U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE

# Estimating Monthly and Annual Streamflow Statistics at Ungaged Sites in Idaho

Water-Resources Investigations Report 01–4093

U.S. Department of the Interior
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*By* Jon E. Hortness *and* Charles Berenbrock

Water-Resources Investigations Report 01–4093

Prepared in cooperation with
U.S. Department of Agriculture,
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## CONVERSION FACTORS, VERTICAL DATUM, AND WATER YEAR

| Multiply | By | To obtain |
|---|---|---|
| cubic foot per second ($ft^3/s$) | 0.02832 | cubic meter per second |
| foot (ft) | 0.3048 | meter |
| foot per mile (ft/mi) | 0.1894 | meter per kilometer |
| inch (in.) | 25.4 | millimeter |
| mile (mi) | 1.609 | kilometer |
| square mile ($mi^2$) | 2.590 | square kilometer |

**Sea level:** In this report, sea level refers to the North American Vertical Datum of 1988 (NAVD of 1988) a vertical control datum established by the minimum-constraint adjustment of Canadian-Mexican-United States leveling observations and held fixed at Father Point/Rimouski, Quebec, Canada.

**Water year:** In U.S. Geological Survey reports dealing with surface-water supply, a water year is the 12-month period, October 1 through September 30. The water year is designated by the calendar year in which it ends; thus, the water year ending September 30, 1999, is called the 1999 water year.

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## ABSTRACT

Updated monthly and annual streamflow information for the many ungaged streams throughout Idaho is needed to assist planners and managers with issues regarding fish and wildlife, water rights, and other land and water uses. To provide this information, the U.S. Geological Survey used a multiple-regression analysis to develop equations for estimating daily mean discharge exceeded 80, 50, and 20 percent of the time each month (80-, 50-, and 20-percent monthly exceedances) and mean annual discharge values at ungaged sites. The analysis produced estimating equations that relate specific streamflow statistics to basin characteristics. The standard errors of estimate, in $\log_{10}$, of the final estimating equations ranged from a minimum of 0.072 (+18.1 to -15.3 percent) to a maximum of 0.498 (+214.8 to -68.2 percent).

The estimating equations might not yield reliable results for sites with basin characteristic values outside of the range of values used to develop the equations. The equations also are not applicable for regulated streams or those that exhibit significant gains and (or) losses as a result of spring flow, seepage through permeable streambeds, or irrigation diversions.

The equations generally were more reliable for estimating the high monthly streamflow statistics (20-percent exceedances) than for estimating the low streamflow statistics (80-percent exceedances) in each region and all streamflow statistics in regions where annual streamflow is relatively low.

## INTRODUCTION

Extreme variability in streamflow across the State of Idaho can complicate decision-making processes for planners and managers who frequently deal with issues regarding fish and wildlife, water rights, and other land and water uses. Monthly and annual streamflow information is needed to assist these planners and managers in making informed decisions. This information is available at sites where long-term gaging stations are located; however, many streams in Idaho are ungaged.

Kjelstrom (1998) outlined methods for estimating monthly exceedance discharge values at ungaged sites in the Salmon and Clearwater River Basins in central Idaho, and Horn (1988) developed estimates for mean annual discharge at ungaged sites across Idaho. However, estimates of monthly exceedance values are needed throughout the State, and Horn s mean annual estimates were based on data only through 1977. Because of the need for updated monthly and annual discharge information at ungaged sites throughout Idaho, the U.S. Geological Survey (USGS), in cooperation with the U.S. Forest Service, began a study to develop techniques for estimating long-term daily mean discharge exceeded 80, 50, and 20 percent of the time each month (80-, 50-, and 20-percent exceedance values) and mean annual discharge.

### Purpose and Scope

This report summarizes the techniques used to estimate various monthly and annual streamflow statistics using regional regression equations and describes the associated reliability and limitations. Equations were developed to estimate the 80-, 50-, and 20-percent monthly exceedance discharges and the mean annual discharge at ungaged, unregulated sites. Standard errors of estimate were calculated to help predict the reliability and accuracy of each equation.

### Description of Study Area

The study area (fig. 1) includes the entire State of Idaho and areas of adjacent States where particular drainage basins cross over State boundaries. The adja-

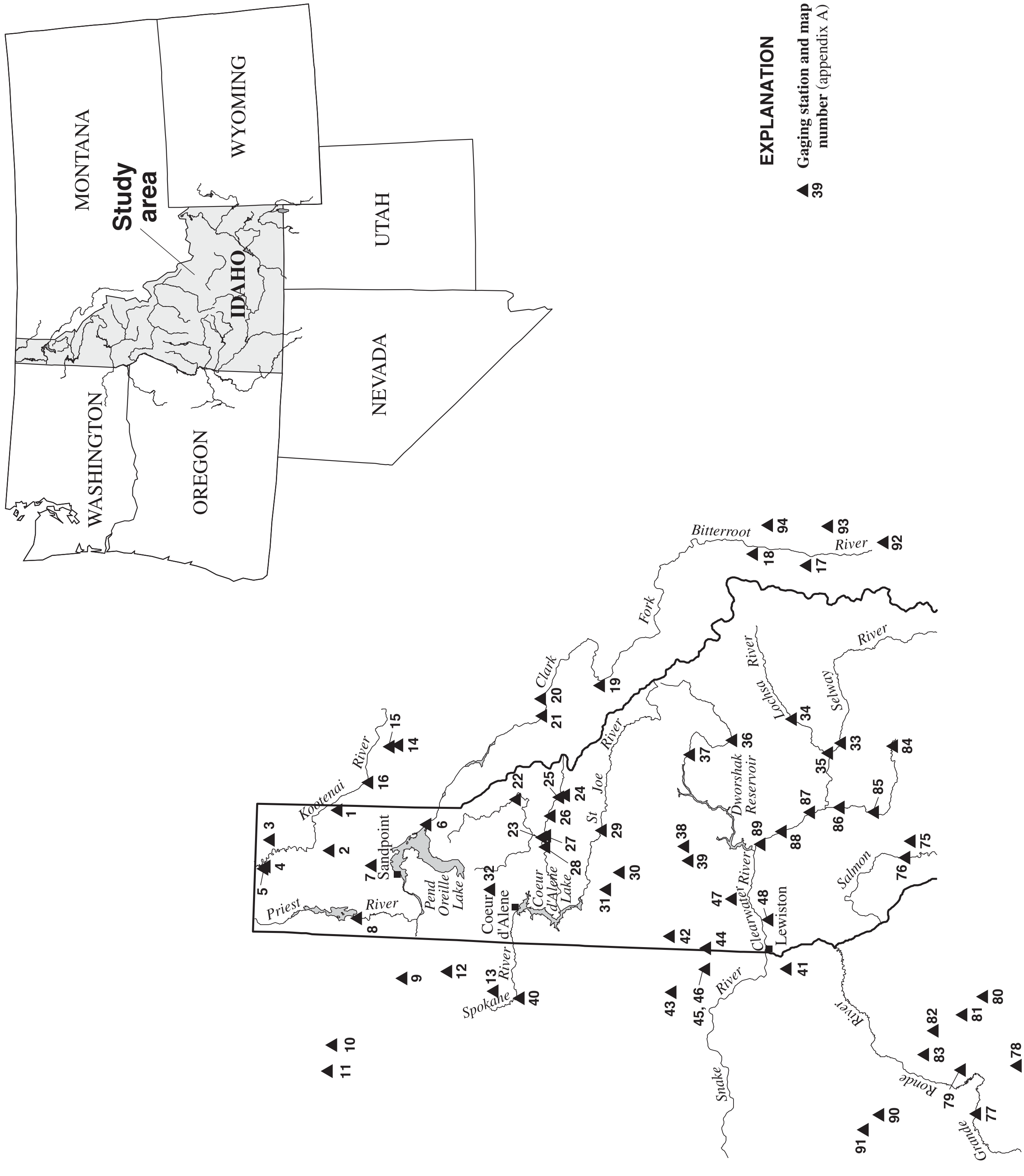
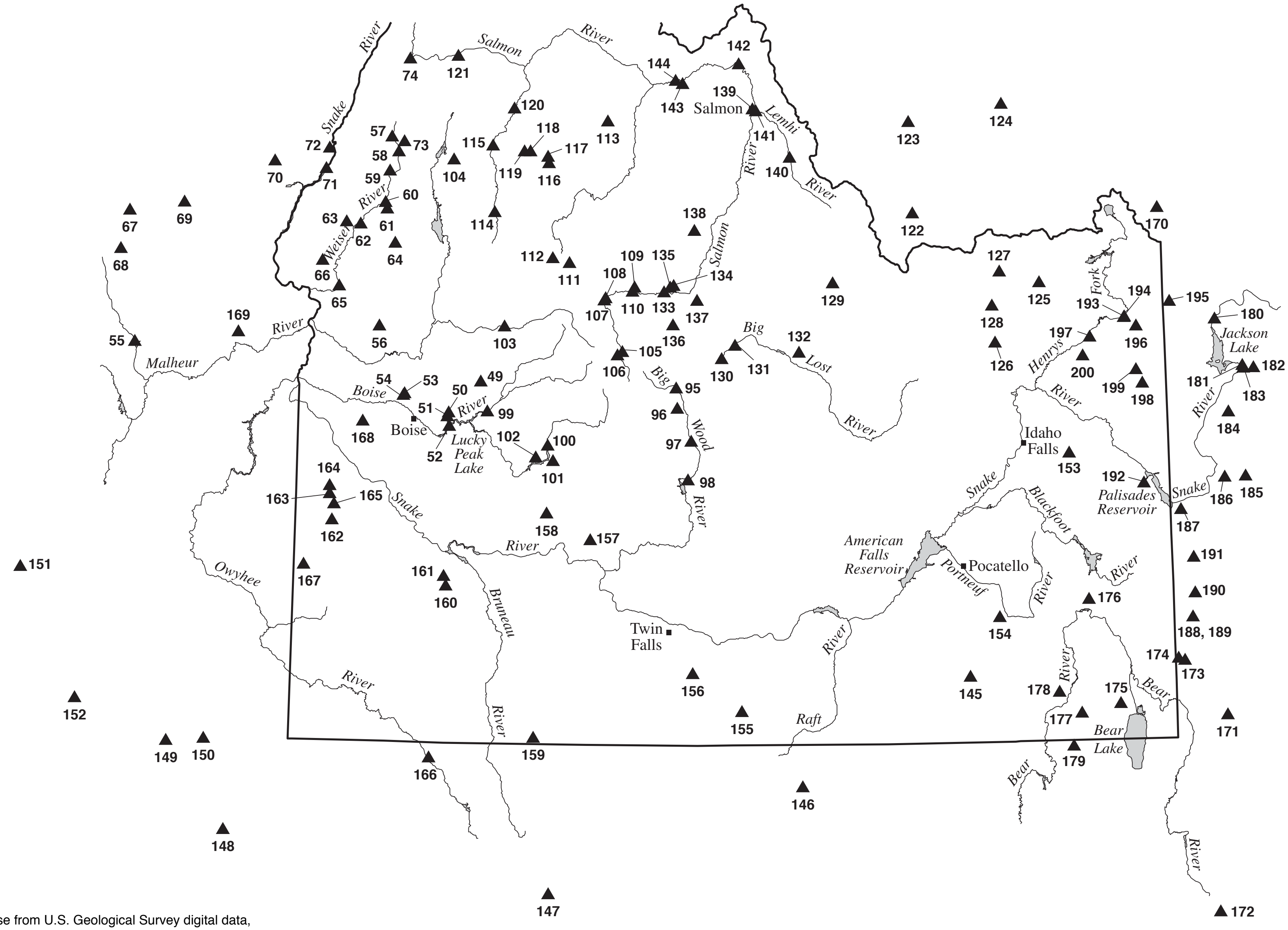



**Figure 1.** Location of streamflow-gaging stations used in regional regression analysis, Idaho.




Base from U.S. Geological Survey digital data,
1:2,000,000, 1999;
Transverse Mercator projection
Factor at central meridian: 0.99960
Longitude of central meridian: -114° 00'
Latitude of origin: 42° 00'
False easting (meters): 500,000.0
False northing (meters): 100,000.0

0 20 40 60 80 100 MILES
0 20 40 60 80 100 KILOMETERS

cent States partially included in the study area are Washington, Oregon, Nevada, Utah, Wyoming, and Montana. The northern and central parts of the area are composed mainly of rugged, mountainous terrain; broad plains and mildly sloping valleys and hills predominate in the south. Geologic features across the study area consist of sedimentary, igneous, and metamorphic rocks ranging in age from Precambrian to Holocene (Bond, 1978). The granitic Idaho batholith is the major structural feature in the central part of the study area, and basalt covers much of the southern and western parts (Ross and Savage, 1967).

Most precipitation in the study area results from storms moving inland from the Pacific Ocean. The amount of precipitation varies widely throughout the area and is greatly affected by topography. Precipitation ranges from less than 10 in. per year on the Snake River Plain in south-central Idaho to 60 to 70 in. per year in the central mountains of Idaho (Molnau, 1995). The most significant amounts of precipitation are a direct result of orographic effects and occur mainly in the winter months. Spring and summer thunderstorms in the southern part of the study area sometimes produce large amounts of precipitation. Resulting streamflow varies geographically and seasonally and can be affected by land use and vegetation. During much of the year, streamflow in most unregulated streams in the study area is minimal base flow; during April, May, June, and July, streamflow is significantly higher, primarily as a result of snowmelt. Occasionally during the winter months, large frontal systems carrying warmer air release moisture as rain on the snowpack and frozen ground, which results in rapid snowmelt and high runoff rates, particularly at elevations less than 6,000 ft above sea level (National Oceanic and Atmospheric Administration, 1971).

## PREVIOUS INVESTIGATIONS

Two previous studies dealt with developing regional regression equations for use in estimating mean annual discharges at ungaged sites in Idaho. Quillian and Harenberg (1982) divided the State into nine regions and developed separate regression equations for each. The following basin characteristics were used in one or more of their equations: basin area, mean annual precipitation, percent forest cover, longitude of the gaging station, and mean basin elevation. Using streamflow data through 1977, Horn (1988) developed a method for estimating mean annual discharges in an effort to define the drought characteristics of streams across Idaho. He divided the State into two regions and used basin area, mean annual precipitation, and percent forest cover to estimate streamflow statistics.

Kjelstrom (1998) developed a method for estimating the 20-, 50-, and 80-percent monthly exceedance discharge values for the Salmon and Clearwater River Basins in central Idaho, using the mean monthly discharge and a multiplication factor. This method pertains only to the approximately 1,050 subbasins identified by Lipscomb (1998), who estimated the mean monthly discharges for each subbasin by apportioning mean annual discharges into monthly increments on the basis of records from gaging stations selected as being characteristic of the subbasin. Lipscomb estimated the mean annual discharges by using the regional regression equations developed by Quillian and Harenberg (1982).

## ESTIMATING STREAMFLOW STATISTICS USING BASIN CHARACTERISTICS

Using multiple-regression equations to relate streamflow statistics to various basin and climatic variables (basin characteristics) is a common method for estimating streamflow at ungaged sites. Once the equations have been developed, streamflow statistics at ungaged sites can be estimated by determining the necessary basin characteristics and inserting that information into the regression equations. In this study, regression equations were developed for use in estimating 80-, 50-, and 20-percent monthly exceedance discharges (Q.80, Q.50, and Q.20) and the mean annual discharge (Qa). These statistics are commonly used for analyzing streamflow.

### Streamflow Data

Daily mean discharge values from 200 continuous-record gaging stations were used to develop the regression equations (U.S. Geological Survey, 1955-2000). Each gaging station had at least 10 years of record through water year 1999. Gaging stations located on streams where flows are regulated, where diversions significantly affect flows, or where significant discharge from springs augments streamflow were not included in the analysis. The locations of all gaging stations used in the analysis are shown in figure 1. The map numbers that correspond to the gaging stations shown in figure 1, the station identification number, station name, and period of record for each are listed in appendix A. Monthly and annual streamflow statistics computed for each station are listed in appendix B.

## Basin Characteristics

More than 50 separate basin characteristics were obtained for each of the 200 gaging stations included in the study. All basin characteristics were obtained using Arc Macro Language programs written for Arc/Info (Environmental Systems Research Institute, Inc., 1999). These programs generated the basin characteristic values from the datasets listed in table 1. Several basin characteristics were removed from consideration after correlation plots of the data were reviewed. Generally, if two basin characteristics correlated well, the one that was the least difficult to obtain was kept and the other was removed. Other characteristics were removed because of missing data or difficulty in obtaining the data. By following this process, nine standard basin characteristics were retained for use in the multiple-regression analysis. Of the nine characteristics used in the analysis, eight were included in at least one of the final equations. These eight standard characteristics were: drainage area (A), mean basin elevation (E), basin relief (BR), slopes greater than 30 percent (S30), mean annual precipitation (P), forested area (F), basin slope (BS), and main channel slope (MCS). Basin azimuth also was included in the analysis but was not used in any of the final equations. Detailed information on the eight basin characteristics used in the equations is listed in table 2, and basin characteristic values obtained for each gaging station are listed in appendix C. One percent was added to the measured values for S30

**Table 1.** Selected data sources used to obtain basin characteristics for regional regression analysis

**[Multiply meter by 3.281 to obtain foot; multiply kilometer (km) by 0.6214 to obtain mile]**

| Dataset name | Source description |
|---|---|
| National Elevation Dataset (NED) | Basin characteristics were calculated using 30-meter resolution digital elevation data (*http://gisdata.usgs.gov/ned/*) |
| National Elevation Dataset Hydrologic Derivatives (NED-H) | Hydrologic derivatives of NED data were developed using procedures similar to those in Stage 1 processing, using a custom projection for Idaho (*http://edcnts12.cr.usgs.gov/ned-h/about/Stage1.html*) |
| National Land Cover Dataset (NLCD) | Vogelmann, J.E., Sohl, T.L., Campbell, P.V., and Shaw, D.M., 1998, Regional land cover characterization using Landsat Thematic Mapper data and ancillary data sources: Environmental Monitoring and Assessment v. 51, p. 415–428 (*http://edcwww.cr.usgs.gov/programs/lccp*) |
| Idaho map of mean annual precipitation | Molnau, M., 1995, Mean annual precipitation, 1961–1990, Idaho: Moscow, University of Idaho, Agricultural Engineering Department, State Climate Program, scale 1:1,000,000 (*http://snow.ag.uidaho.edu/Climate/reports.html*) |
| Western United States average monthly or annual precipitation | Daly, C., and Taylor, G., 1998, Western United States average monthly or annual precipitation, 1961–90, Oregon: Portland, Water and Climate Center of the Natural Resources Conservation Service, grid-cell resolution 4 km (*http://www.ocs.orst.edu/prism/prism_new.html*) |

**Table 2.** Description of selected basin characteristics used in final estimating equations

[Multiply meter by 3.281 to obtain foot; multiply kilometer (km) by 0.6214 to obtain mile]

| Basin characteristic and symbol | Description and estimating technique |
|---|---|
| Drainage area (A) | Area of the basin that contributes surface runoff, in square miles; estimated using Arc/Info Grid with 30-meter resolution digital elevation models (DEMs) |
| Mean basin elevation (E) | Mean elevation of the basin, in feet above sea level; estimated using Arc/Info Grid and averaging elevations using 30-meter resolution DEMs |
| Basin relief (BR) | Maximum relief of the basin, in feet; estimated using Arc/Info Grid by subtracting the lowest elevation in the basin from the highest using 30-meter resolution DEMs |
| Slopes greater than 30 percent (S30) | Area of the basin with slopes greater than 30 percent, in percent of drainage area; estimated using the "average maximum technique" in Arc/Info Grid with 30-meter resolution DEMs |
| Mean annual precipitation (P) | Mean annual precipitation over the entire drainage area, in inches; estimated using Arc/Info Grid with a combination of 500-meter (within Idaho) and 4-km (outside of Idaho) resolution precipitation grids |
| Forested area (F) | Area of the basin containing forest, in percent of drainage area; estimated using Arc/Info Grid with a 37-meter resolution land cover grid |
| Basin slope (BS) | Average slope of the basin, in percent; estimated using the "average maximum technique" in Arc/Info Grid with 30-meter resolution DEMs |
| Main channel slope (MCS) | Slope of the main channel from basin outlet to basin divide, in feet per mile; estimated by determining the difference in elevations at points 85 and 10 percent of the main channel upstream from the outlet, then dividing by 0.75 times the main channel length |

and F to ensure that zero values, which cannot be transformed, would not result at any site. Measured values for E and BR were divided by 1,000 to allow for more convenient coefficients in the final equations. The variables that represent the adjusted values are denoted with an asterisk in the estimating equations (S30*, F*, E*, and BR*).

## Determination of Regions

In regional streamflow frequency analyses, attempts are made to define regions that are hydrologically homogeneous in terms of the characteristics being studied (Haan, 1977). Thus, a graphical cluster analysis was performed using the basin characteristics obtained for the 200 gaging stations included in the study. This analysis revealed several unique groupings of basin characteristics across the State. The final groupings were based on mean basin elevation, basin slope, percentage of basin covered by forest, and mean annual precipitation. On the basis of the cluster analysis and the resulting final groupings of basin characteristics, the State was divided into eight regions (fig. 2) and separate equations were developed for each. The region boundaries were determined on the basis of the following factors: (1) grouping of similar basin characteristics that were revealed in the cluster analysis; (2) geographic features, such as large mountain ranges or breaks between mountains and plains; and (3) engineering judgment based on general knowledge of the area. A part of the area commonly referred to as the eastern Snake River Plain was excluded from the analysis for several reasons: (1) Most of the streams in this region either are regulated or are significantly affected by irrigation diversions, (2) several springs with extremely large discharges add significant flow to streams in the region, and (3) the lithology of the area consists mainly of layered basalts that exhibit extremely high rates of infiltration. The effects of these features on the hydrology of the area cannot be characterized by a regional regression approach.

## Estimation Method

For use in the multiple-regression analysis, all streamflow and basin characteristic data were transformed to base-10 logarithms. This transformation was performed to obtain a linear regression model and to achieve equal variance about the regression line. The linear regression model makes it possible to perform an ordinary least-squares (OLS) analysis from which the regression constants can be computed. Equal variance about the regression line satisfies a basic assumption of regression methods, which states that the distribution of errors about the regression line is normal and constant throughout the range (Riggs, 1968).

A statistical computer software program, Statit (Statware, Inc., 1992), was used to derive the estimating equations in the following linear form:

$$\log Q = \log a + b1 \log B + b2 \log C + \ldots + bn1 , \quad (1)$$

where $Q$ (dependent variable) is the desired monthly or annual streamflow statistic, in cubic feet per second (80-, 50-, or 20-percent exceedance or mean annual discharge); $a$ is the multiple-regression constant; $b1$, $b2$, ... $bn$ are the regression coefficients; and $B$, $C$, ... $N$ are the values of the required basin characteristics (independent variables).

The antilogarithms of all values in equation 1 resulted in the following nonlinear form of the estimating equation:

$$Q = aB^{b1}C^{b2}\ldots N^{bn} . \quad (2)$$

Statit uses OLS regression techniques to determine the best variables for use in the regression equations. All possible combinations of variables were analyzed and the best combinations were chosen on the basis of the standard error of estimate (SEE). The SEE is a measure of the fit of the regression equation to the observed data. The equation with the smallest SEE results in the narrowest confidence limits and thus, generally, the most reliable estimating equation (Haan, 1977).

For any given month, the basin characteristics that resulted in the best overall fit (smallest average SEE) for all of the equations were used as the independent variables in all three estimating equations. This ensures that the correlation structure between the streamflow statistics for each month is preserved, which results in stable and consistent estimates of the statistics (Haan, 1977). Estimating equations were developed for each region and are listed in tables 3 through 10 (back of report), along with the associated errors for each. The SEEs presented in $\log_{10}$ represent the error of the transformed equations. The SEEs presented in a percentage range represent the error of the

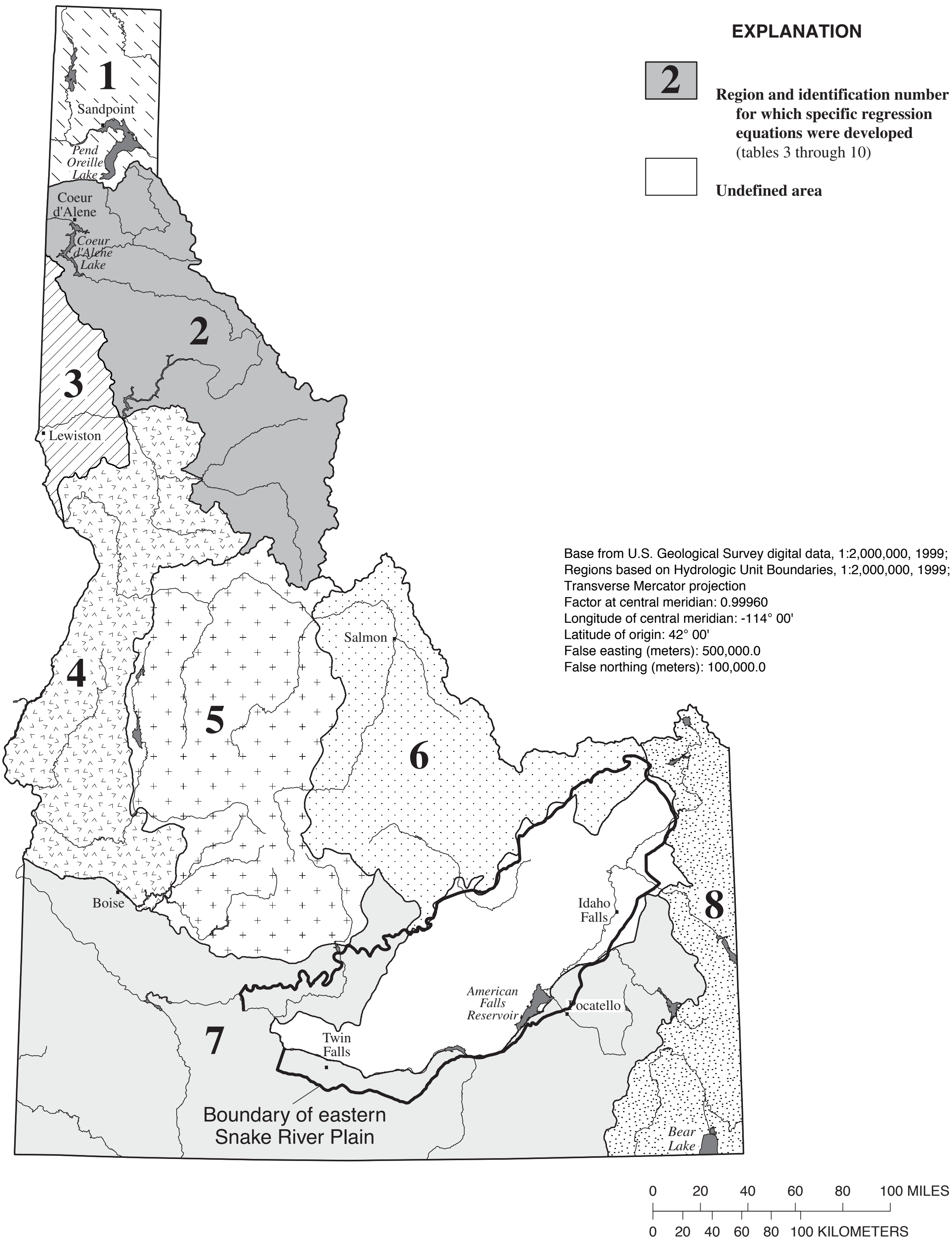



**Figure 2.** Location of regions defined for use in regional regression analysis, Idaho.

final, untransformed equations based on equations presented by Riggs (1968).

## RELIABILITY AND LIMITATIONS

The SEEs for the equations, in $\log_{10}$, over all eight regions ranged from a minimum of 0.072 for Qa in region 3 to a maximum of 0.498 for August (Q.80) in region 7. The standard errors of estimate for these streamflow statistics exhibited a minimum range of +18.1 to -15.3 percent and a maximum range of +214.8 to -68.2 percent. These error values represent the general reliability of the estimating equations; however, other factors could limit the applicability of the equations.

Because this method is based on a regression analysis, the equations might not be reliable for sites where the basin characteristics are outside of the range of characteristics that were used to develop the equations (table 11). In addition, using basin characteristic values near their extremes (maximum or minimum, table 11) might result in unreliable and erroneous estimates. Figure 3 shows a "cloud of common values" for two of the four basin characteristics used in equations for February in region 2. If the minimum value for mean annual precipitation and the maximum value for mean basin elevation were used, this combination would plot outside of the "cloud of common values" and, thus, the equations might result in unreliable estimates. Generating basin characteristic values by using datasets or algorithms other than those described in this study will also result in estimates of unknown reliability. The standard errors of estimate for each equation are applicable only if the datasets presented in table 1 are used to obtain the required basin characteristics and the specific algorithms described in table 2

**Table 11.** Maximum and minimum values of basin characteristics used in regional regression analysis

[A, drainage area, in square miles; E, mean basin elevation, in feet above sea level; BR, basin relief, in feet; S30, slopes greater than 30 percent, in percent of drainage area; P, mean annual precipitation, in inches; F, forested area, in percent of drainage area; BS, basin slope, in percent; MCS, main channel slope, in feet per mile]

| | A | E | BR | S30 | P | F | BS | MCS |
|---|---|---|---|---|---|---|---|---|
| **Region 1** | | | | | | | | |
| maximum . . . . . . . . | 1,011.0 | 5,347.3 | 5,866.9 | 81.4 | 54.3 | 94.5 | 46.4 | 265.6 |
| minimum. . . . . . . . . | 12.5 | 2,397.7 | 2,230.6 | 9.4 | 25.1 | 54.6 | 12.2 | 11.1 |
| **Region 2** | | | | | | | | |
| maximum . . . . . . . . | 1,913.1 | 6,649.7 | 7,789.6 | 89.6 | 60.9 | 95.1 | 58.8 | 466.2 |
| minimum. . . . . . . . . | 3.0 | 3,465.5 | 1,643.9 | 31.7 | 29.6 | 50.3 | 23.8 | 18.5 |
| **Region 3** | | | | | | | | |
| maximum . . . . . . . . | 674.9 | 3,752.2 | 5,098.9 | 57.5 | 30.1 | 63.4 | 35.4 | 139.3 |
| minimum. . . . . . . . . | 17.6 | 2,647.1 | 1,442.8 | 0.1 | 19.3 | 0.6 | 10.0 | 11.8 |
| **Region 4** | | | | | | | | |
| maximum . . . . . . . . | 13,418.3 | 7,461.3 | 11,152.1 | 87.0 | 64.6 | 93.0 | 57.2 | 328.9 |
| minimum. . . . . . . . . | 4.0 | 3,528.6 | 1,821.4 | 17.7 | 15.9 | 4.8 | 18.7 | 17.2 |
| **Region 5** | | | | | | | | |
| maximum . . . . . . . . | 12,228.0 | 8,204.0 | 10,701.3 | 77.8 | 44.5 | 88.7 | 46.7 | 213.0 |
| minimum. . . . . . . . . | 19.3 | 6,171.1 | 2,743.5 | 24.7 | 22.4 | 22.4 | 20.2 | 19.9 |
| **Region 6** | | | | | | | | |
| maximum . . . . . . . . | 6,236.7 | 9,461.0 | 9,419.7 | 94.2 | 32.0 | 80.2 | 66.2 | 869.9 |
| minimum. . . . . . . . . | 6.4 | 6,258.1 | 3,015.2 | 7.5 | 15.3 | 14.5 | 8.6 | 18.0 |
| **Region 7** | | | | | | | | |
| maximum . . . . . . . . | 535.3 | 7,603.0 | 5,683.3 | 55.2 | 29.1 | 38.9 | 35.3 | 372.8 |
| minimum. . . . . . . . . | 12.5 | 2,984.4 | 1,178.3 | 0.0 | 8.2 | 0.0 | 1.7 | 18.4 |
| **Region 8** | | | | | | | | |
| maximum . . . . . . . . | 874.8 | 8,951.0 | 6,232.1 | 86.6 | 56.0 | 93.9 | 49.7 | 413.0 |
| minimum. . . . . . . . . | 16.3 | 5,691.9 | 1,100.5 | 1.2 | 14.2 | 2.3 | 6.1 | 24.7 |

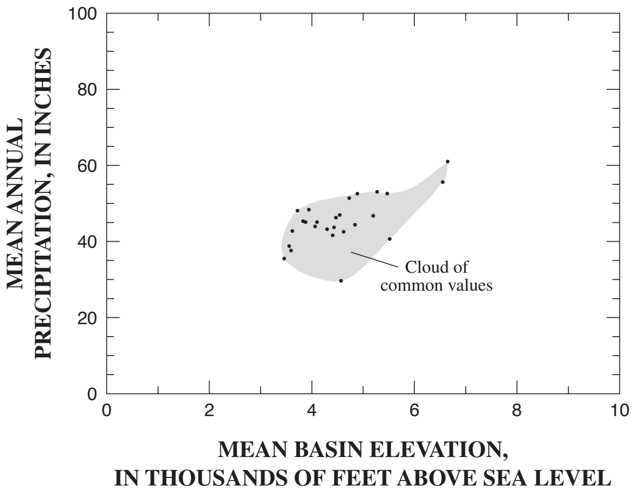



**Figure 3.** Joint distribution of mean basin elevation and mean precipitation for gaged sites in region 2, Idaho.

are used; however, software programs other than Arc/Info can be used.

