

ESTIMATES OF MONTHLY STREAMFLOW CHARACTERISTICS AT SELECTED SITES IN THE  
UPPER MISSOURI RIVER BASIN, MONTANA, BASE PERIOD WATER YEARS 1937-86

by Charles Parrett, Dave R. Johnson, and J.A. Hull

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## CONVERSIONS FACTORS

The following factors can be used to convert inch-pound units in this report to metric (International System) units.

<u>Multiply inch-pound unit</u>	<u>By</u>	<u>To obtain metric unit</u>
cubic foot per second (ft <sup>3</sup> /s)	0.028317	cubic meter per second
foot (ft)	0.3048	meter
foot per mile	0.1894	meter per kilometer
inch	25.4	millimeter
mile	1.609	kilometer
square mile	2.590	square kilometer

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

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ABSTRACT

Estimates of monthly streamflow characteristics (monthly mean flow that is exceeded 90, 80, 50, and 20 percent of the time for all years of record and mean monthly flow) were made and are presented in tabular form for 312 sites in the Missouri River basin upstream from Fort Peck Lake in Montana. The estimates were based on data for water years 1937-86. Data from 154 gaging stations in and near the study area were used in a mixed-station record-extension procedure to extend short-term records to the 1937-86 base period. One hundred of the sites needing estimates had some gaged data available, and the gaged records, extended as required to the 1937-86 base period, were used to estimate the monthly streamflow characteristics.

Data from 47 gaged sites were used in regression analyses relating the monthly streamflow characteristics to drainage area and mean annual precipitation (basin-characteristics equations) and to active-channel width (channel-width equations). The basin-characteristics equations had standard errors of estimate ranging from 35 to 97 percent. The channel-width equations had standard errors of estimate ranging from 36 to 103 percent. The basin-characteristics equations were used to estimate monthly streamflow characteristics at 179 ungaged sites, and the channel-width equations were used to estimate monthly streamflow characteristics at 138 ungaged sites.

Miscellaneous measurements of streamflow available at 139 ungaged sites were correlated with concurrent streamflows at nearby gaged sites to provide estimates of the monthly streamflow characteristics. The reliability of the concurrent-measurement method was estimated by applying the method to 20 pairs of gages. On the basis of the test results, the standard errors of the concurrent-measurement method were estimated to range from 31 to 111 percent.

At 139 ungaged sites needing estimates, more than one of the above methods were used to estimate monthly streamflow characteristics, and the estimates from each of the individual methods were weighted and combined in accordance with the variance and degree of independence of the individual methods. When estimates from all three estimating methods were combined, the standard errors were estimated to range from 24 to 63 percent.

Finally, a drainage-area-ratio adjustment method was used to estimate monthly streamflow characteristics at seven ungaged sites. Although not rigorously tested, the reliability of the drainage-area-ratio adjustment method was estimated to be about equal to that of the basin-characteristics method.

Estimates of monthly streamflow characteristics from gaged records were considered to be the most reliable, and estimates at sites with actual flow record from 1937-86 were considered to be completely reliable (zero error). Twenty gaged sites were used to test the reliability of the record-extension procedure when 5, 15, 25, and 35 years of record were available for 1937-86. The standard errors for the worst case, where only 5 years of record were available, ranged from 9 to 54 percent. For 35 years of record, the standard errors ranged from 2 to 23 percent.

Weighted-average estimates were considered to be the most reliable estimates made at ungaged sites. The concurrent-measurement method generally provided the most reliable estimates at ungaged sites where only one method was used.

## INTRODUCTION

Although the upper Missouri River basin in Montana generally has an abundant supply of surface water, the large demands coupled with the large areal and seasonal variability of runoff commonly result in shortages. To mitigate the effects of periodic shortages and to allocate the finite supply among competing users, the State of Montana developed a legal process enabling State and Federal agencies and political subdivisions to reserve surface water for existing and future beneficial uses. Among the uses for which water may be reserved are instream fish and wildlife preservation. To establish an instream-flow reservation for fish and wildlife purposes, the Montana Department of Fish, Wildlife and Parks needs to determine the quantity of water needed and the quantity of water available to meet the need. The Department has determined the instream-flow needs at several hundred stream sites in the Missouri River basin. The U.S. Geological Survey, in cooperation with the Montana Department of Fish, Wildlife and Parks, has conducted a study to determine the water availability at those sites.

### Purpose and Scope

The objective of the study was to estimate mean monthly streamflow and various points on the monthly mean flow-duration curve for each month (monthly mean streamflow that is exceeded 90, 80, 50, and 20 percent of the time for all years of record) at each identified site. The purposes of this report are to present the estimated monthly streamflow characteristics for the identified sites, to describe the methods used to make the estimates, and to discuss the reliability of the estimates. To ensure that all estimates were representative of the same hydrologic conditions, a common base period of record (1937-86) was developed to determine monthly streamflow characteristics at all gaged sites used in the analyses. The procedure involved extension of the period of streamflow record at short-record gaged sites. The extended-streamflow records were used to develop monthly streamflow estimates at estimation sites where short-record gaged data were available.

