82	115	164	207	256	133
	Q(PREDICTED)	12	25	36	52	67	87	-
	Q(WEIGHTED)	41	77	105	147	182	217	-
12324800	Q(STATION)	8	14	18	23	28	65	23
	Q(PREDICTED)	40	75	104	144	179	226	-
	Q(WEIGHTED)	11	21	33	47	63	113	-

Table 1.--*Annual flood magnitude-frequency data for streamflow-gaging stations*--Continued

STATION		DISCHARGES, IN CUBIC FEET PER SECOND, FOR SELECTED EXCEEDANCE PROBABILITIES						
		Q(50%)	Q(20%)	Q(10%)	Q(4%)	Q(2%)	Q(1%)	MAXIMUM OF RECORD
				WEST REGION--Continued				
12330000	Q(STATION)	375	553	677	840	965	1090	1460
	Q(PREDICTED)	410	647	817	1030	1210	1400	-
	Q(WEIGHTED)	376	558	687	857	991	1130	-
12332000	Q(STATION)	912	1240	1440	1670	1830	1980	1590
	Q(PREDICTED)	740	1110	1360	1680	1920	2190	-
	Q(WEIGHTED)	907	1230	1430	1670	1840	2010	-
12335500	Q(STATION)	504	915	1250	1730	2130	2560	1800
	Q(PREDICTED)	495	807	1030	1330	1570	1860	-
	Q(WEIGHTED)	504	909	1230	1690	2070	2460	-
12338500	Q(STATION)	5230	8210	10500	13600	16200	18900	17600
	Q(PREDICTED)	6310	8890	10500	12500	13900	1550	-
	Q(WEIGHTED)	5280	8260	10500	13500	15800	15400	-
12339900	Q(STATION)	94	156	202	264	314	365	300
	Q(PREDICTED)	39	71	97	134	164	205	-
	Q(WEIGHTED)	91	148	188	243	286	326	-
12340000	Q(STATION)	9360	14000	16900	20400	22900	25200	19200
	Q(PREDICTED)	8730	12000	14000	16400	18000	19900	-
	Q(WEIGHTED)	9340	13900	16700	20100	22400	24500	-
12340200	Q(STATION)	17	26	33	41	47	54	50
	Q(PREDICTED)	18	34	47	65	80	100	-
	Q(WEIGHTED)	17	27	35	46	55	68	-
12341000	Q(STATION)	1310	1740	2000	2310	2530	2740	2400
	Q(PREDICTED)	363	561	700	877	1020	1170	-
	Q(WEIGHTED)	1200	1540	1690	1920	2050	2130	-
12343400	Q(STATION)	1930	2820	3380	4050	4530	5000	4000
	Q(PREDICTED)	1460	2130	2570	3120	3530	3970	-
	Q(WEIGHTED)	1910	2780	3320	3960	4420	4840	-
12344300	Q(STATION)	8	14	19	24	29	33	25
	Q(PREDICTED)	17	33	46	64	80	102	-
	Q(WEIGHTED)	9	16	22	30	38	49	-
12345800	Q(STATION)	148	209	248	294	327	359	265
	Q(PREDICTED)	95	144	178	223	256	288	-
	Q(WEIGHTED)	144	201	237	280	311	339	-
12346500	Q(STATION)	656	853	974	1120	1220	1320	1210
	Q(PREDICTED)	428	652	807	1000	1160	1320	-
	Q(WEIGHTED)	646	839	957	1110	1210	1320	-
12347500	Q(STATION)	607	765	856	959	1030	1090	1170
	Q(PREDICTED)	433	614	731	881	989	1080	-
	Q(WEIGHTED)	600	755	844	950	1020	1090	-
12348500	Q(STATION)	105	137	156	178	194	209	170
	Q(PREDICTED)	106	174	224	292	345	407	-
	Q(WEIGHTED)	105	141	166	197	223	259	-
12350000	Q(STATION)	701	894	1010	1140	1230	1320	1340
	Q(PREDICTED)	461	650	773	927	1040	1130	-
	Q(WEIGHTED)	686	870	977	1100	1190	1270	-
12350200	Q(STATION)	109	159	191	231	259	287	200
	Q(PREDICTED)	59	93	117	149	173	197	-
	Q(WEIGHTED)	105	151	179	215	240	261	-
12350500	Q(STATION)	808	1060	1210	1380	1500	1620	1300
	Q(PREDICTED)	495	695	824	989	1100	1200	-
	Q(WEIGHTED)	791	1030	1160	1320	1430	1530	-
12351000	Q(STATION)	339	507	619	761	865	969	1100
	Q(PREDICTED)	313	491	616	780	906	1050	-
	Q(WEIGHTED)	338	506	619	763	869	980	-
12351400	Q(STATION)	47	79	102	132	156	180	104
	Q(PREDICTED)	52	93	125	171	209	259	-
	Q(WEIGHTED)	47	81	106	139	168	203	-

Table 1.--*Annual flood magnitude-frequency data for streamflow-gaging stations*--Continued

STATION		DISCHARGES, IN CUBIC FEET PER SECOND, FOR SELECTED EXCEEDANCE PROBABILITIES						
		Q(50%)	Q(20%)	Q(10%)	Q(4%)	Q(2%)	Q(1%)	MAXIMUM OF RECORD
				WEST REGION--Continued				
12352000	Q(STATION)	1520	1840	2020	2230	2380	2510	2660
	Q(PREDICTED)	2310	3160	3670	4310	4760	5150	-
	Q(WEIGHTED)	1600	2040	2360	2730	3040	3430	-
12352200	Q(STATION)	10	25	39	62	82	105	56
	Q(PREDICTED)	22	39	52	70	85	104	-
	Q(WEIGHTED)	11	27	41	64	83	105	-
12353400	Q(STATION)	30	69	104	158	206	260	170
	Q(PREDICTED)	51	87	116	154	185	223	-
	Q(WEIGHTED)	32	71	106	157	201	249	-
12353800	Q(STATION)	72	115	145	184	213	242	230
	Q(PREDICTED)	84	136	173	223	262	305	-
	Q(WEIGHTED)	73	117	149	191	223	259	-
12353850	Q(STATION)	34	55	69	86	99	113	66
	Q(PREDICTED)	30	49	63	83	98	114	-
	Q(WEIGHTED)	34	54	68	86	99	113	-
12354000	Q(STATION)	4190	6080	7310	8820	9920	11000	11000
	Q(PREDICTED)	2200	2970	3450	4030	4440	4790	-
	Q(WEIGHTED)	4100	5850	6900	8210	9100	9770	-
12354100	Q(STATION)	173	245	290	346	385	423	295
	Q(PREDICTED)	141	215	266	333	384	436	-
	Q(WEIGHTED)	170	241	286	343	385	427	-
12363900	Q(STATION)	15	24	32	44	53	64	40
	Q(PREDICTED)	21	36	49	66	80	97	-
	Q(WEIGHTED)	15	25	35	48	59	74	-
12364000	Q(STATION)	454	874	1220	1740	2170	2650	1380
	Q(PREDICTED)	778	1200	1490	1870	2150	2490	-
	Q(WEIGHTED)	491	931	1280	1780	2160	2590	-
12365000	Q(STATION)	1520	2500	3170	4020	4650	5270	4330
	Q(PREDICTED)	1890	2740	3280	3960	4470	5010	-
	Q(WEIGHTED)	1540	2520	3180	4010	4620	5220	-
12366000	Q(STATION)	820	1090	1250	1450	1580	1720	1580
	Q(PREDICTED)	824	1220	1480	1800	2050	2310	-
	Q(WEIGHTED)	820	1100	1270	1490	1640	1830	-
12370500	Q(STATION)	38	79	115	172	222	280	131
	Q(PREDICTED)	66	118	160	218	266	330	-
	Q(WEIGHTED)	40	83	121	179	230	292	-
12370900	Q(STATION)	8	19	29	48	65	88	44
	Q(PREDICTED)	25	41	54	71	84	99	-
	Q(WEIGHTED)	9	22	33	53	69	91	-
12371100	Q(STATION)	28	57	84	126	163	206	104
	Q(PREDICTED)	52	84	108	140	165	192	-
	Q(WEIGHTED)	29	59	87	128	163	203	-
12374300	Q(STATION)	89	165	227	318	395	478	250
	Q(PREDICTED)	114	192	251	330	394	473	-
	Q(WEIGHTED)	91	168	231	320	395	477	-
12375700	Q(STATION)	25	49	68	96	119	144	100
	Q(PREDICTED)	11	21	30	43	55	71	-
	Q(WEIGHTED)	24	46	61	85	104	122	-
12378000	Q(STATION)	463	718	900	1140	1330	1520	1700
	Q(PREDICTED)	533	778	940	1150	1300	1450	-
	Q(WEIGHTED)	470	728	909	1140	1320	1490	-
12389500	Q(STATION)	2690	4270	5360	6740	7770	8780	6190
	Q(PREDICTED)	4130	5640	6560	7690	8490	9230	-
	Q(WEIGHTED)	2760	4380	5500	6870	7890	8870	-
12390700	Q(STATION)	1790	2670	3260	3990	4520	5050	5490
	Q(PREDICTED)	1800	2470	2900	3410	3780	4100	-
	Q(WEIGHTED)	1790	2650	3220	3910	4400	4840	-

Table 1.--*Annual flood magnitude-frequency data for streamflow-gaging stations*--Continued

STATION		DISCHARGES, IN CUBIC FEET PER SECOND, FOR SELECTED EXCEEDANCE PROBABILITIES						
		Q(50%)	Q(20%)	Q(10%)	Q(4%)	Q(2%)	Q(1%)	MAXIMUM OF RECORD
				NORTHWEST REGION				
5010000	Q(STATION)	1550	1900	2210	3050	5600	12000	12000
	Q(PREDICTED)	2310	2930	3370	4250	5970	9180	-
	Q(WEIGHTED)	1620	2070	2450	3380	5780	10600	-
5011000	Q(STATION)	1950	2680	3210	4800	9200	16700	16400
	Q(PREDICTED)	2840	3770	4440	5690	7890	11800	-
	Q(WEIGHTED)	1970	2730	3290	4880	8950	15700	-
5012500	Q(STATION)	540	680	790	1000	1500	2600	5930
	Q(PREDICTED)	500	703	863	1150	1680	2670	-
	Q(WEIGHTED)	536	684	805	1040	1590	2630	-
5013000	Q(STATION)	4600	5850	7000	9000	15000	25700	25700
	Q(PREDICTED)	5820	7240	8220	10200	13900	20400	-
	Q(WEIGHTED)	4640	5930	7090	9130	14700	24500	-
5014000	Q(STATION)	186	262	314	382	433	486	540
	Q(PREDICTED)	120	172	216	295	454	773	-
	Q(WEIGHTED)	182	253	301	366	441	592	-
5014500	Q(STATION)	1010	1310	1510	1900	3300	6700	6700
	Q(PREDICTED)	1010	1260	1450	1820	2620	4190	-
	Q(WEIGHTED)	1020	1310	1510	1890	3160	6190	-
5015000	Q(STATION)	195	310	400	620	1000	1800	720
	Q(PREDICTED)	274	361	431	561	847	1420	-
	Q(WEIGHTED)	204	320	408	600	915	1590	-
6073000	Q(STATION)	1140	2000	2750	4300	6200	10500	17400
	Q(PREDICTED)	1720	2840	3780	5360	7430	10700	-
	Q(WEIGHTED)	1170	2090	2890	4500	6650	10600	-
6078500	Q(STATION)	3100	4000	4650	6200	10500	17500	51100
	Q(PREDICTED)	4170	6250	7850	10600	14400	20400	-
	Q(WEIGHTED)	3170	4260	5140	7110	12000	18700	-
6079600	Q(STATION)	119	276	450	800	1350	2500	4360
	Q(PREDICTED)	216	445	670	1060	1550	2310	-
	Q(WEIGHTED)	129	306	501	879	1450	2400	-
6080000	Q(STATION)	6400	9600	12000	17100	24500	38000	59700
	Q(PREDICTED)	9590	13600	16400	21500	28400	39400	-
	Q(WEIGHTED)	6600	10100	12600	18000	26000	38600	-
6081500	Q(STATION)	150	350	540	890	1250	1470	1150
	Q(PREDICTED)	566	1190	1810	2870	4010	5570	-
	Q(WEIGHTED)	183	469	773	1380	2490	3350	-
6084500	Q(STATION)	855	2190	3450	5450	7200	9160	12000
	Q(PREDICTED)	1020	2090	3100	4830	6650	9120	-
	Q(WEIGHTED)	868	2180	3390	5300	6950	9140	-
6092000	Q(STATION)	3600	5200	6700	9900	15500	29000	100000
	Q(PREDICTED)	4140	6520	8370	11600	15600	21700	-
	Q(WEIGHTED)	3620	5290	6860	10100	15500	26900	-
6092500	Q(STATION)	1600	2400	3000	4300	7100	13000	49700
	Q(PREDICTED)	1770	2860	3740	5250	7240	10400	-
	Q(WEIGHTED)	1610	2460	3120	4500	7160	11900	-
6098000	Q(STATION)	490	1340	2450	5100	8700	14000	21600
	Q(PREDICTED)	1130	2170	3130	4740	6560	9140	-
	Q(WEIGHTED)	532	1440	2560	5020	7830	12000	-
6102500	Q(STATION)	1400	2650	3900	6400	10000	17500	54600
	Q(PREDICTED)	1370	2340	3160	4680	6350	9140	-
	Q(WEIGHTED)	1400	2600	3760	5960	8310	13600	-
6132200	Q(STATION)	380	790	1200	2100	3400	6200	12000
	Q(PREDICTED)	746	1300	1780	2590	3660	5320	-
	Q(WEIGHTED)	412	869	1320	2230	3520	5770	-
12335000	Q(STATION)	2110	3730	5010	6850	8380	10000	9500
	Q(PREDICTED)	1220	2650	4040	6410	8550	11100	-
	Q(WEIGHTED)	2020	3550	4800	6720	8470	10600	-

Table 1.--*Annual flood magnitude-frequency data for streamflow-gaging stations*--Continued