The estimating equations are not applicable for streams that exhibit significant gains and (or) losses as a result of spring flow or seepage through highly permeable streambeds. The equations also are not applicable for streams affected by irrigation diversions or large dams that regulate streamflow. The Boise River downstream from Lucky Peak Lake, the Clearwater River downstream from Dworshak Reservoir, and the entire Snake River are examples of stream reaches within the study area for which the estimating equations are not applicable.

In general, the equations are more reliable (lower standard errors of estimate) for estimating the high streamflow statistics (20-percent exceedance) than for estimating the low streamflow statistics (80-percent exceedance) in any given month. This finding is consistent with that of Riggs (1972), who stated that low streamflows are largely affected by localized geology that cannot be quantified easily. Parrett and Cartier (1990) also determined that equations developed for western Montana were generally more reliable for estimating high streamflow statistics.

Although the SEEs of the estimating equations for regions 6 and 7 generally were significantly larger than those for other regions, the natural variability of streamflows in regions 6 and 7 is also significantly greater than in the other regions as a result of more sporadic and generally less precipitation (Molnau, 1995). Prediction of streamflow statistics that have a high degree of variability will always have more uncertainty than prediction of statistics that are more stable.

## APPLICATION OF METHOD

Examples of how to use the equations for estimating monthly or annual streamflow statistics are given in the following paragraphs. The third example addresses the situation where the drainage area of a specific site encompasses parts of two separate regions.

### Example 1

Estimates of Q.80, Q.50, and Q.20 for the month of June and Qa are required for a stream location in region 5. The required basin characteristics for region 5 equations were determined to be the following: A, 480.5 $mi^2$; BS, 30.2 percent; S30, 42.8 percent; and F, 71.0 percent. For use in the equations, 1 percent is added to the values for S30 and F.

$$Q.80 = 2.22\text{x}10^{-4}\ A^{0.810}\ BS^{10.7}\ S30*^{-7.89}\ F*^{0.993} \quad (3)$$

$$Q.80 = 2.22\text{x}10^{-4}\ (480.5)^{0.810}\ (30.2)^{10.7}\ (43.8)^{-7.89}\ (72.0)^{0.993}$$

$$Q.80 = 1{,}770\ \text{ft}^3/\text{s}$$

$$Q.50 = 5.12\text{x}10^{-4}\ A^{0.832}\ BS^{9.84}\ S30*^{-7.28}\ F*^{1.04} \quad (4)$$

$$Q.50 = 5.12\text{x}10^{-4}\ (480.5)^{0.832}\ (30.2)^{9.84}\ (43.8)^{-7.28}\ (72.0)^{1.04}$$

$$Q.50 = 3{,}060\ \text{ft}^3/\text{s}$$

$$Q.20 = 1.27\text{x}10^{-3}\ A^{0.824}\ BS^{9.37}\ S30*^{-6.88}\ F*^{0.942} \quad (5)$$

$$Q.20 = 1.27\text{x}10^{-3}\ (480.5)^{0.824}\ (30.2)^{9.37}\ (43.8)^{-6.88}\ (72.0)^{0.942}$$

$$Q.20 = 4{,}340\ \text{ft}^3/\text{s}$$

$$Qa = 1.07\text{x}10^{-2}\ A^{0.831}\ BS^{7.25}\ S30*^{-5.42}\ F*^{0.448} \quad (6)$$

$$Qa = 1.07\text{x}10^{-2}\ (480.5)^{0.831}\ (30.2)^{7.25}\ (43.8)^{-5.42}\ (72.0)^{0.448}$$

$$Qa = 838\ \text{ft}^3/\text{s}$$

The predicted range of the actual values for each streamflow statistic, based on the range of the standard errors of estimate given in table 7, is as follows:

Q.80--2,620 to 1,200 $ft^3/s$ (+48.0 to -32.4 percent)
Q.50--4,160 to 2,250 $ft^3/s$ (+36.1 to -26.5 percent)
Q.20--5,880 to 3,200 $ft^3/s$ (+35.5 to -26.2 percent)
Qa--1,150 to 608 $ft^3/s$ (+37.7 to -27.4 percent)

## Example 2

Estimates of Q.80, Q.50, and Q.20 for the month of April and Qa are required for a stream location in region 2. The required basin characteristics for region 2 equations were determined to be the following: A, 923.0 $mi^2$; E, 6,220 ft; F, 82.1 percent; and P, 46.5 in. For use in the equations, the value for E is divided by 1,000, and 1 percent is added to the value for F.

$$Q.80 = 1.21x10^{-8}\ A^{0.999}\ E*^{-0.783}\ F*^{2.45}\ P^{2.46} \tag{7}$$

$$Q.80 = 1.21x10^{-8}\ (923.0)^{0.999}\ (6.22)^{-0.783}\ (83.1)^{2.45}\ (46.5)^{2.46}$$

$$Q.80 = 1{,}690\ ft^3/s$$

$$Q.50 = 1.11x10^{-7}\ A^{0.993}\ E*^{-0.696}\ F*^{2.17}\ P^{2.30} \tag{8}$$

$$Q.50 = 1.11x10^{-7}\ (923.0)^{0.993}\ (6.22)^{-0.696}\ (83.1)^{2.17}\ (46.5)^{2.30}$$

$$Q.50 = 2{,}740\ ft^3/s$$

$$Q.20 = 1.26x10^{-6}\ A^{0.978}\ E*^{-0.480}\ F*^{1.87}\ P^{2.10} \tag{9}$$

$$Q.20 = 1.26x10^{-6}\ (923.0)^{0.978}\ (6.22)^{-0.480}\ (83.1)^{1.87}\ (46.5)^{2.10}$$

$$Q.20 = 5{,}140\ ft^3/s$$

$$Qa = 5.14x10^{-6}\ A^{0.986}\ F*^{0.942}\ P^{2.33} \tag{10}$$

$$Qa = 5.14x10^{-6}\ (923.0)^{0.986}\ (83.1)^{0.942}\ (46.5)^{2.33}$$

$$Qa = 2{,}130\ ft^3/s$$

The predicted range of the actual values for each streamflow statistic, based on the range of the standard errors of estimate given in table 4, is as follows:

Q.80--2,750 to 1,040 $ft^3/s$ (+62.9 to -38.6 percent)
Q.50--4,450 to 1,690 $ft^3/s$ (+62.4 to -38.4 percent)
Q.20--8,130 to 3,250 $ft^3/s$ (+58.2 to -36.8 percent)
Qa--3,330 to 1,360 $ft^3/s$ (+56.5 to -36.1 percent)

## Example 3

An estimate of Q.50 for the month of August is required for a stream location in region 4 with a drainage basin encompassing parts of regions 4 and 5. The method for handling sites with parts of the drainage area in two regions is as follows: (1) Calculate values for the entire basin by using equations from the first region, (2) calculate values for the entire basin by using equations from the second region, and (3) average the two values on the basis of the proportion of drainage area in each region (Sando, 1998). The required basin characteristics for region 4 and 5 equations were determined to be the following: A, 853.0 $mi^2$; BS, 38.5 percent; P, 39.4 in.; S30, 61.2 percent; and F, 42.2 percent. The part of the drainage area located in region 4 covers 622.0 $mi^2$ and the part in region 5 covers 231.0 $mi^2$. For use in the equations, 1 percent is added to the values for S30 and F.

#### (1) REGION 4 EQUATIONS

$$Q.50 = 2.92x10^{-6}\ A^{1.09}\ BS^{1.14}\ P^{1.95} \tag{11}$$

$$Q.50 = 2.92x10^{-6}\ (853.0)^{1.09}\ (38.5)^{1.14}\ (39.4)^{1.95}$$

$$Q.50 = 379\ ft^3/s$$

#### (2) REGION 5 EQUATIONS

$$Q.50 = 2.52x10^{-4}\ A^{0.865}\ BS^{8.06}\ S30*^{-5.89}\ F*^{0.848} \tag{12}$$

$$Q.50 = 2.52x10^{-4}\ (853.0)^{0.865}\ (38.5)^{8.06}\ (62.2)^{-5.89}\ (43.2)^{0.848}$$

$$Q.50 = 344\ ft^3/s$$

#### (3) AREA-WEIGHTED AVERAGE OF THE VALUES

$$Q.50 = 379\ ft^3/s\ (622.0 / 853.0) + 344\ ft^3/s\ (231.0 / 853.0) \tag{13}$$

$$Q.50 = 370\ ft^3/s$$

## SUMMARY

Equations for estimating monthly exceedance (80-, 50-, and 20-percent) and mean annual discharge values at ungaged sites were developed using a multiple-regression analysis. The analysis related streamflow to various basin characteristics. Nine basin characteristics were tested in the final analysis, and eight of these characteristics were used in one or more of the final estimating equations. The standard errors of estimate for these equations, in $log_{10}$, ranged from a minimum of 0.072 for mean annual discharge in region 3 to a maximum of 0.498 for August (Q.80) in region 7. The standard errors of estimate for these streamflow statistics exhibited a minimum range of +18.1 to -15.3

percent and a maximum range of +214.8 to -68.2 percent. The estimating equations might not yield reliable results for sites with basin characteristic values outside of the range of values used to develop the equations. The equations also are not applicable for regulated streams or those affected by significant gains and (or) losses due to spring flow, seepage through highly permeable streambeds, or irrigation diversions.

The equations were generally more reliable for estimating the high streamflow statistics (20-percent exceedance) than for estimating the low streamflow statistics (80-percent exceedance) in any given month. This is likely because lower streamflow statistics are more difficult to estimate, owing to effects of localized geology. The standard errors of estimate of equations for regions 6 and 7 generally were significantly larger than those for other regions. This could be a result of the natural variability of streamflows in regions 6 and 7, which is also significantly greater than in other regions because precipitation is generally minimal and sporadic.

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# TABLES 3 -10

**Table 3.** Results of regional regression analysis based on data from 13 gaging stations for region 1

[Q.xx, daily mean discharge exceeded xx percent of the time during the specified month, in cubic feet per second; A, drainage area, in square miles; E*, mean basin elevation, in thousands of feet above sea level; BR*, basin relief, in thousands of feet; F*, forested area, in percent of drainage area plus 1 percent; Qa, mean annual discharge, in cubic feet per second]

| Region 1 | | | |
|---|---|---|---|
| **Month** | **Equation** | **Standard error of estimate ($log_{10}$)** | **Standard error of estimate (percent)** |
| October | $Q.80 = 9.76E\text{-}01\ A^{0.792}\ E^{*\,-0.435}$ | 0.223 | 67.1 to -40.2 |
| | $Q.50 = 4.29E\text{-}01\ A^{0.858}\ E^{*\,0.225}$ | 0.203 | 59.4 to -37.3 |
| | $Q.20 = 5.25E\text{-}02\ A^{0.975}\ E^{*\,1.87}$ | 0.236 | 72.3 to -42.0 |
| November | $Q.80 = 4.16E\text{-}01\ A^{0.879}\ E^{*\,0.086}$ | 0.205 | 60.1 to -37.6 |
| | $Q.50 = 9.55E\text{-}02\ A^{0.966}\ E^{*\,1.28}$ | 0.245 | 75.9 to -43.1 |
| | $Q.20 = 2.85E\text{-}02\ A^{1.00}\ E^{*\,2.54}$ | 0.270 | 86.1 to -46.3 |
| December | $Q.80 = 2.32E\text{-}01\ A^{0.954}\ E^{*\,0.324}$ | 0.230 | 69.7 to -41.1 |
| | $Q.50 = 1.12E\text{-}01\ A^{0.989}\ E^{*\,1.13}$ | 0.243 | 74.8 to -42.8 |
| | $Q.20 = 6.40E\text{-}02\ A^{1.01}\ E^{*\,1.94}$ | 0.257 | 80.8 to -44.7 |
| January | $Q.80 = 2.16E\text{-}01\ A^{0.967}\ E^{*\,0.367}$ | 0.245 | 75.6 to -43.0 |
| | $Q.50 = 1.45E\text{-}01\ A^{1.00}\ E^{*\,0.856}$ | 0.242 | 74.7 to -42.8 |
| | $Q.20 = 1.25E\text{-}01\ A^{1.03}\ E^{*\,1.28}$ | 0.244 | 75.2 to -42.9 |
| February | $Q.80 = 9.27E\text{+}02\ A^{0.838}\ F^{*\,-1.65}$ | 0.198 | 57.9 to -36.7 |
| | $Q.50 = 8.09E\text{+}02\ A^{0.854}\ F^{*\,-1.53}$ | 0.207 | 61.0 to -37.9 |
| | $Q.20 = 5.79E\text{+}02\ A^{0.852}\ F^{*\,-1.33}$ | 0.221 | 66.3 to -39.9 |
| March | $Q.80 = 6.97E\text{+}02\ A^{0.875}\ F^{*\,-1.54}$ | 0.208 | 61.5 to -38.1 |
| | $Q.50 = 1.69E\text{+}02\ A^{0.918}\ F^{*\,-1.15}$ | 0.223 | 67.2 to -40.2 |
| | $Q.20 = 4.92E\text{+}01\ A^{0.869}\ F^{*\,-0.681}$ | 0.223 | 67.2 to -40.2 |
| April | $Q.80 = 8.60E\text{-}01\ A^{0.852}\ E^{*\,0.769}$ | 0.238 | 73.1 to -42.2 |
| | $Q.50 = 6.89E\text{-}01\ A^{0.862}\ E^{*\,1.34}$ | 0.222 | 66.7 to -40.0 |
| | $Q.20 = 4.58E\text{-}01\ A^{0.903}\ E^{*\,1.95}$ | 0.199 | 58.1 to -36.8 |
| May | $Q.80 = 8.51E\text{-}02\ A^{0.778}\ E^{*\,3.33}$ | 0.248 | 77.0 to -43.5 |
| | $Q.50 = 7.18E\text{-}02\ A^{0.836}\ E^{*\,3.60}$ | 0.219 | 65.6 to -39.6 |
| | $Q.20 = 7.59E\text{-}02\ A^{0.860}\ E^{*\,3.75}$ | 0.204 | 60.0 to -37.5 |
| June | $Q.80 = 3.25E\text{-}02\ A^{0.861}\ E^{*\,3.23}$ | 0.278 | 89.6 to -47.3 |
| | $Q.50 = 1.52E\text{-}02\ A^{0.924}\ E^{*\,4.03}$ | 0.275 | 88.2 to -46.9 |
| | $Q.20 = 1.50E\text{-}02\ A^{0.925}\ E^{*\,4.40}$ | 0.267 | 85.1 to -46.0 |
| July | $Q.80 = 1.37E\text{-}01\ A^{0.842}\ E^{*\,1.32}$ | 0.314 | 106.1 to -51.5 |
| | $Q.50 = 7.35E\text{-}02\ A^{0.901}\ E^{*\,1.99}$ | 0.277 | 89.0 to -47.1 |
| | $Q.20 = 2.97E\text{-}02\ A^{0.954}\ E^{*\,2.92}$ | 0.260 | 82.0 to -45.0 |
| August | $Q.80 = 1.20E\text{+}00\ A^{0.844}\ BR^{*\,-0.745}$ | 0.310 | 104.2 to -51.0 |
| | $Q.50 = 1.11E\text{+}00\ A^{0.831}\ BR^{*\,-0.386}$ | 0.275 | 88.5 to -46.9 |
| | $Q.20 = 1.00E\text{+}00\ A^{0.807}\ BR^{*\,0.009}$ | 0.270 | 86.4 to -46.3 |
| September | $Q.80 = 1.02E\text{+}00\ A^{0.914}\ BR^{*\,-0.934}$ | 0.249 | 77.6 to -43.7 |
| | $Q.50 = 9.77E\text{-}01\ A^{0.904}\ BR^{*\,-0.646}$ | 0.231 | 70.2 to -41.2 |
| | $Q.20 = 8.81E\text{-}01\ A^{0.827}\ BR^{*\,-0.073}$ | 0.237 | 72.7 to -42.1 |
| | $Qa = 1.11E\text{-}01\ A^{0.884}\ E^{*\,2.30}$ | 0.197 | 57.4 to -36.5 |

**Table 4.** Results of regional regression analysis based on data from 26 gaging stations for region 2

[Q.xx, daily mean discharge exceeded xx percent of the time during the specified month, in cubic feet per second; A, drainage area, in square miles; BR*, basin relief, in thousands of feet; P, mean annual precipitation, in inches; F*, forested area, in percent of drainage area plus 1 percent; E*, mean basin elevation, in thousands of feet above sea level; Qa, mean annual discharge, in cubic feet per second]

| Region 2 | | | |
|---|---|---|---|
| Month | Equation | Standard error of estimate ($\log_{10}$) | Standard error of estimate (percent) |
| October | $Q.80 = 6.35E{-}03\ A^{0.916}\ BR^{*\,0.656}\ P^{0.892}$ | 0.239 | 73.4 to -42.3 |
| | $Q.50 = 1.63E{-}03\ A^{0.840}\ BR^{*\,1.01}\ P^{1.30}$ | 0.199 | 58.1 to -36.8 |
| | $Q.20 = 1.86E{-}04\ A^{0.822}\ BR^{*\,1.09}\ P^{1.97}$ | 0.192 | 55.5 to -35.7 |
| November | $Q.80 = 2.53E{-}03\ A^{0.925}\ BR^{*\,0.552}\ P^{1.21}$ | 0.225 | 67.7 to -40.4 |
| | $Q.50 = 1.22E{-}03\ A^{0.916}\ BR^{*\,0.644}\ P^{1.50}$ | 0.205 | 60.4 to -37.7 |
| | $Q.20 = 4.23E{-}04\ A^{0.945}\ BR^{*\,0.416}\ P^{2.01}$ | 0.220 | 65.8 to -39.7 |
| December | $Q.80 = 1.52E{-}07\ A^{0.990}\ F^{*\,1.43}\ P^{2.26}$ | 0.201 | 58.7 to -37.0 |
| | $Q.50 = 1.52E{-}07\ A^{0.995}\ F^{*\,1.61}\ P^{2.18}$ | 0.188 | 54.3 to -35.2 |
| | $Q.20 = 2.34E{-}08\ A^{0.983}\ F^{*\,2.05}\ P^{2.36}$ | 0.198 | 57.6 to -36.5 |
| January | $Q.80 = 7.62E{-}08\ A^{0.997}\ F^{*\,1.76}\ P^{2.05}$ | 0.197 | 57.5 to -36.5 |
| | $Q.50 = 6.30E{-}09\ A^{0.975}\ F^{*\,2.51}\ P^{2.01}$ | 0.187 | 53.8 to -35.0 |
| | $Q.20 = 6.62E{-}09\ A^{0.953}\ F^{*\,2.94}\ P^{1.71}$ | 0.208 | 61.4 to -38.1 |
| February | $Q.80 = 3.23E{-}08\ A^{0.988}\ E^{*\,-0.292}\ F^{*\,2.11}\ P^{2.04}$ | 0.199 | 58.3 to -36.8 |
| | $Q.50 = 4.38E{-}07\ A^{0.967}\ E^{*\,-1.46}\ F^{*\,2.03}\ P^{2.12}$ | 0.183 | 52.5 to -34.4 |
| | $Q.20 = 1.73E{-}05\ A^{0.957}\ E^{*\,-2.19}\ F^{*\,1.56}\ P^{2.17}$ | 0.190 | 55.0 to -35.5 |
| March | $Q.80 = 4.03E{-}07\ A^{0.996}\ E^{*\,-1.00}\ F^{*\,2.15}\ P^{1.74}$ | 0.185 | 53.2 to -34.7 |
| | $Q.50 = 1.29E{-}06\ A^{1.00}\ E^{*\,-1.54}\ F^{*\,2.07}\ P^{1.87}$ | 0.185 | 53.1 to -34.7 |
| | $Q.20 = 2.51E{-}06\ A^{0.981}\ E^{*\,-1.97}\ F^{*\,2.22}\ P^{1.87}$ | 0.192 | 55.5 to -35.7 |
| April | $Q.80 = 1.21E{-}08\ A^{0.999}\ E^{*\,-0.783}\ F^{*\,2.45}\ P^{2.46}$ | 0.212 | 62.9 to -38.6 |
| | $Q.50 = 1.11E{-}07\ A^{0.993}\ E^{*\,-0.696}\ F^{*\,2.17}\ P^{2.30}$ | 0.211 | 62.4 to -38.4 |
| | $Q.20 = 1.26E{-}06\ A^{0.978}\ E^{*\,-0.480}\ F^{*\,1.87}\ P^{2.10}$ | 0.199 | 58.2 to -36.8 |
| May | $Q.80 = 1.07E{-}12\ A^{1.03}\ E^{*\,3.18}\ F^{*\,3.35}\ P^{2.36}$ | 0.234 | 71.3 to -41.6 |
| | $Q.50 = 1.27E{-}10\ A^{1.02}\ E^{*\,2.65}\ F^{*\,2.67}\ P^{2.26}$ | 0.223 | 67.0 to -40.1 |
| | $Q.20 = 1.38E{-}09\ A^{0.984}\ E^{*\,2.39}\ F^{*\,2.51}\ P^{2.08}$ | 0.210 | 62.1 to -38.3 |
| June | $Q.80 = 2.87E{-}09\ A^{0.800}\ E^{*\,2.39}\ BR^{*\,1.60}\ F^{*\,1.78}\ P^{1.95}$ | 0.198 | 57.9 to -36.7 |
| | $Q.50 = 5.11E{-}10\ A^{0.790}\ E^{*\,2.64}\ BR^{*\,1.67}\ F^{*\,2.31}\ P^{1.82}$ | 0.205 | 60.4 to -37.6 |
| | $Q.20 = 3.50E{-}10\ A^{0.791}\ E^{*\,2.34}\ BR^{*\,1.74}\ F^{*\,2.56}\ P^{1.86}$ | 0.206 | 60.8 to -37.8 |
| July | $Q.80 = 1.26E{-}08\ A^{0.793}\ E^{*\,1.47}\ BR^{*\,1.44}\ F^{*\,1.88}\ P^{1.62}$ | 0.202 | 59.2 to -37.2 |
| | $Q.50 = 6.46E{-}08\ A^{0.784}\ E^{*\,1.79}\ BR^{*\,1.45}\ F^{*\,1.59}\ P^{1.52}$ | 0.194 | 56.4 to -36.1 |
| | $Q.20 = 1.61E{-}07\ A^{0.755}\ E^{*\,1.82}\ BR^{*\,1.73}\ F^{*\,1.40}\ P^{1.54}$ | 0.193 | 55.8 to -35.8 |
| August | $Q.80 = 1.03E{-}10\ A^{0.963}\ E^{*\,2.58}\ F^{*\,2.92}\ P^{1.43}$ | 0.232 | 70.7 to -41.4 |
| | $Q.50 = 3.40E{-}09\ A^{0.960}\ E^{*\,2.70}\ F^{*\,2.32}\ P^{1.25}$ | 0.230 | 69.9 to -41.2 |
| | $Q.20 = 1.07E{-}08\ A^{0.947}\ E^{*\,2.78}\ F^{*\,2.10}\ P^{1.26}$ | 0.221 | 66.1 to -39.8 |
| September | $Q.80 = 3.75E{-}11\ A^{0.962}\ E^{*\,2.06}\ F^{*\,3.28}\ P^{1.43}$ | 0.236 | 72.0 to -41.9 |
| | $Q.50 = 2.49E{-}09\ A^{0.954}\ E^{*\,2.26}\ F^{*\,2.51}\ P^{1.23}$ | 0.221 | 66.3 to -39.9 |
| | $Q.20 = 9.62E{-}08\ A^{0.937}\ E^{*\,2.10}\ F^{*\,1.76}\ P^{1.30}$ | 0.205 | 60.4 to -37.6 |
| | $Qa = 5.14E{-}06\ A^{0.986}\ F^{*\,0.942}\ P^{2.33}$ | 0.194 | 56.5 to -36.1 |

**Table 5.** Results of regional regression analysis based on data from 9 gaging stations for region 3

[Q.xx, daily mean discharge exceeded xx percent of the time during the specified month, in cubic feet per second; A, drainage area, in square miles; E*, mean basin elevation, in thousands of feet above sea level; P, mean annual precipitation, in inches; Qa, mean annual discharge, in cubic feet per second]

| Region 3 | | | |
|---|---|---|---|
| Month | Equation | Standard error of estimate ($log_{10}$) | Standard error of estimate (percent) |
| October | $Q.80 = 1.56E\text{-}04\ A^{0.659}\ E^{*6.54}$ | 0.156 | 43.4 to -30.2 |
| | $Q.50 = 2.61E\text{-}04\ A^{0.850}\ E^{*5.53}$ | 0.108 | 28.3 to -22.1 |
| | $Q.20 = 2.49E\text{-}04\ A^{1.00}\ E^{*5.17}$ | 0.113 | 29.7 to -22.9 |
| November | $Q.80 = 1.97E\text{-}04\ A^{0.872}\ E^{*5.69}$ | 0.121 | 32.1 to -24.3 |
| | $Q.50 = 1.83E\text{-}04\ A^{1.06}\ E^{*5.20}$ | 0.125 | 33.2 to -24.9 |
| | $Q.20 = 5.61E\text{-}04\ A^{1.09}\ E^{*4.61}$ | 0.271 | 86.8 to -46.5 |
| December | $Q.80 = 2.61E\text{-}04\ A^{1.02}\ E^{*5.00}$ | 0.095 | 24.5 to -19.7 |
| | $Q.50 = 5.93E\text{-}04\ A^{1.12}\ E^{*3.96}$ | 0.178 | 50.7 to -33.7 |
| | $Q.20 = 3.52E\text{-}02\ A^{1.21}\ E^{*1.19}$ | 0.203 | 59.7 to -37.4 |
| January | $Q.80 = 5.07E\text{-}04\ A^{1.09}\ E^{*4.29}$ | 0.090 | 22.9 to -18.7 |
| | $Q.50 = 5.93E\text{-}02\ A^{1.05}\ E^{*1.12}$ | 0.182 | 52.2 to -34.3 |
| | $Q.20 = 1.74E\text{+}00\ A^{1.10}\ E^{*-1.07}$ | 0.192 | 55.4 to -35.7 |
| February | $Q.80 = 2.09E\text{-}04\ A^{1.08}\ P^{2.03}$ | 0.115 | 30.3 to -23.2 |
| | $Q.50 = 1.70E\text{-}04\ A^{1.03}\ P^{2.48}$ | 0.081 | 20.5 to -17.0 |
| | $Q.20 = 8.51E\text{-}05\ A^{1.02}\ P^{3.02}$ | 0.166 | 46.5 to -31.8 |
| March | $Q.80 = 6.12E\text{-}06\ A^{1.20}\ P^{3.11}$ | 0.113 | 29.6 to -22.9 |
| | $Q.50 = 4.10E\text{-}05\ A^{1.10}\ P^{2.94}$ | 0.111 | 29.2 to -22.6 |
| | $Q.20 = 1.15E\text{-}04\ A^{1.10}\ P^{2.85}$ | 0.172 | 48.5 to -32.7 |
| April | $Q.80 = 5.46E\text{-}07\ A^{1.41}\ P^{3.49}$ | 0.253 | 78.9 to -44.1 |
| | $Q.50 = 4.39E\text{-}07\ A^{1.40}\ P^{3.80}$ | 0.193 | 55.9 to -35.8 |
| | $Q.20 = 4.97E\text{-}06\ A^{1.33}\ P^{3.36}$ | 0.183 | 52.5 to -34.4 |
| May | $Q.80 = 4.25E\text{-}05\ A^{1.27}\ E^{*6.15}$ | 0.183 | 52.5 to -34.4 |
| | $Q.50 = 5.51E\text{-}05\ A^{1.39}\ E^{*5.99}$ | 0.214 | 63.5 to -38.8 |
| | $Q.20 = 2.60E\text{-}04\ A^{1.40}\ E^{*5.24}$ | 0.249 | 77.6 to -43.7 |
| June | $Q.80 = 5.52E\text{-}05\ A^{1.02}\ E^{*6.47}$ | 0.154 | 42.4 to -29.8 |
| | $Q.50 = 4.18E\text{-}05\ A^{1.15}\ E^{*6.60}$ | 0.127 | 33.8 to -25.3 |
| | $Q.20 = 3.96E\text{-}05\ A^{1.24}\ E^{*6.79}$ | 0.183 | 52.4 to -34.4 |
| July | $Q.80 = 1.17E\text{-}04\ A^{0.647}\ E^{*6.84}$ | 0.208 | 61.3 to -38.0 |
| | $Q.50 = 1.03E\text{-}04\ A^{0.882}\ E^{*6.29}$ | 0.127 | 34.0 to -25.4 |
| | $Q.20 = 9.48E\text{-}05\ A^{1.04}\ E^{*5.99}$ | 0.092 | 23.7 to -19.1 |
| August | $Q.80 = 1.95E\text{-}04\ A^{0.337}\ E^{*7.32}$ | 0.370 | 134.4 to -57.3 |
| | $Q.50 = 2.37E\text{-}04\ A^{0.640}\ E^{*6.24}$ | 0.185 | 53.0 to -34.7 |
| | $Q.20 = 2.31E\text{-}04\ A^{0.843}\ E^{*5.67}$ | 0.120 | 31.8 to -24.1 |
| September | $Q.80 = 1.36E\text{-}04\ A^{0.413}\ E^{*7.41}$ | 0.258 | 81.3 to -44.8 |
| | $Q.50 = 2.74E\text{-}04\ A^{0.713}\ E^{*5.88}$ | 0.140 | 38.1 to -27.6 |
| | $Q.20 = 2.94E\text{-}04\ A^{0.866}\ E^{*5.40}$ | 0.093 | 23.9 to -19.3 |
| | $Qa = 7.73E\text{-}05\ A^{1.10}\ P^{2.56}$ | 0.072 | 18.1 to -15.3 |