Five methods were developed for estimating monthly streamflow characteristics at ungaged sites. The basin-characteristics method was based on the regression relation between the monthly streamflow characteristics and various basin and climatic variables. The channel-width method was similar to the first and was based on the regression relation between the monthly streamflow characteristics and channel width. The concurrent-measurement method required 7 to 12 measurements of

streamflow at the sites needing estimates and was based on the correlation of measured streamflow and concurrent daily mean streamflow at nearby-gaged sites. In a fourth method, the estimates from the individual methods were weighted in accordance with the variance and degree of independence of the individual methods. At a few sites, none of the foregoing estimating methods were used. Instead, information from similar gaged sites was transferred to these sites using drainage-area-ratio adjustments.

### Streamflow Data

Three hundred and twelve sites in the Missouri River basin upstream from Fort Peck Lake were selected by the Montana Department of Fish, Wildlife and Parks for the determination of selected monthly streamflow characteristics. Of the 312 sites, 100 had gaged record, 139 had miscellaneous-measurement record, and 73 had no streamflow record. Estimates of monthly streamflow characteristics are shown in tables 4-9 at the back of the report.

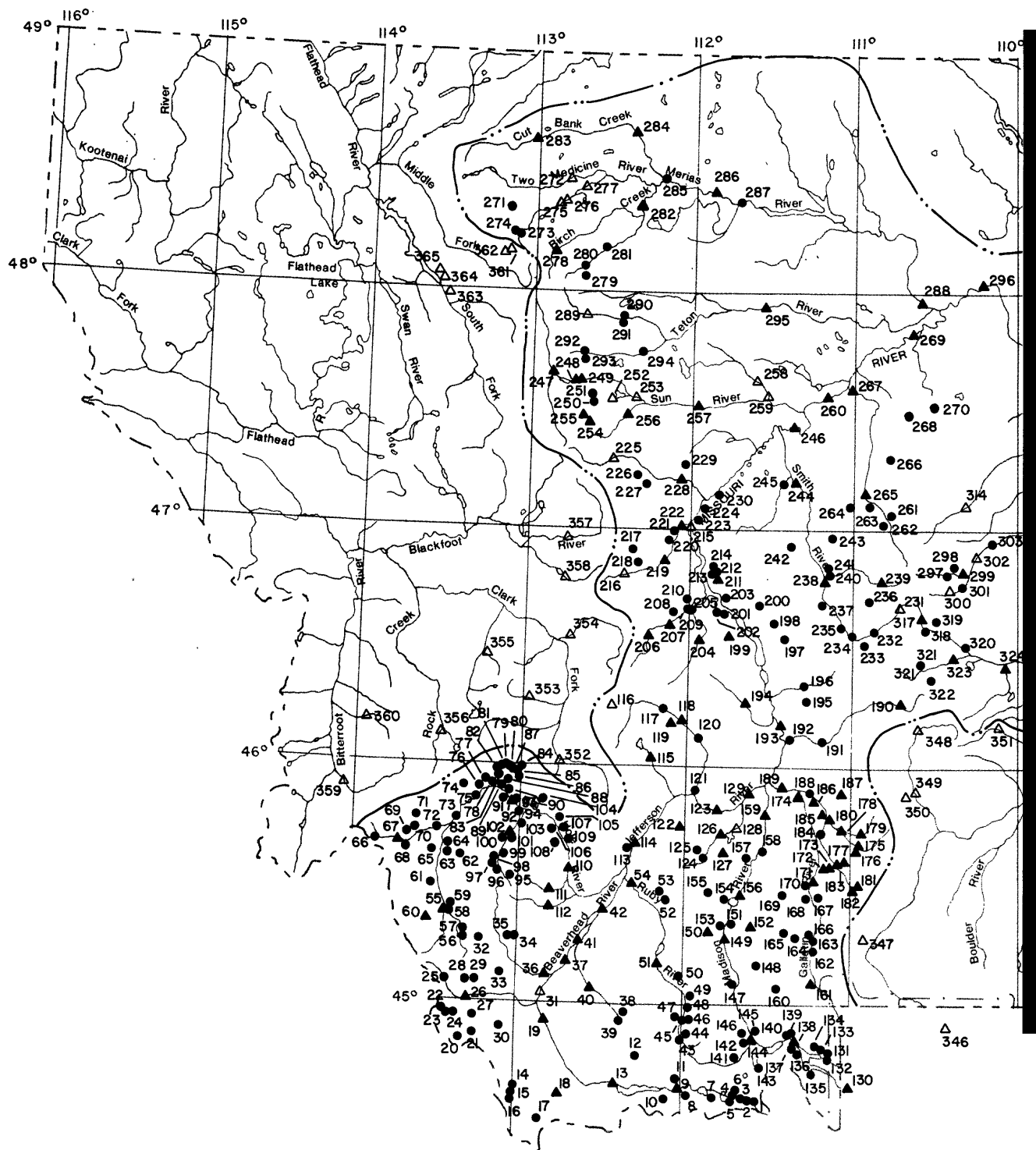
In addition to the 100 sites for which gaged records were used to determine monthly streamflow characteristics, 54 gaged sites were used for correlation and record-extension purposes. Some of these 54 sites were located outside the upper Missouri River basin study area, but were considered to be hydrologically similar to sites within the study area. All of the sites described above were numbered consecutively in downstream order (366 sites); each location is shown in figure 1.