STATION		DISCHARGES, IN CUBIC FEET PER SECOND, FOR SELECTED EXCEEDANCE PROBABILITIES						
		Q(50%)	Q(20%)	Q(10%)	Q(4%)	Q(2%)	Q(1%)	MAXIMUM OF RECORD
				NORTHWEST REGION--Continued				
12355000	Q(STATION)	7430	10300	12100	14300	16000	17600	16300
	Q(PREDICTED)	6460	8390	9710	12200	16300	23200	-
	Q(WEIGHTED)	7400	10200	11900	14100	16100	19000	-
12355500	Q(STATION)	20600	26300	30000	35200	39500	44500	69100
	Q(PREDICTED)	7890	12700	16500	22700	29200	38000	-
	Q(WEIGHTED)	20200	25600	29000	33900	37200	43000	-
12356000	Q(STATION)	160	225	275	380	620	1100	3820
	Q(PREDICTED)	110	198	280	418	627	989	-
	Q(WEIGHTED)	157	222	276	388	623	1060	-
12356500	Q(STATION)	410	620	800	1040	1560	2350	8340
	Q(PREDICTED)	295	484	646	923	1350	2080	-
	Q(WEIGHTED)	396	591	758	999	1440	2190	-
12357000	Q(STATION)	9800	14000	17000	22000	27000	34500	75300
	Q(PREDICTED)	7590	10000	11700	14800	19600	27700	-
	Q(WEIGHTED)	9650	13500	16200	20500	24000	31700	-
12357300	Q(STATION)	130	235	335	515	820	1400	10000
	Q(PREDICTED)	53	96	136	207	321	533	-
	Q(WEIGHTED)	123	212	293	430	575	968	-
12357400	Q(STATION)	2	5	9	15	22	32	10
	Q(PREDICTED)	2	5	8	15	24	43	-
	Q(WEIGHTED)	2	5	9	15	23	38	-
12358500	Q(STATION)	22000	29000	35000	43000	52000	66000	140000
	Q(PREDICTED)	19400	23100	25400	30500	39500	55100	-
	Q(WEIGHTED)	21900	28500	34000	41200	48300	62700	-
12359000	Q(STATION)	15300	18900	21000	24000	26000	30000	36700
	Q(PREDICTED)	12500	15800	17900	22100	28800	40100	-
	Q(WEIGHTED)	15100	18400	20400	23500	27300	34900	-
12359500	Q(STATION)	3700	4450	4900	5500	6000	6900	20200
	Q(PREDICTED)	2780	3800	4550	5900	8070	11800	-
	Q(WEIGHTED)	3570	4290	4790	5660	7290	9980	-
12359800	Q(STATION)	18500	24600	29000	34600	38500	45000	50900
	Q(PREDICTED)	15000	18800	21100	25900	33700	46500	-
	Q(WEIGHTED)	18100	23600	27200	32000	36000	45800	-
12360000	Q(STATION)	1400	1950	2310	2890	3050	4100	5830
	Q(PREDICTED)	689	1050	1350	1850	2640	4000	-
	Q(WEIGHTED)	1320	1770	2060	2540	2820	4040	-
12361000	Q(STATION)	1860	2430	2800	3210	3600	4100	5020
	Q(PREDICTED)	593	1040	1430	2090	2940	4290	-
	Q(WEIGHTED)	1780	2270	2600	2990	3340	4170	-
12361500	Q(STATION)	1290	1880	2290	2820	3230	3650	3780
	Q(PREDICTED)	692	1000	1250	1670	2430	3800	-
	Q(WEIGHTED)	1220	1700	2020	2440	2780	3730	-
12362500	Q(STATION)	25000	34500	40200	47500	53700	61500	78000
	Q(PREDICTED)	13500	18800	22500	29000	37200	49700	-
	Q(WEIGHTED)	24600	33400	38500	45000	49100	58100	-
				SOUTHWEST REGION				
6011000	Q(STATION)	711	932	1070	1220	1330	1430	1360
	Q(PREDICTED)	738	986	1160	1340	1470	1590	-
	Q(WEIGHTED)	714	943	1090	1260	1370	1470	-
6013200	Q(STATION)	5	19	37	75	116	170	28
	Q(PREDICTED)	12	24	32	46	57	69	-
	Q(WEIGHTED)	6	21	35	62	92	129	-
6013400	Q(STATION)	62	115	156	213	258	305	197
	Q(PREDICTED)	127	195	242	302	348	394	-
	Q(WEIGHTED)	73	140	190	252	295	341	-

Table 1.--*Annual flood magnitude-frequency data for streamflow-gaging stations*--Continued

STATION		DISCHARGES, IN CUBIC FEET PER SECOND, FOR SELECTED EXCEEDANCE PROBABILITIES						
		Q(50%)	Q(20%)	Q(10%)	Q(4%)	Q(2%)	Q(1%)	MAXIMUM OF RECORD
		SOUTHWEST REGION--Continued						
6013500	Q(STATION)	345	522	639	784	890	994	909
	Q(PREDICTED)	512	695	820	957	1060	1150	-
	Q(WEIGHTED)	361	557	687	836	937	1040	-
6015500	Q(STATION)	391	681	893	1180	1400	1620	1870
	Q(PREDICTED)	624	847	1000	1170	1290	1410	-
	Q(WEIGHTED)	407	706	914	1180	1380	1580	-
6017500	Q(STATION)	196	284	341	410	461	509	426
	Q(PREDICTED)	449	610	719	841	931	1010	-
	Q(WEIGHTED)	228	367	464	568	622	678	-
6019500	Q(STATION)	936	1200	1370	1560	1690	1830	1700
	Q(PREDICTED)	741	982	1150	1320	1450	1570	-
	Q(WEIGHTED)	923	1170	1330	1510	1640	1780	-
6019800	Q(STATION)	21	38	50	68	82	96	90
	Q(PREDICTED)	19	36	50	70	86	104	-
	Q(WEIGHTED)	21	37	51	69	83	99	-
6025300	Q(STATION)	101	143	170	204	229	253	180
	Q(PREDICTED)	86	137	173	222	259	298	-
	Q(WEIGHTED)	99	141	171	212	241	271	-
6025500	Q(STATION)	7230	10400	12400	14700	16300	17900	23000
	Q(PREDICTED)	4880	5710	6340	6790	7160	7430	-
	Q(WEIGHTED)	7110	9880	11500	13300	14800	16300	-
6027700	Q(STATION)	135	190	227	274	309	344	250
	Q(PREDICTED)	81	137	179	239	286	337	-
	Q(WEIGHTED)	128	177	211	261	301	342	-
6029000	Q(STATION)	65	95	116	143	164	186	126
	Q(PREDICTED)	65	107	136	177	207	240	-
	Q(WEIGHTED)	65	98	123	156	180	206	-
6030300	Q(STATION)	11	41	82	171	275	423	169
	Q(PREDICTED)	15	41	68	119	168	232	-
	Q(WEIGHTED)	11	41	78	153	241	362	-
6030500	Q(STATION)	148	246	323	431	520	617	582
	Q(PREDICTED)	85	143	184	243	288	337	-
	Q(WEIGHTED)	135	207	258	335	407	482	-
6033000	Q(STATION)	1100	1760	2250	2930	3480	4070	3500
	Q(PREDICTED)	1330	1890	2290	2740	3090	3420	-
	Q(WEIGHTED)	1110	1780	2260	2890	3410	3950	-
6034700	Q(STATION)	25	163	437	1260	2490	4610	2130
	Q(PREDICTED)	26	109	228	522	885	1440	-
	Q(WEIGHTED)	25	146	355	938	1830	3330	-
6034800	Q(STATION)	1	6	24	116	320	800	96
	Q(PREDICTED)	4	18	41	103	184	316	-
	Q(WEIGHTED)	1	10	31	110	264	604	-
6035000	Q(STATION)	221	346	438	567	671	782	813
	Q(PREDICTED)	202	337	439	578	689	805	-
	Q(WEIGHTED)	220	345	438	569	675	787	-
6036600	Q(STATION)	2	5	7	12	16	22	10
	Q(PREDICTED)	1	7	15	40	74	129	-
	Q(WEIGHTED)	2	6	10	24	40	65	-
6037500	Q(STATION)	1320	1620	1800	2000	2140	2270	2150
	Q(PREDICTED)	940	1240	1440	1640	1800	1940	-
	Q(WEIGHTED)	1300	1580	1750	1940	2090	2220	-
6055500	Q(STATION)	514	743	906	1120	1300	1470	1300
	Q(PREDICTED)	193	304	384	489	569	652	-
	Q(WEIGHTED)	469	623	723	873	1030	1170	-
6056200	Q(STATION)	20	31	38	49	58	67	47
	Q(PREDICTED)	8	17	24	37	48	60	-
	Q(WEIGHTED)	18	27	33	44	54	64	-

Table 1.--*Annual flood magnitude-frequency data for streamflow-gaging stations*--Continued

STATION		DISCHARGES, IN CUBIC FEET PER SECOND, FOR SELECTED EXCEEDANCE PROBABILITIES						
		Q(50%)	Q(20%)	Q(10%)	Q(4%)	Q(2%)	Q(1%)	MAXIMUM OF RECORD
		SOUTHWEST REGION--Continued						
6056300	Q(STATION)	14	37	62	106	150	205	70
	Q(PREDICTED)	33	74	111	174	231	299	-
	Q(WEIGHTED)	17	47	79	132	179	238	-
6056600	Q(STATION)	206	326	418	550	658	776	445
	Q(PREDICTED)	207	361	481	650	787	935	-
	Q(WEIGHTED)	206	336	442	592	709	838	-
6058700	Q(STATION)	16	56	109	220	347	522	139
	Q(PREDICTED)	19	63	114	221	337	497	-
	Q(WEIGHTED)	16	58	111	220	344	514	-
6061500	Q(STATION)	264	414	522	664	775	890	1200
	Q(PREDICTED)	323	628	891	1290	1630	2020	-
	Q(WEIGHTED)	268	444	593	802	948	1120	-
6061700	Q(STATION)	12	19	25	33	39	47	25
	Q(PREDICTED)	8	18	27	43	57	74	-
	Q(WEIGHTED)	11	19	26	37	46	58	-
6061800	Q(STATION)	12	26	40	64	86	112	80
	Q(PREDICTED)	9	24	38	65	91	123	-
	Q(WEIGHTED)	12	25	39	64	88	116	-
6061900	Q(STATION)	149	261	350	480	587	705	390
	Q(PREDICTED)	73	149	213	316	406	508	-
	Q(WEIGHTED)	137	228	298	411	516	628	-
6062500	Q(STATION)	223	373	480	619	725	831	995
	Q(PREDICTED)	108	183	237	314	375	440	-
	Q(WEIGHTED)	218	355	448	572	676	777	-
6062700	Q(STATION)	2	5	7	11	14	18	16
	Q(PREDICTED)	2	4	6	10	14	19	-
	Q(WEIGHTED)	2	5	7	11	15	18	-
6063000	Q(STATION)	259	484	663	919	1130	1350	1360
	Q(PREDICTED)	229	448	637	923	1170	1450	-
	Q(WEIGHTED)	257	479	659	920	1140	1370	-
6068500	Q(STATION)	145	258	348	479	589	709	454
	Q(PREDICTED)	109	207	286	407	509	622	-
	Q(WEIGHTED)	140	245	328	453	562	680	-
6071200	Q(STATION)	99	235	367	593	808	1070	580
	Q(PREDICTED)	65	187	321	581	849	1200	-
	Q(WEIGHTED)	94	221	350	588	824	1120	-
6071400	Q(STATION)	73	229	415	784	1180	1710	1160
	Q(PREDICTED)	26	107	221	493	824	1320	-
	Q(WEIGHTED)	66	193	342	662	1040	1560	-
6071600	Q(STATION)	110	282	460	776	1090	1470	1020
	Q(PREDICTED)	57	197	376	764	1200	1820	-
	Q(WEIGHTED)	103	260	432	771	1130	1590	-
		UPPER YELLOWSTONE-CENTRAL MOUNTAIN REGION						
6043000	Q(STATION)	777	926	1010	1120	1190	1250	1020
	Q(PREDICTED)	622	887	1070	1310	1500	1690	-
	Q(WEIGHTED)	755	916	1030	1210	1350	1480	-
6043200	Q(STATION)	266	397	490	613	709	808	690
	Q(PREDICTED)	187	290	366	471	555	644	-
	Q(WEIGHTED)	258	377	455	563	647	739	-
6043300	Q(STATION)	15	24	30	38	44	51	30
	Q(PREDICTED)	17	31	43	61	77	95	-
	Q(WEIGHTED)	15	25	33	45	56	68	-
6043500	Q(STATION)	5310	7060	8120	9370	10200	11100	10000
	Q(PREDICTED)	3900	5090	5870	6840	7550	8240	-
	Q(WEIGHTED)	5270	6960	7920	9070	9820	10700	-

Table 1.--*Annual flood magnitude-frequency data for streamflow-gaging stations*--Continued

STATION		DISCHARGES, IN CUBIC FEET PER SECOND, FOR SELECTED EXCEEDANCE PROBABILITIES Q(50%)	Q(20%)	Q(10%)	Q(4%)	Q(2%)	Q(1%)	MAXIMUM OF RECORD
		UPPER YELLOWSTONE-CENTRAL MOUNTAIN REGION--Continued						
6046500	Q(STATION)	374	598	768	1010	1200	1420	1230
	Q(PREDICTED)	153	270	367	513	638	780	-
	Q(WEIGHTED)	357	550	675	862	1010	1190	-
6046700	Q(STATION)	13	31	49	81	112	150	70
	Q(PREDICTED)	19	46	75	128	181	250	-
	Q(WEIGHTED)	14	34	57	98	141	194	-
6047000	Q(STATION)	146	234	302	396	474	557	370
	Q(PREDICTED)	68	115	152	206	252	302	-
	Q(WEIGHTED)	139	213	262	331	387	453	-
6048000	Q(STATION)	542	823	1030	1310	1540	1780	1240
	Q(PREDICTED)	450	757	1000	1350	1650	1980	-
	Q(WEIGHTED)	535	813	1020	1320	1580	1850	-
6048500	Q(STATION)	288	459	590	774	925	1090	902
	Q(PREDICTED)	255	430	568	769	938	1120	-
	Q(WEIGHTED)	286	455	585	773	929	1100	-
6050000	Q(STATION)	367	525	634	778	889	1000	956
	Q(PREDICTED)	252	384	480	610	713	824	-
	Q(WEIGHTED)	357	501	594	723	822	930	-
6052500	Q(STATION)	4870	6570	7670	9030	10000	11000	9840
	Q(PREDICTED)	4950	6900	8240	10000	11300	12700	-
	Q(WEIGHTED)	4870	6590	7730	9160	10200	11300	-
6074500	Q(STATION)	121	265	407	652	892	1190	770
	Q(PREDICTED)	116	194	254	341	414	494	-
	Q(WEIGHTED)	120	248	353	516	657	836	-
6075600	Q(STATION)	13	25	35	52	66	84	52
	Q(PREDICTED)	26	52	76	115	151	195	-
	Q(WEIGHTED)	14	30	48	76	103	134	-
6076000	Q(STATION)	13	26	39	60	81	106	56
	Q(PREDICTED)	28	50	70	100	125	154	-
	Q(WEIGHTED)	14	30	46	72	96	123	-
6076700	Q(STATION)	59	96	123	161	191	223	138
	Q(PREDICTED)	35	60	80	110	136	164	-
	Q(WEIGHTED)	57	90	112	144	170	200	-
6076800	Q(STATION)	9	15	21	30	38	47	37
	Q(PREDICTED)	11	21	29	42	52	65	-
	Q(WEIGHTED)	9	17	24	35	44	55	-
6077000	Q(STATION)	208	303	372	467	542	622	460
	Q(PREDICTED)	210	330	421	546	649	757	-
	Q(WEIGHTED)	208	306	380	485	570	660	-
6077500	Q(STATION)	1940	3330	4470	6170	7640	9280	12300
	Q(PREDICTED)	3550	5640	7240	9510	11400	13400	-
	Q(WEIGHTED)	2070	3700	5160	7230	9020	10900	-
6077700	Q(STATION)	3	11	25	60	107	182	80
	Q(PREDICTED)	5	16	31	63	100	154	-
	Q(WEIGHTED)	3	12	27	61	104	169	-
6077800	Q(STATION)	83	242	422	764	1120	1580	1340
	Q(PREDICTED)	64	179	316	585	879	1280	-
	Q(WEIGHTED)	81	232	396	707	1030	1470	-
6090500	Q(STATION)	1530	2550	3400	4690	5820	7120	11000
	Q(PREDICTED)	1470	2330	2990	3910	4670	5480	-
	Q(WEIGHTED)	1530	2520	3320	4490	5470	6600	-
6109800	Q(STATION)	232	455	647	944	1210	1500	1340
	Q(PREDICTED)	343	543	695	906	1080	1260	-
	Q(WEIGHTED)	241	469	659	932	1160	1410	-
6115500	Q(STATION)	85	155	212	293	362	437	423
	Q(PREDICTED)	93	161	216	296	357	443	-
	Q(WEIGHTED)	86	156	213	294	361	438	-