**Table 6.** Results of regional regression analysis based on data from 43 gaging stations for region 4

[Q.xx, daily mean discharge exceeded xx percent of the time during the specified month, in cubic feet per second; A, drainage area, in square miles; BS, basin slope, in percent; P, mean annual precipitation, in inches; E*, mean basin elevation, in thousands of feet above sea level; F*, forested area, in percent of drainage area plus 1 percent; Qa, mean annual discharge, in cubic feet per second]

| Region 4 | | | |
|---|---|---|---|
| **Month** | **Equation** | **Standard error of estimate ($log_{10}$)** | **Standard error of estimate (percent)** |
| October | $Q.80 = 2.17E\text{-}05\ A^{1.03}\ BS^{1.30}\ P^{1.23}$ | 0.267 | 84.9 to -45.9 |
| | $Q.50 = 2.53E\text{-}05\ A^{1.06}\ BS^{1.16}\ P^{1.37}$ | 0.246 | 76.2 to -43.2 |
| | $Q.20 = 2.42E\text{-}05\ A^{1.07}\ BS^{1.05}\ P^{1.57}$ | 0.218 | 65.1 to -39.4 |
| November | $Q.80 = 5.04E\text{-}05\ A^{1.04}\ BS^{1.14}\ P^{1.20}$ | 0.233 | 71.0 to -41.5 |
| | $Q.50 = 4.55E\text{-}05\ A^{1.06}\ BS^{1.03}\ P^{1.39}$ | 0.211 | 62.5 to -38.5 |
| | $Q.20 = 4.70E\text{-}05\ A^{1.08}\ BS^{0.776}\ P^{1.75}$ | 0.198 | 57.8 to -36.6 |
| December | $Q.80 = 7.85E\text{-}05\ A^{1.04}\ BS^{1.04}\ P^{1.19}$ | 0.235 | 71.8 to -41.8 |
| | $Q.50 = 1.22E\text{-}04\ A^{1.05}\ BS^{0.920}\ P^{1.28}$ | 0.207 | 61.2 to -38.0 |
| | $Q.20 = 5.47E\text{-}04\ A^{1.06}\ BS^{0.380}\ P^{1.53}$ | 0.234 | 71.4 to -41.6 |
| January | $Q.80 = 2.28E\text{-}04\ A^{1.04}\ BS^{1.07}\ E*^{-0.696}\ P^{1.18}$ | 0.216 | 64.2 to -39.1 |
| | $Q.50 = 6.55E\text{-}04\ A^{1.06}\ BS^{0.980}\ E*^{-1.15}\ P^{1.28}$ | 0.208 | 61.4 to -38.1 |
| | $Q.20 = 2.21E\text{-}02\ A^{1.04}\ BS^{0.973}\ E*^{-2.27}\ P^{1.01}$ | 0.175 | 49.6 to -33.2 |
| February | $Q.80 = 1.44E\text{-}03\ A^{1.05}\ BS^{1.16}\ E*^{-1.34}\ P^{0.925}$ | 0.198 | 57.9 to -36.7 |
| | $Q.50 = 1.55E\text{-}02\ A^{1.05}\ BS^{0.979}\ E*^{-1.89}\ P^{0.825}$ | 0.183 | 52.4 to -34.4 |
| | $Q.20 = 4.04E\text{-}01\ A^{1.04}\ BS^{0.798}\ E*^{-2.67}\ P^{0.621}$ | 0.164 | 45.7 to -31.4 |
| March | $Q.80 = 1.26E\text{-}02\ A^{1.11}\ BS^{0.581}\ E*^{-1.66}\ P^{1.07}$ | 0.222 | 66.6 to -40.0 |
| | $Q.50 = 2.71E\text{-}01\ A^{1.08}\ BS^{0.293}\ E*^{-2.03}\ P^{0.855}$ | 0.186 | 53.6 to -34.9 |
| | $Q.20 = 3.38E\text{+}00\ A^{1.05}\ BS^{0.023}\ E*^{-2.28}\ P^{0.726}$ | 0.179 | 51.1 to -33.8 |
| April | $Q.80 = 7.10E\text{-}03\ A^{1.01}\ E*^{-1.56}\ F*^{1.14}\ P^{0.799}$ | 0.228 | 69.2 to -40.9 |
| | $Q.50 = 6.47E\text{-}02\ A^{0.992}\ E*^{-1.62}\ F*^{0.912}\ P^{0.646}$ | 0.177 | 50.2 to -33.4 |
| | $Q.20 = 3.37E\text{-}01\ A^{0.958}\ E*^{-1.38}\ F*^{0.670}\ P^{0.560}$ | 0.149 | 40.9 to -29.0 |
| May | $Q.80 = 2.93E\text{-}05\ A^{1.11}\ F*^{0.885}\ P^{1.90}$ | 0.241 | 74.1 to -42.5 |
| | $Q.50 = 4.35E\text{-}05\ A^{1.07}\ F*^{1.09}\ P^{1.73}$ | 0.232 | 70.4 to -41.3 |
| | $Q.20 = 5.35E\text{-}04\ A^{1.04}\ F*^{0.732}\ P^{1.64}$ | 0.149 | 40.9 to -29.0 |
| June | $Q.80 = 3.33E\text{-}07\ A^{1.19}\ E*^{2.53}\ F*^{0.121}\ P^{2.63}$ | 0.233 | 70.9 to -41.5 |
| | $Q.50 = 4.74E\text{-}07\ A^{1.21}\ E*^{2.35}\ F*^{0.368}\ P^{2.47}$ | 0.266 | 84.5 to -45.8 |
| | $Q.20 = 1.77E\text{-}06\ A^{1.19}\ E*^{1.93}\ F*^{0.411}\ P^{2.41}$ | 0.246 | 76.2 to -43.3 |
| July | $Q.80 = 8.00E\text{-}07\ A^{1.09}\ E*^{2.28}\ P^{2.44}$ | 0.283 | 91.9 to -47.9 |
| | $Q.50 = 3.49E\text{-}07\ A^{1.13}\ E*^{2.70}\ P^{2.58}$ | 0.222 | 66.8 to -40.1 |
| | $Q.20 = 2.12E\text{-}07\ A^{1.17}\ E*^{2.75}\ P^{2.80}$ | 0.222 | 66.6 to -40.0 |
| August | $Q.80 = 2.07E\text{-}06\ A^{1.06}\ BS^{1.26}\ P^{1.86}$ | 0.374 | 136.3 to -57.7 |
| | $Q.50 = 2.92E\text{-}06\ A^{1.09}\ BS^{1.14}\ P^{1.95}$ | 0.311 | 104.7 to -51.1 |
| | $Q.20 = 3.82E\text{-}06\ A^{1.11}\ BS^{0.934}\ P^{2.15}$ | 0.256 | 80.3 to -44.5 |
| September | $Q.80 = 4.93E\text{-}06\ A^{1.04}\ BS^{1.30}\ P^{1.58}$ | 0.366 | 132.0 to -56.9 |
| | $Q.50 = 7.89E\text{-}06\ A^{1.07}\ BS^{1.13}\ P^{1.66}$ | 0.295 | 97.2 to -49.3 |
| | $Q.20 = 1.08E\text{-}05\ A^{1.08}\ BS^{1.03}\ P^{1.75}$ | 0.266 | 84.5 to -45.8 |
| | $Qa = 1.28E\text{-}03\ A^{1.05}\ F*^{0.180}\ P^{1.64}$ | 0.139 | 37.8 to -27.4 |

**Table 7.** Results of regional regression analysis based on data from 30 gaging stations for region 5

[Q.xx, daily mean discharge exceeded xx percent of the time during the specified month, in cubic feet per second; A, drainage area, in square miles; BS, basin slope in percent; S30*, slopes greater than 30 percent, in percent of drainage area plus 1 percent; F*, forested area, in percent of drainage area plus 1 percent; E*, mean basin elevation, in thousands of feet above sea level; Qa, mean annual discharge, in cubic feet per second]

| Region 5 | | | |
|---|---|---|---|
| **Month** | **Equation** | **Standard error of estimate ($log_{10}$)** | **Standard error of estimate (percent)** |
| October | Q.80 = 4.01E-03 $A^{0.857}$ $BS^{5.83}$ $S30*^{-4.71}$ $F*^{0.847}$ | 0.244 | 75.4 to -43.0 |
| | Q.50 = 7.87E-03 $A^{0.873}$ $BS^{5.89}$ $S30*^{-4.56}$ $F*^{0.528}$ | 0.154 | 42.5 to -29.8 |
| | Q.20 = 8.91E-03 $A^{0.863}$ $BS^{6.96}$ $S30*^{-5.33}$ $F*^{0.413}$ | 0.132 | 35.4 to -26.2 |
| November | Q.80 = 8.83E-03 $A^{0.839}$ $BS^{6.07}$ $S30*^{-4.98}$ $F*^{0.735}$ | 0.262 | 82.7 to -45.3 |
| | Q.50 = 1.07E-02 $A^{0.867}$ $BS^{6.56}$ $S30*^{-5.08}$ $F*^{0.400}$ | 0.144 | 39.3 to -28.2 |
| | Q.20 = 1.10E-02 $A^{0.850}$ $BS^{7.53}$ $S30*^{-5.77}$ $F*^{0.325}$ | 0.128 | 34.4 to -25.6 |
| December | Q.80 = 2.05E-01 $A^{0.773}$ $BS^{6.87}$ $S30*^{-5.64}$ | 0.306 | 102.1 to -50.5 |
| | Q.50 = 5.22E-02 $A^{0.834}$ $BS^{6.97}$ $S30*^{-5.39}$ | 0.162 | 45.3 to -31.2 |
| | Q.20 = 2.96E-02 $A^{0.832}$ $BS^{7.81}$ $S30*^{-5.92}$ | 0.156 | 43.1 to -30.1 |
| January | Q.80 = 2.57E-01 $A^{0.776}$ $BS^{6.84}$ $S30*^{-5.68}$ | 0.332 | 114.6 to -53.4 |
| | Q.50 = 6.03E-02 $A^{0.839}$ $BS^{6.68}$ $S30*^{-5.20}$ | 0.177 | 50.2 to -33.4 |
| | Q.20 = 4.84E-02 $A^{0.848}$ $BS^{7.04}$ $S30*^{-5.41}$ | 0.172 | 48.5 to -32.7 |
| February | Q.80 = 2.65E-01 $A^{0.777}$ $BS^{6.71}$ $S30*^{-5.57}$ | 0.345 | 121.5 to -54.8 |
| | Q.50 = 6.46E-02 $A^{0.851}$ $BS^{6.44}$ $S30*^{-5.02}$ | 0.178 | 50.8 to -33.7 |
| | Q.20 = 5.32E-02 $A^{0.869}$ $BS^{6.35}$ $S30*^{-4.86}$ | 0.181 | 51.5 to -34.0 |
| March | Q.80 = 5.07E+00 $A^{0.780}$ $E*^{-2.08}$ $BS^{7.79}$ $S30*^{-6.22}$ | 0.294 | 96.6 to -49.1 |
| | Q.50 = 8.06E-01 $A^{0.871}$ $E*^{-1.65}$ $BS^{6.59}$ $S30*^{-4.97}$ | 0.178 | 50.7 to -33.6 |
| | Q.20 = 2.86E+00 $A^{0.866}$ $E*^{-2.57}$ $BS^{6.81}$ $S30*^{-4.95}$ | 0.189 | 54.4 to -35.2 |
| April | Q.80 = 1.07E+02 $A^{0.919}$ $E*^{-2.45}$ $S30*^{-0.00410}$ | 0.221 | 66.3 to -39.9 |
| | Q.50 = 3.66E+02 $A^{0.900}$ $E*^{-3.07}$ $S30*^{0.160}$ | 0.235 | 71.8 to -41.8 |
| | Q.20 = 2.67E+02 $A^{0.890}$ $E*^{-2.39}$ $S30*^{0.103}$ | 0.231 | 70.1 to -41.2 |
| May | Q.80 = 2.29E-01 $A^{0.790}$ $BS^{7.42}$ $S30*^{-5.69}$ | 0.223 | 67.1 to -40.2 |
| | Q.50 = 2.77E-01 $A^{0.798}$ $BS^{7.36}$ $S30*^{-5.56}$ | 0.189 | 54.7 to -35.3 |
| | Q.20 = 5.37E-01 $A^{0.802}$ $BS^{7.06}$ $S30*^{-5.35}$ | 0.163 | 45.6 to -31.3 |
| June | Q.80 = 2.22E-04 $A^{0.810}$ $BS^{10.7}$ $S30*^{-7.89}$ $F*^{0.993}$ | 0.170 | 48.0 to -32.4 |
| | Q.50 = 5.12E-04 $A^{0.832}$ $BS^{9.84}$ $S30*^{-7.28}$ $F*^{1.04}$ | 0.134 | 36.1 to -26.5 |
| | Q.20 = 1.27E-03 $A^{0.824}$ $BS^{9.37}$ $S30*^{-6.88}$ $F*^{0.942}$ | 0.132 | 35.5 to -26.2 |
| July | Q.80 = 9.71E-05 $A^{0.837}$ $BS^{9.44}$ $S30*^{-6.88}$ $F*^{0.965}$ | 0.189 | 54.6 to -35.3 |
| | Q.50 = 1.91E-04 $A^{0.824}$ $BS^{10.7}$ $S30*^{-7.85}$ $F*^{0.773}$ | 0.160 | 44.7 to -30.9 |
| | Q.20 = 2.14E-04 $A^{0.831}$ $BS^{11.5}$ $S30*^{-8.36}$ $F*^{0.705}$ | 0.145 | 39.5 to -28.3 |
| August | Q.80 = 1.04E-04 $A^{0.864}$ $BS^{7.72}$ $S30*^{-5.65}$ $F*^{1.04}$ | 0.232 | 70.7 to -41.4 |
| | Q.50 = 2.52E-04 $A^{0.865}$ $BS^{8.06}$ $S30*^{-5.89}$ $F*^{0.848}$ | 0.200 | 58.5 to -36.9 |
| | Q.20 = 4.51E-04 $A^{0.855}$ $BS^{8.50}$ $S30*^{-6.21}$ $F*^{0.736}$ | 0.175 | 49.8 to -33.2 |
| September | Q.80 = 4.59E-04 $A^{0.872}$ $BS^{6.50}$ $S30*^{-4.98}$ $F*^{1.03}$ | 0.243 | 75.0 to -42.9 |
| | Q.50 = 1.83E-03 $A^{0.876}$ $BS^{6.33}$ $S30*^{-4.77}$ $F*^{0.710}$ | 0.162 | 45.2 to -31.2 |
| | Q.20 = 3.51E-03 $A^{0.863}$ $BS^{6.63}$ $S30*^{-4.98}$ $F*^{0.569}$ | 0.149 | 41.0 to -29.1 |
| | Qa = 1.07E-02 $A^{0.831}$ $BS^{7.25}$ $S30*^{-5.42}$ $F*^{0.448}$ | 0.139 | 37.7 to -27.4 |

**Table 8.** Results of regional regression analysis based on data from 23 gaging stations for region 6

[Q.xx, daily mean discharge exceeded xx percent of the time during the specified month, in cubic feet per second; A, drainage area, in square miles; BS, basin slope, in percent; F*, forested area, in percent of drainage area plus 1 percent; E*, mean basin elevation, in thousands of feet above sea level; BR*, basin relief, in thousands of feet; Qa, mean annual discharge, in cubic feet per second]

| Region 6 | | | |
|---|---|---|---|
| **Month** | **Equation** | **Standard error of estimate ($log_{10}$)** | **Standard error of estimate (percent)** |
| October | Q.80 = 2.77E-05 $A^{1.12}$ $BS^{2.23}$ | 0.362 | 129.9 to -56.5 |
| | Q.50 = 3.42E-05 $A^{1.12}$ $BS^{2.32}$ | 0.392 | 146.5 to -59.4 |
| | Q.20 = 2.15E-03 $A^{1.05}$ $BS^{1.34}$ | 0.230 | 69.6 to -41.0 |
| November | Q.80 = 3.82E-05 $A^{1.15}$ $BS^{2.17}$ | 0.374 | 136.5 to -57.7 |
| | Q.50 = 1.34E-04 $A^{1.12}$ $BS^{1.91}$ | 0.367 | 132.8 to -57.0 |
| | Q.20 = 3.76E-03 $A^{1.05}$ $BS^{1.15}$ | 0.201 | 58.9 to -37.0 |
| December | Q.80 = 3.77E-05 $A^{1.13}$ $BS^{2.15}$ | 0.352 | 125.0 to -55.6 |
| | Q.50 = 9.66E-05 $A^{1.12}$ $BS^{1.96}$ | 0.354 | 125.9 to -55.7 |
| | Q.20 = 2.06E-03 $A^{1.07}$ $BS^{1.25}$ | 0.194 | 56.4 to -36.1 |
| January | Q.80 = 3.18E-05 $A^{1.14}$ $BS^{2.17}$ | 0.337 | 117.1 to -53.9 |
| | Q.50 = 8.77E-05 $A^{1.12}$ $BS^{1.96}$ | 0.341 | 119.1 to -54.4 |
| | Q.20 = 1.36E-03 $A^{1.07}$ $BS^{1.34}$ | 0.198 | 57.8 to -36.6 |
| February | Q.80 = 2.88E-05 $A^{1.16}$ $BS^{2.17}$ | 0.335 | 116.3 to -53.8 |
| | Q.50 = 8.32E-05 $A^{1.14}$ $BS^{1.96}$ | 0.345 | 121.4 to -54.8 |
| | Q.20 = 2.04E-03 $A^{1.06}$ $BS^{1.24}$ | 0.194 | 56.2 to -36.0 |
| March | Q.80 = 3.55E-05 $A^{1.16}$ $BS^{2.12}$ | 0.336 | 116.7 to -53.9 |
| | Q.50 = 5.55E-04 $A^{1.10}$ $BS^{1.51}$ | 0.227 | 68.7 to -40.7 |
| | Q.20 = 5.45E-03 $A^{1.04}$ $BS^{1.03}$ | 0.169 | 47.5 to -32.2 |
| April | Q.80 = 5.40E-03 $A^{1.05}$ $BS^{0.98}$ $F*^{-0.0111}$ | 0.186 | 53.6 to -34.9 |
| | Q.50 = 6.14E-02 $A^{0.993}$ $BS^{0.360}$ $F*^{0.110}$ | 0.173 | 48.9 to -32.9 |
| | Q.20 = 2.36E-01 $A^{0.941}$ $BS^{-0.0246}$ $F*^{0.343}$ | 0.209 | 61.7 to -38.1 |
| May | Q.80 = 1.47E-07 $A^{1.09}$ $E*^{5.04}$ $F*^{1.12}$ | 0.262 | 82.9 to -45.3 |
| | Q.50 = 5.46E-06 $A^{1.00}$ $E*^{4.14}$ $F*^{0.959}$ | 0.217 | 64.8 to -39.3 |
| | Q.20 = 3.99E-05 $A^{0.943}$ $E*^{3.77}$ $F*^{0.874}$ | 0.225 | 67.8 to -40.4 |
| June | Q.80 = 8.59E-14 $A^{0.977}$ $E*^{10.49}$ $BR*^{2.07}$ $F*^{1.31}$ | 0.363 | 130.7 to -56.6 |
| | Q.50 = 2.05E-09 $A^{0.929}$ $E*^{7.39}$ $BR*^{1.27}$ $F*^{0.923}$ | 0.192 | 55.6 to -35.7 |
| | Q.20 = 3.81E-07 $A^{0.879}$ $E*^{5.77}$ $BR*^{0.971}$ $F*^{0.764}$ | 0.170 | 47.8 to -32.3 |
| July | Q.80 = 5.20E-11 $A^{1.12}$ $E*^{7.05}$ $BS^{2.09}$ | 0.346 | 121.8 to -54.9 |
| | Q.50 = 4.18E-10 $A^{1.13}$ $E*^{7.25}$ $BS^{1.54}$ | 0.263 | 83.3 to -45.4 |
| | Q.20 = 1.92E-08 $A^{1.08}$ $E*^{6.32}$ $BS^{1.22}$ | 0.195 | 56.6 to -36.1 |
| August | Q.80 = 3.56E-10 $A^{1.09}$ $E*^{6.31}$ $BS^{1.87}$ | 0.323 | 110.2 to -52.4 |
| | Q.50 = 3.16E-10 $A^{1.11}$ $E*^{6.53}$ $BS^{1.86}$ | 0.339 | 118.1 to -54.1 |
| | Q.20 = 2.83E-08 $A^{1.05}$ $E*^{6.23}$ $BS^{0.971}$ | 0.204 | 59.9 to -37.5 |
| September | Q.80 = 2.78E-09 $A^{1.12}$ $E*^{5.20}$ $BS^{1.86}$ | 0.309 | 103.7 to -50.9 |
| | Q.50 = 1.80E-09 $A^{1.14}$ $E*^{5.56}$ $BS^{1.84}$ | 0.321 | 109.6 to -52.3 |
| | Q.20 = 1.81E-07 $A^{1.08}$ $E*^{5.13}$ $BS^{0.973}$ | 0.190 | 54.7 to -35.4 |
| | Qa = 7.18E-03 $A^{0.975}$ $BS^{1.23}$ | 0.230 | 69.7 to -41.1 |

**Table 9.** Results of regional regression analysis based on data from 25 gaging stations for region 7

[Q.xx, daily mean discharge exceeded xx percent of the time during the specified month, in cubic feet per second; MCS, main channel slope, in feet per mile; F*, forested area, in percent of drainage area plus 1 percent; E*, mean basin elevation, in thousands of feet above sea level; S30*, slopes greater than 30 percent, in percent of drainage area plus 1 percent; A, drainage area, in square miles; BS, basin slope, in percent; P, mean annual precipitation, in inches; Qa, mean annual discharge, in cubic feet per second]

| Region 7 | | | |
|---|---|---|---|
| **Month** | **Equation** | **Standard error of estimate ($log_{10}$)** | **Standard error of estimate (percent)** |
| October | $Q.80 = 2.27E{+}02\ MCS^{-1.09}\ {F*}^{0.432}$ | 0.417 | 161.2 to -61.7 |
| | $Q.50 = 5.77E{+}02\ MCS^{-1.27}\ {F*}^{0.523}$ | 0.376 | 137.8 to -58.0 |
| | $Q.20 = 1.56E{+}03\ MCS^{-1.43}\ {F*}^{0.568}$ | 0.309 | 103.6 to -50.9 |
| November | $Q.80 = 5.28E{+}02\ MCS^{-1.26}\ {F*}^{0.503}$ | 0.334 | 115.9 to -53.7 |
| | $Q.50 = 9.89E{+}02\ MCS^{-1.36}\ {F*}^{0.568}$ | 0.299 | 99.2 to -49.8 |
| | $Q.20 = 1.71E{+}03\ MCS^{-1.42}\ {F*}^{0.594}$ | 0.278 | 89.8 to -47.3 |
| December | $Q.80 = 5.97E{+}02\ MCS^{-1.26}\ {F*}^{0.507}$ | 0.283 | 91.9 to -47.9 |
| | $Q.50 = 1.02E{+}03\ MCS^{-1.35}\ {F*}^{0.565}$ | 0.282 | 91.2 to -47.7 |
| | $Q.20 = 1.14E{+}03\ MCS^{-1.29}\ {F*}^{0.606}$ | 0.316 | 107.0 to -51.7 |
| January | $Q.80 = 1.16E{+}03\ {E*}^{-0.526}\ {S30*}^{0.209}\ MCS^{-1.33}\ {F*}^{0.485}$ | 0.281 | 90.9 to -47.6 |
| | $Q.50 = 5.82E{+}03\ {E*}^{-1.55}\ {S30*}^{0.468}\ MCS^{-1.41}\ {F*}^{0.548}$ | 0.275 | 88.4 to -46.9 |
| | $Q.20 = 1.27E{+}05\ {E*}^{-3.85}\ {S30*}^{1.02}\ MCS^{-1.49}\ {F*}^{0.705}$ | 0.277 | 89.2 to -47.2 |
| February | $Q.80 = 3.49E{+}03\ {E*}^{-1.13}\ {S30*}^{0.488}\ MCS^{-1.47}\ {F*}^{0.470}$ | 0.274 | 88.1 to -46.8 |
| | $Q.50 = 5.18E{+}04\ {E*}^{-3.06}\ {S30*}^{0.939}\ MCS^{-1.53}\ {F*}^{0.537}$ | 0.300 | 99.7 to -49.9 |
| | $Q.20 = 3.05E{+}05\ {E*}^{-4.06}\ {S30*}^{1.21}\ MCS^{-1.56}\ {F*}^{0.515}$ | 0.353 | 125.4 to -55.6 |
| March | $Q.80 = 4.10E{-}01\ A^{0.922}\ {E*}^{-1.75}\ {S30*}^{0.354}\ {F*}^{0.537}$ | 0.364 | 131.0 to -56.7 |
| | $Q.50 = 1.58E{+}00\ A^{1.00}\ {E*}^{-2.97}\ {S30*}^{0.684}\ {F*}^{0.546}$ | 0.379 | 139.1 to -58.2 |
| | $Q.20 = 6.34E{+}00\ A^{1.04}\ {E*}^{-3.59}\ {S30*}^{0.820}\ {F*}^{0.470}$ | 0.366 | 132.2 to -56.9 |
| April | $Q.80 = 1.17E{+}04\ BS^{-3.34}\ {S30*}^{2.80}\ MCS^{-1.52}\ {F*}^{0.795}$ | 0.323 | 110.5 to -52.5 |
| | $Q.50 = 9.86E{+}03\ BS^{-2.12}\ {S30*}^{2.01}\ MCS^{-1.55}\ {F*}^{0.746}$ | 0.380 | 139.6 to -58.3 |
| | $Q.20 = 7.66E{+}03\ BS^{-0.607}\ {S30*}^{1.02}\ MCS^{-1.57}\ {F*}^{0.570}$ | 0.417 | 161.5 to -61.8 |
| May | $Q.80 = 1.28E{+}01\ MCS^{-1.48}\ {F*}^{0.817}\ P^{1.90}$ | 0.401 | 151.5 to -60.2 |
| | $Q.50 = 1.38E{+}01\ MCS^{-1.49}\ {F*}^{0.862}\ P^{2.13}$ | 0.448 | 180.3 to -64.3 |
| | $Q.20 = 1.91E{+}01\ MCS^{-1.43}\ {F*}^{0.699}\ P^{2.26}$ | 0.422 | 163.9 to -62.1 |
| June | $Q.80 = 5.47E{+}01\ MCS^{-1.46}\ {F*}^{0.775}\ P^{1.21}$ | 0.387 | 143.7 to -59.0 |
| | $Q.50 = 3.59E{+}01\ MCS^{-1.53}\ {F*}^{0.844}\ P^{1.65}$ | 0.424 | 165.6 to -62.4 |
| | $Q.20 = 4.31E{+}01\ MCS^{-1.55}\ {F*}^{0.739}\ P^{1.90}$ | 0.427 | 167.4 to -62.6 |
| July | $Q.80 = 2.66E{+}02\ MCS^{-1.21}\ {F*}^{0.587}\ P^{0.0617}$ | 0.456 | 185.6 to -65.0 |
| | $Q.50 = 2.43E{+}02\ MCS^{-1.36}\ {F*}^{0.698}\ P^{0.464}$ | 0.407 | 155.3 to -60.8 |
| | $Q.20 = 2.85E{+}02\ MCS^{-1.55}\ {F*}^{0.734}\ P^{0.876}$ | 0.380 | 140.0 to -58.3 |
| August | $Q.80 = 1.34E{+}02\ MCS^{-1.03}\ {F*}^{0.465}$ | 0.498 | 214.8 to -68.2 |
| | $Q.50 = 4.80E{+}02\ MCS^{-1.28}\ {F*}^{0.571}$ | 0.471 | 195.7 to -66.2 |
| | $Q.20 = 9.86E{+}02\ MCS^{-1.39}\ {F*}^{0.648}$ | 0.420 | 163.3 to -62.0 |
| September | $Q.80 = 1.10E{+}02\ MCS^{-0.992}\ {F*}^{0.469}$ | 0.483 | 204.1 to -67.1 |
| | $Q.50 = 3.98E{+}02\ MCS^{-1.23}\ {F*}^{0.503}$ | 0.466 | 192.2 to -65.8 |
| | $Q.20 = 9.48E{+}02\ MCS^{-1.36}\ {F*}^{0.547}$ | 0.435 | 172.3 to -63.3 |
| | $Qa = 8.37E{-}01\ A^{0.963}\ BS^{-3.44}\ {S30*}^{2.52}\ {F*}^{0.646}$ | 0.316 | 107.2 to -51.7 |