Of the 139 sites with miscellaneous measurements, 7 were measured 12 times during 1982-83, 1 was measured 12 times during 1986, 70 were measured 7 times during 1987, and 61 were measured 7 times during 1988. No streamflow measurements were made at 73 sites because these are either relatively inaccessible or were considered by the Department of Fish, Wildlife and Parks to be comparatively less important.

### DEVELOPING A COMMON BASE PERIOD

Each streamflow-estimation method described in this report utilizes streamflow information from selected gaging stations in the study area (table 1; all tables are in the Supplemental Data section at the back of the report). The length of streamflow record at these gaging stations ranges from 2 to 81 years. To ensure that streamflow estimates would be unbiased and representative of a consistent hydrologic period, a monthly streamflow record-extension procedure was used to extend all short-term records to a common 1937-86 base period. This mixed-station procedure, described by Alley and Burns (1983), selects the best base station from all those available in a region to fill in each month of missing data at a site. Thus, several different base stations may be used for making estimates at a single site. The criterion for selection is to use the base station that results in the smallest standard error of prediction for that month. Only stations with streamflow record for a particular month and year were used to estimate missing streamflows at other sites for that month and year; previously estimated streamflows were not used to estimate any missing streamflows.

In addition to the capability of using more than one base station to extend a short-term record, the record-extension procedure also has the option of using a cyclic or noncyclic equation to fill in missing record. If the cyclic option is selected, an extension equation is computed for each month using only concurrent



Base modified from U.S. Geological Survey, 1965

Figure 1.--Location of ungaged sites





streamflows for that month. If the noncyclic option is selected, a single extension equation is computed using all concurrent streamflows. For two stations with 5 years of concurrent monthly streamflows, for example, the cyclic correlations would be developed separately for each month and would be based on five concurrent flows for each month. The noncyclic correlation would be based on 60 concurrent monthly flows, but the same correlation would be used for all months. The smallest standard error of prediction criterion also is used to select the cyclic or non-cyclic option. No base station was used to fill in missing record at another station unless the two stations had at least 5 concurrent monthly streamflows. The base stations with less than 5 years of record could thus be used only with the non-cyclic option.

Most streamflow record-extension procedures are based on ordinary least-squares regression equations that are used to estimate individual missing values at stations with short-term records. Ordinary least-squares regression, unfortunately, commonly results in extended records with smaller variances than the unextended records. Techniques other than ordinary least-squares regression that can be used to estimate missing values and that tend to preserve the variance of the unextended records include regression plus noise (Matalas and Jacobs, 1964; U.S. Army Corps of Engineers, 1971) and two alternatives to regression described by Hirsch (1982), which he refers to as MOVE.1 and MOVE.2 (Maintenance of Variance Extension, Types 1 and 2). The selected streamflow record-extension procedure has the capability of using any of these extension techniques, including ordinary least-squares regression.

For this study, the MOVE.1 curve-fitting technique was used to estimate missing values. The MOVE.1 technique is analogous to ordinary least-squares regression, except that ordinary regression minimizes the squared vertical deviations of the dependent variable from the regression line, whereas the MOVE.1 technique minimizes the areas of the right triangles formed by the horizontal and vertical deviations from the regression line (Hirsch and Gilroy, 1984, p. 707).

To develop a common 1937-86 base period of record for all gaging stations used in the study, 154 stations were used as potential base stations. The earliest year of record considered was 1906, so that record lengths ranged from 2 to 81 years before the record extension. After record extension, all data prior to 1937 were excluded from the data base. All stations and available periods of record since 1906 used in the record-extension procedure are identified in table 2.