Table 1.--*Annual flood magnitude-frequency data for streamflow-gaging stations*--Continued

STATION		DISCHARGES, IN CUBIC FEET PER SECOND, FOR SELECTED EXCEEDANCE PROBABILITIES Q(50%)	Q(20%)	Q(10%)	Q(4%)	Q(2%)	Q(1%)	MAXIMUM OF RECORD
		UPPER YELLOWSTONE-CENTRAL MOUNTAIN REGION--Continued						
6117000	Q(STATION)	49	104	153	232	304	387	167
	Q(PREDICTED)	75	130	175	240	296	359	-
	Q(WEIGHTED)	53	111	162	236	300	371	-
6118500	Q(STATION)	737	1220	1620	2210	2730	3300	5240
	Q(PREDICTED)	678	1080	1390	1830	2190	2580	-
	Q(WEIGHTED)	734	1210	1590	2130	2600	3120	-
6120500	Q(STATION)	1060	2040	2790	3820	4630	5470	7270
	Q(PREDICTED)	2190	3550	4600	6090	7340	8710	-
	Q(WEIGHTED)	1090	2120	2950	4090	5020	5960	-
6122000	Q(STATION)	328	727	1100	1690	2240	2870	2050
	Q(PREDICTED)	752	1420	2010	2940	3770	4730	-
	Q(WEIGHTED)	360	829	1310	2060	2770	3540	-
6187500	Q(STATION)	310	467	578	728	845	967	642
	Q(PREDICTED)	394	568	713	891	1030	1180	-
	Q(WEIGHTED)	317	482	610	778	911	1050	-
6188000	Q(STATION)	8400	10500	11700	13200	14300	15300	13600
	Q(PREDICTED)	2790	3800	4480	5350	6000	6650	-
	Q(WEIGHTED)	8190	10000	10800	11900	12700	13500	-
6191000	Q(STATION)	1120	1510	1760	2060	2270	2480	2080
	Q(PREDICTED)	1240	1670	2060	2510	2840	3180	-
	Q(WEIGHTED)	1120	1520	1790	2130	2380	2620	-
6191500	Q(STATION)	17400	22000	24700	27800	29800	31800	32000
	Q(PREDICTED)	15000	18100	20000	22200	23800	25200	-
	Q(WEIGHTED)	17300	21800	24300	27200	29000	30800	-
6193000	Q(STATION)	553	852	1080	1400	1660	1940	1770
	Q(PREDICTED)	475	721	899	1150	1340	1550	-
	Q(WEIGHTED)	547	833	1040	1330	1550	1800	-
6193500	Q(STATION)	1060	1800	2390	3250	3970	4770	4500
	Q(PREDICTED)	2010	3250	4210	5560	6680	7910	-
	Q(WEIGHTED)	1100	1920	2640	3680	4570	5500	-
6194000	Q(STATION)	211	392	548	791	1010	1260	1400
	Q(PREDICTED)	214	371	498	685	845	1030	-
	Q(WEIGHTED)	211	389	538	764	960	1190	-
6197000	Q(STATION)	674	1220	1710	2510	3260	4150	5870
	Q(PREDICTED)	423	705	927	1250	1520	1810	-
	Q(WEIGHTED)	643	1100	1450	1980	2440	3010	-
6197500	Q(STATION)	3740	4570	5090	5740	6210	6680	6800
	Q(PREDICTED)	2370	3260	3850	4620	5200	5790	-
	Q(WEIGHTED)	3670	4430	4880	5490	5940	6430	-
6200000	Q(STATION)	5950	7400	8330	9490	10300	11200	9840
	Q(PREDICTED)	3190	4490	5380	6550	7430	8340	-
	Q(WEIGHTED)	5800	7080	7810	8810	9520	10400	-
6200500	Q(STATION)	945	1370	1700	2150	2510	2910	3510
	Q(PREDICTED)	587	916	1160	1500	1770	2070	-
	Q(WEIGHTED)	932	1340	1630	2040	2360	2730	-
6201000	Q(STATION)	950	1540	2010	2700	3270	3910	3000
	Q(PREDICTED)	857	1530	2090	2940	3690	4530	-
	Q(WEIGHTED)	945	1540	2020	2760	3390	4090	-
6201550	Q(STATION)	9	24	40	69	101	142	55
	Q(PREDICTED)	17	51	94	184	285	427	-
	Q(WEIGHTED)	10	29	57	113	181	271	-
6201600	Q(STATION)	140	564	1200	2740	4720	7770	2680
	Q(PREDICTED)	319	690	1050	1660	2230	2940	-
	Q(WEIGHTED)	158	588	1160	2340	3670	5660	-
6201650	Q(STATION)	104	395	807	1750	2900	4580	3200
	Q(PREDICTED)	197	520	881	1570	2300	3270	-
	Q(WEIGHTED)	113	419	829	1680	2650	4010	-

Table 1.--*Annual flood magnitude-frequency data for streamflow-gaging stations*--Continued

STATION		DISCHARGES, IN CUBIC FEET PER SECOND, FOR SELECTED EXCEEDANCE PROBABILITIES						
		Q(50%)	Q(20%)	Q(10%)	Q(4%)	Q(2%)	Q(1%)	MAXIMUM OF RECORD
		UPPER YELLOWSTONE-CENTRAL MOUNTAIN REGION--Continued						
6201700	Q(STATION)	40	123	228	447	696	1040	307
	Q(PREDICTED)	46	133	237	445	673	986	-
	Q(WEIGHTED)	41	125	230	446	687	1020	-
6204050	Q(STATION)	747	1240	1620	2180	2640	3160	1630
	Q(PREDICTED)	767	1360	1630	1980	2240	2520	-
	Q(WEIGHTED)	749	1270	1620	2100	2450	2850	-
6204500	Q(STATION)	2310	3250	3910	4780	5460	6160	5790
	Q(PREDICTED)	2840	4070	4930	6070	6930	7830	-
	Q(WEIGHTED)	2340	3330	4070	5050	5830	6600	-
6205000	Q(STATION)	6600	8490	9710	11300	12400	13500	12000
	Q(PREDICTED)	5150	7460	9100	11300	13000	14800	-
	Q(WEIGHTED)	6550	8410	9640	11300	12500	13800	-
6205100	Q(STATION)	86	246	436	811	1220	1780	1580
	Q(PREDICTED)	36	108	196	377	579	861	-
	Q(WEIGHTED)	81	222	372	663	969	1410	-
6206500	Q(STATION)	1150	1480	1720	2050	2320	2600	4000
	Q(PREDICTED)	887	1240	1470	1780	2010	2250	-
	Q(WEIGHTED)	1140	1450	1670	1990	2230	2500	-
6207500	Q(STATION)	7640	9160	10100	11100	11900	12600	12700
	Q(PREDICTED)	5050	6790	7960	9440	10500	11600	-
	Q(WEIGHTED)	7560	9010	9880	10900	11700	12400	-
6207800	Q(STATION)	110	313	550	1020	1520	2200	2650
	Q(PREDICTED)	186	489	824	1460	2130	3010	-
	Q(WEIGHTED)	121	358	653	1220	1830	2630	-
6208500	Q(STATION)	7780	9540	10600	11800	12700	13500	11800
	Q(PREDICTED)	4580	6870	8570	10900	12700	14600	-
	Q(WEIGHTED)	7680	9370	10400	11700	12700	13700	-
6209500	Q(STATION)	1210	1710	2060	2510	2860	3210	3110
	Q(PREDICTED)	1300	1750	2050	2440	2720	3010	-
	Q(WEIGHTED)	1210	1710	2060	2500	2830	3170	-
6210000	Q(STATION)	528	798	995	1260	1480	1700	1850
	Q(PREDICTED)	582	826	993	1210	1380	1550	-
	Q(WEIGHTED)	532	802	995	1250	1450	1650	-
6211000	Q(STATION)	574	1200	1780	2720	3580	4600	2260
	Q(PREDICTED)	794	1510	2130	3110	3980	5000	-
	Q(WEIGHTED)	583	1230	1830	2790	3670	4690	-
6211500	Q(STATION)	250	563	879	1440	1990	2700	1720
	Q(PREDICTED)	261	610	964	1600	2220	3010	-
	Q(WEIGHTED)	250	567	891	1470	2040	2770	-
6215000	Q(STATION)	140	281	400	577	727	893	575
	Q(PREDICTED)	162	296	409	583	735	910	-
	Q(WEIGHTED)	143	285	403	580	731	902	-
6216000	Q(STATION)	177	331	468	686	884	1120	2280
	Q(PREDICTED)	252	463	644	923	1170	1450	-
	Q(WEIGHTED)	186	359	524	781	1010	1270	-
6216200	Q(STATION)	121	228	320	464	591	738	565
	Q(PREDICTED)	28	82	148	282	433	640	-
	Q(WEIGHTED)	115	208	283	413	540	705	-
6216300	Q(STATION)	80	197	321	551	786	1090	924
	Q(PREDICTED)	8	25	48	95	150	229	-
	Q(WEIGHTED)	74	170	253	406	553	760	-
6216500	Q(STATION)	651	1300	1920	3010	4090	5440	14900
	Q(PREDICTED)	865	1780	2640	4050	5370	6950	-
	Q(WEIGHTED)	659	1330	2010	3180	4340	5740	-
6287500	Q(STATION)	408	941	1530	2660	3880	5530	7810
	Q(PREDICTED)	337	647	1320	2220	3130	4300	-
	Q(WEIGHTED)	403	898	1480	2530	3620	5090	-

Table 1.--*Annual flood magnitude-frequency data for streamflow-gaging stations*--Continued

STATION		DISCHARGES, IN CUBIC FEET PER SECOND, FOR SELECTED EXCEEDANCE PROBABILITIES						
		Q(50%)	Q(20%)	Q(10%)	Q(4%)	Q(2%)	Q(1%)	MAXIMUM OF RECORD
		UPPER YELLOWSTONE-CENTRAL MOUNTAIN REGION--Continued						
6288200	Q(STATION)	571	1170	1740	2670	3550	4600	7350
	Q(PREDICTED)	288	741	1240	2180	3160	4450	-
	Q(WEIGHTED)	531	1060	1550	2450	3350	4520	-
6289000	Q(STATION)	1080	1520	1800	2150	2420	2670	2730
	Q(PREDICTED)	929	1320	1580	1940	2210	2490	-
	Q(WEIGHTED)	1070	1500	1770	2110	2370	2630	-
6290000	Q(STATION)	316	615	906	1420	1920	2570	5560
	Q(PREDICTED)	578	1170	1720	2610	3440	4430	-
	Q(WEIGHTED)	336	697	1090	1770	2440	3240	-
6290500	Q(STATION)	1310	2130	2820	3890	4830	5920	8010
	Q(PREDICTED)	1620	2620	3400	4490	5400	6380	-
	Q(WEIGHTED)	1320	2170	2910	4010	4960	6030	-
6291500	Q(STATION)	440	634	773	961	1110	1270	1130
	Q(PREDICTED)	361	619	828	1140	1390	1680	-
	Q(WEIGHTED)	436	633	781	997	1180	1370	-
6294000	Q(STATION)	2050	3750	5160	7250	9040	11000	22600
	Q(PREDICTED)	2100	3850	5360	7660	9710	12000	-
	Q(WEIGHTED)	2050	3760	5200	7360	9250	11300	-
6298000	Q(STATION)	1670	2270	2660	3140	3490	3840	3400
	Q(PREDICTED)	1570	2180	2600	3130	3540	3960	-
	Q(WEIGHTED)	1670	2260	2650	3140	3500	3860	-
6298500	Q(STATION)	123	228	316	451	568	701	850
	Q(PREDICTED)	187	303	392	518	621	733	-
	Q(WEIGHTED)	128	239	333	470	586	712	-
6299500	Q(STATION)	314	498	638	837	1000	1180	1130
	Q(PREDICTED)	270	420	531	684	809	942	-
	Q(WEIGHTED)	312	490	621	805	952	1120	-
6300500	Q(STATION)	527	706	824	974	1090	1200	1230
	Q(PREDICTED)	337	497	610	762	881	1000	-
	Q(WEIGHTED)	514	678	779	917	1020	1130	-
		NORTHWEST-FOOTHILLS REGION						
6087900	Q(STATION)	144	301	443	669	874	1120	620
	Q(PREDICTED)	33	115	176	352	552	826	-
	Q(WEIGHTED)	114	210	262	425	622	900	-
6088500	Q(STATION)	637	1230	1780	2760	3690	4890	7600
	Q(PREDICTED)	358	1000	1380	2520	3720	5320	-
	Q(WEIGHTED)	613	1180	1640	2640	3710	5090	-
6089300	Q(STATION)	72	193	322	556	793	1100	530
	Q(PREDICTED)	68	220	366	713	1100	1630	-
	Q(WEIGHTED)	71	201	344	656	999	1430	-
6099700	Q(STATION)	91	349	701	1480	2400	3690	4240
	Q(PREDICTED)	147	452	1020	1920	2880	4170	-
	Q(WEIGHTED)	99	385	873	1790	2750	4030	-
6100200	Q(STATION)	6	27	60	144	250	414	249
	Q(PREDICTED)	15	56	110	228	364	553	-
	Q(WEIGHTED)	7	35	85	199	330	508	-
6100300	Q(STATION)	56	249	543	1260	2150	3470	5440
	Q(PREDICTED)	75	242	449	869	1330	1960	-
	Q(WEIGHTED)	58	246	491	980	1530	2360	-
6101600	Q(STATION)	8	18	28	44	59	77	38
	Q(PREDICTED)	4	18	37	82	136	214	-
	Q(WEIGHTED)	8	18	33	69	110	159	-
6101700	Q(STATION)	29	97	184	366	568	848	675
	Q(PREDICTED)	18	66	129	266	426	650	-
	Q(WEIGHTED)	26	83	150	929	459	702	-