**Table 10.** Results of regional regression analysis based on data from 31 gaging stations for region 8

[Q.xx, daily mean discharge exceeded xx percent of the time during the specified month, in cubic feet per second; A, drainage area, in square miles; F*, forested area, in percent of drainage area plus 1 percent; P, mean annual precipitation, in inches; E*, mean basin elevation, in thousands of feet above sea level; BS, basin slope, in percent; S30*, slopes greater than 30 percent, in percent of drainage area plus 1 percent; Qa, mean annual discharge, in cubic feet per second]

| Region 8 | | | |
|---|---|---|---|
| **Month** | **Equation** | **Standard error of estimate ($log_{10}$)** | **Standard error of estimate (percent)** |
| October | Q.80 = 9.18E-06 $A^{1.07}$ $F^{*\,-0.950}$ $P^{4.03}$ | 0.367 | 133.0 to -57.1 |
| | Q.50 = 1.04E-05 $A^{1.08}$ $F^{*\,-0.999}$ $P^{4.09}$ | 0.350 | 123.7 to -55.3 |
| | Q.20 = 1.53E-04 $A^{1.05}$ $F^{*\,-0.992}$ $P^{3.44}$ | 0.275 | 88.3 to -46.9 |
| November | Q.80 = 5.75E-06 $A^{1.09}$ $F^{*\,-1.07}$ $P^{4.24}$ | 0.358 | 127.8 to -56.1 |
| | Q.50 = 2.11E-05 $A^{1.07}$ $F^{*\,-0.999}$ $P^{3.89}$ | 0.303 | 100.9 to -50.2 |
| | Q.20 = 1.27E-04 $A^{1.04}$ $F^{*\,-1.05}$ $P^{3.54}$ | 0.272 | 87.1 to -46.6 |
| December | Q.80 = 5.14E-03 $A^{1.05}$ $E^{*\,-3.75}$ $F^{*\,-0.876}$ $P^{4.31}$ | 0.340 | 118.6 to -54.3 |
| | Q.50 = 2.02E-02 $A^{1.02}$ $E^{*\,-3.52}$ $F^{*\,-0.824}$ $P^{3.83}$ | 0.288 | 93.9 to -48.4 |
| | Q.20 = 6.27E-02 $A^{1.00}$ $E^{*\,-3.43}$ $F^{*\,-0.819}$ $P^{3.54}$ | 0.267 | 84.8 to -45.9 |
| January | Q.80 = 1.29E-02 $A^{1.05}$ $E^{*\,-3.85}$ $F^{*\,-0.908}$ $P^{4.13}$ | 0.338 | 117.5 to -54.0 |
| | Q.50 = 5.20E-02 $A^{1.01}$ $E^{*\,-3.81}$ $F^{*\,-0.853}$ $P^{3.76}$ | 0.300 | 99.6 to -49.9 |
| | Q.20 = 1.01E-01 $A^{0.987}$ $E^{*\,-3.60}$ $F^{*\,-0.809}$ $P^{3.49}$ | 0.272 | 87.0 to -46.5 |
| February | Q.80 = 2.47E-02 $A^{1.05}$ $E^{*\,-3.86}$ $F^{*\,-0.947}$ $P^{3.99}$ | 0.328 | 112.6 to -53.0 |
| | Q.50 = 5.90E-02 $A^{1.01}$ $E^{*\,-3.78}$ $F^{*\,-0.864}$ $P^{3.71}$ | 0.299 | 98.9 to -49.7 |
| | Q.20 = 1.49E-01 $A^{0.979}$ $E^{*\,-3.74}$ $F^{*\,-0.784}$ $P^{3.44}$ | 0.273 | 87.3 to -46.6 |
| March | Q.80 = 4.79E-02 $A^{1.02}$ $E^{*\,-3.76}$ $F^{*\,-0.855}$ $P^{3.71}$ | 0.293 | 96.5 to -49.1 |
| | Q.50 = 1.77E-01 $A^{0.975}$ $E^{*\,-3.67}$ $F^{*\,-0.788}$ $P^{3.33}$ | 0.271 | 86.7 to -46.4 |
| | Q.20 = 1.07E+00 $A^{0.934}$ $E^{*\,-3.60}$ $F^{*\,-0.735}$ $P^{2.85}$ | 0.259 | 81.5 to -44.9 |
| April | Q.80 = 2.75E+02 $A^{0.871}$ $E^{*\,-5.49}$ $BS^{0.146}$ $P^{1.50}$ | 0.236 | 72.3 to -42.0 |
| | Q.50 = 8.65E+02 $A^{0.835}$ $E^{*\,-5.11}$ $BS^{0.210}$ $P^{1.07}$ | 0.194 | 56.1 to -36.0 |
| | Q.20 = 1.18E+03 $A^{0.844}$ $E^{*\,-4.28}$ $BS^{0.180}$ $P^{0.678}$ | 0.155 | 43.0 to -30.0 |
| May | Q.80 = 1.71E+01 $A^{0.923}$ $E^{*\,-4.29}$ $BS^{0.456}$ $P^{1.53}$ | 0.248 | 77.0 to -43.5 |
| | Q.50 = 1.06E+01 $A^{0.908}$ $E^{*\,-3.26}$ $BS^{0.412}$ $P^{1.28}$ | 0.248 | 76.8 to -43.5 |
| | Q.20 = 6.88E+00 $A^{0.891}$ $E^{*\,-2.28}$ $BS^{0.394}$ $P^{1.02}$ | 0.244 | 75.5 to -43.0 |
| June | Q.80 = 2.22E-06 $A^{1.18}$ $BS^{0.956}$ $F^{*\,-0.778}$ $P^{3.64}$ | 0.287 | 93.6 to -48.4 |
| | Q.50 = 4.37E-05 $A^{1.10}$ $BS^{0.838}$ $F^{*\,-0.899}$ $P^{3.31}$ | 0.265 | 83.9 to -45.6 |
| | Q.20 = 2.96E-04 $A^{1.07}$ $BS^{0.798}$ $F^{*\,-0.787}$ $P^{2.84}$ | 0.267 | 84.9 to -45.9 |
| July | Q.80 = 2.05E-06 $A^{1.16}$ $S30^{*\,0.646}$ $F^{*\,-0.861}$ $P^{3.81}$ | 0.354 | 125.9 to -55.7 |
| | Q.50 = 7.85E-06 $A^{1.17}$ $S30^{*\,0.586}$ $F^{*\,-0.716}$ $P^{3.44}$ | 0.299 | 98.8 to -49.7 |
| | Q.20 = 2.12E-05 $A^{1.16}$ $S30^{*\,0.525}$ $F^{*\,-0.591}$ $P^{3.22}$ | 0.265 | 84.0 to -45.6 |
| August | Q.80 = 1.52E-06 $A^{1.12}$ $S30^{*\,0.471}$ $F^{*\,-0.989}$ $P^{4.13}$ | 0.374 | 136.4 to -57.7 |
| | Q.50 = 1.17E-06 $A^{1.16}$ $S30^{*\,0.514}$ $F^{*\,-1.05}$ $P^{4.26}$ | 0.332 | 114.9 to -53.5 |
| | Q.20 = 1.04E-05 $A^{1.12}$ $S30^{*\,0.400}$ $F^{*\,-0.897}$ $P^{3.73}$ | 0.278 | 89.7 to -47.3 |
| September | Q.80 = 1.14E-05 $A^{1.04}$ $F^{*\,-0.834}$ $P^{3.89}$ | 0.385 | 142.8 to -58.8 |
| | Q.50 = 1.31E-05 $A^{1.05}$ $F^{*\,-0.838}$ $P^{3.90}$ | 0.370 | 134.4 to -57.3 |
| | Q.20 = 3.64E-05 $A^{1.05}$ $F^{*\,-0.857}$ $P^{3.72}$ | 0.321 | 109.5 to -52.3 |
| | Qa = 2.72E-02 $A^{1.03}$ $E^{*\,-2.36}$ $BS^{0.522}$ $F^{*\,-0.659}$ $P^{2.70}$ | 0.209 | 61.8 to -38.2 |

# APPENDICES

**Appendix A.** Selected streamflow-gaging stations and periods of record used in regression analysis

| Map number (fig. 1) | Gaging station number | Gaging station name | Period of record (in water years) |
|---|---|---|---|
| | | **Region 1** | |
| 1 | 12305500 | Boulder Creek near Leonia, ID | 1928-72,1973-77 |
| 2 | 12311000 | Deep Creek at Moravia, ID | 1928-72 |
| 3 | 12316800 | Mission Creek near Copeland, ID | 1958-82 |
| 4 | 12320500 | Long Canyon Creek near Porthill, ID | 1931-59 |
| 5 | 12321000 | Smith Creek near Porthill, ID | 1928-60 |
| 6 | 12392155 | Lightning Creek at Clark Fork, ID | 1989-99 |
| 7 | 12392300 | Pack River near Colburn, ID | 1958-83 |
| 8 | 12393500 | Priest River at Outlet of Priest Lake near Coolin, ID | 1912-48 |
| 9 | 12396000 | Calispell Creek near Dalkena, WA | 1950-73 |
| 10 | 12408500 | Mill Creek near Colville, WA | 1939-72,1977-86 |
| 11 | 12409000 | Colville River at Kettle Falls, WA | 1923-99 |
| 12 | 12427000 | Little Spokane River at Elk, WA | 1948-71 |
| 13 | 12431000 | Little Spokane River at Dartford, WA | 1929-32,1946-99 |
| | | **Region 2** | |
| 14 | 12302500 | Granite Creek near Libby, MT | 1933-34,1936-44,1960-69 |
| 15 | 12303100 | Flower Creek near Libby, MT | 1960-92 |
| 16 | 12303500 | Lake Creek at Troy, MT | 1945-57,1983-95 |
| 17 | 12347500 | Blodgett Creek near Corvallis, MT | 1947-69 |
| 18 | 12350500 | Kootenai Creek near Stevensville, MT | 1949-53,1957-63 |
| 19 | 12354000 | St. Regis River near St. Regis, MT | 1910-17,1958-75 |
| 20 | 12389500 | Thompson River near Thompson Falls, MT | 1911-16,1956-99 |
| 21 | 12390700 | Prospect Creek at Thompson Falls, MT | 1956-99 |
| 22 | 12411000 | North Fork Coeur d'Alene River above Shoshone Creek near Prichard, ID | 1950-99 |
| 23 | 12413000 | North Fork Coeur d'Alene River at Enaville, ID | 1911-13,1939-99 |
| 24 | 12413140 | Placer Creek at Wallace, ID | 1967-97,1999 |
| 25 | 12413150 | South Fork Coeur d'Alene River at Silverton, ID | 1967-88,1998-99 |
| 26 | 12413210 | South Fork Coeur d'Alene at Elizabeth Park near Kellogg, ID | 1987-99 |
| 27 | 12413470 | South Fork Coeur d'Alene River near Pinehurst, ID | 1987-99 |
| 28 | 12413500 | Coeur d'Alene River at Cataldo, ID | 1911-12,1920-72,1987-99 |
| 29 | 12414500 | St. Joe River at Calder, ID | 1911-12,1920-99 |
| 30 | 12414900 | St. Maries River near Santa, ID | 1966-99 |
| 31 | 12415000 | St. Maries River at Lotus, ID | 1912-13,1920-66 |
| 32 | 12416000 | Hayden Creek below North Fork near Hayden Lake, ID | 1948-84,1959,1966-97 |
| 33 | 13336500 | Selway River near Lowell, ID | 1911-12,1930-99 |
| 34 | 13336900 | Fish Creek near Lowell, ID | 1958-67 |
| 35 | 13337000 | Lochsa River near Lowell, ID | 1911-12,1930-99 |
| 36 | 13340500 | NF Clearwater River at Bungalow Ranger Station, ID | 1945-69 |
| 37 | 13340600 | NF Clearwater River near Canyon Ranger Station, ID | 1967-99 |
| 38 | 13341300 | Bloom Creek near Bovill, ID | 1959-72 |
| 39 | 13341400 | East Fork Potlatch River near Bovill, ID | 1959-72 |
| | | **Region 3** | |
| 40 | 12424000 | Hangman Creek at Spokane, WA | 1948-99 |
| 41 | 13334700 | Asotin Creek below Kearney Gulch near Asotin, WA | 1960-82,1992 |
| 42 | 13345000 | Palouse River near Potlatch, ID | 1915-19,1966-99 |
| 43 | 13346100 | Palouse River at Colfax, WA | 1964-73,1976-79 |
| 44 | 13346800 | Paradise Creek at University of Idaho at Moscow, ID | 1979-99 |
| 45 | 13348000 | South Fork Palouse River at Pullman, WA | 1934-42,1960-81 |
| 46 | 13348500 | Missouri Flat Creek at Pullman, WA | 1934-40,1960-79 |
| 47 | 13341500 | Potlatch River at Kendrick, ID | 1946-60 |
| 48 | 13342450 | Lapwai Creek near Lapwai, ID | 1975-99 |
| | | **Region 4** | |
| 49 | 13196500 | Bannock Creek near Idaho City, ID | 1939-42,1951-72 |
| 50 | 13200000 | Mores Creek above Robie Creek near Arrowrock Dam, ID | 1951-99 |
| 51 | 13200500 | Robie Creek near Arrowrock Dam, ID | 1951-72 |
| 52 | 13201000 | Mores Creek near Arrowrock, ID | 1916-54 |
| 53 | 13207000 | Spring Valley Creek near Eagle, ID | 1955-59,1961-72 |
| 54 | 13207500 | Dry Creek near Eagle, ID | 1954-68 |
| 55 | 13216500 | North Fork Malheur River above Beulah Reservoir near Beulah, OR | 1914,1936-94 |
| 56 | 13250600 | Big Willow Creek near Emmett, ID | 1962-83 |
| 57 | 13251300 | West Branch Weiser River near Tamarack, ID | 1959-78 |
| 58 | 13251500 | Weiser River at Tamarack, ID | 1937-72,1974-76 |
| 59 | 13253500 | Weiser River at Starkey, ID | 1939-49 |
| 60 | 13256000 | Weiser River near Council, ID | 1937-53 |
| 61 | 13257000 | Middle Fork Weiser River near Mesa, ID | 1911-13,1919-22,1937-49,1981-83,1985-88 |
| 62 | 13258500 | Weiser River near Cambridge, ID | 1939-99 |
| 63 | 13260000 | Pine Creek near Cambridge, ID | 1938-92 |
| 64 | 13261000 | Little Weiser River near Indian Valley, ID | 1920-21,1923-27,1938-71 |
| 65 | 13266000 | Weiser River near Weiser, ID | 1890-91,1894-1904,1910-14,1953-99 |
| 66 | 13267000 | Mann Creek near Weiser, ID | 1911-13,1920-21,1937-62 |
| 67 | 13269300 | North Fork Burnt River near Whitney, OR | 1965-80 |
| 68 | 13270800 | South Fork Burnt River above Barney Creek near Unity, OR | 1963-81 |
| 69 | 13275500 | Powder River near Baker, OR | 1904-14,1929-68 |
| 70 | 13288200 | Eagle Creek above Skull Creek near New Bridge, OR | 1958-95 |
| 71 | 13289960 | Wildhorse River at Brownlee Dam, ID | 1979-96 |
| 72 | 13290190 | Pine Creek near Pine, OR | 1967-96 |

**Appendix A.** Selected streamflow-gaging stations and periods of record used in regression analyses--Continued

| Map number (fig. 1) | Gaging station number | Gaging station name | Period of record (in water years) |
|---|---|---|---|
| | | **Region 4 - Continued** | |
| 73 | 13315500 | Mud Creek near Tamarack, ID | 1937-38,1946-59 |
| 74 | 13316500 | Little Salmon River at Riggins, ID | 1951-55,1956-99 |
| 75 | 13316800 | NF Skookumchuck Creek near White Bird, ID | 1961-72 |
| 76 | 13317000 | Salmon River at White Bird, ID | 1910-17,1920-99 |
| 77 | 13319000 | Grande Ronde River at La Grande, OR | 1904-15,1918-23,1926-89 |
| 78 | 13320000 | Catherine Creek near Union, OR | 1926-96 |
| 79 | 13323600 | Indian Creek near Imbler, OR | 1938-50 |
| 80 | 13329500 | Hurricane Creek near Joseph, OR | 1915,1924-78 |
| 81 | 13330000 | Lostine River near Lostine, OR | 1912-15,1925-91,1995-99 |
| 82 | 13330500 | Bear Creek near Wallowa, OR | 1915,1924-85,1995-99 |
| 83 | 13331500 | Minam River at Minam, OR | 1912-14,1965-99 |
| 84 | 13337500 | South Fork Clearwater River near Elk City, ID | 1945-75 |
| 85 | 13338000 | South Fork Clearwater River near Grangeville, ID | 1911-16,1923-63 |
| 86 | 13338500 | South Fork Clearwater River at Stites, ID | 1911-12,1965-99 |
| 87 | 13339000 | Clearwater River at Kamiah, ID | 1910-66 |
| 88 | 13339500 | Lolo Creek near Greer, ID | 1980-99 |
| 89 | 13340000 | Clearwater River at Orofino, ID | 1931-38,1965-99 |
| 90 | 14010000 | South Fork Walla Walla River near Milton, OR | 1903,1906-17,1931-91 |
| 91 | 14011000 | NF Walla Walla River near Milton, OR | 1930-69 |
| | | **Region 5** | |
| 92 | 12343400 | East Fork Bitterroot River near Conner, MT | 1956-72 |
| 93 | 12346500 | Skalkaho Creek near Hamilton, MT | 1949-53,1957-79 |
| 94 | 12351000 | Burnt Fork Bitterroot River near Stevensville, MT | 1920,1922-24,1938-62 |
| 95 | 13135500 | Big Wood River near Ketchum, ID | 1948-72 |
| 96 | 13136500 | Warm Springs Creek at Guyer Hot Springs near Ketchum, ID | 1941-58 |
| 97 | 13139500 | Big Wood River at Hailey, ID | 1889,1915-99 |
| 98 | 13141000 | Big Wood River near Bellevue, ID | 1911-96 |
| 99 | 13185000 | Boise River near Twin Springs, ID | 1911-99 |
| 100 | 13186000 | South Fork Boise River near Featherville, ID | 1945-99 |
| 101 | 13186500 | Lime Creek near Bennett, ID | 1945-56 |
| 102 | 13187000 | Fall Creek near Anderson Ranch Dam, ID | 1945-56 |
| 103 | 13235000 | South Fork Payette River at Lowman, ID | 1941-99 |
| 104 | 13240000 | Lake Fork Payette River above Jumbo Creek near McCall, ID | 1946-99 |
| 105 | 13292500 | Salmon River near Obsidian, ID | 1941-53 |
| 106 | 13293000 | Alturas Lake Creek near Obsidian, ID | 1941-52 |
| 107 | 13295000 | Valley Creek at Stanley, ID | 1911-14,1921-73 |
| 108 | 13295500 | Salmon River below Valley Creek at Stanley, ID | 1925-61 |
| 109 | 13296000 | Yankee Fork Salmon River near Clayton, ID | 1921-49 |
| 110 | 13296500 | Salmon River below Yankee Fork near Clayton, ID | 1922-91 |
| 111 | 13308500 | Middle Fork Salmon River near Capehorn, ID | 1929-72 |
| 112 | 13309000 | Bear Valley Creek near Capehorn, ID | 1921-60 |
| 113 | 13310000 | Big Creek near Big Creek, ID | 1945-59 |
| 114 | 13310500 | South Fork Salmon River near Knox, ID | 1929-61 |
| 115 | 13310700 | South Fork Salmon River near Krassel Ranger Station, ID | 1967-82,1985-86,1989-99 |
| 116 | 13311000 | East Fork South Fork Salmon River at Stibnite, ID | 1928-43,1983-97 |
| 117 | 13311500 | East Fork South Fork Salmon River near Stibnite, ID | 1928-41 |
| 118 | 13312000 | East Fork South Fork Salmon River near Yellow Pine, ID | 1928-43 |
| 119 | 13313000 | Johnson Creek at Yellow Pine, ID | 1928-99 |
| 120 | 13314000 | South Fork Salmon River near Warren, ID | 1931-43 |
| 121 | 13315000 | Salmon River near French Creek, ID | 1945-56 |
| | | **Region 6** | |
| 122 | 06013500 | Big Sheep Creek below Muddy Creek near Dell, MT | 1936,1946-53,1960-79 |
| 123 | 06015500 | Grasshopper Creek near Dillon, MT | 1921-33,1946-54,1955-58,1960-61 |
| 124 | 06019500 | Ruby River above Reservoir near Alder, MT | 1938-99 |
| 125 | 13108500 | Camas Creek at 18-mile Shearing Corral near Kilgore, ID | 1937-53,1969-73 |
| 126 | 13112000 | Camas Creek at Camas, ID | 1925-99 |
| 127 | 13113000 | Beaver Creek at Spencer, ID | 1941-53,1969-82,1985-93 |
| 128 | 13113500 | Beaver Creek at Dubois, ID | 1921-73,1983,1985-87 |
| 129 | 13117300 | Sawmill Creek near Goldburg, ID | 1960-73 |
| 130 | 13120000 | NF Big Lost River at Wild Horse near Chilly, ID | 1944-99 |
| 131 | 13120500 | Big Lost River at Howell Ranch near Chilly, ID | 1904-14,1920-99 |
| 132 | 13128900 | Lower Cedar Creek above Diversions near Mackay, ID | 1966-73,1980-84 |
| 133 | 13297330 | Thompson Creek near Clayton, ID | 1972-99 |
| 134 | 13297350 | Bruno Creek near Clayton, ID | 1971-99 |
| 135 | 13297355 | Squaw Creek below Bruno Creek near Clayton, ID | 1973-99 |
| 136 | 13297450 | Little Boulder Creek near Clayton, ID | 1970-86 |
| 137 | 13298000 | East Fork Salmon River near Clayton, ID | 1929-39,1973-82 |
| 138 | 13299000 | Challis Creek near Challis, ID | 1944-63 |
| 139 | 13302500 | Salmon River at Salmon, ID | 1912-16,1919-99 |
| 140 | 13305000 | Lemhi River near Lemhi, ID | 1938-39,1955-63,1967-99 |
| 141 | 13305500 | Lemhi River at Salmon, ID | 1928-43 |
| 142 | 13306000 | NF Salmon River at North Fork, ID | 1912,1930-40 |
| 143 | 13306500 | Panther Creek near Shoup, ID | 1945-78 |
| 144 | 13307000 | Salmon River near Shoup, ID | 1944-82 |

**Appendix A.** Selected streamflow-gaging stations and periods of record used in regression analyses--Continued

| Map number (fig. 1) | Gaging station number | Gaging station name | Period of record (in water years) |
|---|---|---|---|
| | | **Region 7** | |
| 145 | 10119000 | Little Malad River above Elkhorn Reservoir near Malad City, ID | 1911-13,1932,1941-69 |
| 146 | 10172940 | Dove Creek near Park Valley, UT | 1959-68,1971-73 |
| 147 | 10315500 | Marys River above Hot Springs Creek near Deeth, NV | 1944-99 |
| 148 | 10329500 | Martin Creek near Paradise Valley, NV | 1922-99 |
| 149 | 10352500 | McDermitt Creek near McDermitt, NV | 1949-99 |
| 150 | 10353000 | East Fork Quinn River near McDermitt, NV | 1949-82 |
| 151 | 10396000 | Donner Und Blitzen River near Frenchglen, OR | 1911-21,1938-99 |
| 152 | 10406500 | Trout Creek near Denio, NV | 1911-12,1922-23,1925-91 |
| 153 | 13057940 | Willow Creek below Tex Creek near Ririe, ID | 1977-79,1986-99 |
| 154 | 13075000 | Marsh Creek near McCammon, ID | 1954-99 |
| 155 | 13083000 | Trapper Creek near Oakley, ID | 1911-16,1919-99 |
| 156 | 13092000 | Rock Creek near Rock Creek, ID | 1909-13,1939,1944-75 |
| 157 | 13154000 | Clover Creek below Calf Creek near Bliss, ID | 1938-43,1957-62 |
| 158 | 13155300 | Little Canyon Creek at Stout Crossing near Glenns Ferry, ID | 1966-72 |
| 159 | 13162500 | East Fork Jarbidge River near Three Creek, ID | 1929-33,1954-72 |
| 160 | 13169500 | Big Jacks Creek near Bruneau, ID | 1938-49,1965-99 |
| 161 | 13170000 | Little Jacks Creek near Bruneau, ID | 1939-50 |
| 162 | 13172680 | Reynolds Creek at Tollgate near Reynolds, ID | 1966-99 |
| 163 | 13172720 | Reynolds Creek at Macks near Reynolds, ID | 1964-91 |
| 164 | 13172735 | Reynolds Creek at Salmon near Reynolds, ID | 1964-99 |
| 165 | 13172740 | Reynolds Creek at Outlet near Reynolds, ID | 1963-99 |
| 166 | 13176000 | Owyhee River above China Diversion Dam near Owyhee, NV | 1939-84 |
| 167 | 13178000 | Jordon Creek above Lone Tree Creek near Jordan Valley, OR | 1946-53,1955-72 |
| 168 | 13211309 | Indian Creek above Waste Water Plant near Nampa, ID | 1982-96 |
| 169 | 13226500 | Bully Creek at Warmsprings near Vale, OR | 1903-07,1910-17,1922-23,1964-86 |
| | | **Region 8** | |
| 170 | 06037500 | Madison River near West Yellowstone, MT | 1913-73,1983-86,1989-99 |
| 171 | 09223000 | Hams Fork Below Pole Creek near Frontier, WY | 1952-99 |
| 172 | 10015700 | Sulphur Creek below La Chapelle Creek near Evanston, WY | 1957-97 |
| 173 | 10040000 | Thomas Fork near Geneva, ID | 1940-51 |
| 174 | 10041000 | Thomas Fork near Wyoming-Idaho State Line | 1949-92 |
| 175 | 10058600 | Bloomington Creek at Bloomington, ID | 1960-86 |
| 176 | 10077000 | Soda Creek near Soda Springs, ID | 1913-29 |
| 177 | 10093000 | Cub River near Preston, ID | 1940-52,1955-86 |
| 178 | 10096000 | Cub River above Maple Creek near Franklin, ID | 1940-52 |
| 179 | 10099000 | High Creek near Richmond, UT | 1947-52,1971-72,1979-84,1986 |
| 180 | 13010065 | Snake River above Jackson Lake at Flagg Ranch, WY | 1984-99 |
| 181 | 13011500 | Pacific Creek at Moran, WY | 1944-75,1978-99 |
| 182 | 13011900 | Buffalo Fork above Lava Creek near Moran, WY | 1965-99 |
| 183 | 13012000 | Buffalo Fork near Moran, WY | 1917-18,1945-60 |
| 184 | 13014500 | Gros Ventre River at Kelly, WY | 1918,1945-58 |
| 185 | 13019438 | Little Granite Creek at Mouth near Bondurant, WY | 1982-93 |
| 186 | 13019500 | Hoback River near Jackson, WY | 1917-18,1945-58 |
| 187 | 13023000 | Greys River above Reservoir near Alpine, WY | 1917-18,1937-39,1954-99 |
| 188 | 13024000 | Salt River near Smoot, WY | 1932-57 |
| 189 | 13024500 | Cottonwood Creek near Smoot, WY | 1932-57 |
| 190 | 13025000 | Swift Creek near Afton, WY | 1942-80 |
| 191 | 13027000 | Strawberry Creek near Bedford, WY | 1932-43 |
| 192 | 13032000 | Bear Creek above Reservoir near Irwin, ID | 1917-18,1934-36,1953-72 |
| 193 | 13044500 | Warm River at Warm River, ID | 1912-15,1918-33 |
| 194 | 13045500 | Robinson Creek at Warm River, ID | 1912-15,1918-33 |
| 195 | 13046680 | Boundary Creek near Bechler Ranger Station Y.N.P., WY | 1984-99 |
| 196 | 13047500 | Falls River near Squirrel, ID | 1902-09,1918-99 |
| 197 | 13049500 | Falls River near Chester, ID | 1920-99 |
| 198 | 13052200 | Teton River above South Leigh Creek near Driggs, ID | 1962-99 |
| 199 | 13054000 | Teton River near Tetonia, ID | 1930-33,1934-37,1940-57 |
| 200 | 13055000 | Teton River near St Anthony, ID | 1890-93,1903-09,1920-99 |