The extended streamflow records at 47 of the 154 gaged sites were subsequently used in regression analyses relating monthly streamflow characteristics to basin and climatic characteristics. The gaged sites selected for the regression analyses each had at least five years of actual streamflow record and were considered to be most representative of the ungaged sites needing estimates of monthly streamflow characteristics. Because the MOVE.1 curve-fitting technique results in estimated flows that are perfectly correlated with the concurrent base-station flows, the possibility existed that the extended-flow records would have substantially larger inter-station correlations than the actual flow records. Inflated inter-station flow correlations would probably result in biased, and possibly invalid, regression results.

To check whether the MOVE.1 curve-fitting technique resulted in larger inter-station correlations, recorded monthly streamflows for each gage site used in the regression analyses were correlated in turn with concurrent monthly streamflows at every other gage site used in the regression analyses. This procedure resulted in

a 47 by 47 matrix of correlation coefficients for each month. The columns of correlation coefficients for each station for each month were then averaged to produce an average correlation coefficient for each station for each month. This procedure was repeated for the complete extended-flow record (50 years of concurrent streamflow data at every gage site), and the average correlation coefficients computed for the actual record periods were subtracted from the average correlation coefficients computed from the extended-record period. The final results are presented in table 3, where positive changes in correlation coefficients indicate that the average inter-station correlation increased when the record was extended. Most months show about as many negative changes in inter-station correlation as they do positive ones. Where the changes are positive, they generally are not large. The extended-flow records thus are considered to be unbiased and suitable for subsequent regression analysis.

## ESTIMATES OF MONTHLY STREAMFLOW CHARACTERISTICS

All sites requiring estimates and the methods used to make the estimates of the monthly streamflow characteristics are identified in table 1. At 139 sites, more than one method was used, and the final estimates were weighted averages of the estimates from the individual methods. Final estimates of monthly streamflow characteristics at all estimation sites are presented in tables 4 to 9. Because estimates of mean annual streamflow are useful for many water-management purposes, estimates of mean annual streamflow also were developed for this report by multiplying each mean monthly streamflow estimate by the number of days in the month, summing the resultant 12 values, and dividing by 365. The estimated mean annual streamflows are presented in table 10.

Most of the estimation sites were on small, perennial streams (drainage areas less than 200 square miles) in forested, mountainous areas. Some sites were in plains area, but these sites were on larger streams with headwaters in the mountains. Virtually all streams requiring monthly flow estimates were typical mountainous streams with fairly stable base flows and runoff that resulted primarily from snowmelt.

### Basin-Characteristics Method

One method for estimating monthly streamflow characteristics at the ungaged estimation sites used multiple-regression equations that related the monthly streamflow characteristics at 47 gaged sites to various basin and climatic variables. This basin-characteristics method has previously been used in Montana to estimate monthly streamflow characteristics (Boner and Buswell, 1970; Parrett and Cartier, 1989). For this analysis, the following basin and climatic characteristics were available for each gaged site and were used as independent variables in the regressions:

A drainage area, in square miles;  
 P mean annual precipitation on the basin, in inches;  
 E mean basin elevation, in thousands of feet;  
 E6 percentage of basin above 6,000 feet elevation, plus 1;  
 F percentage of drainage area covered by forest, plus 1;  
 L main-channel length, in miles;  
 S main-channel slope, in feet per mile;  
 TI mean basin minimum January temperature, in degrees Fahrenheit, plus 10;  
 and  
 I24 precipitation intensity for a storm of 24 hours duration having a 2-year recurrence interval, in inches.

The monthly streamflow data and the basin and climatic variables at the 47 gaged sites were converted to logarithms and used in a linear multiple-regression analysis to derive estimating equations of the following form:

$$\log Q = \log a + b_1 \log B + b_2 \log C + \dots b_n \log N, \quad (1)$$

where

Q (response variable) is the desired monthly streamflow characteristic in cubic feet per second (monthly mean streamflow exceeded 90, 80, 50, or 20 percent of the time for all years of record, or mean monthly streamflow);

a is the multiple-regression constant;

b<sub>1</sub>, b<sub>2</sub>, ... b<sub>n</sub> are the regression coefficients; and

B, C, ... N are values of the significant basin or climatic characteristics (explanatory variables).

The following nonlinear form of the regression equation results when antilogarithms of the terms are taken:

$$Q = a B^{b_1} C^{b_2} \dots N^{b_n}. \quad (2)$$

A computerized step-wise regression procedure, which added explanatory variables to the equation one at a time until all significant variables were included, was used in this study. An explanatory variable was considered significant if the partial-F test statistic was equal to or greater than 5.0. The computerized procedure also provided standard errors of estimate and coefficients of determination as measures of the regression reliability. In general, the larger the coefficient of determination and the smaller the standard error of estimate, the more reliable is the estimating equation.