Table 1.--*Annual flood magnitude-frequency data for streamflow-gaging stations*--Continued

STATION		DISCHARGES, IN CUBIC FEET PER SECOND, FOR SELECTED EXCEEDANCE PROBABILITIES						
		Q(50%)	Q(20%)	Q(10%)	Q(4%)	Q(2%)	Q(1%)	MAXIMUM OF RECORD
		NORTHWEST-FOOTHILLS REGION--Continued						
6101800	Q(STATION)	7	47	132	404	833	1610	220
	Q(PREDICTED)	51	170	320	634	989	1480	-
	Q(WEIGHTED)	9	77	220	558	947	1510	-
6101900	Q(STATION)	8	49	123	329	624	1120	369
	Q(PREDICTED)	21	75	233	476	759	1150	-
	Q(WEIGHTED)	9	57	178	429	722	1140	-
6102100	Q(STATION)	19	64	123	247	390	589	244
	Q(PREDICTED)	6	25	82	178	293	459	-
	Q(WEIGHTED)	15	44	97	195	315	492	-
6102200	Q(STATION)	17	56	113	232	368	558	300
	Q(PREDICTED)	10	36	104	221	361	561	-
	Q(WEIGHTED)	15	48	108	224	362	560	-
6102300	Q(STATION)	3	11	21	40	60	88	42
	Q(PREDICTED)	3	14	37	83	138	220	-
	Q(WEIGHTED)	3	12	29	66	110	166	-
6105800	Q(STATION)	68	164	258	417	571	759	390
	Q(PREDICTED)	31	108	186	296	462	871	-
	Q(WEIGHTED)	60	140	214	327	489	837	-
6108200	Q(STATION)	23	186	547	1730	3650	7130	2070
	Q(PREDICTED)	53	177	526	1040	1610	2380	-
	Q(WEIGHTED)	27	182	535	1200	1990	3270	-
6108300	Q(STATION)	16	82	199	508	936	1620	460
	Q(PREDICTED)	29	100	308	619	975	1470	-
	Q(WEIGHTED)	17	88	256	586	965	1510	-
6132400	Q(STATION)	217	701	1300	2500	3810	5580	2200
	Q(PREDICTED)	190	573	1280	2380	3530	5050	-
	Q(WEIGHTED)	212	651	1290	2410	3610	5200	-
6133000	Q(STATION)	1060	2290	3420	5270	6930	8880	7930
	Q(PREDICTED)	817	2160	2870	5020	7210	10000	-
	Q(WEIGHTED)	1030	2260	3240	5150	7070	9390	-
6133500	Q(STATION)	293	753	1240	2100	2960	4030	3090
	Q(PREDICTED)	309	891	1550	2820	4160	5900	-
	Q(WEIGHTED)	293	778	1330	2430	3550	4880	-
6134500	Q(STATION)	1950	3570	4940	7060	8950	11200	9170
	Q(PREDICTED)	755	1990	2650	4680	6790	9530	-
	Q(WEIGHTED)	1870	3310	4260	6070	8000	10500	-
6134800	Q(STATION)	32	81	136	239	349	493	239
	Q(PREDICTED)	52	173	230	453	703	1050	-
	Q(WEIGHTED)	34	107	182	375	585	841	-
		NORTHEAST PLAINS REGION						
6109900	Q(STATION)	17	51	91	171	256	369	125
	Q(PREDICTED)	32	80	130	219	308	418	-
	Q(WEIGHTED)	19	62	111	200	288	399	-
6110000	Q(STATION)	469	815	1070	1400	1640	1890	1750
	Q(PREDICTED)	434	845	1210	1800	2330	2940	-
	Q(WEIGHTED)	466	820	1100	1510	1830	2170	-
6111700	Q(STATION)	15	36	57	95	134	182	87
	Q(PREDICTED)	17	46	79	141	206	287	-
	Q(WEIGHTED)	15	39	67	119	171	236	-
6112100	Q(STATION)	327	768	1220	2000	2770	3730	1740
	Q(PREDICTED)	122	274	423	678	925	1220	-
	Q(WEIGHTED)	255	496	686	1040	1420	1910	-
6128400	Q(STATION)	250	670	1130	1960	2810	3880	2200
	Q(PREDICTED)	113	321	550	973	1400	1940	-
	Q(WEIGHTED)	201	479	746	1250	1800	2500	-

Table 1.--*Annual flood magnitude-frequency data for streamflow-gaging stations*--Continued

STATION		DISCHARGES, IN CUBIC FEET PER SECOND, FOR SELECTED EXCEEDANCE PROBABILITIES						
		Q(50%)	Q(20%)	Q(10%)	Q(4%)	Q(2%)	Q(1%)	MAXIMUM OF RECORD
		NORTHEAST PLAINS REGION--Continued						
6128500	Q(STATION)	66	116	156	214	262	314	185
	Q(PREDICTED)	24	75	136	254	380	543	-
	Q(WEIGHTED)	51	96	144	237	328	436	-
6129100	Q(STATION)	12	27	43	72	101	136	60
	Q(PREDICTED)	14	38	65	116	169	237	-
	Q(WEIGHTED)	12	31	53	96	139	191	-
6129200	Q(STATION)	25	102	217	494	844	1380	757
	Q(PREDICTED)	26	73	125	222	322	449	-
	Q(WEIGHTED)	25	87	158	296	457	677	-
6129400	Q(STATION)	14	36	61	105	152	210	141
	Q(PREDICTED)	8	27	49	95	145	211	-
	Q(WEIGHTED)	11	31	54	98	147	210	-
6129500	Q(STATION)	347	691	987	1450	1840	2260	1590
	Q(PREDICTED)	385	918	1440	2310	3130	4100	-
	Q(WEIGHTED)	351	744	1130	1760	2300	2900	-
6135500	Q(STATION)	614	1210	1670	2320	2840	3390	3500
	Q(PREDICTED)	291	753	1200	1910	2550	3270	-
	Q(WEIGHTED)	557	1070	1480	2140	2710	3340	-
6137900	Q(STATION)	13	40	74	141	214	312	299
	Q(PREDICTED)	12	42	77	145	216	308	-
	Q(WEIGHTED)	12	40	75	143	215	309	-
6138700	Q(STATION)	16	71	157	363	619	999	190
	Q(PREDICTED)	40	126	225	410	601	841	-
	Q(WEIGHTED)	19	88	188	389	609	905	-
6138800	Q(STATION)	35	139	286	610	994	1530	345
	Q(PREDICTED)	78	234	408	726	1050	1440	-
	Q(WEIGHTED)	43	175	350	682	1030	1470	-
6139500	Q(STATION)	373	1210	2200	4100	6120	8720	5570
	Q(PREDICTED)	1280	3140	4910	7760	10300	13200	-
	Q(WEIGHTED)	482	1720	3240	5850	8170	11000	-
6140400	Q(STATION)	104	276	457	770	1080	1450	700
	Q(PREDICTED)	102	293	501	875	1250	1700	-
	Q(WEIGHTED)	103	284	481	835	1180	1600	-
6141900	Q(STATION)	1	8	19	49	91	155	72
	Q(PREDICTED)	2	8	17	35	56	84	-
	Q(WEIGHTED)	1	7	17	39	66	105	-
6144350	Q(STATION)	403	931	1420	2180	2840	3590	4980
	Q(PREDICTED)	292	679	1020	1550	2000	2490	-
	Q(WEIGHTED)	368	806	1170	1750	2270	2850	-
6144500	Q(STATION)	1330	2770	3970	5680	7080	8560	5110
	Q(PREDICTED)	991	2330	3520	5350	6900	8630	-
	Q(WEIGHTED)	1280	2660	3820	5550	7000	8580	-
6145000	Q(STATION)	308	632	904	1320	1660	2020	1160
	Q(PREDICTED)	171	483	802	1340	1840	2420	-
	Q(WEIGHTED)	270	569	851	1330	1750	2240	-
6148000	Q(STATION)	552	1120	1570	2220	2750	3320	3020
	Q(PREDICTED)	439	1000	1500	2280	2950	3690	-
	Q(WEIGHTED)	530	1080	1540	2240	2840	3490	-
6150000	Q(STATION)	383	1050	1670	2660	3540	4510	3090
	Q(PREDICTED)	175	490	811	1350	1850	2430	-
	Q(WEIGHTED)	351	880	1330	2060	2770	3590	-
6150500	Q(STATION)	342	813	1230	1820	2310	2820	2300
	Q(PREDICTED)	204	557	910	1500	2030	2650	-
	Q(WEIGHTED)	322	747	1110	1690	2200	2760	-
6151000	Q(STATION)	222	521	779	1170	1480	1820	1220
	Q(PREDICTED)	150	415	682	1130	1540	2020	-
	Q(WEIGHTED)	211	495	748	1150	1500	1880	-

Table 1.--*Annual flood magnitude-frequency data for streamflow-gaging stations*--Continued

STATION		DISCHARGES, IN CUBIC FEET PER SECOND, FOR SELECTED EXCEEDANCE PROBABILITIES						
		Q(50%)	Q(20%)	Q(10%)	Q(4%)	Q(2%)	Q(1%)	MAXIMUM OF RECORD
		NORTHEAST PLAINS REGION--Continued						
6154400	Q(STATION)	388	1240	2210	4000	5830	8110	8460
	Q(PREDICTED)	452	1150	1820	2960	4000	5220	-
	Q(WEIGHTED)	407	1190	1960	3250	4500	6010	-
6154500	Q(STATION)	879	2000	2970	4470	5770	7200	3940
	Q(PREDICTED)	771	1870	2900	4550	6010	7690	-
	Q(WEIGHTED)	855	1940	2930	4510	5900	7470	3940
6155100	Q(STATION)	75	145	201	280	343	411	220
	Q(PREDICTED)	28	93	169	310	455	634	-
	Q(WEIGHTED)	54	115	180	300	416	552	-
6155200	Q(STATION)	136	557	1120	2250	3460	5030	800
	Q(PREDICTED)	225	665	1120	1900	2620	3480	-
	Q(WEIGHTED)	153	600	1120	2030	2920	4030	-
6155300	Q(STATION)	30	92	159	279	395	536	360
	Q(PREDICTED)	23	78	142	262	385	536	-
	Q(WEIGHTED)	28	86	150	270	389	535	-
6155400	Q(STATION)	9	43	92	201	322	485	105
	Q(PREDICTED)	20	68	124	230	338	472	-
	Q(WEIGHTED)	11	52	108	217	331	477	-
6156000	Q(STATION)	166	941	2130	4740	7670	11600	3500
	Q(PREDICTED)	867	2260	3560	5620	7400	9380	-
	Q(WEIGHTED)	194	1120	2450	5020	7570	10700	-
6158000	Q(STATION)	1500	2750	3690	5000	6030	7090	12600
	Q(PREDICTED)	897	2000	2910	4220	5270	6380	-
	Q(WEIGHTED)	1390	2520	3380	4640	5680	6770	-
6168500	Q(STATION)	584	1370	2030	3040	3880	4770	3310
	Q(PREDICTED)	776	1950	2990	4530	5790	7140	-
	Q(WEIGHTED)	606	1500	2340	3600	4600	5650	-
6169000	Q(STATION)	284	753	1190	1820	2370	2950	1800
	Q(PREDICTED)	351	942	1490	2340	3070	3850	-
	Q(WEIGHTED)	291	789	1270	2000	2600	3240	-
6169500	Q(STATION)	1080	2420	3550	5180	6500	7890	5110
	Q(PREDICTED)	942	2360	3590	5420	6900	8470	-
	Q(WEIGHTED)	1050	2390	3560	5280	6670	8140	-
6170000	Q(STATION)	635	2330	4000	6460	8400	10400	7080
	Q(PREDICTED)	637	1640	2540	3900	5020	6240	-
	Q(WEIGHTED)	634	2170	3530	5460	7080	8740	-
6178000	Q(STATION)	819	2230	3650	6100	8400	11200	12700
	Q(PREDICTED)	1020	2510	3790	5680	7210	8810	-
	Q(WEIGHTED)	837	2280	3690	5940	7950	10200	-
6178500	Q(STATION)	702	1860	2900	4470	5770	7170	4020
	Q(PREDICTED)	1280	3160	4800	7180	9100	11100	-
	Q(WEIGHTED)	751	2090	3390	5350	6860	8440	-
6179500	Q(STATION)	219	960	1950	3920	6030	8700	5450
	Q(PREDICTED)	551	1400	2160	3300	4250	5260	-
	Q(WEIGHTED)	267	1110	2050	3550	4940	6550	-
6180000	Q(STATION)	589	1500	2330	3620	4740	5960	3600
	Q(PREDICTED)	473	1290	2120	3540	4850	6430	-
	Q(WEIGHTED)	554	1400	2210	3570	4810	6250	-
6182500	Q(STATION)	1040	2590	4000	6180	8060	10200	6360
	Q(PREDICTED)	628	1710	2720	4310	5660	7130	-
	Q(WEIGHTED)	941	2250	3370	5130	6720	8460	-
6183000	Q(STATION)	1130	2550	3790	5600	7100	8700	8000
	Q(PREDICTED)	182	1900	2960	4570	5900	7330	-
	Q(WEIGHTED)	740	2270	3330	4970	6370	7880	-
6183100	Q(STATION)	93	173	233	314	376	437	328
	Q(PREDICTED)	38	121	209	363	507	676	-
	Q(WEIGHTED)	75	149	220	341	447	562	-

Table 1.--*Annual flood magnitude-frequency data for streamflow-gaging stations*--Continued