**Appendix B.** Monthly and annual streamflow statistics for selected streamflow-gaging stations

[Q.xx, daily mean discharge exceeded xx percent of the time during the specified month, in cubic feet per second; Qa, mean annual discharge, in cubic feet per second]

| Gaging station number | Oct | | | Nov | | | Dec | | | Jan | | | Feb | | | Mar | | | Apr | | | May | | | June | | | July | | | Aug | | | Sept | | | Qa |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | |
| **Region 1** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12305500 | 11.3 | 17.5 | 43.3 | 14.8 | 30.9 | 88.8 | 17.4 | 35.8 | 76.2 | 17.5 | 29.6 | 55.7 | 17.9 | 30.4 | 65.3 | 25.0 | 42.7 | 78.7 | 89.5 | 182 | 365 | 297 | 512 | 726 | 90.2 | 196 | 416 | 19.7 | 33.7 | 71.0 | 8.7 | 14.5 | 20.8 | 8.3 | 12.7 | 19.3 | 120 |
| 12311000 | 18.0 | 26.1 | 51.8 | 27.6 | 42.3 | 93.5 | 35.6 | 57.5 | 123 | 34.9 | 56.4 | 111 | 41.8 | 76.8 | 137 | 70.4 | 125 | 216 | 222 | 368 | 607 | 297 | 482 | 660 | 91.7 | 176 | 305 | 24.2 | 38.2 | 71.4 | 12.0 | 17.0 | 24.3 | 13.3 | 17.0 | 25.1 | 146 |
| 12316800 | 4.4 | 5.3 | 6.8 | 4.5 | 6.2 | 11.2 | 3.7 | 6.3 | 13.5 | 4.0 | 6.3 | 11.0 | 4.6 | 6.8 | 13.0 | 6.4 | 9.5 | 23.9 | 24.3 | 52.3 | 93.0 | 114 | 169 | 243 | 43.2 | 79.2 | 148 | 10.3 | 17.6 | 32.6 | 5.1 | 7.0 | 9.4 | 4.2 | 5.3 | 7.3 | 36.4 |
| 12320500 | 6.9 | 10.5 | 26.5 | 7.6 | 14.0 | 42.7 | 7.2 | 12.9 | 30.4 | 6.9 | 11.1 | 22.2 | 6.9 | 10.8 | 19.8 | 7.9 | 12.8 | 21.7 | 21.1 | 46.5 | 106 | 142 | 238 | 358 | 104 | 217 | 339 | 21.3 | 41.2 | 95.8 | 8.0 | 13.0 | 19.8 | 6.3 | 8.7 | 15.2 | 63.8 |
| 12321000 | 14.0 | 32.6 | 128 | 24.9 | 59.3 | 142 | 25.3 | 51.5 | 106 | 23.1 | 38.2 | 63.6 | 23.1 | 35.0 | 52.4 | 28.1 | 44.8 | 77.8 | 76.1 | 165 | 392 | 439 | 724 | 1106 | 259 | 543 | 935 | 39.8 | 81.8 | 203 | 12.5 | 21.9 | 37.6 | 9.9 | 16.7 | 35.3 | 191 |
| 12392155 | 15.7 | 28.3 | 134 | 30.4 | 136 | 409 | 50.7 | 128 | 299 | 66.9 | 126 | 262 | 66.2 | 125 | 195 | 141 | 268 | 424 | 367 | 681 | 1290 | 841 | 1370 | 2160 | 350 | 1050 | 1790 | 62.1 | 142 | 348 | 21.0 | 29.8 | 59.6 | 13.3 | 18.8 | 29.5 | 426 |
| 12392300 | 44.2 | 63.7 | 116 | 61.2 | 111 | 200 | 71.4 | 122 | 234 | 70.3 | 111 | 183 | 78.1 | 123 | 251 | 112 | 181 | 338 | 312 | 494 | 762 | 777 | 1110 | 1630 | 384 | 698 | 1250 | 76.1 | 141 | 277 | 32.2 | 47.3 | 69.4 | 29.4 | 43.6 | 79.5 | 323 |
| 12393500 | 189 | 250 | 450 | 219 | 325 | 690 | 249 | 401 | 813 | 286 | 438 | 722 | 297 | 421 | 670 | 307 | 495 | 716 | 569 | 1130 | 2240 | 2430 | 3510 | 4560 | 1860 | 3050 | 4490 | 731 | 1120 | 1890 | 339 | 478 | 669 | 214 | 308 | 411 | 1090 |
| 12396000 | 12.3 | 15.3 | 22.7 | 13.6 | 18.6 | 30.0 | 13.8 | 22.2 | 40.2 | 18.1 | 25.8 | 44.9 | 20.1 | 35.6 | 63.0 | 32.2 | 55.5 | 113 | 117 | 198 | 330 | 139 | 205 | 303 | 46.3 | 67.5 | 104 | 16.5 | 28.9 | 39.1 | 11.3 | 15.6 | 20.1 | 9.2 | 14.1 | 18.0 | 69.8 |
| 12408500 | 10.4 | 14.4 | 18.2 | 12.1 | 15.1 | 21.5 | 11.5 | 15.4 | 21.7 | 10.5 | 14.7 | 21.9 | 12.2 | 17.4 | 27.8 | 18.9 | 32.5 | 82.2 | 71.6 | 131 | 232 | 83.2 | 137 | 210 | 38.4 | 57.3 | 90.3 | 15.9 | 25.5 | 40.9 | 8.1 | 13.9 | 19.8 | 7.8 | 11.9 | 16.7 | 48.2 |
| 12409000 | 75.1 | 112 | 156 | 101 | 142 | 190 | 104 | 154 | 236 | 106 | 164 | 273 | 140 | 228 | 399 | 247 | 415 | 685 | 433 | 707 | 1237 | 310 | 627 | 1040 | 163 | 310 | 499 | 63.0 | 133 | 246 | 40.8 | 82.8 | 133 | 56.3 | 91.0 | 131 | 310 |
| 12427000 | 41.4 | 45.3 | 50.5 | 41.6 | 47.3 | 52.0 | 43.4 | 48.6 | 54.6 | 43.4 | 48.7 | 58.3 | 45.9 | 57.7 | 71.5 | 56.6 | 66.1 | 80.0 | 66.7 | 79.1 | 102 | 62.0 | 71.1 | 85.8 | 51.8 | 59.8 | 69.3 | 44.2 | 49.8 | 56.7 | 40.8 | 45.4 | 50.6 | 41.3 | 44.7 | 49.3 | 56.4 |
| 12431000 | 129 | 157 | 180 | 150 | 180 | 221 | 167 | 207 | 277 | 173 | 222 | 351 | 202 | 329 | 589 | 318 | 510 | 799 | 358 | 560 | 897 | 234 | 382 | 563 | 160 | 242 | 338 | 121 | 160 | 207 | 109 | 134 | 164 | 116 | 140 | 163 | 304 |
| **Region 2** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12302500 | 8.1 | 18.7 | 40 | 10.3 | 24.3 | 45.3 | 14.6 | 22 | 46.4 | 13.4 | 19.0 | 26.6 | 11.0 | 14.9 | 34.9 | 13.9 | 21.7 | 41.5 | 51.2 | 85.3 | 153 | 135 | 217 | 329 | 125 | 209 | 302 | 35.2 | 56.0 | 103 | 12.3 | 20.0 | 29.6 | 8.6 | 13.0 | 22.8 | 69.5 |
| 12303100 | 5.9 | 7.7 | 11.4 | 6.7 | 9.4 | 15.8 | 5.9 | 7.8 | 12.2 | 5.0 | 6.9 | 10.5 | 5.0 | 6.6 | 11.1 | 5.7 | 9.0 | 14.8 | 13.0 | 22.9 | 44.6 | 41.6 | 73.5 | 123 | 45.7 | 81.5 | 125 | 14.0 | 22.7 | 43.8 | 7.0 | 9.7 | 13.6 | 6.1 | 7.7 | 9.9 | 26.0 |
| 12303500 | 110 | 141 | 214 | 119 | 191 | 361 | 132 | 207 | 380 | 113 | 189 | 336 | 130 | 200 | 360 | 165.0 | 263 | 438 | 321 | 568 | 851 | 726 | 1120 | 1590 | 552 | 956 | 1470 | 238 | 353 | 601 | 152 | 197 | 255 | 123 | 148 | 174 | 428 |
| 12347500 | 6.6 | 16.7 | 41.7 | 9.3 | 17.6 | 41.2 | 9.5 | 16.5 | 32.2 | 7.4 | 11.7 | 22.3 | 7.9 | 13.3 | 20.7 | 9.7 | 15.5 | 21.8 | 27.6 | 52.0 | 115 | 127 | 245 | 359 | 168 | 255 | 360 | 35.1 | 71.2 | 144 | 10.1 | 20.6 | 29.8 | 5.0 | 11.7 | 22.5 | 70.4 |
| 12350500 | 11.5 | 27.3 | 62.3 | 13.6 | 23.6 | 52.0 | 10.3 | 14.5 | 32.7 | 8.6 | 11.7 | 18.1 | 9.1 | 13.2 | 26.9 | 12.6 | 17.8 | 22.6 | 31.0 | 62.8 | 130 | 120 | 211 | 360 | 185 | 289 | 410 | 51.6 | 101 | 184 | 13.2 | 19.2 | 32.5 | 8.1 | 13.2 | 20.8 | 78.9 |
| 12354000 | 101 | 121 | 167 | 108 | 153 | 324 | 96.5 | 141 | 315 | 107 | 165 | 345 | 133 | 211 | 410 | 169 | 307 | 563 | 618 | 1070 | 1770 | 1290 | 1970 | 3030 | 655 | 1311 | 2350 | 218 | 313 | 528 | 120 | 153 | 199 | 103 | 127 | 153 | 580 |
| 12389500 | 150 | 183 | 212 | 150 | 184 | 226 | 136 | 178 | 239 | 129 | 176 | 246 | 144 | 195 | 303 | 185 | 282 | 451 | 387 | 657 | 1180 | 743 | 1200 | 1850 | 517 | 931 | 1450 | 267 | 380 | 545 | 189 | 245 | 298 | 159 | 200 | 238 | 452 |
| 12390700 | 44.3 | 54.2 | 62.8 | 41.7 | 51.3 | 86.4 | 44.1 | 59.8 | 156 | 46.9 | 73.9 | 153 | 53.0 | 104 | 206 | 92.6 | 177 | 310 | 238 | 414 | 731 | 471 | 733 | 1150 | 233 | 488 | 786 | 104 | 139 | 210 | 70.2 | 85.5 | 101 | 52.3 | 65.6 | 73.9 | 243 |
| 12411000 | 85.2 | 105 | 159 | 101 | 180 | 477 | 135 | 272 | 664 | 147 | 308 | 667 | 209 | 424 | 878 | 349 | 708 | 1360 | 1120 | 1810 | 2970 | 977 | 1910 | 3090 | 308 | 521 | 978 | 145 | 202 | 293 | 94.9 | 123 | 154 | 84.0 | 101 | 123 | 708 |
| 12413000 | 224 | 282 | 439 | 276 | 524 | 1280 | 397 | 852 | 2050 | 430 | 944 | 1980 | 646 | 1310 | 2610 | 1100 | 2110 | 3830 | 2880 | 4690 | 7610 | 2510 | 4530 | 7130 | 927 | 1600 | 2820 | 415 | 585 | 879 | 261 | 340 | 441 | 231 | 274 | 350 | 1910 |
| 12413140 | 3.2 | 4.9 | 6.7 | 3.6 | 7.2 | 17.7 | 4.3 | 10.4 | 27.4 | 4.4 | 14.9 | 35.4 | 6.7 | 20.1 | 42.3 | 20.1 | 33.4 | 65.0 | 42.9 | 67.1 | 117 | 61.7 | 100 | 179 | 21.8 | 42.1 | 80.1 | 9.6 | 15.8 | 23.2 | 4.9 | 7.6 | 10.0 | 3.5 | 5.3 | 6.6 | 36.9 |
| 12413150 | 48.7 | 54.7 | 65.1 | 48.5 | 66.0 | 113.3 | 50.6 | 79.0 | 139 | 45.9 | 92.2 | 169 | 60.9 | 110 | 169 | 104 | 170 | 318 | 210 | 380 | 615 | 455 | 711 | 1120 | 246 | 507 | 791 | 92.5 | 151 | 239 | 57.6 | 80.8 | 102 | 51.4 | 62.9 | 74.5 | 247 |
| 12413210 | 63.7 | 75.5 | 97.5 | 73.1 | 115 | 208 | 87.0 | 134.4 | 291 | 82.9 | 157 | 316 | 85.5 | 216 | 385 | 214 | 344 | 569 | 409 | 576 | 1060 | 526 | 733 | 1150 | 238 | 445 | 860 | 120 | 180 | 276 | 75.2 | 105 | 130 | 63.8 | 77.9 | 92.0 | 334 |
| 12413470 | 89 | 106 | 152 | 110 | 182 | 370 | 138 | 248 | 497 | 141 | 291 | 573 | 157 | 419 | 872 | 404 | 635 | 969 | 684 | 1100 | 1820 | 791 | 1150 | 1830 | 332 | 575 | 1200 | 165 | 252 | 368 | 109 | 154 | 186 | 89.5 | 115 | 137 | 546 |
| 12413500 | 316 | 403 | 665 | 378 | 692 | 1780 | 533 | 1060 | 2510 | 554 | 1200 | 2590 | 687 | 1630 | 3520 | 1390 | 2710 | 4870 | 3920 | 6400 | 10300 | 3560 | 6520 | 9830 | 1280 | 2170 | 3830 | 574 | 802 | 1210 | 365 | 463 | 595 | 324 | 387 | 483 | 2540 |
| 12414500 | 348 | 432 | 623 | 369 | 604 | 1330 | 415 | 740 | 1730 | 420 | 788 | 1680 | 534 | 1070 | 1960 | 898 | 1660 | 3010 | 2670 | 4550 | 7660 | 4810 | 7420 | 11200 | 2130 | 3820 | 6630 | 784 | 1160 | 1840 | 458 | 580 | 746 | 370 | 447 | 547 | 2350 |
| 12414900 | 51.9 | 63.0 | 86.7 | 61.4 | 95.8 | 179 | 75.0 | 123 | 277 | 93.3 | 188 | 494 | 140 | 305 | 699 | 298 | 534 | 1010 | 425 | 728 | 1280 | 311 | 620 | 1110 | 152 | 277 | 494 | 75.8 | 114 | 177 | 47.7 | 67.3 | 87.6 | 46.0 | 59.6 | 75.1 | 357 |
| 12415000 | 53.8 | 75.2 | 137 | 67.7 | 119 | 296 | 81.9 | 191 | 500 | 101 | 193 | 565 | 128 | 376 | 1010 | 311 | 734 | 1430 | 849 | 1500 | 2470 | 502 | 923 | 1540 | 191 | 314 | 572 | 75.9 | 109 | 167 | 46.9 | 63.0 | 83.4 | 46.0 | 57.2 | 86.9 | 519 |
| 12416000 | 3.7 | 4.8 | 6.4 | 4.2 | 6.6 | 13.8 | 4.8 | 9.2 | 27.4 | 5.5 | 13.2 | 39.7 | 8.5 | 25.4 | 55.0 | 24.7 | 40.1 | 78.6 | 34.2 | 61.1 | 119 | 22.8 | 42.9 | 79.6 | 11.1 | 19.1 | 33.5 | 6.1 | 8.9 | 14.0 | 4.2 | 5.7 | 7.7 | 3.7 | 4.9 | 6.1 | 28.1 |
| 13336500 | 525 | 740 | 1190 | 630 | 970 | 1720 | 658 | 983 | 1750 | 666 | 975 | 1750 | 761 | 1190 | 1990 | 1190 | 1870 | 3000 | 2970 | 4800 | 8910 | 8010 | 12300 | 18100 | 5920 | 10600 | 17200 | 1340 | 2320 | 4480 | 626 | 841 | 1190 | 494 | 650 | 897 | 3750 |
| 13336900 | 34.2 | 49.9 | 77.6 | 46.8 | 69.7 | 198 | 48.8 | 79.4 | 220 | 46.9 | 88.4 | 158 | 58.2 | 131.1 | 233 | 87.3 | 170 | 257 | 347 | 529 | 826 | 678 | 938 | 1250 | 222 | 389 | 752 | 57.4 | 84.0 | 131 | 30.7 | 39.1 | 52.6 | 28.5 | 34.8 | 54.6 | 254 |
| 13337000 | 385 | 558 | 959 | 486 | 796 | 1510 | 520 | 814 | 1540 | 540 | 840 | 1560 | 610 | 984 | 1700 | 972 | 1550 | 2480 | 2470 | 4100 | 698 | 6340 | 9370 | 13700 | 4080 | 7390 | 12000 | 982 | 1670 | 3090 | 452 | 610 | 869 | 357 | 481 | 684 | 2860 |
| 13340500 | 587 | 782 | 1190 | 693 | 1010 | 1800 | 680 | 1020 | 1860 | 681 | 1080 | 1730 | 821 | 1190 | 2060 | 1000 | 1510 | 2300 | 2640 | 4400 | 7250 | 7200 | 9710 | 12700 | 3870 | 6490 | 9980 | 1210 | 1720 | 2570 | 704 | 848 | 1060 | 569 | 682 | 858 | 2840 |
| 13340600 | 742 | 873 | 1230 | 830 | 1240 | 2120 | 834 | 1220 | 2140 | 860 | 1370 | 2440 | 1030 | 1690 | 2800 | 1770 | 2740 | 4400 | 3600 | 5440 | 8900 | 6820 | 9840 | 14700 | 4010 | 7400 | 11800 | 1460 | 2190 | 3600 | 872 | 1120 | 1440 | 731 | 890 | 1090 | 3510 |
| 13341300 | 0.9 | 1.3 | 2.1 | 1.3 | 1.8 | 3.3 | 1.6 | 2.3 | 3.9 | 1.7 | 2.7 | 6.2 | 2.4 | 5.2 | 10.8 | 2.9 | 5.6 | 11.3 | 8.3 | 12.9 | 22.6 | 3.9 | 7.5 | 14.0 | 2.1 | 3.3 | 4.9 | 1.1 | 1.6 | 2.1 | 0.7 | 0.9 | 1.4 | 0.8 | 1.0 | 1.6 | 5.0 |
| 13341400 | 9.2 | 12.2 | 21.1 | 12.5 | 17.8 | 39.4 | 15.2 | 27.2 | 52.7 | 16.8 | 35.1 | 76.4 | 22.6 | 63.1 | 130.2 | 41.6 | 77.3 | 160 | 114 | 181 | 284 | 47.7 | 90.4 | 168 | 19.8 | 31.1 | 51.7 | 8.6 | 12.3 | 17.3 | 5.9 | 7.6 | 10.7 | 6.4 | 8.8 | 13.2 | 61.7 |
| **Region 3** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12424000 | 8.8 | 17.6 | 25.6 | 17.4 | 27.3 | 45.6 | 29.1 | 60.5 | 211 | 41 | 140 | 617 | 120 | 359 | 1070 | 193 | 448 | 1110 | 124 | 254 | 522 | 53.2 | 111 | 217 | 25.4 | 46.8 | 87.9 | 9.6 | 19.4 | 33.5 | 6.0 | 12.3 | 20.6 | 5.4 | 13.2 | 20.8 | 238 |
| 13334700 | 35.4 | 38.8 | 42.6 | 38.2 | 42.6 | 48.6 | 41 | 49.7 | 73.9 | 41.1 | 53.8 | 100 | 48.3 | 70.3 | 106 | 56.5 | 77.3 | 110 | 68.2 | 100 | 155 | 88.2 | 141 | 195 | 58.1 | 93.3 | 151 | 38.6 | 46.8 | 61.6 | 32.6 | 38.4 | 43.7 | 33.3 | 37.3 | 41.4 | 76.1 |
| 13345000 | 9.1 | 14.0 | 24.1 | 15.3 | 30.6 | 74.2 | 26.6 | 58.4 | 198 | 36.7 | 130 | 499 | 94.1 | 303 | 800 | 242 | 532 | 1170 | 224 | 531 | 1100 | 91.5 | 223 | 542 | 37.2 | 68.3 | 155 | 13.4 | 24.6 | 41.4 | 5.2 | 11.1 | 17.7 | 5.0 | 10.3 | 16.1 | 271 |
| 13346100 | 12.4 | 18.8 | 30.5 | 22.2 | 37.5 | 64.6 | 30.2 | 64.4 | 255 | 52.4 | 188 | 629 | 118 | 349 | 913 | 253 | 518 | 1040 | 212 | 621 | 1140 | 90.0 | 252 | 614 | 31.4 | 70.2 | 141 | 8.3 | 20.0 | 35.0 | 1.1 | 7.4 | 19.0 | 2.9 | 13.1 | 19.9 | 299 |
| 13346800 | 0.2 | 0.3 | 1.1 | 0.3 | 1.0 | 3.2 | 0.7 | 1.7 | 4.9 | 1.3 | 5.1 | 16.5 | 3.7 | 11.0 | 30.7 | 5.8 | 14.2 | 26.7 | 3.2 | 6.3 | 12.9 | 1.3 | 2.6 | 6.0 | 0.7 | 1.5 | 3.1 | 0.4 | 0.6 | 1.1 | 0.3 | 0.5 | 0.8 | 0.2 | 0.3 | 0.8 | 7.4 |
| 13348000 | 1.8 | 3.7 | 5.4 | 2.9 | 4.8 | 9.5 | 4.7 | 11.6 | 36.8 | 7.0 | 25.9 | 96.1 | 23.9 | 58.5 | 154 | 32.1 | 75.3 | 166 | 22.1 | 42.4 | 82.4 | 7.8 | 18.2 | 32.6 | 3.4 | 6.6 | 14.9 | 1.6 | 2.9 | 5.5 | 0.7 | 2.3 | 3.7 | 1.0 | 2.7 | 4.6 | 39.0 |
| 13348500 | 0 | 0.2 | 0.5 | 0.1 | 0.5 | 1.0 | 0.2 | 1.0 | 5.3 | 0.8 | 4.7 | 21.2 | 3.1 | 11.8 | 37.1 | 3.8 | 15.4 | 41.5 | 1.7 | 4.6 | 13.2 | 0.3 | 1.2 | 2.8 | 0.2 | 0.4 | 0.9 | 0 | 0.2 | 0.4 | 0 | 0.2 | 0.3 | 0 | 0.2 | 0.3 | 8.5 |
| 13341500 | 14.3 | 25.6 | 54.0 | 27.0 | 62.5 | 185 | 43.3 | 137 | 435 | 49 | 152 | 624 | 150 | 388 | 1400 | 403 | 891 | 1830 | 697 | 1250 | 1980 | 167 | 365 | 728 | 54.9 | 92.0 | 196 | 15.5 | 26.6 | 48.2 | 8.4 | 11.4 | 18.3 | 9.0 | 13.2 | 21.9 | 427 |
| 13342450 | 7.6 | 14.4 | 21.8 | 13.9 | 20.6 | 33.5 | 18.2 | 30.3 | 60.4 | 22 | 34.7 | 119 | 28.9 | 69.2 | 162 | 57.1 | 144 | 302 | 76.8 | 154 | 362 | 34.4 | 86.9 | 221 | 17.6 | 33.3 | 75.9 | 5.5 | 12.9 | 22.1 | 3.6 | 6.6 | 11.6 | 4.6 | 8.7 | 15.3 | 80.1 |
| **Region 4** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13196500 | 0.4 | 0.6 | 0.8 | 0.5 | 0.7 | 1.0 | 0.6 | 0.8 | 1.1 | 0.6 | 0.8 | 1.4 | 0.7 | 1.1 | 2.0 | 0.9 | 1.6 | 3.1 | 2.9 | 4.7 | 11.6 | 2.8 | 5.9 | 11.1 | 1.3 | 2.4 | 3.9 | 0.4 | 0.8 | 1.4 | 0.2 | 0.4 | 0.7 | 0.3 | 0.5 | 0.6 | 2.2 |
| 13200000 | 41.5 | 55.7 | 78.8 | 57.4 | 80.1 | 115 | 60.5 | 91.8 | 146 | 67.2 | 107 | 188 | 93.4 | 155 | 329 | 172 | 323 | 732 | 345 | 805 | 1430 | 376 | 747 | 1160 | 172 | 381 | 652 | 43.4 | 91.8 | 170 | 19.7 | 41 | 63.2 | 22.1 | 39 | 59.3 | 293 |
| 13200500 | 1.5 | 2.0 | 3.0 | 2.3 | 3.0 | 4.1 | 2.4 | 3.5 | 5.4 | 2.8 | 4.1 | 9.2 | 4.4 | 8.0 | 16.6 | 6.5 | 11.6 | 21.2 | 10.7 | 21.6 | 48.3 | 5.4 | 13.1 | 22.8 | 2.1 | 4.3 | 7.6 | 0.4 | 1.2 | 2.4 | 0.2 | 0.6 | 1.1 | 0.4 | 0.9 | 1.6 | 8.2 |
| 13201000 | 42.1 | 56.4 | 79.4 | 60.7 | 83.5 | 117 | 59.8 | 93.7 | 159 | 67.7 | 93.8 | 163 | 89.2 | 155 | 282 | 179 | 337 | 730 | 538 | 986 | 1610 | 456 | 789 | 1140 | 172 | 355 | 643 | 41.2 | 83.7 | 152 | 21.0 | 35.9 | 55.8 | 25.4 | 36.4 | 49.8 | 302 |
| 13207000 | 0 | 0 | 0 | 0 | 0.1 | 0.1 | 0 | 0.1 | 0.7 | 0.1 | 0.8 | 7.4 | 0.8 | 2.7 | 11.5 | 0.8 | 4.5 | 10.3 | 0.4 | 3.5 | 12.1 | 0 | 0.8 | 4.9 | 0 | 0.1 | 1.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.5 |
| 13207500 | 0.3 | 0.8 | 1.4 | 0.8 | 1.4 | 2.0 | 1.0 | 1.7 | 3.8 | 1.3 | 2.4 | 7.5 | 3.9 | 6.9 | 20.7 | 4.0 | 10.2 | 29.6 | 1.3 | 8.2 | 40.0 | 0.2 | 1.3 | 17.7 | 0.2 | 0.6 | 3.1 | 0.1 | 0.2 | 0.4 | 0.1 | 0.2 | 0.4 | 0.1 | 0.2 | 0.5 | 7.4 |
| 13216500 | 43.4 | 51.4 | 61.1 | 45.3 | 55.6 | 67.3 | 41.3 | 53.4 | 72.7 | 41.9 | 54.7 | 77.2 | 51.3 | 71.0 | 137 | 81.2 | 149 | 327 | 159 | 306 | 583 | 147 | 266 | 448 | 75.2 | 130 | 232 | 41.1 | 56.7 | 80.1 | 35.7 | 43.8 | 54.7 | 37.6 | 45.4 | 54.8 | 133 |
| 13250600 | 5.4 | 5.9 | 6.6 | 6.0 | 7.0 | 9.8 | 6.5 | 12.3 | 40.9 | 7.0 | 19.2 | 73.5 | 13.8 | 31.2 | 74.9 | 17.1 | 40.6 | 77.0 | 11.5 | 25.6 | 58.6 | 6.0 | 7.8 | 15.0 | 4.7 | 5.7 | 7.5 | 3.0 | 3.8 | 4.8 | 3.1 | 3.9 | 4.5 | 3.8 | 4.5 | 5.4 | 25.2 |
| 13251300 | 1.0 | 1.3 | 1.6 | 1.1 | 1.4 | 2.2 | 1.0 | 1.3 | 2.4 | 0.9 | 1.3 | 2.4 | 1.1 | 1.6 | 3.5 | 1.5 | 2.6 | 6.1 | 9.3 | 15.1 | 25.1 | 9.3 | 19.3 | 31.2 | 2.0 | 3.9 | 9.3 | 1.1 | 1.7 | 2.4 | 0.9 | 1.1 | 1.7 | 0.9 | 1.1 | 1.5 | 5.2 |
| 13251500 | 5.4 | 6.8 | 9.0 | 6.1 | 8.0 | 13.1 | 6.2 | 8.6 | 21.0 | 6.1 | 9.9 | 22.3 | 6.9 | 15.4 | 29.3 | 13.6 | 29.5 | 84.8 | 109 | 191 | 324 | 50.9 | 104 | 200 | 13.2 | 22.3 | 39.6 | 7.3 | 9.2 | 12.9 | 5.5 | 6.8 | 8.4 | 5.3 | 6.2 | 7.7 | 44.4 |
| 13253500 | 17.8 | 21 | 30.7 | 27.7 | 34.1 | 47.9 | 29.2 | 38.7 | 73.6 | 32.7 | 46.5 | 75.3 | 37.1 | 49.3 | 71.2 | 58.0 | 112 | 285 | 292 | 426 | 708 | 155 | 262 | 484 | 62.8 | 109 | 173 | 19.4 | 28.5 | 46.8 | 13.8 | 17.6 | 21.0 | 15.6 | 17.8 | 20.7 | 128 |
| 13256000 | 51.6 | 64.9 | 101 | 70 | 95.3 | 150 | 74.7 | 121 | 304 | 82.1 | 169 | 276 | 130 | 249 | 499 | 266 | 618 | 1110 | 824 | 1290 | 2180 | 555 | 911 | 1480 | 183 | 352 | 595 | 55.0 | 71.2 | 121 | 58.1 | 68.6 | 80.6 | 49.9 | 61.9 | 80.5 | 423 |
| 13257000 | 12.8 | 19.7 | 32 | 20.4 | 30.5 | 53.7 | 25.4 | 36.4 | 93.3 | 27.1 | 41.3 | 58.5 | 32.5 | 58.8 | 105 | 60.6 | 108 | 178 | 130 | 218 | 376 | 281 | 405 | 566 | 120 | 233 | 441 | 13.2 | 39.2 | 86.4 | 0.4 | 5.9 | 24.1 | 0.9 | 12.3 | 22.2 | 122 |
| 13258500 | 68.9 | 96.3 | 140 | 92.5 | 133 | 228 | 106 | 177 | 439 | 122 | 226 | 514 | 198 | 413 | 937 | 472 | 932 | 1680 | 915 | 1510 | 2440 | 1020 | 1620 | 2460 | 364 | 802 | 1450 | 78.5 | 138 | 282 | 61.5 | 78.7 | 108 | 55.1 | 79.6 | 115 | 651 |
| 13260000 | 6.1 | 9.1 | 12.1 | 9.8 | 12.8 | 16.2 | 10.4 | 13.3 | 19.2 | 10.4 | 13.9 | 23.2 | 12.5 | 26.1 | 47.7 | 28.5 | 52.2 | 98.3 | 51.2 | 81.6 | 119 | 67.7 | 100 | 151 | 33.1 | 65.2 | 113 | 3.6 | 8.8 | 20.1 | 2.4 | 3.6 | 6.1 | 2.6 | 4.2 | 8.1 | 38.6 |
| 13261000 | 10.7 | 13.5 | 18.5 | 13.5 | 20.1 | 34.1 | 15.4 | 23.8 | 56.3 | 17.1 | 30.9 | 74.3 | 27 | 56.5 | 104 | 43.7 | 75.9 | 131 | 118 | 196 | 325 | 219 | 340 | 495 | 109 | 230 | 401 | 23.5 | 41.0 | 72.5 | 10.1 | 14.7 | 20.7 | 8.3 | 11.1 | 14.2 | 105 |
| 13266000 | 115 | 165 | 236 | 146 | 201 | 361 | 163 | 268 | 702 | 203 | 379 | 1080 | 307 | 788 | 2120 | 843 | 1780 | 3610 | 1280 | 2220 | 3470 | 1540 | 2360 | 3510 | 630 | 1340 | 2420 | 242 | 309 | 490 | 106 | 249 | 307 | 84.0 | 185 | 259 | 1130 |
| 13267000 | 2.8 | 4.0 | 5.7 | 4.3 | 6.0 | 9.1 | 4.8 | 7.1 | 13.4 | 6.0 | 9.5 | 21.0 | 8.3 | 22.2 | 43.8 | 25.6 | 61.0 | 125 | 89.2 | 148 | 240 | 46.4 | 97.4 | 150 | 13.0 | 21.8 | 42.1 | 3.7 | 7.1 | 12.1 | 0.8 | 2.1 | 4.1 | 1 | 2.2 | 3.3 | 40.4 |
| 13269300 | 1.5 | 2.4 | 3.9 | 3.0 | 4.5 | 7.6 | 3.2 | 7.1 | 15.3 | 5.7 | 9.0 | 21.7 | 8.0 | 15.2 | 52.6 | 23.3 | 64.5 | 164 | 75.4 | 186 | 338 | 44.7 | 112 | 226 | 16.7 | 27.5 | 46.6 | 1.6 | 7.2 | 15.7 | 0.5 | 1.4 | 4.6 | 0.6 | 1.3 | 2.2 | 49.8 |
| 13270800 | 19.8 | 22.5 | 24.7 | 19.4 | 22.1 | 24.1 | 19.1 | 20.9 | 23.8 | 19.0 | 21.1 | 23.2 | 19.5 | 21.3 | 22.8 | 20.8 | 22.8 | 26.4 | 24.7 | 31.1 | 45.3 | 32.1 | 48.3 | 71.7 | 25.7 | 32.9 | 45.5 | 21.7 | 26.1 | 28.9 | 20.6 | 23 | 26.1 | 20.2 | 22.2 | 25 | 27.2 |