In most of the regression equations, drainage area was the most significant explanatory variable and mean annual precipitation was the next most significant. For some monthly streamflow characteristics for some months, main-channel length was the most important explanatory variable, and mean basin elevation or percentage of forest cover was the next most significant. In these instances, however, using drainage area and mean annual precipitation rather than the two most significant explanatory variables resulted in estimating equations that were only slightly less reliable. Main-channel slope was determined to be significant for some monthly

streamflow characteristics for some months, but using just drainage area and mean annual precipitation in these instances also resulted in estimating equations that were almost as reliable as estimating equations using the three most significant explanatory variables.

To ensure that all estimates made using the regression equations would be consistent, the final estimating equations used drainage area and mean annual precipitation as the only explanatory variables for all monthly streamflow characteristics for all months. Results of the regression analysis using basin and climatic characteristics, together with the coefficients of determination and standard errors associated with each estimating equation, are given in table 11. As indicated by the results, the coefficients of determination for the basin-characteristics method range from 0.56 to 0.89, and the standard errors range from 35 to 97 percent.

The equations given in table 11 were used to estimate monthly streamflow characteristics at 179 sites where the basin-characteristics method was considered to be applicable, as indicated in table 1. Sites where the method was not considered applicable are: (1) sites where gains or losses in streamflow occur upstream, (2) springs, and (3) some sites on large rivers. At the sites where the method was used, drainage area was planimetered on U.S. Geological Survey topographic maps with 1:250,000 scale, and mean annual precipitation was determined from maps prepared by the U.S. Soil Conservation Service (1981).

#### Channel-Width Method

The second method used to estimate monthly streamflow characteristics at the selected ungaged sites was also based on a regression analysis. In this method, the monthly streamflow characteristics at the 47 selected gaged sites were related to measured active-channel width rather than to basin characteristics. This channel-width method was previously used to estimate monthly streamflow characteristics in western Montana (Parrett and Cartier, 1989).

The active-channel width has been described by Osterkamp and Hedman (1977, p. 256) as "...a short-term geomorphic feature subject to change by prevailing discharges. The upper limit is defined by a break in the relatively steep bank slope of the active channel to a more gently sloping surface beyond the channel edge. The break in slope normally coincides with the lower limit of permanent vegetation...."

The monthly streamflow characteristics and measured active-channel widths at the 47 gaged sites were converted to logarithms, and simple linear regression was used to derive estimating equations of the following form:

$$\log Q = \log a + b \log W_{AC}, \quad (3)$$

where

Q is a monthly streamflow characteristic as previously defined,  
a is the regression constant,  
b is the regression coefficient, and  
 $W_{AC}$  is the active-channel width.

As before, the nonlinear form of equation 3, determined by taking antilogarithms, is:

$$Q = a W_{AC}^b. \quad (4)$$

The final regression equations derived using active-channel width and their coefficients of determination and standard errors of estimate are given in table 12. The coefficients of determination for the channel-width method range from 0.49 to 0.88, and the standard errors range from 36 to 103 percent. Active-channel width was measured at 138 ungaged sites needing estimates as indicated in table 1, and monthly streamflow characteristics at those sites were estimated using the equations given in table 12. The channel-width method was not used to estimate streamflow characteristics at sites where the active channel could not be identified or at sites where access was not feasible.

#### Concurrent-Measurement Method

The third method used to estimate monthly streamflow characteristics at ungaged sites was based on periodic measurements of streamflow made at selected ungaged sites. The measured streamflows at each ungaged site were correlated with concurrent streamflows at a selected similar gaged site, and the relation between the streamflows at the two sites was used to transfer the long-term monthly streamflow characteristic at the gaged site to the ungaged site. This concurrent measurement method was previously used to successfully estimate monthly streamflow characteristics in western Montana (Parrett and Cartier, 1989).

For this study, the concurrent-measurement method used 7 measurements of streamflow at 131 of the ungaged estimation sites indicated in table 1. The measurements were made from April through September so that measured flows would range from near-base flow to near-peak flow. At 8 additional sites, 12 streamflow measurements (1 each month) were used for the concurrent-measurement method. The measured streamflows at each ungaged site were paired with concurrent streamflows at a selected gaged site, and a line was drawn through the logarithms of the data using the MOVE.1 curve-fitting technique. Several examples of typical MOVE.1 and ordinary least-squares regression lines are compared to measurement data at study sites (fig. 2). To estimate a long-term monthly streamflow characteristic at an ungaged site using the concurrent-measurement method, the long-term monthly streamflow characteristic at the gaged site is entered on the MOVE.1 line, and the estimated value is read on the y-axis as shown on figure 2.