STATION		DISCHARGES, IN CUBIC FEET PER SECOND, FOR SELECTED EXCEEDANCE PROBABILITIES						
		Q(50%)	Q(20%)	Q(10%)	Q(4%)	Q(2%)	Q(1%)	MAXIMUM OF RECORD
		NORTHEAST PLAINS REGION--Continued						
6183300	Q(STATION)	30	65	95	140	176	213	240
	Q(PREDICTED)	32	101	176	306	430	573	-
	Q(WEIGHTED)	30	76	126	210	280	354	-
6183400	Q(STATION)	85	366	740	1500	2290	3300	690
	Q(PREDICTED)	55	172	296	508	705	933	-
	Q(WEIGHTED)	76	271	463	797	1150	1590	-
6329700	Q(STATION)	8	31	57	105	152	210	110
	Q(PREDICTED)	6	23	44	87	132	191	-
	Q(WEIGHTED)	8	27	50	94	140	198	-
6329800	Q(STATION)	95	254	406	649	864	1110	1200
	Q(PREDICTED)	72	236	416	736	1050	1420	-
	Q(WEIGHTED)	88	246	411	698	966	1270	-
6329900	Q(STATION)	30	103	186	336	481	655	276
	Q(PREDICTED)	45	152	273	492	708	968	-
	Q(WEIGHTED)	32	119	226	419	601	820	-
6330100	Q(STATION)	135	456	815	1460	2080	2810	1250
	Q(PREDICTED)	117	383	673	1180	1670	2240	-
	Q(WEIGHTED)	130	425	739	1290	1830	2470	-
6331000	Q(STATION)	1230	2810	4160	6150	7810	9580	6910
	Q(PREDICTED)	832	2420	3980	6520	8750	11300	-
	Q(WEIGHTED)	1130	2660	4070	6330	8280	10400	-
6331900	Q(STATION)	72	193	310	498	663	849	1120
	Q(PREDICTED)	61	193	336	581	811	1080	-
	Q(WEIGHTED)	68	193	324	550	756	991	-
		EAST-CENTRAL PLAINS REGION						
6115100	Q(STATION)	47	305	798	2190	4160	7380	1950
	Q(PREDICTED)	84	294	546	1030	1530	2130	-
	Q(WEIGHTED)	55	301	692	1660	3020	5120	-
6115300	Q(STATION)	61	220	423	838	1290	1900	470
	Q(PREDICTED)	53	188	356	685	1050	1490	-
	Q(WEIGHTED)	59	208	395	769	1190	1720	-
6120600	Q(STATION)	1	6	13	30	52	84	68
	Q(PREDICTED)	8	31	66	145	244	394	-
	Q(WEIGHTED)	3	14	34	79	130	209	-
6120700	Q(STATION)	42	113	188	320	449	608	307
	Q(PREDICTED)	18	68	138	296	486	764	-
	Q(WEIGHTED)	37	98	168	310	464	671	-
6120800	Q(STATION)	77	420	1060	2900	5630	10300	5390
	Q(PREDICTED)	67	227	432	855	1340	1990	-
	Q(WEIGHTED)	75	365	849	2150	4140	7440	-
6120900	Q(STATION)	115	695	1760	4730	8910	15700	24400
	Q(PREDICTED)	168	542	1010	1960	3050	4480	-
	Q(WEIGHTED)	124	650	1500	3690	6820	11700	-
6125700	Q(STATION)	115	388	717	1360	2030	2910	2400
	Q(PREDICTED)	204	626	1120	2070	3120	4400	-
	Q(WEIGHTED)	136	478	893	1690	2520	3580	-
6126300	Q(STATION)	138	437	788	1460	2170	3090	1620
	Q(PREDICTED)	175	539	966	1790	2700	3810	-
	Q(WEIGHTED)	147	476	866	1620	2410	3410	-
6127100	Q(STATION)	66	189	326	575	826	1140	510
	Q(PREDICTED)	18	69	134	271	427	632	-
	Q(WEIGHTED)	55	144	242	432	647	913	-
6127200	Q(STATION)	48	115	182	300	414	554	380
	Q(PREDICTED)	47	160	297	564	855	1210	-
	Q(WEIGHTED)	48	132	232	424	612	847	-

Table 1.--*Annual flood magnitude-frequency data for streamflow-gaging stations*--Continued

STATION		DISCHARGES, IN CUBIC FEET PER SECOND, FOR SELECTED EXCEEDANCE PROBABILITIES						
		Q(50%)	Q(20%)	Q(10%)	Q(4%)	Q(2%)	Q(1%)	MAXIMUM OF RECORD
		EAST-CENTRAL PLAINS REGION--Continued						
6127570	Q(STATION)	99	228	352	557	750	980	488
	Q(PREDICTED)	42	143	265	500	751	1060	-
	Q(WEIGHTED)	86	197	315	531	750	1010	-
6128900	Q(STATION)	123	279	426	669	894	1160	1030
	Q(PREDICTED)	90	300	542	995	1480	2030	-
	Q(WEIGHTED)	117	286	470	803	1120	1500	-
6129000	Q(STATION)	1270	3050	4710	7350	9700	12400	9910
	Q(PREDICTED)	567	1640	2790	4860	7050	9440	-
	Q(WEIGHTED)	1150	2620	4030	6380	8730	11300	-
6129700	Q(STATION)	73	253	481	951	1470	2180	60
	Q(PREDICTED)	30	108	204	392	596	845	-
	Q(WEIGHTED)	64	200	365	697	1090	1610	-
6129800	Q(STATION)	40	125	224	418	624	893	380
	Q(PREDICTED)	17	63	121	238	366	528	-
	Q(WEIGHTED)	36	108	190	354	537	771	-
6130600	Q(STATION)	78	212	356	616	876	1200	748
	Q(PREDICTED)	145	465	826	1490	2180	2950	-
	Q(WEIGHTED)	93	304	554	1010	1440	1950	-
6130800	Q(STATION)	17	66	129	255	392	571	334
	Q(PREDICTED)	14	52	100	198	305	442	-
	Q(WEIGHTED)	17	61	117	230	356	517	-
6130850	Q(STATION)	42	129	225	399	571	782	760
	Q(PREDICTED)	30	106	200	384	582	824	-
	Q(WEIGHTED)	40	122	216	393	575	797	-
6130900	Q(STATION)	13	53	106	214	332	489	458
	Q(PREDICTED)	17	63	121	236	361	519	-
	Q(WEIGHTED)	14	57	113	224	345	502	-
6130950	Q(STATION)	1780	3660	5210	7470	9330	11300	5200
	Q(PREDICTED)	1320	3670	6050	10000	14100	18100	-
	Q(WEIGHTED)	1690	3660	5540	8550	11300	14000	-
6131000	Q(STATION)	2780	8270	14000	23700	32800	43400	24600
	Q(PREDICTED)	1990	5370	8710	14200	19700	25100	-
	Q(WEIGHTED)	2700	7710	12800	21200	29600	39000	-
6172300	Q(STATION)	85	421	906	1940	3100	4620	4460
	Q(PREDICTED)	140	466	838	1520	2220	3010	-
	Q(WEIGHTED)	95	435	882	1780	2780	4030	-
6172350	Q(STATION)	39	124	217	379	532	712	400
	Q(PREDICTED)	111	366	649	1160	1670	2230	-
	Q(WEIGHTED)	56	215	405	746	1040	1390	-
6174000	Q(STATION)	2640	6630	10300	16000	20900	26400	16000
	Q(PREDICTED)	1080	3080	5050	8280	11400	14400	-
	Q(WEIGHTED)	2400	5680	8640	13300	17800	22500	-
6175550	Q(STATION)	180	478	763	1220	1620	2070	1220
	Q(PREDICTED)	163	547	982	1770	2590	3500	-
	Q(WEIGHTED)	176	504	859	1480	2060	2710	-
6175700	Q(STATION)	62	243	467	896	1330	1870	2230
	Q(PREDICTED)	98	262	604	889	1660	2300	-
	Q(WEIGHTED)	68	248	513	893	1440	2020	-
6175900	Q(STATION)	108	423	811	1550	2310	3240	3900
	Q(PREDICTED)	138	468	847	1550	2260	3080	-
	Q(WEIGHTED)	113	435	823	1550	2290	3190	-
6176500	Q(STATION)	455	2060	4240	8690	13400	19600	9780
	Q(PREDICTED)	1010	2970	5000	8430	11900	15400	-
	Q(WEIGHTED)	540	2300	4480	8600	12900	18200	-
6177050	Q(STATION)	94	253	411	672	910	1180	650
	Q(PREDICTED)	69	231	421	778	1160	1600	-
	Q(WEIGHTED)	90	247	414	710	994	1320	-

Table 1.--*Annual flood magnitude-frequency data for streamflow-gaging stations*--Continued

STATION		DISCHARGES, IN CUBIC FEET PER SECOND, FOR SELECTED EXCEEDANCE PROBABILITIES						
		Q(50%)	Q(20%)	Q(10%)	Q(4%)	Q(2%)	Q(1%)	MAXIMUM OF RECORD
		EAST-CENTRAL PLAINS REGION--Continued						
6177100	Q(STATION)	215	632	1070	1820	2520	3340	1000
	Q(PREDICTED)	177	558	986	1770	2580	3480	-
	Q(WEIGHTED)	206	604	1030	1800	2550	3400	-
6177150	Q(STATION)	486	1340	2190	3590	4870	6340	1900
	Q(PREDICTED)	457	1350	2320	3990	5700	7500	-
	Q(WEIGHTED)	480	1340	2240	3770	5220	6820	-
6177200	Q(STATION)	130	339	539	860	1150	1470	430
	Q(PREDICTED)	228	706	1240	2190	3190	4300	-
	Q(WEIGHTED)	152	472	834	1460	2030	2690	-
6177250	Q(STATION)	7	75	234	742	1510	2790	1610
	Q(PREDICTED)	40	142	263	495	741	1040	-
	Q(WEIGHTED)	14	98	246	634	1190	2060	-
6177300	Q(STATION)	8	37	80	172	276	416	234
	Q(PREDICTED)	12	48	93	183	282	406	-
	Q(WEIGHTED)	9	41	85	177	279	412	-
6177350	Q(STATION)	31	62	88	124	152	183	85
	Q(PREDICTED)	41	143	264	493	740	1030	-
	Q(WEIGHTED)	33	90	159	286	398	535	-
6177400	Q(STATION)	92	363	706	1380	4060	2970	1000
	Q(PREDICTED)	168	543	968	1740	2550	3460	-
	Q(WEIGHTED)	107	423	809	1530	3460	3170	-
6177500	Q(STATION)	1130	2950	4650	7340	9680	12300	6730
	Q(PREDICTED)	1090	3120	5210	8790	12400	16100	-
	Q(WEIGHTED)	1130	2980	4770	7700	10300	13200	-
6177700	Q(STATION)	73	265	489	905	1320	1820	750
	Q(PREDICTED)	64	230	429	805	1200	1670	-
	Q(WEIGHTED)	71	252	464	860	1270	1760	-
6177800	Q(STATION)	46	271	629	1460	2430	3770	1500
	Q(PREDICTED)	46	169	319	607	912	1280	-
	Q(WEIGHTED)	46	235	503	1090	1800	2730	-
6181000	Q(STATION)	3800	11700	20100	34400	47900	63600	40000
	Q(PREDICTED)	3840	10200	16400	26500	36400	45700	-
	Q(WEIGHTED)	3810	11400	19100	32000	44600	58500	-
6181200	Q(STATION)	54	117	170	245	306	371	313
	Q(PREDICTED)	38	135	249	457	532	910	-
	Q(WEIGHTED)	50	124	204	345	407	612	-
6185100	Q(STATION)	41	187	385	791	1230	1780	676
	Q(PREDICTED)	94	313	556	979	1400	1850	-
	Q(WEIGHTED)	53	235	460	879	1310	1810	-
6185200	Q(STATION)	12	131	409	1270	2520	4540	2570
	Q(PREDICTED)	44	157	288	530	774	1050	-
	Q(WEIGHTED)	19	141	356	922	1740	2980	-
6185300	Q(STATION)	314	645	909	1280	1580	1880	1670
	Q(PREDICTED)	146	479	843	1480	2120	2790	-
	Q(WEIGHTED)	275	582	880	1370	1820	2290	-
6185400	Q(STATION)	55	214	409	781	1160	1620	1325
	Q(PREDICTED)	74	256	463	838	1220	1640	-
	Q(WEIGHTED)	59	229	432	807	1190	1630	-
6217700	Q(STATION)	156	653	1410	3260	5650	9310	5120
	Q(PREDICTED)	81	282	535	1040	1610	2330	-
	Q(WEIGHTED)	140	524	1060	2290	3960	6410	-
6294900	Q(STATION)	63	151	237	382	519	683	463
	Q(PREDICTED)	24	89	172	341	530	771	-
	Q(WEIGHTED)	54	128	209	363	524	722	-
6295020	Q(STATION)	116	490	1030	2250	3710	5790	938
	Q(PREDICTED)	60	213	398	755	1140	1600	-
	Q(WEIGHTED)	104	393	774	1590	2640	4050	-

Table 1.--*Annual flood magnitude-frequency data for streamflow-gaging stations*--Continued