## Appendix B. Monthly and annual streamflow statistics for selected streamflow-gaging stations--Continued

| Gaging station number | Oct | | | Nov | | | Dec | | | Jan | | | Feb | | | Mar | | | Apr | | | May | | | June | | | July | | | Aug | | | Sept | | | Qa |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | |
| **Region 4--Continued** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13275500 | 7.2 | 12.5 | 22.8 | 12.1 | 22.3 | 37.5 | 16.0 | 26.7 | 47.6 | 17.2 | 28.4 | 52.6 | 24.4 | 44.7 | 83.2 | 54.4 | 105 | 212 | 152 | 292 | 541 | 198 | 325 | 506 | 96.4 | 192 | 353 | 17.3 | 36.7 | 71 | 4.9 | 10.7 | 22.5 | 3.2 | 7.3 | 13 | 109 |
| 13288200 | 77.0 | 96.1 | 116 | 84.6 | 107 | 147 | 78.4 | 100 | 136 | 75.3 | 98.8 | 129 | 81.9 | 108 | 150 | 111 | 154 | 254 | 237 | 378 | 557 | 538 | 811 | 1280 | 561 | 934 | 1420 | 166 | 309 | 588 | 103 | 136 | 179 | 79.5 | 100 | 125 | 312 |
| 13289960 | 16.6 | 29.5 | 38.8 | 24.1 | 30.3 | 44.5 | 24.3 | 31.9 | 57.6 | 25.2 | 35.3 | 75.0 | 32.7 | 56.2 | 193 | 105 | 205 | 416 | 196 | 316 | 528 | 178 | 324 | 574 | 78.3 | 190 | 370 | 27.6 | 53.4 | 97.7 | 14.1 | 27.7 | 44.8 | 13.6 | 23.9 | 38.6 | 134 |
| 13290190 | 40.4 | 66.0 | 90.1 | 69.5 | 99.0 | 155 | 82.3 | 130 | 292 | 84.7 | 149 | 299 | 132 | 232 | 522 | 297 | 510 | 859 | 372 | 616 | 935 | 497 | 835 | 1210 | 284 | 700 | 1140 | 39.6 | 99.2 | 300 | 27.3 | 39.1 | 69.8 | 27.5 | 47.1 | 74.3 | 350 |
| 13315500 | 1.7 | 2.1 | 2.8 | 1.9 | 2.8 | 4.2 | 2.2 | 2.8 | 5.9 | 2.2 | 3.2 | 6.8 | 2.5 | 4.2 | 6.4 | 3.8 | 8.9 | 20.2 | 38.8 | 85.4 | 151 | 28.7 | 67.5 | 120 | 6.2 | 9.8 | 16.7 | 2.5 | 3.3 | 4.7 | 1.6 | 1.9 | 2.4 | 1.4 | 1.7 | 2.1 | 19.2 |
| 13316500 | 169 | 213 | 276 | 178 | 237 | 342 | 172 | 232 | 397 | 168 | 242 | 379 | 195 | 293 | 531 | 315 | 529 | 943 | 778 | 1200 | 1820 | 1410 | 2200 | 3370 | 1270 | 2330 | 3490 | 302 | 534 | 1010 | 173 | 249 | 345 | 155 | 217 | 284 | 799 |
| 13316800 | 1.5 | 2.6 | 5.8 | 2.4 | 3.9 | 8.0 | 2.1 | 4.8 | 9.1 | 2.0 | 4.3 | 10.5 | 3.5 | 7.0 | 15.3 | 5.5 | 9.1 | 18.5 | 20.6 | 32.5 | 51.0 | 46.5 | 64.0 | 92.0 | 14.2 | 36.3 | 63.7 | 3.2 | 5.2 | 9.6 | 0.8 | 2.1 | 3.4 | 0.7 | 1.7 | 3.2 | 17.5 |
| 13317000 | 3740 | 4680 | 5670 | 3900 | 4720 | 5830 | 3380 | 4220 | 5280 | 3280 | 3940 | 4940 | 3520 | 4190 | 5070 | 4000 | 4940 | 6580 | 6340 | 9420 | 16600 | 17600 | 27900 | 45700 | 20300 | 35700 | 55800 | 6520 | 10800 | 19200 | 3720 | 5210 | 7030 | 3460 | 4400 | 5370 | 11200 |
| 13319000 | 25.9 | 36.3 | 51.8 | 34.8 | 51.8 | 110 | 37.4 | 74.9 | 234 | 45.9 | 102 | 279 | 73.2 | 184 | 480 | 254 | 563 | 1200 | 659 | 1120 | 1930 | 516 | 938 | 1550 | 164 | 346 | 714 | 37.6 | 69.4 | 140 | 17.4 | 26.9 | 47.4 | 18.9 | 26.2 | 40.2 | 387 |
| 13320000 | 24.0 | 28.7 | 36.8 | 25.5 | 33.2 | 46.9 | 25.1 | 34.5 | 54.5 | 25.5 | 37.4 | 57.9 | 28.4 | 45.9 | 72.9 | 47.5 | 76.0 | 139 | 121 | 214 | 336 | 247 | 371 | 553 | 149 | 266 | 420 | 45.5 | 71.4 | 127 | 25.5 | 35.1 | 46.3 | 22.8 | 28.3 | 35.0 | 118 |
| 13323600 | 2.9 | 4.2 | 7.0 | 3.7 | 5.2 | 9.7 | 3.8 | 6.0 | 14.8 | 4.0 | 6.0 | 10.2 | 4.0 | 6.7 | 11.6 | 6.6 | 12.9 | 20.9 | 30.5 | 43.5 | 108 | 104 | 164 | 281 | 53.1 | 115 | 222 | 10.8 | 19.8 | 41.0 | 3.9 | 6.4 | 8.1 | 3.0 | 3.8 | 5.4 | 41.5 |
| 13329500 | 23.4 | 29.1 | 37.9 | 21.6 | 26.9 | 40.3 | 18.5 | 24.3 | 34.7 | 15.5 | 21.4 | 28.7 | 14.5 | 19.7 | 26.0 | 14.2 | 20.1 | 25.1 | 21.8 | 34.1 | 67.0 | 83.6 | 148 | 244 | 170 | 240 | 353 | 84.7 | 145 | 233 | 37.7 | 53.9 | 77.9 | 27.0 | 34.1 | 43.4 | 74.3 |
| 13330000 | 31.7 | 43.0 | 68.5 | 32.3 | 49.1 | 82.6 | 28.3 | 43.5 | 79.0 | 28.1 | 40.9 | 66.9 | 27.4 | 40.9 | 60.2 | 33.8 | 48.4 | 70.0 | 64.1 | 119 | 239 | 245 | 445 | 752 | 482 | 737 | 1080 | 146 | 315 | 609 | 48.1 | 72.0 | 120 | 33.4 | 46.0 | 64.2 | 195 |
| 13330500 | 10.4 | 15.7 | 32.6 | 15.3 | 26.7 | 52.2 | 16.4 | 32.1 | 70.3 | 16.6 | 32.4 | 62.5 | 20.5 | 34.4 | 65.5 | 33.1 | 54.6 | 93.1 | 72.0 | 136 | 254 | 209 | 346 | 520 | 226 | 364 | 544 | 31.9 | 76.6 | 198 | 12.2 | 18.1 | 27.1 | 9.1 | 13.5 | 19.3 | 115 |
| 13331500 | 67.8 | 86.4 | 120 | 77.7 | 120 | 181 | 78.6 | 130 | 234 | 88.9 | 160 | 285 | 116 | 193 | 331 | 187 | 267 | 437 | 291 | 447 | 744 | 719 | 1190 | 1810 | 943 | 1500 | 2180 | 224 | 495 | 1040 | 91.8 | 137 | 217 | 67.0 | 93.5 | 124 | 462 |
| 13337500 | 40.0 | 56.9 | 81.0 | 49.4 | 72.7 | 114 | 46.8 | 71.8 | 120 | 46.2 | 71.8 | 122 | 54.8 | 80.9 | 145 | 77.7 | 135 | 236 | 314 | 583 | 976 | 720 | 1030 | 1530 | 277 | 472 | 859 | 76.0 | 122 | 205 | 36.8 | 49.9 | 72.1 | 32.1 | 42.9 | 65.7 | 274 |
| 13338000 | 148 | 213 | 333 | 167 | 246 | 395 | 161 | 238 | 417 | 159 | 219 | 379 | 185 | 262 | 432 | 280 | 422 | 736 | 996 | 1800 | 2830 | 2100 | 2930 | 4230 | 1150 | 1950 | 3120 | 299 | 517 | 925 | 139 | 198 | 285 | 123 | 164 | 248 | 875 |
| 13338500 | 174 | 247 | 350 | 221 | 298 | 454 | 217 | 288 | 464 | 226 | 350 | 740 | 268 | 441 | 844 | 514 | 798 | 1430 | 1190 | 1830 | 2860 | 1850 | 3010 | 4570 | 1250 | 2200 | 3570 | 369 | 633 | 1180 | 184 | 260 | 388 | 151 | 217 | 315 | 1050 |
| 13339000 | 1180 | 1740 | 2890 | 1440 | 2200 | 4050 | 1440 | 2190 | 4420 | 1450 | 2090 | 4030 | 1730 | 2600 | 4850 | 2520 | 4160 | 6940 | 7690 | 12700 | 21200 | 18900 | 27700 | 40100 | 11900 | 20600 | 34800 | 2750 | 4700 | 8430 | 1290 | 1730 | 2360 | 1080 | 1420 | 1940 | 8200 |
| 13339500 | 39.9 | 60.9 | 107 | 64.0 | 118 | 215 | 91.6 | 125 | 219 | 90.5 | 144 | 332 | 129 | 257 | 638 | 328 | 541 | 916 | 541 | 783 | 1180 | 411 | 646 | 1010 | 175 | 334 | 595 | 72.0 | 112 | 205 | 37.8 | 56.6 | 79.5 | 33.3 | 50.4 | 76.3 | 329 |
| 13340000 | 1230 | 1810 | 2680 | 1590 | 2540 | 4220 | 1650 | 2510 | 4330 | 1780 | 2780 | 6190 | 2030 | 3590 | 7300 | 4320 | 6690 | 10800 | 8680 | 13300 | 21900 | 17700 | 26800 | 39000 | 11700 | 21700 | 35600 | 2900 | 5080 | 9700 | 1370 | 1920 | 2880 | 1070 | 1540 | 2260 | 8830 |
| 14010000 | 92.9 | 107 | 125 | 102 | 124 | 155 | 110 | 138 | 191 | 115 | 144 | 208 | 126 | 161 | 230 | 151 | 195 | 263 | 204 | 259 | 347 | 213 | 286 | 387 | 134 | 178 | 259 | 104 | 118 | 142 | 95.1 | 108 | 121 | 93.2 | 106 | 119 | 176 |
| 14011000 | 5.7 | 7.3 | 11.7 | 9.4 | 16.1 | 36.8 | 13.4 | 31.0 | 69.9 | 16.9 | 33.5 | 72.7 | 25.7 | 45.2 | 89.0 | 36.2 | 62.6 | 113 | 71.8 | 107 | 163 | 44.6 | 84.8 | 139 | 11.7 | 24.9 | 57.4 | 2.7 | 4.7 | 9.8 | 2.0 | 2.9 | 4.8 | 2.9 | 3.9 | 6.3 | 47.3 |
| **Region 5** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12343400 | 91.1 | 108 | 132 | 82.4 | 102 | 125 | 68.2 | 87.6 | 112 | 69.9 | 82.7 | 102 | 72.1 | 82.7 | 109 | 79.2 | 96.1 | 138 | 133 | 203 | 316 | 478 | 878 | 1450 | 605 | 1080 | 1640 | 179 | 266 | 429 | 95.7 | 126 | 165 | 90.3 | 110 | 138 | 293 |
| 12346500 | 33.7 | 41.1 | 47.9 | 30.0 | 34.7 | 41.4 | 25.0 | 28.9 | 35.1 | 22.2 | 26 | 31.5 | 22.3 | 25.5 | 28.9 | 22.6 | 25.6 | 29.4 | 28.1 | 39.1 | 73.0 | 93.6 | 191 | 376 | 236 | 398 | 498 | 89.1 | 127 | 201 | 50.6 | 65.7 | 85.9 | 38.2 | 45.8 | 57.1 | 93.5 |
| 12351000 | 17.0 | 20.2 | 25.2 | 17.5 | 20.9 | 27.2 | 16.3 | 19.6 | 23.9 | 13.8 | 17.0 | 19.7 | 13.4 | 16.3 | 20.1 | 13.6 | 16.0 | 19.7 | 19.4 | 31.3 | 64.0 | 63.2 | 105 | 212 | 95.7 | 167 | 251 | 36.1 | 51.7 | 87.3 | 21.7 | 29.3 | 37.1 | 18.3 | 21.7 | 25.8 | 48.3 |
| 13135500 | 59.8 | 72.6 | 82.3 | 53.0 | 64.3 | 72.8 | 42.8 | 53.4 | 64.4 | 42.5 | 50.2 | 57.8 | 42.0 | 48.3 | 54.4 | 42.9 | 47.6 | 54.5 | 60.2 | 99.3 | 230 | 235 | 421 | 746 | 347 | 534 | 800 | 129 | 202 | 349 | 76.2 | 101 | 131 | 64.3 | 78.7 | 91.1 | 167 |
| 13136500 | 33.9 | 37.3 | 42.3 | 32.3 | 35.6 | 40.0 | 30.0 | 33.9 | 37.7 | 29.0 | 33.1 | 36.1 | 28.2 | 31.0 | 34.3 | 29.5 | 33.1 | 37.9 | 48.0 | 87.0 | 198 | 166 | 265 | 399 | 146 | 200 | 321 | 57.1 | 75.5 | 111 | 38.3 | 44.9 | 54.7 | 34.0 | 38.0 | 42.6 | 87.4 |
| 13139500 | 20.1 | 158 | 246 | 14.3 | 147 | 219 | 7.7 | 127 | 180 | 5.5 | 129 | 176 | 4.8 | 128 | 169 | 11.3 | 144 | 208 | 181 | 364 | 719 | 577 | 1050 | 1820 | 654 | 1250 | 2200 | 216 | 481 | 983 | 65.6 | 191 | 350 | 29.1 | 153 | 262 | 409 |
| 13141000 | 49.0 | 88.2 | 152 | 48.3 | 100 | 163 | 44.0 | 74.5 | 126 | 37.5 | 58.4 | 94.7 | 36.8 | 60.6 | 107 | 46.1 | 99.4 | 164 | 109 | 284 | 619 | 239 | 670 | 1400 | 229 | 727 | 1630 | 79.0 | 168 | 563 | 59.5 | 89.4 | 128 | 52.8 | 79.2 | 119 | 300 |
| 13185000 | 303 | 371 | 459 | 320 | 394 | 519 | 300 | 389 | 547 | 308 | 395 | 527 | 333 | 435 | 607 | 450 | 683 | 1110 | 1110 | 1790 | 3010 | 2170 | 3460 | 5290 | 1790 | 3150 | 4820 | 519 | 956 | 1780 | 319 | 437 | 597 | 286 | 360 | 449 | 1210 |
| 13186000 | 194 | 235 | 290 | 197 | 241 | 298 | 179 | 226 | 284 | 188 | 228 | 285 | 202 | 238 | 307 | 243 | 332 | 486 | 555 | 993 | 1900 | 1360 | 2400 | 3830 | 1200 | 2170 | 3480 | 339 | 606 | 1160 | 194 | 276 | 398 | 173 | 226 | 289 | 779 |
| 13186500 | 20.6 | 25.9 | 31.4 | 24.3 | 29.0 | 38.7 | 24.4 | 31.0 | 40.8 | 26.5 | 33.6 | 42.5 | 28.2 | 39.0 | 50.0 | 35.2 | 50.9 | 77.1 | 118 | 246 | 527 | 182 | 271 | 445 | 66.5 | 109 | 177 | 24.2 | 36.1 | 49.7 | 14.6 | 22.3 | 28.8 | 15.7 | 21.0 | 26.6 | 89.8 |
| 13187000 | 13.8 | 16.8 | 19.2 | 15.6 | 18.4 | 24.1 | 16.0 | 19.3 | 26.6 | 16.8 | 21.5 | 28.4 | 18.3 | 22.9 | 32.2 | 21.8 | 30.2 | 50.8 | 73.7 | 196 | 369 | 171 | 255 | 373 | 83.4 | 120 | 175 | 25.4 | 35.5 | 53.1 | 15.5 | 18.0 | 22.0 | 13.3 | 15.3 | 17.8 | 72.7 |
| 13235000 | 305 | 350 | 420 | 293 | 346 | 424 | 266 | 325 | 411 | 258 | 315 | 386 | 265 | 314 | 396 | 308 | 389 | 536 | 533 | 844 | 1440 | 1280 | 2020 | 3160 | 1680 | 2640 | 3770 | 633 | 1040 | 1760 | 376 | 503 | 671 | 316 | 384 | 463 | 872 |
| 13240000 | 13.6 | 20.8 | 36.1 | 16.5 | 28.6 | 64.8 | 17.0 | 28.3 | 59.1 | 18.2 | 27.7 | 49.1 | 19.9 | 30.1 | 45.8 | 23.9 | 33.9 | 54.5 | 50.0 | 98.3 | 231 | 251 | 469 | 782 | 318 | 573 | 827 | 49.3 | 106 | 255 | 18.2 | 28 | 43.6 | 13.1 | 18.9 | 27.9 | 144 |
| 13292500 | 32.2 | 40.2 | 51.7 | 31.5 | 38.1 | 52.1 | 25.3 | 30.4 | 41.1 | 22.5 | 26.3 | 35.0 | 21.3 | 24.4 | 25.9 | 21.5 | 25.3 | 30.4 | 28.4 | 35.9 | 92.0 | 131 | 252 | 350 | 189 | 244 | 382 | 21.3 | 69.0 | 170 | 6.2 | 10.2 | 21.9 | 8.3 | 29.5 | 47.9 | 81.1 |
| 13293000 | 14.4 | 17.9 | 28.2 | 17.8 | 21.9 | 28.9 | 18.3 | 21.4 | 29.3 | 17.3 | 20.5 | 22.9 | 16.2 | 19.0 | 23.6 | 15.9 | 18.3 | 23.3 | 20.6 | 30.2 | 75.4 | 109 | 209 | 308 | 200 | 263 | 392 | 56.7 | 104 | 185 | 20.3 | 27.9 | 43.1 | 13.7 | 16.7 | 23.7 | 75.6 |
| 13295000 | 76.0 | 93.0 | 117 | 77.7 | 91.9 | 116 | 69.1 | 83.7 | 103 | 65.8 | 81.0 | 98.3 | 67.2 | 79.5 | 94.5 | 72.8 | 83.9 | 95.8 | 97.4 | 161 | 310 | 340 | 507 | 786 | 402 | 623 | 892 | 138 | 246 | 421 | 77.0 | 109 | 156 | 73.3 | 91.1 | 116 | 204 |
| 13295500 | 281 | 363 | 462 | 290 | 367 | 456 | 259 | 330 | 395 | 256 | 312 | 376 | 255 | 309 | 361 | 270 | 309 | 354 | 332 | 502 | 894 | 967 | 1430 | 2180 | 1280 | 1820 | 2630 | 463 | 816 | 1360 | 280 | 388 | 506 | 259 | 333 | 408 | 664 |
| 13296000 | 51.4 | 66.1 | 78.0 | 46.2 | 58.7 | 71.2 | 42.0 | 51.9 | 63.5 | 39.1 | 45.4 | 55.9 | 40.3 | 45.2 | 50.4 | 41.6 | 50.5 | 59.5 | 63.5 | 131 | 346 | 365 | 610 | 1080 | 306 | 624 | 1110 | 104 | 167 | 287 | 62.3 | 90.4 | 116 | 55.6 | 71.5 | 81.9 | 197 |
| 13296500 | 392 | 491 | 613 | 388 | 480 | 592 | 355 | 434 | 513 | 340 | 401 | 471 | 347 | 398 | 458 | 357 | 406 | 469 | 475 | 720 | 1320 | 1450 | 2250 | 3670 | 1830 | 2950 | 4490 | 642 | 1140 | 2010 | 397 | 545 | 776 | 374 | 474 | 614 | 990 |
| 13308500 | 81.8 | 94.9 | 115 | 72.9 | 89.5 | 104 | 65.5 | 77.2 | 91.1 | 62.0 | 72.6 | 84.2 | 60.9 | 69.2 | 79.3 | 62.6 | 70.8 | 77.5 | 75.9 | 111 | 250 | 411 | 708 | 1200 | 486 | 852 | 1330 | 152 | 227 | 380 | 97.1 | 122 | 159 | 86.4 | 100 | 118 | 241 |
| 13309000 | 91.7 | 109 | 140 | 88.9 | 106 | 135 | 80.1 | 99.5 | 114 | 76.9 | 90.5 | 108 | 76.2 | 90.0 | 103 | 81.8 | 93.4 | 107 | 106 | 189 | 408 | 564 | 911 | 1540 | 420 | 862 | 1410 | 148 | 224 | 364 | 93.6 | 126 | 157 | 89 | 108 | 128 | 290 |
| 13310000 | 153 | 173 | 218 | 133 | 156 | 196 | 120 | 142 | 173 | 114 | 130 | 150 | 111 | 126 | 141 | 114 | 138 | 158 | 173 | 320 | 790 | 918 | 1570 | 2430 | 1230 | 1690 | 2360 | 393 | 561 | 936 | 212 | 252 | 302 | 171 | 189 | 214 | 509 |
| 13310500 | 34.6 | 42.0 | 52.7 | 35 | 44.9 | 57.6 | 33.5 | 42.4 | 54.5 | 34.2 | 41.0 | 50.9 | 34.2 | 40.5 | 49.4 | 36.3 | 46.8 | 60.1 | 63.7 | 148 | 310 | 307 | 487 | 747 | 245 | 465 | 701 | 71.0 | 104 | 175 | 39.5 | 51.0 | 64.7 | 33.8 | 40.9 | 47.4 | 145 |
| 13310700 | 120 | 143 | 172 | 126 | 153 | 229 | 121 | 157 | 287 | 118 | 165 | 280 | 122 | 167 | 300 | 153 | 233 | 411 | 293 | 530 | 1010 | 936 | 1560 | 2550 | 854 | 1730 | 2730 | 230 | 411 | 837 | 135 | 188 | 254 | 113 | 150 | 186 | 556 |
| 13311000 | 7.1 | 10.1 | 13.3 | 7.0 | 8.9 | 11.6 | 6.2 | 8.0 | 9.5 | 6.0 | 7.0 | 8.3 | 6.1 | 7.0 | 8.0 | 6.3 | 7.5 | 9.2 | 8.5 | 15.9 | 29.5 | 34.9 | 63.1 | 102 | 37.3 | 81.4 | 146 | 14.8 | 23.7 | 44.8 | 9.1 | 13.1 | 18.2 | 7.9 | 10.3 | 14.1 | 24.5 |
| 13311500 | 16.3 | 19.6 | 22.7 | 14.7 | 18.2 | 19.7 | 13.4 | 16.9 | 20.5 | 12.4 | 14.8 | 17.7 | 12.7 | 14.3 | 16.7 | 12.8 | 14.9 | 20.7 | 18.2 | 42.0 | 69.9 | 106 | 160 | 227 | 84.9 | 139 | 271 | 32.0 | 48.3 | 69.7 | 20.3 | 25.4 | 30.9 | 17.6 | 20.9 | 24.9 | 50.4 |
| 13312000 | 44.8 | 53.0 | 65.0 | 36.8 | 46.1 | 57.9 | 35.3 | 44.4 | 51.8 | 30.9 | 40.2 | 50.8 | 30.8 | 37.6 | 50.2 | 34.6 | 40.5 | 58.1 | 54.8 | 120 | 257 | 268 | 414 | 627 | 252 | 423 | 716 | 93.7 | 130 | 204 | 58.0 | 71.4 | 91.0 | 49.3 | 56.8 | 66.7 | 137 |
| 13313000 | 65.7 | 88.6 | 114 | 65.7 | 88.8 | 120 | 61.7 | 80.1 | 114 | 63.4 | 76.9 | 107 | 62 | 75.9 | 100 | 67.0 | 83.0 | 120 | 111 | 203 | 467 | 618 | 1130 | 1910 | 660 | 1300 | 2040 | 152 | 271 | 544 | 78.1 | 115 | 162 | 64.8 | 87.5 | 113 | 347 |
| 13314000 | 362 | 464 | 594 | 365 | 510 | 652 | 352 | 478 | 679 | 367 | 439 | 615 | 364 | 450 | 617 | 416 | 607 | 790 | 894 | 1990 | 3950 | 3570 | 5690 | 8130 | 2550 | 4970 | 8370 | 782 | 1240 | 2320 | 396 | 549 | 759 | 354 | 447 | 551 | 1600 |
| 13315000 | 3680 | 4040 | 5180 | 3800 | 4300 | 5070 | 3070 | 3820 | 4760 | 3070 | 3550 | 4300 | 3160 | 3640 | 4250 | 3430 | 4000 | 5050 | 4680 | 7950 | 15900 | 17800 | 30800 | 45400 | 24000 | 33700 | 46100 | 8160 | 11600 | 17600 | 4200 | 5110 | 6300 | 3570 | 3990 | 4600 | 10600 |
| **Region 6** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 06013500 | 50.0 | 63.2 | 74.2 | 46.0 | 56.9 | 66.3 | 40.6 | 48.3 | 54.7 | 37.9 | 42.4 | 49.5 | 36.8 | 40.8 | 47.4 | 37.5 | 43.0 | 50.8 | 49.0 | 71.5 | 115 | 44.4 | 73.9 | 116 | 49.4 | 92.1 | 148 | 45 | 65.2 | 93.8 | 53.6 | 66.4 | 84.9 | 43.0 | 53.7 | 67.9 | 65.0 |
| 06015500 | 22.2 | 36.1 | 48.0 | 30.7 | 39.8 | 49.7 | 20.2 | 25.8 | 38.8 | 16.0 | 20.8 | 30.3 | 15.7 | 24.7 | 32.9 | 23.9 | 33.3 | 54.1 | 48.0 | 69.8 | 96.1 | 51.3 | 87.3 | 169 | 42.5 | 107 | 235 | 15.5 | 29.6 | 60.3 | 9.0 | 20.1 | 41.0 | 8.3 | 15.1 | 29.5 | 51.5 |
| 06019500 | 103 | 120 | 143 | 108 | 122 | 139 | 97.7 | 110 | 124 | 90.1 | 103 | 117 | 91.0 | 102 | 114 | 93.6 | 106 | 122 | 112 | 141 | 206 | 224 | 358 | 598 | 233 | 418 | 706 | 110 | 165 | 267 | 89.7 | 117 | 151 | 91.1 | 111 | 144 | 183 |
| 13108500 | 19.3 | 23.6 | 38.0 | 21.0 | 30.4 | 38.3 | 16.8 | 24.2 | 30.3 | 13.2 | 19.0 | 25.0 | 13.2 | 19.6 | 25.9 | 12.2 | 19.6 | 31.0 | 34.8 | 95.8 | 320 | 144 | 266 | 509 | 60.2 | 150 | 331 | 22.1 | 36.0 | 62.6 | 14.1 | 21.7 | 34.2 | 13.9 | 19.6 | 34.2 | 86.6 |
| 13112000 | 0 | 0.6 | 10.9 | 0.1 | 2.8 | 13.8 | 0.1 | 2.1 | 9.3 | 0 | 2.1 | 7.5 | 0 | 1.8 | 8.0 | 0.2 | 3.6 | 12.5 | 11.0 | 46.2 | 145 | 40.5 | 124 | 336 | 7.9 | 60.5 | 198 | 0 | 7.1 | 25.3 | 0 | 0.1 | 10.7 | 0 | 0.1 | 7.3 | 37.8 |
| 13113000 | 7.2 | 17.8 | 26.8 | 10.3 | 16.6 | 25.0 | 7.3 | 13.8 | 20.7 | 7.1 | 13.1 | 19.1 | 7.3 | 13.7 | 20.4 | 11.1 | 19.8 | 28.9 | 30.7 | 69.8 | 135 | 43.1 | 83.3 | 145 | 24.7 | 51.3 | 109 | 8.0 | 19.1 | 43.9 | 3.6 | 11.7 | 25.2 | 4.3 | 10.5 | 24.2 | 35.7 |
| 13113500 | 0 | 0.1 | 15.0 | 0 | 0.1 | 18.4 | 0 | 0.4 | 13.2 | 0 | 0.1 | 11.5 | 0 | 0.8 | 14.4 | 0.1 | 5.9 | 19.4 | 9.6 | 40.5 | 104 | 11.5 | 52.2 | 143 | 0.2 | 30.5 | 108 | 0.1 | 4.2 | 26.9 | 0 | 0 | 13.3 | 0 | 0.1 | 12.4 | 21.6 |
| 13117300 | 16.4 | 21.5 | 27.9 | 15.6 | 18.6 | 24.0 | 13.8 | 16.0 | 19.3 | 13.9 | 16.2 | 19.4 | 14.7 | 17.2 | 19.7 | 14.0 | 16.9 | 23.2 | 17.9 | 24.4 | 46.3 | 56.4 | 117 | 235 | 82.5 | 192 | 297 | 33.9 | 52.0 | 80.3 | 19.1 | 28.3 | 35.5 | 16.8 | 23.5 | 29.6 | 50.3 |
| 13120000 | 29.5 | 37.7 | 48.6 | 23.9 | 30.5 | 36.9 | 20.8 | 24.7 | 29.6 | 19.3 | 23.0 | 27.5 | 18.5 | 21.2 | 24.5 | 17.8 | 20.8 | 25.5 | 25.3 | 43.6 | 89.6 | 113 | 226 | 417 | 236 | 378 | 592 | 93.4 | 170 | 296 | 44.8 | 64.0 | 97.9 | 33.3 | 43.4 | 59.1 | 105 |
| 13120500 | 88.1 | 123 | 160 | 76.9 | 103 | 127 | 65.8 | 83.3 | 104 | 64.3 | 78.9 | 97.8 | 63.4 | 75.6 | 89.4 | 64.7 | 76.3 | 92.8 | 80.5 | 132 | 258 | 329 | 628 | 1140 | 629 | 1130 | 1780 | 249 | 491 | 900 | 120 | 194 | 302 | 93.4 | 136 | 186 | 323 |
| 13128900 | 8.6 | 11.3 | 15.0 | 7.1 | 8.1 | 11.1 | 5.5 | 6.6 | 7.7 | 4.5 | 5.6 | 7.3 | 3.8 | 4.8 | 6.9 | 3.1 | 4.3 | 5.6 | 2.8 | 4.1 | 7.2 | 9.6 | 23.2 | 58.4 | 45.5 | 75.2 | 121 | 32.8 | 48.7 | 69.3 | 17.1 | 20.8 | 31.4 | 11.3 | 14.6 | 20.0 | 22.0 |
| 13297330 | 3.6 | 4.8 | 6.5 | 3.4 | 4.6 | 6.4 | 3.3 | 4.1 | 5.4 | 3.1 | 3.8 | 5.3 | 3.2 | 3.9 | 5.7 | 4.1 | 6.2 | 11.1 | 9.0 | 18.5 | 39.0 | 26.6 | 51.1 | 94.9 | 20.2 | 50.3 | 95.7 | 7.1 | 14.3 | 27.4 | 4.2 | 6.9 | 9.7 | 3.5 | 5.2 | 6.6 | 18.0 |
| 13297350 | 0.2 | 0.3 | 0.6 | 0.2 | 0.3 | 0.5 | 0.2 | 0.3 | 0.4 | 0.2 | 0.3 | 0.4 | 0.2 | 0.3 | 0.5 | 0.2 | 0.4 | 0.6 | 0.4 | 0.7 | 1.7 | 0.6 | 3.1 | 7.6 | 0.4 | 3.4 | 9.4 | 0.3 | 0.8 | 2.1 | 0.2 | 0.4 | 0.8 | 0.2 | 0.3 | 0.6 | 1.2 |
| 13297355 | 7.4 | 11.6 | 15.0 | 7.4 | 11.2 | 15.2 | 7.5 | 9.6 | 14.8 | 7.2 | 9.0 | 14.1 | 7.1 | 9.5 | 14.2 | 9.9 | 13.8 | 19.8 | 18.7 | 33.1 | 62.8 | 46.9 | 94.1 | 172 | 36.4 | 105 | 217 | 12.7 | 28.1 | 55.5 | 7.5 | 13.8 | 20.4 | 6.9 | 11.8 | 15.4 | 35.3 |
| 13297450 | 6.3 | 9.1 | 12.3 | 5.7 | 7.8 | 9.9 | 5.3 | 6.8 | 8.2 | 4.7 | 5.9 | 7.4 | 4.3 | 5.3 | 7.1 | 4.5 | 5.3 | 7.0 | 5.5 | 6.7 | 11.3 | 13.5 | 27.5 | 53.8 | 44.7 | 76.4 | 124 | 28.0 | 58.3 | 92.2 | 11.6 | 19.2 | 32.7 | 7.4 | 12.1 | 16.1 | 22.5 |
| 13298000 | 84.9 | 108 | 154 | 80.3 | 98.6 | 129 | 61.8 | 82.7 | 109 | 60.3 | 74.7 | 100 | 65.3 | 77.0 | 93.2 | 71.0 | 81.5 | 102 | 84.4 | 112 | 183 | 192 | 344 | 612 | 419 | 753 | 1260 | 175 | 323 | 675 | 98.0 | 148 | 246 | 77.0 | 106 | 160 | 231 |
| 13299000 | 19.3 | 22.4 | 25.9 | 16.2 | 19.6 | 22.0 | 12.3 | 15.3 | 17.8 | 9.7 | 13.2 | 15.9 | 9.6 | 12.6 | 15.1 | 9.7 | 13.4 | 16.1 | 14.6 | 21.5 | 40.9 | 50.1 | 88.4 | 160 | 98.4 | 143 | 201 | 48.1 | 60.7 | 82.8 | 29.6 | 38.5 | 48.4 | 21.2 | 25.7 | 32.0 | 43.9 |
| 13302500 | 1000 | 1270 | 1540 | 1100 | 1310 | 1510 | 924 | 1150 | 1360 | 890 | 1060 | 1260 | 921 | 1090 | 1230 | 969 | 1110 | 1250 | 1100 | 1410 | 2150 | 2130 | 3250 | 5660 | 3110 | 5370 | 8160 | 1300 | 2350 | 3940 | 753 | 1210 | 1630 | 783 | 1070 | 1360 | 1960 |
| 13305000 | 196 | 252 | 319 | 227 | 272 | 331 | 200 | 231 | 275 | 188 | 222 | 266 | 199 | 232 | 275 | 214 | 254 | 291 | 199 | 259 | 313 | 162 | 255 | 407 | 288 | 485 | 826 | 143 | 246 | 410 | 90.1 | 142 | 201 | 99.4 | 154 | 224 | 272 |
| 13305500 | 174 | 229 | 302 | 222 | 266 | 312 | 177 | 218 | 260 | 167 | 202 | 242 | 186 | 210 | 256 | 197 | 233 | 271 | 203 | 246 | 337 | 118 | 251 | 419 | 193 | 480 | 922 | 42 | 126 | 302 | 29.4 | 51.9 | 98.1 | 50.2 | 109 | 185 | 246 |