As discussed by Parrett and Cartier (1989, p. 20), the relation between concurrent high flows may be different from the relation between concurrent low flows, or a difference in the timing of runoff at two sites may result in a concurrent streamflow plot that resembles a loop. In these cases, more complicated curve-fitting techniques would probably result in more accurate estimates of monthly streamflow characteristics than the MOVE.1 curve-fitting technique. Based on an examination of concurrent streamflows from pairs of streamflow-gaging stations in the study area, however, it was concluded that, in most instances, the deviation from a single straight-line fit was not significant or the scatter about the line was great enough to mask any deviations. Accordingly, all estimates made using the concurrent-measurement method and the tests of reliability of the method were based on the MOVE.1 curve-fitting technique.

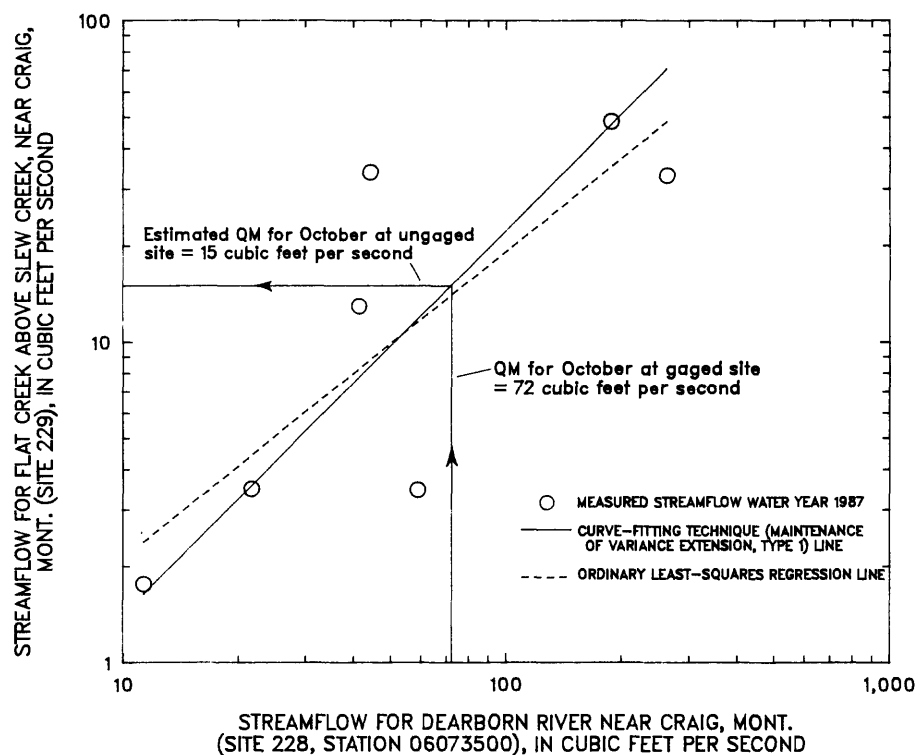
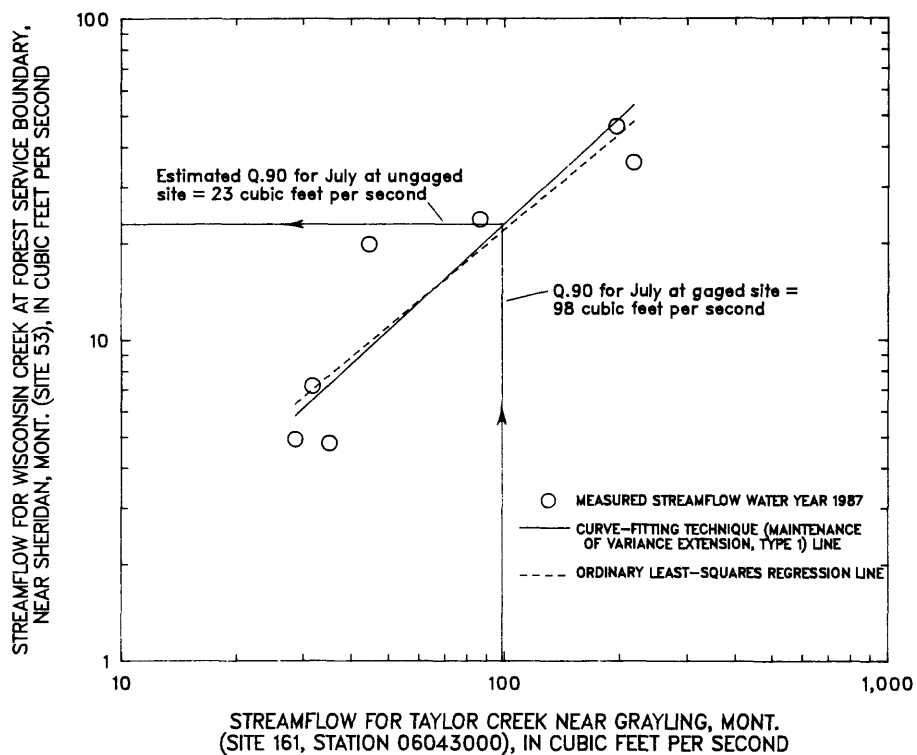


Figure 2.--Lines for the curve-fitting technique and ordinary least-squares regression.