STATION		DISCHARGES, IN CUBIC FEET PER SECOND, FOR SELECTED EXCEEDANCE PROBABILITIES						
		Q(50%)	Q(20%)	Q(10%)	Q(4%)	Q(2%)	Q(1%)	MAXIMUM OF RECORD
		EAST-CENTRAL PLAINS REGION--Continued						
6295050	Q(STATION)	1650	3200	4490	6410	8040	9850	9350
	Q(PREDICTED)	780	2230	3740	6320	8950	11600	-
	Q(WEIGHTED)	1480	2870	4200	6370	8410	10600	-
6309020	Q(STATION)	9	24	40	66	90	119	39
	Q(PREDICTED)	16	58	112	222	342	494	-
	Q(WEIGHTED)	11	37	70	137	199	280	-
6309040	Q(STATION)	132	459	858	1640	2460	3520	1500
	Q(PREDICTED)	218	703	1250	1430	3330	4540	-
	Q(WEIGHTED)	152	551	1030	1540	2850	3980	-
6309060	Q(STATION)	47	111	173	272	363	467	320
	Q(PREDICTED)	16	622	122	245	380	553	-
	Q(WEIGHTED)	41	289	152	260	370	503	-
6326900	Q(STATION)	77	165	239	347	436	531	338
	Q(PREDICTED)	20	117	140	268	403	565	-
	Q(WEIGHTED)	64	147	196	310	421	546	-
6326950	Q(STATION)	21	78	145	271	398	553	267
	Q(PREDICTED)	25	91	171	327	491	687	-
	Q(WEIGHTED)	22	83	156	296	438	611	-
		SOUTHEAST PLAINS REGION						
6294400	Q(STATION)	7	17	27	45	62	84	40
	Q(PREDICTED)	15	41	72	127	184	256	-
	Q(WEIGHTED)	8	21	37	70	104	147	-
6294800	Q(STATION)	123	455	904	1880	3030	4640	800
	Q(PREDICTED)	116	305	482	800	1100	1470	-
	Q(WEIGHTED)	122	428	805	1540	2340	3430	-
6294850	Q(STATION)	25	84	158	309	478	706	398
	Q(PREDICTED)	22	58	101	178	256	355	-
	Q(WEIGHTED)	25	79	145	267	399	573	-
6295100	Q(STATION)	96	214	328	520	702	921	540
	Q(PREDICTED)	110	285	448	740	1020	1350	-
	Q(WEIGHTED)	98	227	356	590	815	1080	-
6295200	Q(STATION)	9	23	39	66	94	129	45
	Q(PREDICTED)	4	12	21	40	59	84	-
	Q(WEIGHTED)	8	21	35	58	82	112	-
6296000	Q(STATION)	321	695	1070	1730	2390	3230	3280
	Q(PREDICTED)	369	889	1400	2320	3220	4350	-
	Q(WEIGHTED)	325	724	1130	1890	2640	3600	-
6296100	Q(STATION)	102	236	362	566	753	970	410
	Q(PREDICTED)	64	170	272	454	630	841	-
	Q(WEIGHTED)	98	224	341	530	709	921	-
6306300	Q(STATION)	4020	5870	7150	8810	10100	11400	17500
	Q(PREDICTED)	975	2340	3650	6030	8340	11200	-
	Q(WEIGHTED)	3840	5510	6670	8270	9710	11400	-
6306900	Q(STATION)	120	383	709	1380	2120	3150	1400
	Q(PREDICTED)	324	839	1280	2060	2790	3660	-
	Q(WEIGHTED)	136	445	812	1550	2310	3310	-
6306950	Q(STATION)	42	115	198	353	516	728	222
	Q(PREDICTED)	52	138	224	377	525	703	-
	Q(WEIGHTED)	43	118	203	359	519	720	-
6307640	Q(STATION)	131	278	411	623	815	1040	2080
	Q(PREDICTED)	26	70	117	202	286	390	-
	Q(WEIGHTED)	120	240	342	489	627	793	-
6307660	Q(STATION)	5	22	47	105	176	282	58
	Q(PREDICTED)	24	66	109	187	263	356	-
	Q(WEIGHTED)	7	29	61	130	206	309	-

Table 1.--*Annual flood magnitude-frequency data for streamflow-gaging stations*--Continued

STATION		DISCHARGES, IN CUBIC FEET PER SECOND, FOR SELECTED EXCEEDANCE PROBABILITIES						
		Q(50%)	Q(20%)	Q(10%)	Q(4%)	Q(2%)	Q(1%)	MAXIMUM OF RECORD
		SOUTHEAST PLAINS REGION--Continued						
6307760	Q(STATION)	3	9	15	29	43	61	39
	Q(PREDICTED)	10	26	47	86	126	179	-
	Q(WEIGHTED)	4	12	23	47	73	106	-
6307780	Q(STATION)	83	302	593	1210	1930	2920	570
	Q(PREDICTED)	49	127	214	372	531	735	-
	Q(WEIGHTED)	80	272	508	955	1450	2120	-
6308200	Q(STATION)	13	44	83	160	244	355	390
	Q(PREDICTED)	18	53	86	145	200	266	-
	Q(WEIGHTED)	14	45	83	157	233	330	-
6308300	Q(STATION)	163	519	944	1770	2650	3800	990
	Q(PREDICTED)	166	551	839	1360	1830	2390	-
	Q(WEIGHTED)	163	524	924	1660	2400	3350	-
6309080	Q(STATION)	614	1320	1940	2880	3680	4580	2430
	Q(PREDICTED)	251	665	998	1600	2140	2770	-
	Q(WEIGHTED)	579	1210	1740	2510	3170	3940	-
6309090	Q(STATION)	20	81	166	347	552	833	1400
	Q(PREDICTED)	41	110	181	309	436	590	-
	Q(WEIGHTED)	22	86	170	335	511	741	-
6317050	Q(STATION)	99	361	708	1460	2320	3520	3120
	Q(PREDICTED)	134	361	553	895	1210	1580	-
	Q(WEIGHTED)	102	361	676	1300	1970	2860	-
6324700	Q(STATION)	27	97	188	378	593	887	715
	Q(PREDICTED)	81	214	333	545	743	979	-
	Q(WEIGHTED)	31	111	211	416	632	912	-
6325500	Q(STATION)	1130	1830	2350	3060	3620	4220	3160
	Q(PREDICTED)	1220	2950	4220	6530	8650	11100	-
	Q(WEIGHTED)	1140	1960	2640	3820	4870	6070	-
6326400	Q(STATION)	252	492	687	971	1210	1460	1370
	Q(PREDICTED)	67	176	287	488	684	927	-
	Q(WEIGHTED)	232	435	593	817	1020	1260	-
6326600	Q(STATION)	1220	2870	4390	6790	8920	11300	4700
	Q(PREDICTED)	1280	3160	4480	6890	9040	11500	-
	Q(WEIGHTED)	1230	2920	4410	6820	8960	11400	-
6326650	Q(STATION)	31	52	67	88	104	120	61
	Q(PREDICTED)	10	29	48	81	111	148	-
	Q(WEIGHTED)	29	48	63	86	106	131	-
6326700	Q(STATION)	110	155	183	218	242	267	225
	Q(PREDICTED)	38	105	164	269	366	479	-
	Q(WEIGHTED)	102	146	179	234	286	348	-
6326800	Q(STATION)	61	102	137	187	226	267	350
	Q(PREDICTED)	30	82	128	211	288	379	-
	Q(WEIGHTED)	58	99	135	194	246	306	-
6328800	Q(STATION)	12	50	98	191	287	407	150
	Q(PREDICTED)	23	66	105	174	239	316	-
	Q(WEIGHTED)	13	53	100	186	271	374	-
6328900	Q(STATION)	8	23	40	67	93	122	62
	Q(PREDICTED)	81	218	334	542	733	955	-
	Q(WEIGHTED)	15	56	106	212	312	426	-
6329570	Q(STATION)	46	759	289	523	751	1020	700
	Q(PREDICTED)	280	728	1070	1700	2260	2910	-
	Q(WEIGHTED)	70	754	463	881	1270	1710	-
6334000	Q(STATION)	1820	3340	4490	6040	7260	8510	6000
	Q(PREDICTED)	1180	2880	4200	6580	8770	11300	-
	Q(WEIGHTED)	1800	3310	4470	6100	7460	8920	-
6334100	Q(STATION)	261	567	850	1300	1720	2200	1170
	Q(PREDICTED)	173	461	695	1110	1500	1940	-
	Q(WEIGHTED)	255	554	825	1260	1660	2130	-

Table 1.--*Annual flood magnitude-frequency data for streamflow-gaging stations*--Continued

STATION		DISCHARGES, IN CUBIC FEET PER SECOND, FOR SELECTED EXCEEDANCE PROBABILITIES Q(50%)	Q(20%)	Q(10%)	Q(4%)	Q(2%)	Q(1%)	MAXIMUM OF RECORD
				SOUTHEAST PLAINS REGION--Continued				
6334200	Q(STATION)	558	1270	1940	3050	4080	5290	1800
	Q(PREDICTED)	813	2060	2970	4610	6080	7740	-
	Q(WEIGHTED)	584	1410	2170	3520	4760	6180	-
6334500	Q(STATION)	2710	4740	6310	8510	10300	12200	9420
	Q(PREDICTED)	1720	4140	5860	9040	11900	15200	-
	Q(WEIGHTED)	2640	4670	6240	8630	10700	13000	-
6334630	Q(STATION)	2000	4900	7720	12400	16700	21700	23000
	Q(PREDICTED)	2100	5120	7280	11200	14800	18900	-
	Q(WEIGHTED)	2010	4940	7620	12000	16000	20600	-
6334640	Q(STATION)	122	459	865	1630	2400	3340	750
	Q(PREDICTED)	233	615	920	1470	1960	2540	-
	Q(WEIGHTED)	134	487	878	1580	2240	3040	-
6334720	Q(STATION)	12	38	69	128	188	264	106
	Q(PREDICTED)	67	182	282	461	627	818	-
	Q(WEIGHTED)	17	61	114	225	332	459	-
6335000	Q(STATION)	3410	5950	7810	10300	12200	14200	12700
	Q(PREDICTED)	2060	5080	7100	10800	14100	17800	-
	Q(WEIGHTED)	3350	5880	7740	10400	12500	14900	-
6335700	Q(STATION)	12	27	41	62	80	100	58
	Q(PREDICTED)	11	32	52	80	122	161	-
	Q(WEIGHTED)	12	28	43	67	93	120	-
6336100	Q(STATION)	25	47	64	99	124	154	147
	Q(PREDICTED)	14	40	64	108	148	196	-
	Q(WEIGHTED)	24	46	64	102	133	170	-
6336200	Q(STATION)	41	101	156	239	310	387	210
	Q(PREDICTED)	18	50	79	132	181	239	-
	Q(WEIGHTED)	39	92	139	206	266	333	-
6336300	Q(STATION)	3	17	39	86	141	215	200
	Q(PREDICTED)	15	42	68	114	156	207	-
	Q(WEIGHTED)	4	21	45	94	146	212	-
6336400	Q(STATION)	175	401	596	885	1120	1380	629
	Q(PREDICTED)	65	176	270	438	592	771	-
	Q(WEIGHTED)	165	368	532	765	959	1180	-
6336450	Q(STATION)	67	156	235	353	453	562	438
	Q(PREDICTED)	66	178	273	443	598	780	-
	Q(WEIGHTED)	67	160	243	379	501	639	-
6336500	Q(STATION)	899	3470	6830	13800	21400	31700	30000
	Q(PREDICTED)	957	3780	5330	8170	10700	13500	-
	Q(WEIGHTED)	902	3500	6660	12900	19300	27900	-
6336980	Q(STATION)	250	670	1070	1710	2270	2900	1050
	Q(PREDICTED)	73	198	308	502	682	891	-
	Q(WEIGHTED)	230	580	882	1310	1680	2100	-
6337100	Q(STATION)	253	674	1080	1710	2270	2900	1100
	Q(PREDICTED)	266	697	1030	1640	2180	2810	-
	Q(WEIGHTED)	254	678	1070	1690	2240	2860	-
6356000	Q(STATION)	619	1440	2210	3460	4600	5910	2780
	Q(PREDICTED)	546	1380	1990	3090	4070	5200	-
	Q(WEIGHTED)	614	1430	2170	3380	4460	5710	-
6358600	Q(STATION)	54	124	192	302	405	526	450
	Q(PREDICTED)	49	133	206	355	455	594	-
	Q(WEIGHTED)	53	125	194	315	419	546	-
6358620	Q(STATION)	21	36	46	61	73	85	64
	Q(PREDICTED)	4	13	21	37	51	69	-
	Q(WEIGHTED)	19	32	40	54	65	79	-

Table 2.--*Basin characteristics at gaging stations*

Station number	Station name	Years of record	Drainage area (A) (square miles)	Mean annual precipitation (P) (inches)
	West Region			
12300500	Fortine Cr nr Trego, Mont	23	112	29
12300800	Deep Cr nr Fortine, Mont	20	18.9	49
12301300	Tobacco R nr Eureka, Mont	21	440	33
12301700	Kootenai R trib nr Rexford, Mont	12	.86	30
12301800	Gold Cr nr Rexford, Mont	11	6.12	31
12302000	Fisher R nr Jennings, Mont	29	780	32
12302400	Shaughnessy Cr nr Libby, Mont	20	1.16	60
12302500	Granite Cr nr Libby, Mont	23	23.6	67
12303100	Flower Cr nr Libby, Mont	18	11.1	79
12303500	Lake Cr at Troy, Mont	14	210	67
12304250	Whitetail Cr nr Yaak, Mont	15	2.48	37
12304300	Cyclone Cr nr Yaak, Mont	19	5.73	65
12304400	Fourth of July Cr nr Yaak, Mont	15	7.84	68
12304500	Yaak R nr Troy, Mont	25	766	43
12323300	Smith Gulch nr Silverbow, Mont	20	4.85	12
12323500	German Gulch Cr nr Ramsay, Mont	13	40.6	18
12324100	Racetrack Cr bl Granite Cr nr Anaconda, Mont	17	39.5	35
12324700	Clark Fk trib nr Drummond, Mont	21	4.61	15
12324800	Morris Cr nr Drummond, Mont	15	12.6	18
12330000	Boulder Cr at Maxville, Mont	39	71.3	31
12332000	M Fk Rock Cr nr Phillipsburg, Mont	40	123	36
12335500	Nevada Cr ab Reservoir nr Finn, Mont	39	116	23
12338500	Blackfoot R nr Ovando, Mont	25	1,270	29
12339900	W Twin Cr nr Bonner, Mont	20	7.33	24
12340000	Blackfoot R nr Bonner, Mont	44	2,290	29
12340200	Marshall Cr nr Missoula, Mont	15	5.63	23
12341000	Rattlesnake Cr at Missoula, Mont	10	79.7	34
12343400	E Fk Bitterroot R nr Connor, Mont	36	381	32
12344300	Burke Gulch nr Darby, Mont	21	6.50	20
12345800	Camas Cr nr Hamilton, Mont	16	5.05	75
12346500	Skalkaho Cr nr Hamilton, Mont	28	87.8	36
12347500	Blodgett Cr nr Corvallis, Mont	30	26.4	73
12348500	Willow Cr nr Corvallis, Mont	19	22.4	33
12350000	Bear Cr nr Victor, Mont	19	26.8	76
12350200	Gash Cr nr Victor, Mont	16	3.37	70
12350500	Kootenai Cr nr Stevensville, Mont	22	28.9	76
12351000	Burnt Fk Bitterroot R nr Stevensville, Mont	40	74.0	32
12351400	Eightmile Cr nr Florence, Mont	16	20.6	20
12352000	Lolo Cr ab Sleeman Cr nr Lolo, Mont	12	250	52
12352200	Hayes Cr nr Missoula, Mont	15	4.16	33
12353400	Negro Gulch nr Alberton, Mont	15	8.02	33
12353800	Thompson Cr nr Superior, Mont	18	12.2	43
12353850	E Fk Timber Cr nr Haugan, Mont	15	2.72	58
12354000	St Regis R nr St Regis, Mont	26	303	52
12354100	N Fk Little Joe Cr nr St Regis, Mont	15	14.7	56
12363900	Rock Cr nr Olney, Mont	15	3.61	35
12364000	Logan Cr at Tally Lake nr Whitefish, Mont	10	183	28
12365000	Stillwater R nr Whitefish, Mont	27	524	31
12366000	Whitefish Cr nr Kalispell, Mont	29	170	37
12370500	Dayton Cr nr Proctor, Mont	20	20.9	20
12370900	Teepee Cr nr Polson, Mont	15	2.55	52
12371100	Hellroaring Cr nr Polson, Mont	26	6.22	48
12374300	Mill Cr nr Niarada, Mont	15	28.2	27
12375700	Garden Cr nr Hot Springs, Mont	15	3.29	19
12378000	Mission Cr nr St Ignatius, Mont	11	74.8	48
12389500	Thompson R nr Thompson Falls, Mont	24	642	41
12390700	Prospect Cr at Thompson Falls, Mont	23	182	54