**Appendix B. Monthly and annual streamflow statistics for selected streamflow-gaging stations**--Continued

| Gaging station number | Oct | | | Nov | | | Dec | | | Jan | | | Feb | | | Mar | | | Apr | | | May | | | June | | | July | | | Aug | | | Sept | | | Qa |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | Q.80 | Q.50 | Q.20 | |
| Region 6--Continued | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13306000 | 30.8 | 39.8 | 45.8 | 35.3 | 42.1 | 47.4 | 29.6 | 37.5 | 44.4 | 30.2 | 33.8 | 40.6 | 30.5 | 35.2 | 38.4 | 35.5 | 39.9 | 49.7 | 48.7 | 87.6 | 192 | 183 | 279 | 404 | 127 | 216 | 351 | 46.4 | 67.0 | 111 | 27.1 | 38.1 | 48.2 | 27.2 | 35.1 | 40.7 | 90.4 |
| 13306500 | 90.8 | 104 | 126 | 81.4 | 101 | 116 | 72.8 | 87.3 | 103 | 68.7 | 82.4 | 94.5 | 72.3 | 79.0 | 92.4 | 73.6 | 85.2 | 98.4 | 102 | 146 | 276 | 313 | 588 | 1220 | 484 | 880 | 1520 | 173 | 263 | 427 | 105 | 134 | 173 | 92.3 | 106 | 129 | 258 |
| 13307000 | 1630 | 1940 | 2300 | 1780 | 2020 | 2240 | 1550 | 1800 | 2010 | 1440 | 1670 | 1920 | 1520 | 1680 | 1870 | 1530 | 1680 | 1920 | 1620 | 2090 | 3340 | 3100 | 5270 | 9360 | 5620 | 8580 | 12300 | 2170 | 3530 | 5510 | 1290 | 1650 | 2250 | 1300 | 1580 | 1990 | 3040 |
| Region 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10119000 | 11.9 | 14.5 | 16.5 | 12.3 | 14.5 | 16.8 | 12.5 | 14.3 | 17.0 | 12.5 | 14.6 | 17.1 | 12.8 | 15.6 | 19.2 | 14.2 | 18.0 | 24.1 | 16.6 | 20.2 | 27.1 | 16.1 | 19.7 | 23.7 | 14.6 | 17.8 | 21.3 | 14.1 | 15.9 | 18.5 | 12.7 | 14.6 | 17.1 | 12.5 | 14.3 | 16.0 | 16.8 |
| 10172940 | 0.2 | 0.3 | 0.7 | 0.2 | 0.4 | 0.6 | 0.2 | 0.3 | 0.5 | 0.2 | 0.2 | 0.7 | 0.2 | 0.4 | 0.8 | 0.3 | 0.6 | 1.2 | 0.3 | 0.9 | 2.4 | 0.6 | 1.1 | 4.7 | 0.4 | 0.9 | 1.9 | 0.2 | 0.4 | 1.0 | 0.1 | 0.2 | 0.6 | 0.2 | 0.3 | 0.6 | 0.99 |
| 10315500 | 1.8 | 3.0 | 9.2 | 4.0 | 9.6 | 19.4 | 8.1 | 13.0 | 21.9 | 8.8 | 14.4 | 26.7 | 14.9 | 24.1 | 45.7 | 31.0 | 56.9 | 102 | 66.8 | 131 | 261 | 95.3 | 216 | 376 | 43.3 | 126 | 263 | 3.8 | 14.6 | 44 | 1.0 | 1.8 | 5.4 | 0.9 | 1.6 | 2.5 | 65.9 |
| 10329500 | 6.3 | 7.2 | 8.9 | 6.8 | 9.0 | 11.3 | 7.2 | 9.2 | 12.4 | 7.4 | 9.9 | 14.0 | 9.2 | 13.7 | 30.6 | 15.6 | 30.2 | 83.4 | 32.1 | 67.1 | 131 | 42.7 | 93.3 | 165 | 16.4 | 40.8 | 86.7 | 5.3 | 7.9 | 16.4 | 4.8 | 5.2 | 6.6 | 5.1 | 5.8 | 6.9 | 35.1 |
| 10352500 | 2.3 | 3.7 | 6.4 | 4.5 | 6.2 | 8.7 | 4.8 | 7.4 | 12.4 | 5.4 | 8.7 | 18.7 | 8.4 | 18.1 | 42.4 | 12.8 | 36.1 | 132 | 15.5 | 64.2 | 148 | 19.0 | 57.5 | 116 | 8.5 | 24.7 | 56.1 | 2.2 | 6.6 | 15.6 | 0.5 | 1.9 | 4.7 | 0.5 | 2.2 | 3.5 | 33.4 |
| 10353000 | 2.4 | 3.2 | 4.2 | 3.4 | 4.6 | 6.3 | 3.6 | 5.4 | 9.2 | 4.0 | 6.2 | 19.0 | 6.8 | 14.4 | 29.5 | 12.6 | 26.5 | 72.0 | 25.4 | 70.5 | 133 | 18.6 | 53.4 | 95.0 | 6.7 | 15.8 | 33.2 | 1.4 | 3.2 | 6.7 | 1.0 | 1.6 | 2.7 | 1.0 | 1.7 | 3.0 | 25.9 |
| 10396000 | 34 | 43.8 | 52.4 | 35.6 | 46.3 | 57.5 | 33.0 | 45.4 | 59.6 | 33.6 | 45.5 | 71.9 | 39.6 | 53.4 | 102 | 53.1 | 92.9 | 212 | 112 | 191 | 308 | 205 | 339 | 523 | 142 | 250 | 403 | 48.8 | 80.3 | 136 | 32.9 | 46.3 | 60.9 | 32.3 | 42.0 | 52.0 | 128 |
| 10406500 | 3.4 | 5.1 | 6.1 | 4.3 | 5.9 | 7.7 | 4.4 | 5.5 | 7.7 | 4.0 | 5.8 | 8.5 | 4.7 | 6.8 | 10.9 | 5.7 | 9.3 | 19.4 | 12.8 | 25.4 | 51.7 | 24.4 | 52.5 | 94.0 | 10.0 | 25.6 | 51.8 | 3 | 7.7 | 15.2 | 1.6 | 3.0 | 4.9 | 1.7 | 3.1 | 4.9 | 16.1 |
| 13057940 | 21.7 | 38.3 | 60.6 | 25.9 | 43.1 | 63.0 | 25.0 | 42.4 | 59 | 26.6 | 39.9 | 56.4 | 31.8 | 45.8 | 61.3 | 49.9 | 67.4 | 127 | 123 | 238 | 532 | 115 | 403 | 726 | 48.4 | 153 | 340 | 15.4 | 54.3 | 119 | 11.6 | 34.1 | 66.4 | 14.1 | 24.9 | 54.2 | 125 |
| 13075000 | 62.2 | 75.5 | 95.2 | 64.2 | 78.6 | 100 | 60.9 | 75.1 | 97.6 | 59 | 74.6 | 96.5 | 65.7 | 87.9 | 122 | 77.7 | 105 | 156 | 70.4 | 98.1 | 151 | 54.0 | 90.2 | 165 | 45.6 | 69.4 | 109 | 36.8 | 49.9 | 70.0 | 39.5 | 54.9 | 72.1 | 53.4 | 68.5 | 87 | 87.1 |
| 13083000 | 9.4 | 11.2 | 12.9 | 9.9 | 11.7 | 13.3 | 9.6 | 11.8 | 13.6 | 9.4 | 11.5 | 13.9 | 10.5 | 12.2 | 14.7 | 11.7 | 14.2 | 18.1 | 14.2 | 19.1 | 28.9 | 17.3 | 29.7 | 44.1 | 12.3 | 19.7 | 29.5 | 9.0 | 12.0 | 15.8 | 8.2 | 9.8 | 12.3 | 8.6 | 9.9 | 12.2 | 15.2 |
| 13092000 | 8.1 | 9.6 | 12.2 | 9.5 | 11.5 | 13.9 | 9.7 | 12.4 | 16.0 | 9.7 | 12.9 | 18.9 | 12.0 | 16.0 | 23.6 | 14.9 | 21.7 | 36.7 | 36.1 | 66.2 | 123 | 58 | 111 | 199 | 24.0 | 44.9 | 83.3 | 9.5 | 15.7 | 23.6 | 6.3 | 8.5 | 11.5 | 6.4 | 8.2 | 9.9 | 34.5 |
| 13154000 | 2.2 | 2.8 | 3.6 | 3.2 | 3.8 | 5.4 | 3.6 | 4.9 | 14.4 | 5.0 | 7.0 | 11.7 | 8.3 | 24.6 | 89.4 | 20 | 61.3 | 171 | 10.4 | 31.8 | 87.0 | 2.1 | 5.8 | 17.1 | 0.8 | 2.3 | 7.4 | 0.1 | 0.7 | 1.3 | 0.3 | 0.7 | 1.1 | 0.5 | 0.9 | 2.0 | 29.9 |
| 13155300 | 0.6 | 1.2 | 1.6 | 0.8 | 1.2 | 1.5 | 0.9 | 1.2 | 2.0 | 1.2 | 2.2 | 11.3 | 1.6 | 5.5 | 18.1 | 5.7 | 10.0 | 17.5 | 11.3 | 16.8 | 51.0 | 8.1 | 26.9 | 57.2 | 2.5 | 8.1 | 14.5 | 0.6 | 2.7 | 4.2 | 0.3 | 0.9 | 1.8 | 0.3 | 0.8 | 1.5 | 10.9 |
| 13162500 | 7.9 | 10.9 | 15.3 | 8.5 | 11.0 | 14.3 | 8.1 | 9.9 | 13.2 | 7.8 | 9.3 | 12.9 | 8.5 | 11.1 | 20.9 | 11.9 | 18.5 | 27.4 | 33.1 | 56.9 | 96.7 | 106 | 176 | 312 | 116 | 236 | 376 | 24.4 | 55.1 | 122 | 9.9 | 17.5 | 28.7 | 7.6 | 10.5 | 17.7 | 60.8 |
| 13169500 | 0 | 0 | 1.5 | 0 | 0 | 1.7 | 0 | 0 | 0.6 | 0 | 0 | 1 | 0 | 0 | 5.5 | 0 | 2.3 | 30.0 | 0 | 3.3 | 21.1 | 0 | 1.5 | 12.0 | 0 | 0 | 5.8 | 0 | 0 | 2.5 | 0 | 0 | 1.2 | 0 | 0 | 1.1 | 5.3 |
| 13170000 | 0.1 | 0.2 | 0.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0.1 | 0 | 0.1 | 0.3 | 0 | 0.1 | 2.6 | 0 | 0.1 | 1.9 | 0 | 0.1 | 0.2 | 0 | 0.1 | 0.1 | 0 | 0.1 | 0.1 | 0.1 | 0.3 | 0.5 | 0 | 0.1 | 0.1 | 0.8 |
| 13172680 | 0.5 | 1.4 | 2.1 | 1.3 | 2.0 | 3.4 | 1.5 | 2.3 | 5.6 | 1.7 | 3.2 | 9.7 | 2.2 | 5.5 | 13.4 | 5.3 | 11.3 | 37.4 | 12.9 | 35.2 | 62.9 | 18.5 | 58.3 | 94.1 | 5.9 | 18.6 | 42.2 | 0.8 | 3.0 | 7.3 | 0 | 0.8 | 2.0 | 0 | 0.6 | 1.5 | 15.9 |
| 13172720 | 0 | 0 | 0.2 | 0 | 0.2 | 0.7 | 0.1 | 0.5 | 1.7 | 0.5 | 1.2 | 4.7 | 0.8 | 2.5 | 6.1 | 1.6 | 4.0 | 13.5 | 1.2 | 4.4 | 10.8 | 0.6 | 1.5 | 3.3 | 0.2 | 0.6 | 1.2 | 0 | 0.1 | 0.3 | 0 | 0 | 0.1 | 0 | 0 | 0.1 | 2.67 |
| 13172735 | 0.1 | 0.3 | 0.9 | 0.3 | 0.7 | 1.3 | 0.7 | 1.3 | 2.9 | 1.0 | 2.1 | 5.2 | 1.4 | 3.2 | 7.0 | 2.2 | 4.8 | 11.3 | 2.2 | 5.4 | 10.1 | 1.4 | 3.0 | 5.6 | 0.5 | 1.3 | 2.3 | 0 | 0.2 | 0.7 | 0 | 0 | 0.2 | 0 | 0.1 | 0.3 | 3.13 |
| 13172740 | 0.8 | 1.3 | 3.7 | 1.0 | 2.6 | 5.5 | 2.2 | 3.8 | 11.8 | 3.0 | 6.9 | 27.4 | 4.4 | 12.6 | 34.4 | 6.6 | 21.0 | 67.1 | 8.3 | 37.0 | 81.2 | 10.6 | 46 | 85.6 | 5.4 | 17 | 36.6 | 1.4 | 3.0 | 6.0 | 0.7 | 1.6 | 3.3 | 0.6 | 1.2 | 2.4 | 21.0 |
| 13176000 | 16.5 | 26.3 | 41.8 | 18.5 | 25.4 | 37 | 17.6 | 24.3 | 41.8 | 18.3 | 30.4 | 67.7 | 25.2 | 46.1 | 104 | 41.6 | 94.0 | 212 | 130 | 292 | 648 | 197 | 423 | 717 | 140 | 207 | 330 | 71.1 | 102 | 158 | 47.5 | 92.6 | 120 | 16.5 | 47.2 | 86.6 | 149 |
| 13178000 | 3.3 | 9.2 | 18.6 | 14.8 | 21.1 | 32 | 17.6 | 27.9 | 53.5 | 20 | 34.7 | 161 | 35.6 | 96.5 | 266 | 90.8 | 181 | 395 | 295 | 602 | 1160 | 234 | 506 | 938 | 58.3 | 147 | 290 | 6.2 | 15.5 | 45 | 1.9 | 3.9 | 6.8 | 1.9 | 3.2 | 5.8 | 195 |
| 13211309 | 32.5 | 43.5 | 56.8 | 31.7 | 37 | 45.3 | 28.0 | 33.2 | 38.3 | 24.3 | 29.5 | 33.1 | 21.9 | 26.3 | 32.2 | 23.3 | 26.8 | 34.0 | 31.7 | 46.7 | 67.9 | 37.3 | 47.2 | 70.2 | 37.9 | 49.8 | 66.8 | 35.3 | 47.1 | 63.4 | 34.8 | 48.1 | 61.6 | 37 | 54.7 | 72.4 | 40.3 |
| 13226500 | 2.1 | 3.8 | 9.4 | 3.6 | 7.3 | 12.6 | 5.6 | 10.5 | 28.2 | 8.0 | 18.5 | 77.6 | 15.4 | 55.8 | 157 | 36.4 | 93.8 | 278 | 7.5 | 48.0 | 225 | 3.1 | 11.3 | 39.0 | 3.0 | 7.1 | 20.4 | 0.8 | 2.5 | 7.5 | 0.6 | 2.0 | 3.6 | 1.0 | 2.0 | 4.7 | 54.8 |
| Region 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 06037500 | 358 | 422 | 500 | 365 | 417 | 484 | 352 | 415 | 467 | 347 | 403 | 455 | 352 | 396 | 438 | 360 | 402 | 449 | 403 | 461 | 584 | 583 | 789 | 1100 | 516 | 767 | 1090 | 381 | 474 | 611 | 357 | 427 | 506 | 357 | 417 | 499 | 501 |
| 09223000 | 16.4 | 21.0 | 27.4 | 15.1 | 19.5 | 24.7 | 12.8 | 15.9 | 21.0 | 11.5 | 14.7 | 19.1 | 11.5 | 15.4 | 19.7 | 14.4 | 19.2 | 25.2 | 32.3 | 65.2 | 153 | 177 | 353 | 667 | 148 | 340 | 633 | 39.0 | 74.6 | 140 | 17.3 | 27.4 | 44.2 | 14.3 | 20.5 | 28.5 | 100 |
| 10015700 | 0.2 | 0.9 | 6.6 | 0.6 | 3.2 | 8.7 | 1.0 | 3.5 | 7.7 | 1.5 | 3.7 | 7.3 | 2.4 | 4.4 | 7.7 | 3.5 | 8.4 | 28.4 | 15.8 | 36.7 | 76.2 | 19.2 | 53.0 | 117 | 5.0 | 18.1 | 49.4 | 0.4 | 3.2 | 11.5 | 0.1 | 0.4 | 4.2 | 0 | 0.4 | 2.3 | 17.9 |
| 10040000 | 3.0 | 4.5 | 5.5 | 2.6 | 4.1 | 4.9 | 2.1 | 3.5 | 4.5 | 2.1 | 3.0 | 4.2 | 2.0 | 2.6 | 3.7 | 2.4 | 3.3 | 5.1 | 9.5 | 23.3 | 76.1 | 26.0 | 52.6 | 106 | 17.8 | 31.1 | 44.8 | 6.7 | 12.0 | 17.5 | 3.6 | 6.0 | 8.5 | 3.2 | 4.4 | 5.7 | 17.2 |
| 10041000 | 13.1 | 17.8 | 23.9 | 12.7 | 16.6 | 21.0 | 11.4 | 15.3 | 19.0 | 11.5 | 14.8 | 18.1 | 12.4 | 14.8 | 17.9 | 13.7 | 16.6 | 23.9 | 28.1 | 54.8 | 149 | 74.5 | 192 | 434 | 45.1 | 87.6 | 157 | 22 | 39.9 | 65.1 | 14.3 | 23.0 | 35.9 | 11.9 | 18.4 | 26.9 | 54.6 |
| 10058600 | 18.2 | 21.1 | 24.9 | 16.8 | 18.9 | 22.5 | 16.1 | 17.5 | 20.7 | 14.5 | 16.5 | 19.2 | 14.2 | 16.1 | 18.4 | 14.5 | 16.4 | 19.1 | 17.8 | 23.5 | 36.7 | 32.6 | 61.3 | 91.2 | 37.9 | 73.9 | 125 | 25.5 | 37.5 | 61.9 | 21.0 | 27.3 | 37.7 | 19.3 | 23.2 | 30.6 | 31.3 |
| 10077000 | 48.5 | 58.4 | 67.9 | 49.5 | 58.6 | 68.6 | 48.1 | 54.2 | 60.9 | 44.3 | 49.6 | 60.1 | 46 | 49.8 | 58.0 | 47.0 | 54.1 | 68.3 | 61.2 | 76.4 | 121 | 59.4 | 71.3 | 88.2 | 54.6 | 64.3 | 74.3 | 52.3 | 62.4 | 73.5 | 48.9 | 55.9 | 74.8 | 49.2 | 57.1 | 74.3 | 61.5 |
| 10093000 | 25.4 | 28.9 | 32.6 | 22.3 | 25.5 | 28.4 | 19.7 | 22.8 | 26.8 | 18.3 | 20.5 | 25.6 | 17.3 | 20.1 | 26.4 | 20.1 | 25.6 | 37.5 | 37.3 | 67.4 | 111 | 140 | 276 | 461 | 173 | 324 | 546 | 59.5 | 89.8 | 156 | 38.3 | 48.2 | 63.8 | 30.2 | 34.9 | 43.3 | 91.7 |
| 10096000 | 3.0 | 4.5 | 16.5 | 3.4 | 4.6 | 15.7 | 9.2 | 15.9 | 31.2 | 15.2 | 26.5 | 33.4 | 22.4 | 28.8 | 34.7 | 23.3 | 35.5 | 59.5 | 68.4 | 136 | 216 | 161 | 251 | 411 | 7.6 | 122 | 287 | 2.4 | 3.6 | 5.2 | 1.9 | 2.8 | 4.4 | 2.1 | 2.9 | 5.2 | 64.8 |
| 10099000 | 9.4 | 11.4 | 14.5 | 8.1 | 11.3 | 14 | 8.0 | 9.2 | 13.1 | 6.9 | 9.0 | 12.4 | 6.8 | 10.5 | 14.5 | 9.1 | 15.6 | 24.9 | 24.2 | 47.2 | 65.7 | 73.6 | 116 | 174 | 70.9 | 124 | 171 | 25.9 | 39.1 | 64.5 | 14.2 | 18.0 | 25.4 | 10.1 | 12.4 | 15.8 | 36.9 |
| 13010065 | 262 | 361 | 433 | 257 | 362 | 454 | 296 | 359 | 446 | 292 | 339 | 422 | 288 | 349 | 424 | 310 | 355 | 402 | 382 | 526 | 960 | 1370 | 2680 | 4580 | 1210 | 3020 | 5040 | 453 | 786 | 1400 | 274 | 438 | 610 | 262 | 358 | 465 | 929 |
| 13011500 | 50 | 61.2 | 79.2 | 42.2 | 52.8 | 65.3 | 37.3 | 47.2 | 58.7 | 34.9 | 44.8 | 55.7 | 36.7 | 46.1 | 55.6 | 41.9 | 50.4 | 62.5 | 59.9 | 94.0 | 210 | 421 | 872 | 1470 | 679 | 1180 | 1860 | 131 | 236 | 514 | 67.8 | 90.1 | 130 | 56.0 | 69.1 | 87.3 | 272 |
| 13011900 | 171 | 215 | 261 | 144 | 172 | 200 | 120 | 140 | 161 | 106 | 122 | 141 | 104 | 117 | 129 | 110 | 123 | 142 | 133 | 182 | 284 | 391 | 866 | 1610 | 1400 | 2140 | 3170 | 525 | 1180 | 2250 | 256 | 381 | 589 | 188 | 257 | 327 | 550 |
| 13012000 | 186 | 213 | 272 | 157 | 178 | 208 | 130 | 154 | 172 | 121 | 133 | 152 | 121 | 130 | 150 | 121 | 140 | 150 | 153 | 202 | 350 | 565 | 1050 | 1870 | 1570 | 2320 | 3350 | 732 | 1370 | 2150 | 300 | 410 | 596 | 212 | 266 | 336 | 597 |
| 13014500 | 174 | 207 | 236 | 158 | 178 | 204 | 142 | 160 | 184 | 138 | 148 | 165 | 135 | 144 | 161 | 136 | 145 | 161 | 156 | 196 | 373 | 556 | 1070 | 1960 | 1060 | 1620 | 2450 | 395 | 740 | 1210 | 195 | 266 | 394 | 174 | 215 | 266 | 475 |
| 13019438 | 5.5 | 7.3 | 11.3 | 5.2 | 6.7 | 9.3 | 4.6 | 5.6 | 7.6 | 3.8 | 4.9 | 6.5 | 3.9 | 5.1 | 6.3 | 4.8 | 6.6 | 8.9 | 12.1 | 28.1 | 56.8 | 58.9 | 86.9 | 168 | 40.0 | 90.7 | 188 | 18.4 | 28.5 | 49.1 | 9.8 | 14.7 | 20.9 | 6.7 | 9.1 | 14.2 | 29.5 |
| 13019500 | 238 | 264 | 308 | 200 | 229 | 258 | 178 | 204 | 237 | 177 | 193 | 220 | 171 | 190 | 207 | 166 | 187 | 208 | 221 | 364 | 1100 | 1200 | 2050 | 2870 | 1600 | 2170 | 3010 | 696 | 1110 | 1710 | 367 | 474 | 628 | 259 | 320 | 384 | 706 |
| 13023000 | 251 | 309 | 387 | 220 | 262 | 320 | 186 | 226 | 271 | 177 | 209 | 256 | 176 | 202 | 236 | 184 | 215 | 262 | 297 | 488 | 928 | 1090 | 1700 | 2460 | 1180 | 1960 | 2790 | 523 | 843 | 1380 | 343 | 469 | 632 | 279 | 367 | 459 | 654 |
| 13024000 | 6.8 | 10.3 | 13.2 | 5.7 | 8.4 | 11.9 | 4.8 | 7.5 | 9.1 | 4.0 | 6.4 | 9.2 | 3.8 | 5.9 | 9.1 | 6.0 | 7.8 | 9.6 | 10.3 | 21.3 | 66.6 | 79.4 | 129 | 197 | 73.1 | 127 | 188 | 22.9 | 36.9 | 64.5 | 12.1 | 16.6 | 23.2 | 7.8 | 12.1 | 15.2 | 36.2 |
| 13024500 | 20.2 | 23.1 | 27.0 | 16.8 | 19.3 | 22.4 | 15.2 | 17.3 | 19.5 | 13.6 | 15.4 | 17.5 | 12.3 | 14.1 | 16.2 | 11.7 | 13.4 | 15.3 | 14.6 | 18.8 | 32.2 | 38.3 | 69.8 | 128 | 101 | 157 | 215 | 55.6 | 77.4 | 114 | 33.8 | 43.8 | 56.4 | 24.3 | 28.8 | 35.6 | 44.5 |
| 13025000 | 44.7 | 49.5 | 55.7 | 39.5 | 44.4 | 49.1 | 36.5 | 39.8 | 44.7 | 34.3 | 37.4 | 41.9 | 32.4 | 35.5 | 38.5 | 32.2 | 34.8 | 37.4 | 35.3 | 40.9 | 49.9 | 58.0 | 103 | 189 | 198 | 277 | 378 | 110 | 173 | 280 | 66.7 | 80.4 | 106 | 50.9 | 60.4 | 69.1 | 86.9 |
| 13027000 | 42.4 | 46.0 | 50.0 | 36.5 | 41.5 | 45.4 | 32.8 | 37.8 | 40.9 | 30.9 | 34.4 | 36.3 | 28.9 | 32.1 | 34.6 | 27.4 | 30.6 | 32.1 | 29.4 | 38.4 | 58.1 | 63.2 | 95.6 | 141 | 110 | 148 | 213 | 71.7 | 87.7 | 124 | 59.3 | 67.5 | 81.7 | 48.0 | 55.8 | 63.4 | 62.4 |
| 13032000 | 24.9 | 28.4 | 32.2 | 22.3 | 25.1 | 28.9 | 19.8 | 22.7 | 26.6 | 18.1 | 21.5 | 26.7 | 16.9 | 20.8 | 28.2 | 18.8 | 24.0 | 30.9 | 46.2 | 90.0 | 176 | 177 | 291 | 460 | 109 | 176 | 267 | 51.7 | 72.4 | 105 | 34.3 | 42.9 | 54.3 | 27.0 | 33.2 | 39.1 | 78.2 |
| 13044500 | 196 | 215 | 230 | 187 | 208 | 230 | 179 | 200 | 219 | 181 | 199 | 215 | 184 | 198 | 215 | 179 | 198 | 216 | 197 | 221 | 298 | 237 | 335 | 461 | 209 | 269 | 339 | 201 | 229 | 252 | 200 | 216 | 235 | 198 | 216 | 233 | 229 |
| 13045500 | 63.8 | 77.6 | 99.8 | 61.0 | 76.1 | 96.9 | 55.3 | 71.2 | 87.7 | 51.2 | 65.0 | 75.3 | 52.4 | 61.7 | 72.0 | 54.5 | 66.2 | 82.0 | 84.2 | 121 | 262 | 215 | 411 | 605 | 96.0 | 196 | 315 | 67.4 | 98.0 | 122 | 65.4 | 82.7 | 100 | 60.2 | 77.2 | 99.8 | 124 |
| 13046680 | 65.5 | 83.4 | 97.4 | 67.4 | 79.8 | 96.9 | 64.4 | 78.0 | 93.1 | 61.6 | 73.5 | 85.2 | 60.9 | 69.8 | 82.4 | 62.6 | 69.2 | 82.6 | 74.7 | 98.0 | 168 | 160 | 248 | 403 | 94.0 | 247 | 336 | 71.6 | 98.5 | 129 | 66.7 | 86.9 | 105 | 64.6 | 82.4 | 101 | 116 |
| 13047500 | 391 | 483 | 572 | 385 | 470 | 546 | 353 | 438 | 499 | 332 | 406 | 457 | 343 | 389 | 435 | 352 | 391 | 434 | 411 | 522 | 913 | 1200 | 1830 | 2550 | 1360 | 2110 | 2920 | 484 | 691 | 1230 | 409 | 521 | 686 | 393 | 497 | 620 | 768 |
| 13049500 | 311 | 452 | 596 | 423 | 523 | 644 | 431 | 514 | 607 | 410 | 474 | 557 | 414 | 466 | 528 | 419 | 470 | 547 | 501 | 660 | 1180 | 1220 | 1930 | 2770 | 878 | 1810 | 2750 | 82.5 | 239 | 768 | 96.1 | 196 | 373 | 183 | 293 | 449 | 788 |
| 13052200 | 241 | 317 | 390 | 211 | 286 | 345 | 177 | 224 | 277 | 165 | 200 | 246 | 167 | 208 | 252 | 198 | 239 | 332 | 247 | 348 | 452 | 324 | 466 | 678 | 547 | 849 | 1340 | 395 | 688 | 1110 | 272 | 430 | 546 | 234 | 359 | 440 | 411 |
| 13054000 | 279 | 321 | 378 | 257 | 288 | 348 | 198 | 230 | 267 | 177 | 205 | 229 | 181 | 208 | 232 | 177 | 218 | 285 | 267 | 367 | 543 | 270 | 418 | 698 | 520 | 815 | 1100 | 447 | 558 | 745 | 356 | 423 | 521 | 294 | 337 | 413 | 394 |
| 13055000 | 460 | 544 | 656 | 413 | 489 | 579 | 353 | 418 | 480 | 327 | 384 | 439 | 333 | 385 | 448 | 367 | 430 | 541 | 481 | 678 | 1000 | 912 | 1440 | 2310 | 1290 | 1940 | 2970 | 816 | 1070 | 1690 | 622 | 748 | 900 | 518 | 632 | 737 | 843 |