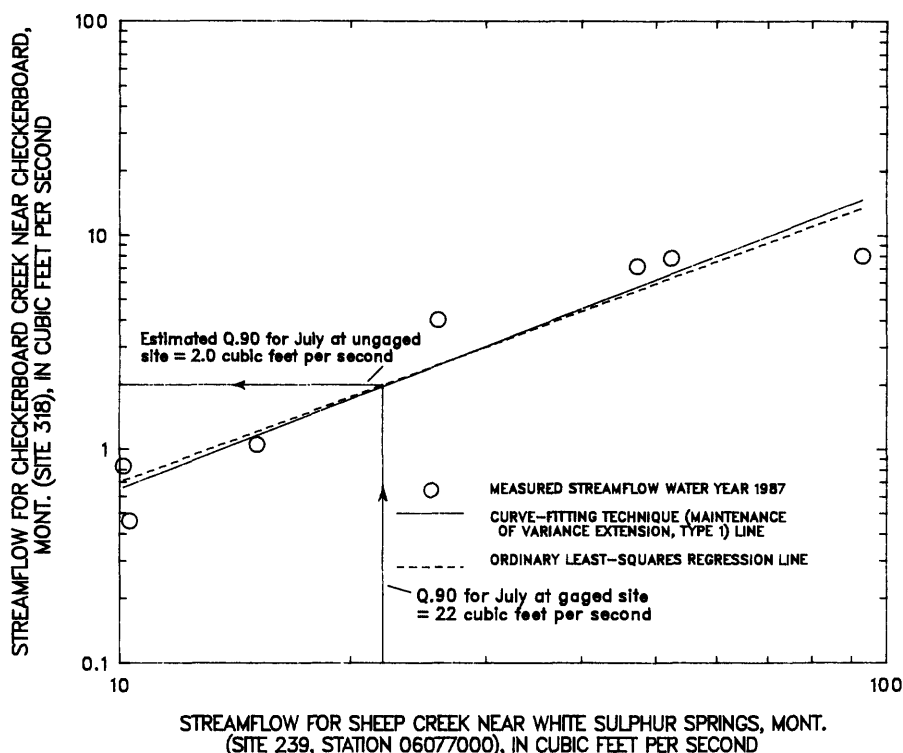


Figure 2.--Lines for the curve-fitting technique and ordinary least-squares regression.--Continued

To estimate the reliability of the concurrent-measurement method, 20 of the gaged sites used in the basin-characteristics and channel-width regression analyses were considered to be ungaged sites for which the concurrent-measurement method was used to estimate monthly streamflow characteristics. Thus, a suitable gaged site was selected for comparison with each regression gaged site (herein called the pseudo-ungaged site), and seven concurrent daily mean streamflows occurring between April and September during a randomly selected year of concurrent record were correlated using the MOVE.1 curve-fitting technique. The estimated monthly streamflow characteristics at each pseudo-ungaged site were then subtracted from the actual monthly streamflow characteristics determined from the extended flow record, and the standard deviations of the differences were calculated. The pseudo-ungaged sites, their respective correlating gaged sites, and the year of record selected for the test are presented for each station pair in table 13. The calculated standard deviations of the differences are equivalent to the standard errors of estimate determined by regression and thus are considered to be a comparable measure of reliability for the concurrent-measurement method. The standard errors for all three estimation methods can be compared in table 14. Standard error can be converted from log units to percentage using the following equation:

$$SEP = 100 (e^{(2.3026 \cdot SEL)^2} - 1)^{0.5}, \quad (5)$$



where

SEP is standard error, in percent,  
e is the base of natural logarithms, and  
SEL is standard error, in base 10 log units.

When converted to percentages, the standard errors for the concurrent-measurement method range from 36 (0.15 log unit) to 111 (0.39 log unit).

#### Weighted-Average-Estimate Method

When different methods are available for estimating streamflow characteristics, it seems reasonable to assume that a weighted average of the individual estimates might provide a better answer than any of the individual estimates. Equations for weighting three estimates (E.J. Gilroy, U.S. Geological Survey, written commun., 1987) are:

$$Z = a_1 \cdot X_1 + a_2 \cdot X_2 + a_3 \cdot X_3, \quad (6)$$

where

Z is the unbiased, weighted estimate of some streamflow characteristic;  
 $a_1$ ,  $a_2$ ,  $a_3$  are weights which result in the minimum-variance, unbiased, linear combination of  $X_1$ ,  $X_2$ , and  $X_3$ ; and  
 $X_1$ ,  $X_2$ ,  $X_3$  are estimates of the streamflow characteristic from three different methods.