Table 2.--*Basin characteristics at gaging stations*--Continued

Station number	Station name	Years of record	Drainage area (A) (square miles)	Mean annual precipitation (P) (inches)
	Northwest Region			
5010000	Belly R at international boundary	17	74.8	79
5011000	Belly R nr Mountain View, Alberta	68	121	65
5012500	Boundary Cr at international boundary	17	21.0	75
5013000	Waterton R nr Waterton Park, Alberta	55	238	68
5014000	Grinnell Cr nr Many Glacier, Mont	29	3.47	95
5014500	Swiftcurrent Cr at Many Glacier, Mont	66	31.4	95
5015000	Canyon Cr nr Many Glacier, Mont	13	7.09	105
6073000	Dearborn R nr Clemons, Mont	28	123	37
6078500	N Fk Sun R nr Augusta, Mont	25	258	42
6079600	Beaver Cr at Gibson Dam nr Augusta, Mont	15	20.3	29
6080000	Sun R nr Augusta, Mont	26	609	42
6081500	Willow Cr nr Augusta, Mont	20	96.1	21
6084500	Elk Cr at Augusta, Mont	20	157	21
6092000	Two Medicine R nr Browning, Mont	43	317	36
6092500	Badger Cr nr Browning, Mont	24	133	39
6098000	Dupuyer Cr nr Valier, Mont	24	137	25
6102500	Teton R nr Farmington, Mont	19	105	35
6132200	S Fk Milk R nr Babb, Mont	18	68.6	36
12335000	Blackfoot R nr Helmville, Mont	16	481	15
12355000	N Fk Flathead R at Flathead, B C	50	450	55
12355500	N Fk Flathead R nr Columbia Falls, Mont	57	1,550	26
12356000	Skyland Cr nr Essex, Mont	25	8.37	47
12356500	Bear Cr nr Essex, Mont	12	20.7	51
12357000	M Fk Flathead R at Essex, Mont	24	510	52
12357300	Moccasin Cr nr West Glacier, Mont	17	2.38	57
12357400	M Fk Flathead R trib at West Glacier, Mont	15	.14	39
12358500	M Fk Flathead R nr West Glacier, Mont	39	1,130	59
12359000	S Fk Flathead R at Spotted Bear Ranger Station, Mont	18	958	52
12359500	Spotted Bear R nr Hungry Horse, Mont	10	184	56
12359800	S Fk Flathead R ab Twin Cr nr Hungry Horse, Mont	15	1,160	52
12360000	Twin Cr nr Hungry Horse, Mont	13	47.0	53
12361000	Sullivan Cr nr Hungry Horse, Mont	26	71.3	35
12361500	Graves Cr nr Hungry Horse, Mont	13	27.0	67
12362500	S Fk Flathead R nr Columbia Falls, Mont	42	1,660	37

Table 2.--*Basin characteristics at gaging stations*--Continued

Station number	Station name	Years of record	Drainage area (A) (square miles)	Basin above 6000 feet elevation (HE) (percent)
	Southwest Region			
6011000	Red Rock R nr Lakeview, Mont	28	323	100.0
6013200	Traux Cr nr Lima, Mont	15	4.06	100.0
6013400	Muddy Cr nr Dell, Mont	15	62.7	99.0
6013500	Big Sheep Cr bl Muddy Cr nr Dell, Mont	27	280	99.0
6015500	Grasshopper Cr nr Dillon, Mont	39	348	94.0
6017500	Blacktail Deer Cr nr Dillon, Mont	20	312	96.0
6019500	Ruby R ab Reservoir nr Alder, Mont	40	538	91.0
6019800	Idaho Cr nr Alder, Mont	19	11.0	83.0
6025300	Moose Cr nr Divide, Mont	15	41.4	97.0
6025500	Big Hole R nr Melrose, Mont	55	2,480	91.0
6027700	Fish Cr nr Silverstar, Mont	20	39.5	80.0
6029000	Whitetail Cr nr Whitehall, Mont	18	30.8	97.2
6030300	Jefferson R trib No. 2 nr Whitehall, Mont	22	4.50	31.0
6030500	Boulder R ab Rock Cr nr Basin, Mont	11	19.4	100.0
6033000	Boulder R nr Boulder, Mont	44	381	80.0
6034700	Sand Cr at Sappington, Mont	15	9.41	0.0
6034800	Jefferson R trib 3 nr Sappington, Mont	15	1.14	0.0
6035000	Willow Cr nr Harrison, Mont	41	83.8	70.7
6036600	Jefferson R trib 4 nr Three Forks, Mont	15	0.53	0.0
6037500	Madison R nr West Yellowstone, Mont	59	420	99.0
6055500	Crow Cr nr Radersburg, Mont	18	78.0	86.0
6056200	Castle Cr trib nr Ringling, Mont	15	2.59	80.0
6056300	Cabin Cr nr Townsend, Mont	19	12.6	44.0
6056600	Deep Cr bl N Fk Deep Cr nr Townsend, Mont	16	87.7	61.0
6058700	Mitchell Gulch nr East Helena, Mont	20	8.09	12.0
6061500	Prickly Pear Cr nr Clancy, Mont	41	192	34.0
6061700	Jackson Cr nr East Helena, Mont	15	3.44	59.3
6061800	Crystal Cr nr East Helena, Mont	15	3.77	38.9
6061900	McClellan Cr at City Diversion Dam nr East Helena, Mont	16	33.2	47.0
6062500	Tenmile Cr nr Rimini, Mont	64	32.7	86.2
6062700	Little Porcupine Cr trib nr Helena, Mont	15	.48	76.5
6063000	Tenmile Cr nr Helena, Mont	47	102	39.5
6068500	Little Prickly Pear Cr nr Marysville, Mont	20	44.4	55.0
6071200	Lyons Cr nr Wolf Cr, Mont	16	29.4	13.0
6071400	Dog Cr nr Craig, Mont	16	15.9	0.0
6071600	Wegner Cr at Craig, Mont	19	35.0	3.0

Table 2.--*Basin characteristics at gaging stations*--Continued

Station number	Station name	Years of record	Drainage area (A) (square miles)	Mean basin elevation (E) (feet) above sea level)	Basin above 6000 feet elevation (HE) (percent)
	Upper Yellowstone-Central Mountain Region				
6043000	Taylor Cr nr Grayling, Mont	11	98.0	8,320	99.0
6043200	Squaw Cr nr Gallatin Gateway, Mont	17	40.4	7,440	98.0
6043300	Logger Cr nr Gallatin Gateway, Mont	20	2.48	7,120	87.0
6043500	Gallatin R nr Gallatin Gateway, Mont	69	825	7,960	95.0
6046500	Rocky Cr nr Bozeman, Mont	22	49.0	6,110	55.0
6046700	Pitcher Cr nr Bozeman, Mont	16	2.33	5,680	15.0
6047000	Bear Canyon nr Bozeman, Mont	18	17.0	6,690	92.0
6048000	E Gallatin R at Bozeman, Mont	22	148	6,210	51.0
6048500	Bridger Cr nr Bozeman, Mont	25	62.5	6,540	62.0
6050000	Hyalite Cr at Hyalite Ranger Station nr Bozeman, Mont	19	48.2	7,710	97.0
6052500	Gallatin R at Logan, Mont	59	1,800	6,820	64.0
6074500	Smith R nr White Sulphur Springs, Mont	12	30.7	6,770	81.0
6075600	Fivemile Cr nr White Sulphur Springs, Mont	15	6.00	5,980	45.0
6076000	Newland Cr nr White Sulphur Springs, Mont	22	6.74	6,380	81.0
6076700	Sheep Cr nr Neihart, Mont	19	5.22	7,210	99.0
6076800	Nuggett Cr nr Neihart, Mont	15	1.48	7,190	99.0
6077000	Sheep Cr nr White Sulphur Springs, Mont	32	54.4	6,910	94.0
6077500	Smith R nr Eden, Mont	20	1,590	5,840	35.6
6077700	Smith R trib nr Eden, Mont	15	1.44	3,840	0.0
6077800	Goodman Coulee nr Eden, Mont	20	21.8	4,020	0.0
6090500	Belt Cr nr Monarch, Mont	27	368	6,190	56.0
6109800	S Fk Judith R nr Utica, Mont	20	58.7	6,640	94.0
6115500	N Fk Musselshell R nr Delpine, Mont	38	31.4	6,120	77.0
6117000	Checkerboard Cr at Delpine, Mont	10	23.9	6,340	77.0
6118500	S Fk Musselshell R ab Martinsdale, Mont	37	287	6,110	60.0
6120500	Musselshell R at Harlowton, Mont	70	1,130	5,650	38.8
6122000	American Fk bl Lebo Cr nr Harlowton, Mont	22	166	5,480	24.8
6187500	Tower Cr at Tower Fls Yellowstone Natl Pk, Wyo	21	50.4	8,340	99.0
6188000	Lamar R nr Tower Falls Rngr Sta Yellowstone Park, Wyo	47	660	7,400	91.0
6191000	Gardner R nr Mammoth Yellowstone Natl Pk, Mont	50	202	7,940	98.0
6191500	Yellowstone R at Corwin Springs, Mont	72	2,620	8,440	96.0
6193000	Shields R nr Wilsall, Mont	22	87.8	7,040	97.0
6193500	Shields R Clyde Park, Mont	41	543	6,090	44.1
6194000	Brackett Cr nr Clyde Park, Mont	27	57.9	6,140	60.0
6197000	Big Timber Cr nr Big Timber, Mont	13	74.9	6,680	59.0
6197500	Boulder R nr Contact, Mont	32	226	8,510	91.0
6200000	Boulder R at Big Timber, Mont	31	523	7,570	75.0
6200500	Sweet Grass Cr ab Melville, Mont	46	63.8	7,630	75.0
6201000	Sweet Grass Cr bl Melville, Mont	30	143	6,110	32.8
6201550	Yellowstone R trib nr Greycliff, Mont	15	2.72	4,290	0.0
6201600	Bridger Cr nr Greycliff, Mont	16	61.5	5,320	12.0
6201650	Work Cr nr Reed Point, Mont	16	32.5	4,630	0.0
6201700	Hump Cr nr Reed Point, Mont	19	7.61	4,420	0.0
6204050	W Rosebud Cr nr Roscoe, Mont	13	52.1	9,560	100.0
6204500	Rosebud Cr nr Absarokee, Mont	35	394	7,890	66.1

Table 2.--*Basin characteristics at gaging stations*--Continued

Station number	Station name	Years of record	Drainage area (A) (square miles)	Mean basin elevation (E) (feet above sea level)	Basin above 6000 feet elevation (HE) (percent)
	Upper Yellowstone-Central Mountain Region--Continued				
6205000	Stillwater R nr Absarokee, Mont	48	975	7,220	53.0
6205100	Allen Cr nr Park City, Mont	18	7.17	3,960	0.0
6206500	Sunlight Cr nr Painter, Wyo	30	135	8,500	100.0
6207500	Clarks Fk Yellowstone R nr Belfry, Mont	57	1,150	7,430	80.0
6207800	Bluewater Cr nr Bridger, Mont	11	28.1	4,860	0.0
6208500	Clarks Fk Yellowstone R at Edgar, Mont	56	2,030	6,130	45.0
6209500	Rock Cr nr Red Lodge, Mont	46	124	9,540	99.0
6210000	W Fk Rock Cr bl Basin Cr nr Red Lodge, Mont	24	63.1	9,050	100.0
6211000	Red Lodge Cr ab Cooney Reservoir nr Boyd, Mont	42	143	5,710	23.6
6211500	Willow Cr nr Boyd, Mont	42	53.3	4,730	8.1
6215000	Pryor Cr ab Pryor, Mont	12	39.6	6,000	48.4
6216000	Pryor Cr at Pryor, Mont	14	117	5,280	41.0
6216200	W Wets Cr nr Billings, Mont	24	8.80	3,980	0.0
6216300	W Buckeye Cr nr Billings, Mont	20	2.64	3,780	0.0
6216500	Pryor Cr nr Billings, Mont	49	440	4,550	12.0
6287500	Soap Cr nr St Xavier, Mont	22	98.3	4,240	5.0
6288200	Beauvais Cr nr St Xavier, Mont	11	100	4,210	0.0
6289000	Little Bighorn R at State line nr Wyola, Mont	40	193	7,830	93.0
6290000	Pass Cr nr Wyola, Mont	22	111	5,570	15.0
6290500	Little Bighorn R bl Pass Cr nr Wyola, Mont	38	428	6,140	47.0
6291500	Lodgepass Cr ab Willow Cr Diversion, Mont	37	80.7	6,360	52.0
6294000	Little Bighorn R nr Hardin, Mont	26	1,290	4,770	19.8
6298000	Tongue R nr Dayton, Wyo	49	204	8,330	92.0
6298500	Little Tongue R nr Dayton, Wyo	23	25.1	7,560	80.0
6299500	Wolf Cr at Wolf, Wyo	35	37.8	7,700	90.0
6300500	E Fk Big Goose Cr nr Big Horn, Wyo	25	20.3	9,560	100.0