**Appendix C.** Basin characteristics for selected streamflow-gaging stations

[A, drainage area, in square miles; E, mean basin elevation, in feet above sea level; BR, basin relief, in feet; S30, slopes greater than 30 percent, in percent of drainage area; P, mean annual precipitation, in inches; F, forested area, in percent of drainage area; BS, basin slope, in percent; MCS, main channel slope, in feet per mile]

| Gaging station number | A | E | BR | S30 | P | F | BS | MCS |
|---|---|---|---|---|---|---|---|---|
| | | | | **Region 1** | | | | |
| 12305500 | 55.3 | 4686.9 | 4134.8 | 69.4 | 48.3 | 91.9 | 37.1 | 140.1 |
| 12311000 | 133.1 | 3257.0 | 5376.7 | 27.0 | 30.4 | 72.6 | 21.2 | 19.6 |
| 12316800 | 12.5 | 4084.4 | 3178.5 | 33.2 | 29.1 | 94.5 | 25.4 | 265.6 |
| 12320500 | 29.9 | 5347.3 | 5803.1 | 81.4 | 41.3 | 89.5 | 46.4 | 206.9 |
| 12321000 | 71.1 | 5054.2 | 5866.9 | 62.3 | 46.1 | 70.4 | 37.0 | 151.0 |
| 12392155 | 115.1 | 4648.5 | 4844.3 | 71.8 | 54.3 | 82.4 | 43.2 | 128.3 |
| 12392300 | 121.4 | 4280.6 | 5441.4 | 52.4 | 38.1 | 62.6 | 32.2 | 126.9 |
| 12393500 | 596.6 | 3941.3 | 5124.1 | 46.3 | 38.8 | 79.0 | 28.9 | 13.1 |
| 12396000 | 68.2 | 3622.5 | 3731.6 | 51.8 | 36.7 | 79.6 | 30.1 | 96.6 |
| 12408500 | 82.5 | 3520.8 | 3832.5 | 46.2 | 37.7 | 89.4 | 29.6 | 105.0 |
| 12409000 | 1011.0 | 2904.3 | 5308.7 | 29.2 | 27.6 | 76.9 | 22.3 | 11.1 |
| 12427000 | 84.4 | 2459.0 | 2230.6 | 10.4 | 28.2 | 65.2 | 13.2 | 30.4 |
| 12431000 | 634.9 | 2397.7 | 4281.5 | 9.4 | 25.1 | 54.6 | 12.2 | 25.9 |
| | | | | **Region 2** | | | | |
| 12302500 | 23.7 | 5275.3 | 5917.3 | 82.4 | 53.0 | 66.4 | 54.1 | 246.0 |
| 12303100 | 11.3 | 5466.8 | 4788.9 | 71.2 | 52.6 | 76.7 | 48.3 | 466.2 |
| 12303500 | 125.0 | 4069.2 | 5752.5 | 62.8 | 43.9 | 87.3 | 38.5 | 76.9 |
| 12347500 | 26.1 | 6649.7 | 4871.1 | 83.8 | 60.9 | 50.3 | 57.0 | 156.6 |
| 12350500 | 29.0 | 6557.7 | 5711.5 | 89.6 | 55.6 | 60.4 | 58.8 | 289.4 |
| 12354000 | 43.6 | 4843.4 | 4434.8 | 84.6 | 44.5 | 88.3 | 47.2 | 180.4 |
| 12389500 | 641.5 | 4567.1 | 4998.9 | 47.0 | 29.6 | 85.8 | 30.0 | 18.5 |
| 12390700 | 181.5 | 4437.3 | 4349.7 | 79.6 | 43.7 | 93.1 | 43.5 | 79.3 |
| 12411000 | 334.0 | 3947.0 | 3722.1 | 75.6 | 48.2 | 89.7 | 40.8 | 29.8 |
| 12413000 | 893.7 | 3835.9 | 4637.1 | 77.6 | 45.4 | 88.9 | 41.9 | 20.8 |
| 12413140 | 15.0 | 4411.0 | 3461.3 | 88.8 | 41.5 | 94.2 | 49.6 | 217.1 |
| 12413150 | 105.6 | 4615.4 | 4133.8 | 82.3 | 42.5 | 89.8 | 45.8 | 84.2 |
| 12413210 | 181.8 | 4301.2 | 4438.3 | 82.5 | 43.3 | 88.4 | 45.8 | 62.8 |
| 12413470 | 287.1 | 4096.4 | 4605.6 | 80.7 | 45.1 | 83.5 | 44.6 | 50.8 |
| 12413500 | 1207.4 | 3878.0 | 4673.2 | 77.8 | 45.0 | 87.3 | 42.3 | 19.5 |
| 12414500 | 1024.5 | 4545.6 | 5487.6 | 74.4 | 47.0 | 89.8 | 41.3 | 29.2 |
| 12414900 | 272.6 | 3592.6 | 3792.4 | 34.9 | 37.7 | 80.5 | 25.1 | 34.8 |
| 12415000 | 434.5 | 3465.5 | 4214.6 | 31.7 | 35.6 | 82.2 | 23.8 | 26.7 |
| 12416000 | 21.5 | 3564.7 | 3243.5 | 81.2 | 38.8 | 95.1 | 41.8 | 242.0 |
| 13336500 | 1913.1 | 5511.8 | 7789.6 | 75.6 | 40.6 | 82.8 | 44.2 | 39.8 |
| 13336900 | 88.3 | 4467.2 | 4633.9 | 55.7 | 46.3 | 91.3 | 34.7 | 159.2 |
| 13337000 | 1179.4 | 5197.2 | 7331.2 | 63.5 | 46.6 | 88.2 | 38.5 | 43.0 |
| 13340500 | 997.5 | 4888.8 | 5663.4 | 68.1 | 52.5 | 82.1 | 39.0 | 43.1 |
| 13340600 | 1294.2 | 4732.9 | 6182.5 | 69.9 | 51.4 | 82.9 | 40.4 | 34.1 |
| 13341300 | 3.0 | 3716.0 | 1643.9 | 55.6 | 48.1 | 86.8 | 32.0 | 282.7 |
| 13341400 | 42.7 | 3617.2 | 2146.1 | 36.4 | 42.7 | 86.0 | 26.3 | 63.4 |
| | | | | **Region 3** | | | | |
| 12424000 | 674.9 | 2647.1 | 3187.9 | 6.8 | 20.8 | 19.4 | 10.5 | 13.0 |
| 13334700 | 170.5 | 3752.2 | 5098.9 | 57.5 | 23.0 | 30.5 | 35.4 | 121.9 |
| 13345000 | 316.0 | 3165.1 | 2859.7 | 25.8 | 30.1 | 63.4 | 21.2 | 17.4 |
| 13346100 | 491.7 | 2963.6 | 3350.1 | 17.8 | 26.9 | 41.7 | 17.7 | 11.8 |
| 13346800 | 17.6 | 2844.2 | 1801.2 | 6.0 | 24.5 | 12.5 | 11.8 | 32.9 |
| 13348000 | 126.9 | 2745.5 | 2637.5 | 3.3 | 23.8 | 6.9 | 11.9 | 21.4 |
| 13348500 | 27.1 | 2652.2 | 1442.8 | 0.1 | 23.2 | 0.6 | 10.0 | 26.0 |
| 13341500 | 453.7 | 2969.1 | 3849.7 | 17.8 | 29.5 | 59.8 | 18.2 | 46.5 |
| 13342450 | 268.9 | 3149.2 | 4100.8 | 22.2 | 19.3 | 30.7 | 18.9 | 139.3 |
| | | | | **Region 4** | | | | |
| 13196500 | 4.8 | 5313.2 | 2396.4 | 57.4 | 22.1 | 60.4 | 32.9 | 318.3 |
| 13200000 | 397.0 | 5070.8 | 5019.7 | 51.0 | 24.8 | 66.3 | 31.3 | 83.3 |
| 13200500 | 16.0 | 4680.6 | 3410.5 | 70.6 | 23.3 | 65.0 | 39.8 | 317.0 |
| 13201000 | 424.4 | 5024.2 | 5068.8 | 52.0 | 24.5 | 65.0 | 31.7 | 71.8 |
| 13207000 | 19.2 | 4017.4 | 3094.6 | 30.2 | 19.4 | 8.0 | 24.3 | 197.1 |
| 13207500 | 59.4 | 3963.4 | 4310.5 | 34.3 | 20.4 | 11.7 | 25.3 | 162.8 |
| 13216500 | 342.5 | 5360.8 | 4668.1 | 23.2 | 23.8 | 52.7 | 21.6 | 58.1 |
| 13250600 | 55.2 | 4099.3 | 2987.5 | 28.0 | 15.9 | 4.8 | 23.6 | 76.7 |
| 13251300 | 4.0 | 4947.6 | 1821.4 | 41.5 | 39.8 | 81.5 | 27.3 | 328.9 |
| 13251500 | 36.6 | 4654.2 | 1896.9 | 27.1 | 34.6 | 87.8 | 22.3 | 53.8 |
| 13253500 | 105.4 | 4969.7 | 4662.7 | 38.0 | 32.3 | 88.1 | 26.5 | 53.7 |
| 13256000 | 391.9 | 4668.2 | 5242.5 | 32.7 | 29.6 | 64.6 | 24.2 | 41.4 |
| 13257000 | 86.1 | 5430.2 | 5221.5 | 38.3 | 34.0 | 74.1 | 27.4 | 133.0 |
| 13258500 | 596.4 | 4636.5 | 5444.7 | 30.6 | 29.2 | 58.2 | 23.5 | 33.5 |
| 13260000 | 55.3 | 4751.8 | 5035.8 | 37.9 | 22.4 | 42.3 | 26.4 | 240.6 |
| 13261000 | 79.5 | 5313.9 | 4618.1 | 36.5 | 28.2 | 67.1 | 26.9 | 165.2 |
| 13266000 | 1448.3 | 4141.3 | 5874.7 | 22.1 | 22.2 | 32.6 | 19.3 | 26.1 |

**Appendix C.** Basin characteristics for selected streamflow-gaging stations--Continued

| Gaging station number | A | E | BR | S30 | P | F | BS | MCS |
|---|---|---|---|---|---|---|---|---|
| | | | | **Region 4--Continued** | | | | |
| 13267000 | 56.8 | 4846.2 | 4800.2 | 53.4 | 22.1 | 55.4 | 31.6 | 160.9 |
| 13269300 | 110.8 | 4901.1 | 3066.8 | 17.7 | 25.1 | 81.6 | 18.7 | 60.1 |
| 13270800 | 38.9 | 5823.5 | 3427.4 | 42.0 | 28.6 | 91.6 | 28.2 | 220.3 |
| 13275500 | 205.2 | 5224.6 | 5393.4 | 40.8 | 24.7 | 74.5 | 26.5 | 63.4 |
| 13288200 | 155.7 | 5742.6 | 6684.6 | 63.7 | 47.5 | 67.6 | 40.5 | 140.3 |
| 13289960 | 177.1 | 5037.5 | 6313.8 | 43.3 | 27.5 | 62.2 | 29.4 | 107.0 |
| 13290190 | 298.5 | 4287.7 | 7681.4 | 40.0 | 33.7 | 50.2 | 27.4 | 100.7 |
| 13315500 | 15.1 | 4742.2 | 2183.3 | 45.0 | 35.4 | 93.0 | 27.4 | 115.0 |
| 13316500 | 576.1 | 5421.1 | 7591.0 | 51.5 | 29.6 | 71.8 | 33.4 | 57.6 |
| 13316800 | 15.3 | 5031.2 | 3191.9 | 44.2 | 30.2 | 69.3 | 30.6 | 298.5 |
| 13317000 | 13418.3 | 6753.8 | 11152.1 | 60.3 | 24.7 | 58.3 | 37.7 | 17.2 |
| 13319000 | 687.4 | 4582.0 | 5095.2 | 21.8 | 27.6 | 68.4 | 20.3 | 46.0 |
| 13320000 | 104.1 | 5263.8 | 5586.1 | 40.8 | 39.7 | 85.9 | 28.6 | 164.9 |
| 13323600 | 24.8 | 5515.7 | 3278.0 | 20.8 | 43.6 | 77.1 | 21.3 | 220.4 |
| 13329500 | 29.6 | 7461.3 | 5298.0 | 87.0 | 64.6 | 47.0 | 57.2 | 259.5 |
| 13330000 | 71.5 | 6893.5 | 5981.8 | 77.2 | 56.7 | 53.1 | 49.2 | 196.8 |
| 13330500 | 72.1 | 5804.7 | 5859.0 | 75.0 | 44.7 | 67.2 | 45.6 | 161.3 |
| 13331500 | 239.2 | 5699.5 | 6598.7 | 70.5 | 46.5 | 66.4 | 43.5 | 60.8 |
| 13337500 | 260.8 | 5095.1 | 3584.2 | 28.8 | 35.3 | 91.7 | 24.1 | 36.1 |
| 13338000 | 843.4 | 5116.5 | 7070.0 | 42.4 | 34.9 | 91.8 | 29.7 | 46.1 |
| 13338500 | 1168.3 | 4546.6 | 7553.9 | 35.1 | 31.3 | 70.5 | 25.7 | 42.4 |
| 13339000 | 4827.4 | 4956.2 | 8163.1 | 58.6 | 38.3 | 77.4 | 36.2 | 27.5 |
| 13339500 | 241.4 | 3528.6 | 4938.4 | 25.5 | 31.5 | 84.1 | 22.6 | 58.2 |
| 13340000 | 5507.9 | 4736.4 | 8364.5 | 54.5 | 37.4 | 76.6 | 34.4 | 22.1 |
| 14010000 | 61.9 | 4273.1 | 3818.7 | 74.7 | 46.4 | 68.3 | 46.3 | 157.3 |
| 14011000 | 42.6 | 3640.0 | 4263.5 | 71.2 | 42.2 | 57.2 | 42.1 | 158.6 |
| | | | | **Region 5** | | | | |
| 12343400 | 379.3 | 6361.7 | 5278.4 | 55.1 | 28.4 | 78.6 | 33.2 | 59.8 |
| 12346500 | 88.1 | 6676.0 | 4576.0 | 67.5 | 29.6 | 86.4 | 38.8 | 208.0 |
| 12351000 | 73.0 | 6495.2 | 4390.9 | 62.0 | 30.6 | 79.6 | 36.5 | 163.2 |
| 13135500 | 137.5 | 8204.0 | 4931.8 | 67.5 | 31.4 | 55.8 | 40.6 | 66.8 |
| 13136500 | 92.6 | 7696.0 | 4229.0 | 77.8 | 35.8 | 59.7 | 42.6 | 63.3 |
| 13139500 | 627.6 | 7685.6 | 6615.8 | 74.0 | 29.4 | 43.2 | 42.7 | 48.3 |
| 13141000 | 786.2 | 7347.3 | 7120.0 | 69.3 | 26.5 | 35.5 | 40.2 | 39.5 |
| 13185000 | 831.6 | 6415.7 | 7338.2 | 75.1 | 32.4 | 50.2 | 44.3 | 57.7 |
| 13186000 | 641.6 | 7025.2 | 6088.8 | 74.4 | 34.7 | 50.6 | 42.1 | 42.7 |
| 13186500 | 133.6 | 6276.7 | 5458.7 | 47.3 | 22.4 | 22.4 | 29.3 | 113.8 |
| 13187000 | 55.6 | 6171.1 | 5094.1 | 59.3 | 32.2 | 59.2 | 33.6 | 166.4 |
| 13235000 | 449.3 | 6824.5 | 6785.8 | 76.6 | 34.5 | 54.3 | 46.7 | 72.8 |
| 13240000 | 48.7 | 6921.9 | 3860.7 | 67.9 | 37.2 | 71.6 | 42.1 | 117.4 |
| 13292500 | 93.9 | 8181.1 | 3434.5 | 53.1 | 34.7 | 56.9 | 32.8 | 59.1 |
| 13293000 | 35.6 | 8161.5 | 3578.7 | 60.4 | 44.5 | 47.1 | 37.6 | 70.2 |
| 13295000 | 148.9 | 7318.8 | 4478.4 | 37.0 | 23.9 | 63.0 | 26.1 | 54.8 |
| 13295500 | 510.4 | 7786.2 | 4677.4 | 45.2 | 29.6 | 54.9 | 30.4 | 36.9 |
| 13296000 | 187.3 | 7992.1 | 4200.9 | 71.1 | 27.1 | 74.5 | 41.0 | 82.9 |
| 13296500 | 811.1 | 7791.6 | 4965.3 | 53.7 | 28.0 | 61.9 | 33.6 | 31.5 |
| 13308500 | 133.8 | 7482.6 | 3135.5 | 40.2 | 28.4 | 70.8 | 26.6 | 89.5 |
| 13309000 | 181.7 | 7060.3 | 2987.5 | 24.7 | 30.0 | 70.1 | 20.2 | 25.8 |
| 13310000 | 451.5 | 6981.2 | 5385.2 | 74.0 | 28.7 | 78.6 | 44.3 | 75.5 |
| 13310500 | 91.7 | 6631.3 | 3717.0 | 52.9 | 37.5 | 88.7 | 31.7 | 99.9 |
| 13310700 | 329.3 | 6381.8 | 5387.1 | 63.8 | 33.6 | 83.8 | 38.0 | 46.1 |
| 13311000 | 19.3 | 7724.4 | 2743.5 | 62.6 | 34.0 | 83.7 | 35.3 | 213.0 |
| 13311500 | 42.9 | 7619.9 | 3363.9 | 72.5 | 30.9 | 77.3 | 40.8 | 178.3 |
| 13312000 | 106.9 | 7404.6 | 4182.6 | 73.0 | 30.0 | 78.2 | 41.7 | 132.3 |
| 13313000 | 216.4 | 7135.2 | 4457.6 | 40.7 | 34.3 | 81.7 | 28.2 | 65.6 |
| 13314000 | 1164.0 | 6696.9 | 6378.5 | 60.5 | 33.2 | 81.2 | 37.4 | 63.7 |
| 13315000 | 12228.0 | 6913.7 | 10701.3 | 60.4 | 24.4 | 57.4 | 37.8 | 19.9 |
| | | | | **Region 6** | | | | |
| 06013500 | 277.0 | 7928.2 | 4691.8 | 31.8 | 18.8 | 14.5 | 24.1 | 78.4 |
| 06015500 | 349.0 | 6940.1 | 5193.8 | 19.6 | 19.2 | 28.8 | 18.8 | 31.8 |
| 06019500 | 525.5 | 7235.2 | 5130.4 | 20.5 | 22.9 | 26.0 | 20.1 | 49.9 |
| 13108500 | 228.4 | 6943.3 | 3641.5 | 12.8 | 26.8 | 39.4 | 12.8 | 36.7 |
| 13112000 | 393.9 | 6428.8 | 5062.4 | 7.5 | 21.1 | 22.9 | 8.6 | 35.7 |
| 13113000 | 123.2 | 7027.5 | 3015.2 | 23.5 | 20.3 | 29.9 | 19.6 | 59.3 |
| 13113500 | 238.7 | 6696.9 | 3696.0 | 18.8 | 19.4 | 24.4 | 16.7 | 52.8 |
| 13117300 | 74.2 | 8380.5 | 4280.2 | 53.7 | 23.8 | 54.1 | 32.7 | 125.2 |
| 13120000 | 114.7 | 8659.7 | 4984.0 | 72.1 | 29.8 | 58.1 | 43.1 | 76.3 |
| 13120500 | 440.4 | 8626.3 | 5284.1 | 60.8 | 27.0 | 38.0 | 37.8 | 42.1 |
| 13128900 | 8.4 | 9461.0 | 5123.4 | 94.2 | 26.6 | 21.0 | 66.2 | 869.9 |
| 13297330 | 29.5 | 7618.4 | 3963.8 | 85.8 | 22.6 | 68.9 | 47.7 | 175.6 |
| 13297350 | 6.4 | 7520.2 | 3470.0 | 68.3 | 21.7 | 66.3 | 40.8 | 403.6 |

**Appendix C.** Basin characteristics for selected streamflow-gaging stations--Continued

| Gaging station number | A | E | BR | S30 | P | F | BS | MCS |
|---|---|---|---|---|---|---|---|---|
| | | | | **Region 6--Continued** | | | | |
| 13297355 | 71.6 | 7729.2 | 4114.3 | 60.2 | 25.2 | 73.0 | 36.3 | 160.3 |
| 13297450 | 18.3 | 8951.8 | 5501.5 | 64.3 | 32.0 | 39.2 | 41.3 | 298.9 |
| 13298000 | 540.2 | 8092.5 | 6227.5 | 62.7 | 26.0 | 31.7 | 38.2 | 58.0 |
| 13299000 | 84.6 | 7780.8 | 4996.6 | 62.0 | 25.6 | 62.4 | 37.2 | 196.8 |
| 13302500 | 3746.1 | 7397.5 | 8655.9 | 52.9 | 21.6 | 37.3 | 33.4 | 19.6 |
| 13305000 | 907.1 | 7430.9 | 6430.2 | 36.9 | 15.6 | 24.3 | 25.2 | 48.6 |
| 13305500 | 1258.0 | 7108.2 | 7370.8 | 39.1 | 15.3 | 24.9 | 26.4 | 39.8 |
| 13306000 | 210.3 | 6258.1 | 6244.4 | 78.0 | 22.9 | 77.8 | 43.6 | 100.0 |
| 13306500 | 520.7 | 7028.2 | 6652.8 | 62.2 | 24.0 | 80.2 | 38.6 | 87.8 |
| 13307000 | 6236.7 | 7154.3 | 9419.7 | 52.8 | 20.4 | 41.1 | 33.3 | 18.0 |
| | | | | **Region 7** | | | | |
| 10119000 | 107.1 | 6070.2 | 3724.2 | 17.8 | 13.2 | 8.1 | 17.7 | 59.0 |
| 10172940 | 28.7 | 6681.4 | 2659.9 | 13.7 | 17.0 | 0.7 | 17.5 | 187.5 |
| 10315500 | 389.8 | 6589.8 | 5032.4 | 21.8 | 15.2 | 2.3 | 17.5 | 34.3 |
| 10329500 | 176.2 | 6210.4 | 4930.3 | 26.4 | 21.9 | 4.1 | 21.0 | 73.6 |
| 10352500 | 225.4 | 5890.4 | 3931.3 | 17.2 | 17.0 | 1.4 | 17.3 | 60.6 |
| 10353000 | 137.9 | 6117.4 | 3436.4 | 28.0 | 22.2 | 2.1 | 22.2 | 70.3 |
| 10396000 | 204.7 | 6197.6 | 5455.7 | 15.2 | 29.1 | 22.4 | 16.2 | 78.3 |
| 10406500 | 86.7 | 6025.9 | 3926.9 | 31.2 | 16.9 | 3.9 | 23.1 | 147.5 |
| 13057940 | 431.4 | 6422.9 | 2544.2 | 8.4 | 16.6 | 19.2 | 13.3 | 29.1 |
| 13075000 | 367.4 | 5587.7 | 4652.6 | 20.2 | 14.3 | 9.0 | 16.8 | 32.6 |
| 13083000 | 52.4 | 6339.4 | 3095.6 | 41.3 | 17.4 | 6.2 | 28.1 | 116.4 |
| 13092000 | 81.6 | 6350.2 | 3685.2 | 48.7 | 14.5 | 9.4 | 31.6 | 144.5 |
| 13154000 | 103.3 | 4812.3 | 3683.5 | 14.0 | 14.0 | 0.0 | 15.1 | 104.0 |
| 13155300 | 14.2 | 5927.8 | 2397.6 | 36.8 | 23.5 | 3.0 | 25.2 | 203.3 |
| 13162500 | 84.9 | 7603.0 | 5683.3 | 55.2 | 24.8 | 24.5 | 35.3 | 124.3 |
| 13169500 | 243.7 | 5170.0 | 3447.7 | 7.4 | 13.8 | 0.0 | 10.1 | 63.9 |
| 13170000 | 103.4 | 5067.4 | 3447.5 | 11.5 | 14.2 | 0.1 | 13.2 | 114.6 |
| 13172680 | 18.7 | 6133.6 | 2569.4 | 24.9 | 21.2 | 38.4 | 23.0 | 372.8 |
| 13172720 | 12.5 | 4883.0 | 2467.9 | 21.6 | 13.6 | 11.1 | 21.1 | 265.9 |
| 13172735 | 13.1 | 5001.8 | 2329.3 | 36.3 | 14.7 | 5.5 | 26.1 | 322.0 |
| 13172740 | 91.8 | 5015.7 | 3719.2 | 20.7 | 14.8 | 12.4 | 20.2 | 150.2 |
| 13176000 | 452.3 | 6660.1 | 3672.2 | 24.6 | 21.6 | 2.9 | 20.6 | 25.2 |
| 13178000 | 454.2 | 5781.8 | 3905.0 | 21.8 | 26.1 | 38.9 | 19.5 | 30.2 |
| 13211309 | 233.7 | 2984.4 | 1178.3 | 0.0 | 8.2 | 0.0 | 1.7 | 18.4 |
| 13226500 | 535.3 | 4133.8 | 3958.2 | 15.3 | 12.3 | 0.8 | 17.4 | 40.2 |
| | | | | **Region 8** | | | | |
| 06037500 | 434.9 | 7900.0 | 2785.6 | 7.9 | 42.3 | 93.9 | 11.3 | 30.3 |
| 09223000 | 128.6 | 8466.6 | 2454.4 | 19.5 | 32.0 | 72.8 | 20.4 | 52.4 |
| 10015700 | 58.5 | 7971.5 | 2997.9 | 1.2 | 21.6 | 25.4 | 9.6 | 119.9 |
| 10040000 | 45.4 | 7243.6 | 2730.5 | 36.9 | 23.8 | 24.8 | 26.5 | 56.9 |
| 10041000 | 113.8 | 7330.7 | 2826.5 | 40.7 | 25.1 | 36.5 | 27.4 | 87.7 |
| 10058600 | 24.3 | 7684.3 | 3487.4 | 40.5 | 35.1 | 37.6 | 27.4 | 197.2 |
| 10077000 | 50.9 | 6184.9 | 1100.5 | 5.5 | 18.2 | 2.3 | 6.1 | 24.7 |
| 10093000 | 30.4 | 7384.3 | 3983.1 | 49.4 | 36.0 | 53.7 | 31.3 | 276.1 |
| 10096000 | 23.2 | 5691.9 | 1695.4 | 18.0 | 14.2 | 2.5 | 19.8 | 138.9 |
| 10099000 | 16.3 | 7655.4 | 4510.9 | 86.6 | 40.9 | 62.2 | 49.4 | 413.0 |
| 13010065 | 502.5 | 8199.4 | 3509.4 | 14.7 | 47.4 | 82.8 | 15.8 | 38.3 |
| 13011500 | 162.7 | 8134.7 | 3763.2 | 20.8 | 36.3 | 72.4 | 20.3 | 60.6 |
| 13011900 | 330.1 | 8951.0 | 4566.8 | 33.9 | 37.1 | 59.7 | 27.0 | 58.9 |
| 13012000 | 370.2 | 8815.8 | 4619.9 | 32.8 | 36.6 | 60.2 | 26.3 | 48.7 |
| 13014500 | 608.0 | 8863.0 | 5015.9 | 26.9 | 31.6 | 62.6 | 23.3 | 46.4 |
| 13019438 | 82.7 | 8559.5 | 4943.0 | 60.8 | 31.0 | 54.5 | 38.6 | 129.1 |
| 13019500 | 561.3 | 7961.5 | 5650.1 | 42.6 | 26.7 | 60.9 | 30.3 | 43.7 |
| 13023000 | 448.8 | 8105.3 | 5632.6 | 54.5 | 34.9 | 72.2 | 35.1 | 40.0 |
| 13024000 | 48.2 | 8010.1 | 4119.5 | 40.5 | 32.9 | 73.4 | 28.0 | 106.6 |
| 13024500 | 25.7 | 8647.5 | 3738.3 | 81.3 | 39.5 | 73.4 | 45.1 | 248.9 |
| 13025000 | 27.7 | 8496.0 | 4223.5 | 84.9 | 39.3 | 72.3 | 49.3 | 256.8 |
| 13027000 | 20.1 | 8469.4 | 3663.7 | 80.7 | 40.8 | 54.0 | 49.7 | 243.4 |
| 13032000 | 78.3 | 7187.5 | 3806.4 | 69.7 | 26.7 | 56.1 | 38.8 | 89.2 |
| 13044500 | 131.1 | 6675.6 | 2604.8 | 5.5 | 31.8 | 69.3 | 9.1 | 42.7 |
| 13045500 | 123.7 | 6418.3 | 2516.2 | 5.4 | 35.3 | 65.4 | 10.6 | 93.5 |
| 13046680 | 85.4 | 7912.5 | 2270.2 | 3.3 | 56.0 | 87.7 | 6.9 | 112.8 |
| 13047500 | 333.6 | 7540.3 | 3655.8 | 7.8 | 52.9 | 83.6 | 11.0 | 73.7 |
| 13049500 | 512.9 | 6974.2 | 4197.5 | 6.4 | 42.6 | 63.3 | 9.9 | 50.3 |
| 13052200 | 341.4 | 7302.9 | 5223.4 | 34.5 | 31.7 | 39.7 | 23.6 | 46.0 |
| 13054000 | 479.2 | 7200.1 | 5277.0 | 30.0 | 30.3 | 38.2 | 21.5 | 33.6 |
| 13055000 | 874.8 | 6920.9 | 6232.1 | 24.3 | 27.7 | 36.1 | 19.0 | 28.7 |

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