Table 2.--*Basin characteristics at gaging stations*--Continued

Station number	Station name	Years of record	Drainage area (A) (square miles)	Mean basin elevation (E) (feet above sea level)
	Northwest-Foothills Region			
6087900	Muddy Cr.trib nr Power, Mont	16	3.15	3,840
6088500	Muddy Cr at Vaughn, Mont	43	314	3,840
6089300	Sun R trib nr Great Falls, Mont	19	21.1	3,510
6099700	M Fk Dry Fk Marias R nr Dupuyer, Mont	15	20.2	4,590
6100200	Heines Coulee trib nr Valier, Mont	16	0.60	3,910
6100300	Lone Man Coulee nr Valier, Mont	19	14.1	3,890
6101600	Marias R trib No. 3 nr Chester, Mont	16	0.26	2,990
6101700	Fey Coulee trib nr Chester, Mont	16	2.47	3,260
6101800	Sixmile Coulee nr Chester, Mont	15	24.6	3,110
6101900	Dead Indian Coulee nr Fort Benton, Mont	15	2.85	3,340
6102100	Dry Fk Coulee trib nr Loma, Mont	15	0.84	2,770
6102200	Marias R trib at Loma, Mont	17	1.62	2,830
6102300	Marias R trib No. 2 at Loma, Mont	17	0.25	2,750
6105800	Bruce Coulee trib nr Choteau, Mont	16	1.70	4,170
6108200	Kinley Coulee nr Dutton, Mont	16	9.67	3,700
6108300	Kinley Coulee trib nr Dutton, Mont	15	2.65	3,760
6132400	Dry Fk Milk R nr Babb, Mont	17	17.4	5,130
6133000	Milk R at Western Crossing of international boundary	47	397	4,870
6133500	N Fk Milk R ab St Mary Canal nr Browning, Mont	39	61.8	4,850
6134500	Milk R at Milk River, Alberta	67	1,040	4,010
6134800	Van Cleeve Coulee trib nr Sunburst, Mont	16	10.8	3,600

Table 2.--*Basin characteristics at gaging stations*--Continued

Station number	Station name	Years of record	Drainage area (*A*) (square miles)	Mean basin elevation (*E*) (feet above sea level)	Mean minimum January temperature (*TI*) (degrees F)
	Northeast Plains Region				
6109900	Judith R trib nr Utica, Mont	15	7.15	5,420	7
6110000	Judith R nr Utica, Mont	55	328	6,540	7
6111700	Mill Cr nr Lewistown, Mont	19	3.14	4,630	8
6112100	Cottonwood Cr nr Moore, Mont	17	47.9	5,840	9
6128400	S Fk Bear Cr nr Roy, Mont	15	39.6	3,570	10
6128500	S Fk Bear Cr trib nr Roy, Mont	17	5.40	3,430	10
6129100	N Fk McDonald Cr trib nr Heath, Mont	16	2.24	4,750	8
6129200	Alkali Cr nr Heath, Mont	15	3.76	4,570	8
6129400	S Fk McDonald Cr trib nr Grassrange, Mont	15	0.51	3,850	8
6129500	McDonald Cr at Winnett, Mont	36	421	4,140	8
6135500	Sage Cr at Q Ranch nr Wild Horse, Alberta	38	175	3,200	-1
6137900	England Coulee at Hingham, Mont	15	0.93	3,090	2
6138700	S Fk Spring Coulee nr Havre, Mont	19	6.47	3,100	4
6138800	Spring Coulee nr Havre, Mont	15	17.8	3,090	4
6139500	Big Sand Cr nr Assinniboine, Mont	21	1,810	3,200	4
6140400	Bullhook Cr nr Havre, Mont	15	39.6	3,220	5
6141900	Milk R trib nr Lohman, Mont	15	0.11	2,500	4
6144350	Middle Cr nr Alberta Boundary	15	116	3,970	-3
6144500	Lodge Cr at international boundary	41	753	3,480	-1
6145000	McRae Cr at international boundary	20	59.0	2,900	-1
6148000	Battle Cr ab Cypress Lake nr West Plains, Sask	28	270	4,070	-1
6150000	Woodpile Coulee nr international boundary	44	60.2	2,950	-1
6150500	E Fk Battle Cr nr international boundary	44	89.5	3,000	-1
6151000	Lyons Cr at international boundary	44	66.7	3,000	-1
6154400	Peoples Cr nr Hays, Mont	12	220	3,570	3
6154500	Peoples Cr nr Dodson, Mont	21	670	3,500	2
6155100	Black Coulee nr Malta, Mont	12	7.03	2,550	1
6155200	Alkali Cr nr Malta, Mont	17	162	2,470	0
6155300	Disjardin Coulee nr Malta, Mont	23	4.84	2,470	0
6155400	Taylor Coulee nr Malta, Mont	18	3.89	2,530	0
6156000	Whitewater Cr nr international boundary	51	458	2,820	-2
6158000	Frenchman R ab Eastend Res nr Ravenscrag, Sask	34	601	3,670	-4
6168500	Rock Cr at international boundary	35	241	2,910	-5
6169000	Horse Cr at international boundary	46	73.5	2,810	-5
6169500	Rock Cr bl Horse Cr nr international boundary	32	328	2,870	-5
6170000	McEachern Cr at international boundary	53	182	2,830	-5
6178000	M Fk Poplar R at international boundary	47	362	2,950	-5
6178500	E Poplar R at internatonal boundary	43	534	2,800	-5
6179500	W Fk Poplar R at international boundary	20	139	3,000	-5
6180000	W Fk Poplar R nr Richland, Mont	15	428	2,900	4
6182500	Big Muddy Cr at Daleview, Mont	25	279	2,510	-4
6183000	Big Muddy Cr at Plentywood, Mont	19	850	2,460	-4
6183100	Box Elder Cr nr Plentywood, Mont	19	9.40	2,380	-4
6183300	Spring Cr nr Plentywood, Mont	24	7.05	2,440	-4
6183400	Spring Cr at Highway 16 nr Plentywood, Mont	19	16.9	2,330	-4
6329700	Painted Woods Cr trib nr Williston, N Dak	19	0.37	2,150	-2
6329800	Painted Woods Cr nr Williston, N Dak	19	17.0	2,300	-2
6329900	Painted Woods Cr trib No. 2 nr Williston, N Dak	19	8.30	2,300	-2
6330100	Sand Cr nr Williston, N Dak	19	38.0	2,150	-2
6331000	Little Muddy Cr bl Cow Cr nr Williston, N Dak	24	775	2,110	-2
6331900	White Earth R trib nr Tioga, N Dak	14	9.60	2,400	-4

Table 2.--*Basin characteristics at gaging stations*--Continued

Station number	Station name	Years of record	Drainage area (A) (square miles)	Mean basin elevation (E) (feet above sea level)
	East-Central Plains Region			
6115100	Missouri R trib nr Landusky, Mont	16	3.39	2,690
6115300	Duval Cr nr Landusky, Mont	16	3.31	3,100
6120600	Antelope Cr trib nr Harlowton, Mont	18	0.47	5,400
6120700	Antelope Cr trib nr mouth nr Harlowton, Mont	18	1.92	5,200
6120800	Antelope Cr trib No. 2 nr Harlowton, Mont	23	21.2	4,570
6120900	Antelope Cr at Harlowton, Mont	22	88.7	4,930
6125700	Big Coulee nr Lavina, Mont	15	232	4,230
6126300	Current Cr nr Roundup, Mont	15	220	4,250
6127100	S Willow Cr trib nr Roundup, Mont	15	1.38	3,590
6127200	Musselshell R trib nr Musselshell, Mont	15	10.8	3,300
6127570	Butts Coulee nr Melstone, Mont	16	6.71	3,000
6128900	Box Elder Cr trib nr Winnett, Mont	19	16.2	2,900
6129000	Box Elder Cr nr Winnett, Mont	21	684	3,470
6129700	Gorman Coulee nr Cat Creek, Mont	16	2.32	2,910
6129800	Gorman Coulee trib nr Cat Creek, Mont	24	0.81	2,900
6130600	Cat Cr nr Cat Creek, Mont	16	36.5	2,870
6130800	Second Cr trib nr Jordan, Mont	17	0.52	2,830
6130850	Second Cr trib No. 2 nr Jordan, Mont	21	2.08	2,830
6130900	Second Cr trib No. 3 nr Jordan, Mont	15	0.72	2,780
6130950	Little Dry Cr nr Van Norman, Mont	18	1,220	2,860
6131000	Big Dry Cr nr Van Norman, Mont	38	2,550	2,870
6172300	Unger Cr nr Vandalia, Mont	21	11.1	2,560
6172350	Mooney Coulee nr Tampico, Mont	15	14.3	2,410
6174000	Willow Cr nr Glasgow, Mont	25	538	2,400
6175550	E Fk Sand Cr nr Vida, Mont	15	8.51	2,440
6175700	E Fk Wolf Cr nr Lustre, Mont	23	9.61	2,850
6175900	Wolf Cr trib No. 2 nr Wolf Point, Mont	24	6.54	2,470
6176500	Wolf Cr nr Wolf Point, Mont	25	251	2,570
6177050	E Fk Duck Cr nr Brockway, Mont	24	12.4	2,910
6177100	Duck Cr nr Brockway, Mont	15	54.0	2,910
6177150	Redwater R at Brockway, Mont	17	216	2,810
6177200	Tusler Cr nr Brockway, Mont	16	90.2	2,980
6177250	Tusler Cr trib nr Brockway, Mont	17	3.17	2,700
6177300	Redwater R trib nr Brockway, Mont	17	0.29	2,620
6177350	S Fk Dry Ash Cr nr Circle, Mont	17	5.74	2,840
6177400	McCune Cr nr Circle, Mont	18	29.9	2,810
6177500	Redwater R at Circle, Mont	41	547	2,810
6177700	Cow Cr trib nr Vida, Mont	16	1.71	2,490
6177800	Wolf Cr trib nr Vida, Mont	17	0.91	2,450
6181000	Poplar R nr Poplar, Mont	30	3,170	2,730
6181200	Missouri R trib No. 2 nr Brockton, Mont	15	1.60	2,170
6185100	Big Muddy Cr trib nr Culbertson, Mont	15	7.38	2,110
6185200	Missouri R trib No. 3 nr Culbertson, Mont	15	1.23	2,090
6185300	Missouri R trib No. 4 nr Culbertson, Mont	15	11.6	2,170
6185400	Missouri R trib No. 5 nr Culbertson, Mont	16	3.67	2,210
6217700	Crooked Cr trib nr Shepherd, Mont	17	7.21	3,650
6294900	M Fk Froze to Death Cr trib nr Ingomar, Mont	15	1.36	3,220
6295020	Short Cr nr Forsyth, Mont	17	3.23	2,820
6295050	Little Porcupine Cr nr Forsyth, Mont	18	614	2,910
6309020	Rock Springs Cr trib at Rock Springs, Mont	16	0.96	3,000
6309040	Dry House Cr nr Angela, Mont	15	35.6	2,940
6309060	N Fk Sunday Cr trib No. 2 nr Angela, Mont	17	0.22	2,710
6326900	Yellowstone R trib No. 4 nr Fallon, Mont	15	0.67	2,410
6326950	Yellowstone R trib No. 5 nr Marsh, Mont	16	0.82	2,440

Table 2.--*Basin characteristics at gaging stations*--Continued

Station number	Station name	Years of record	Drainage area (A) (square miles)	Forest cover (F) (percent)
	Southeast Plains Region			
6294400	Andresen Coulee nr Custer, Mont	16	2.35	31.0
6294800	Unknown Cr nr Bighorn, Mont	15	14.6	10.0
6294850	Buckingham Coulee nr Myers, Mont	15	2.63	29.0
6295100	Rosebud Cr nr Kirby, Mont	15	34.2	12.0
6295200	Whitedirt Cr nr Lame Deer, Mont	15	1.58	63.0
6296000	Rosebud Cr nr Forsyth, Mont	19	1,280	41.0
6296100	Snell Cr nr Hathaway, Mont	15	10.5	11.0
6306300	Tongue R at State line nr Decker, Mont	29	1,480	37.0
6306900	Spring Cr nr Decker, Mont	21	34.7	5.0
6306950	Leaf Rock Cr nr Kirby, Mont	19	4.53	10.0
6307640	Spring Cr nr Ashland, Mont	15	1.56	14.0
6307660	Walking Horse Cr nr Ashland, Mont	16	3.33	15.0
6307760	Stebbins Cr nr Ashland, Mont	15	5.41	64.0
6307780	Stebbins Cr at Mouth nr Ashland, Mont	16	20.8	37.0
6308200	Basin Cr trib nr Volborg, Mont	24	0.14	0.0
6308300	Basin Cr nr Volborg, Mont	19	10.9	1.7
6309080	Deep Cr nr Kinsey, Mont	17	11.5	0.0
6309090	Ash Cr nr Locate, Mont	15	6.23	17.0
6317050	Rucker Draw nr Spotted Horse, Wyo	18	3.98	0.0
6324700	Sand Cr nr Broadus, Mont	24	10.6	4.9
6325500	Little Powder R nr Broadus, Mont	25	1,970	7.4
6326400	Meyers Cr nr Locate, Mont	15	9.42	17.0
6326600	O'Fallon Cr nr Ismay, Mont	17	669	2.3
6326650	O'Fallon Cr trib nr Ismay, Mont	15	0.17	0.0
6326700	Deep Cr nr Baker, Mont	15	1.55	0.0
6326800	Pennel Cr nr Baker, Mont	17	1.00	0.0
6328800	Indian Cr at Intake, Mont	16	0.46	0.0
6328900	War Dance Cr nr Intake, Mont	16	3.69	0.0
6329570	First Hay Cr nr Sidney, Mont	16	30.0	0.0
6334000	Little Missouri R nr Alzada, Mont	53	904	8.0
6334100	Wolf Cr nr Hammond, Mont	24	9.09	0.0
6334200	Willow Cr nr Alzada, Mont	16	123	0.0
6334500	Little Missouri R at Camp Crook, S Dak	24	1,970	5.6
6334630	Box Elder Cr nr Webster, Mont	15	1,090	4.2
6334640	N Fk Coal Bank Cr nr Webster, Mont	15	15.0	0.0
6334720	Soda Cr trib nr Webster, Mont	17	2.22	0.0
6335000	Little Beaver Cr nr Marmarth, N Dak	39	587	0.0
6335700	Deep Cr nr Bowman, N Dak	19	0.20	0.0
6336100	Sheep Cr trib nr Medora, N Dak	15	0.29	0.0
6336200	Sheep Cr trib No. 2 nr Medora, N Dak	16	0.42	0.0
6336300	Little Missouri R trib nr Medora, N Dak	19	0.32	0.0
6336400	Jules Cr nr Medora, N Dak	19	3.80	0.0
6336450	Spring Cr nr Wibaux, Mont	17	3.88	0.0
6336500	Beaver Cr at Wibaux, Mont	35	351	0.0
6336980	Little Missouri R trib nr Watford City, N Dak	14	2.10	0.0
6337100	Spring Cr nr Watford City, N Dak	14	22.7	0.0
6356000	S Fk Grand River at Buffalo, S Dak	24	148	0.5
6358600	S Fk Moreau R trib nr Redig, S Dak	22	2.33	0.0
6358620	Sand Cr trib nr Redig, S Dak	16	0.04	0.0

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