Equations for the weights (E.J. Gilroy, U.S. Geological Survey, written commun., 1987) are:

$$a_1 = [C (SE_3^2 - S_{1,3}) - B (SE_3^2 - S_{2,3})] / (A \cdot C - B^2), \quad (7)$$

$$a_2 = [A (SE_3^2 - S_{2,3}) - B (SE_3^2 - S_{1,3})] / (A \cdot C - B^2), \quad (8)$$

$$a_3 = 1 - a_1 - a_2, \quad (9)$$

where

$$C = SE_2^2 + SE_3^2 - 2 S_{2,3};$$

$SE_1$ ,  $SE_2$ ,  $SE_3$  are the standard errors of the three different estimating methods;

$S_{1,2} = r_{1,2} (SE_1 \cdot SE_2)$  and is the covariance of methods 1 and 2;

$S_{1,3} = r_{1,3} (SE_1 \cdot SE_3)$  and is the covariance of methods 1 and 3;

$S_{2,3} = r_{2,3} (SE_2 \cdot SE_3)$  and is the covariance of methods 2 and 3;

$r_{i,j}$  is the cross-correlation coefficient between the residuals from estimating methods i and j;

$$A = SE_1^2 + SE_3^2 - 2 S_{1,3}; \text{ and}$$

$$B = SE_3^2 + S_{1,2} - S_{1,3} - S_{2,3}.$$

The estimated standard error of the weighted estimate,  $SE_z$ , is determined from the following equation:

$$SE_z = [(a_1 \cdot SE_1)^2 + (a_2 \cdot SE_2)^2 + (1 - a_1 - a_2)^2 SE_3^2 + 2 a_1 \cdot a_2 \cdot S_{1,2} + 2 a_1 (1 - a_1 - a_2) S_{1,3} + 2 a_2 (1 - a_1 - a_2) S_{2,3}]^{0.5}, \quad (10)$$

where all terms are as previously defined.

The above equations, and a similar set where only two methods were weighted, were used to calculate weights and standard errors for all combinations of the three estimating methods. Weighted estimates of monthly streamflow characteristics were made and used as final estimates at 139 sites as indicated in table 1. The standard errors used in the calculations for the basin-characteristics and channel-width methods are based on data from 47 sites, whereas the standard errors for the concurrent-measurement method are based on data from 20 sites. The resultant weights and standard errors for the combinations of methods are given in table 15. In general, the standard errors of the weighted estimates, which range from 24 to 63 percent when all three estimating methods are used, are significantly smaller than the standard errors of the individual estimates. Thus, the weighted estimates are generally considered to be more reliable than any of the individual estimates.

#### Drainage-Area-Ratio Adjustment Method

Seven of the estimation sites were located fairly close to gaged sites or other estimation sites on the same stream. In each of these instances, the estimated monthly streamflow characteristics at the nearby gaged site or other estimation site were transferred to the site of interest by multiplying the estimated monthly streamflow characteristics by the ratio of the drainage area at the site of interest to the drainage area of the nearby site. This drainage-area-ratio adjustment method (table 1) is considered to be applicable only when the drainage areas of the two sites are not substantially different, and when diversions between the estimation site and the nearby gaged or estimation site are not substantial. Standard errors were not determined for the drainage-area-ratio adjustment method because of the small number of sites where the method was applicable.

#### RELIABILITY OF ESTIMATES

Estimates of monthly streamflow characteristics for sites with streamflow-gaging stations (column 3, table 1) are considered to be the most reliable. Indeed, for those gaged sites where the period of actual streamflow record includes the 1937-86 base period, the estimates of monthly streamflow characteristics are based entirely on recorded streamflows and are considered to be perfectly reliable (zero error). For those gaged sites where the streamflow record was extended to the 1937-86 base period, the estimates of monthly streamflow characteristics are subject to the errors of the record extension. In general, the shorter the actual streamflow record and the longer the period of extended record, the less reliable are the estimates of monthly streamflow characteristics.

Seven sites shown as gaged sites in table 1 (sites 172-177 and site 180) are exceptions to the general rules of reliability just described. These sites were not actually gaged but had estimates of monthly mean flow for 1952-54 based on one or two measurements per month (Hackett and others, 1960, p. 60-68). The reliability of the estimated monthly streamflow characteristics for the 1937-86 period for these sites is considered to be less than the reliability of estimates made at any actual gaged site and about equivalent to the reliability of weighted estimates made at ungaged sites.

The numbers of gaged estimation sites with various lengths of actual streamflow record within the 1937-86 base period are shown graphically in figure 3. As indicated, 27 estimation sites had only 0 to 5 years of actual record within the 1937-86 base period.

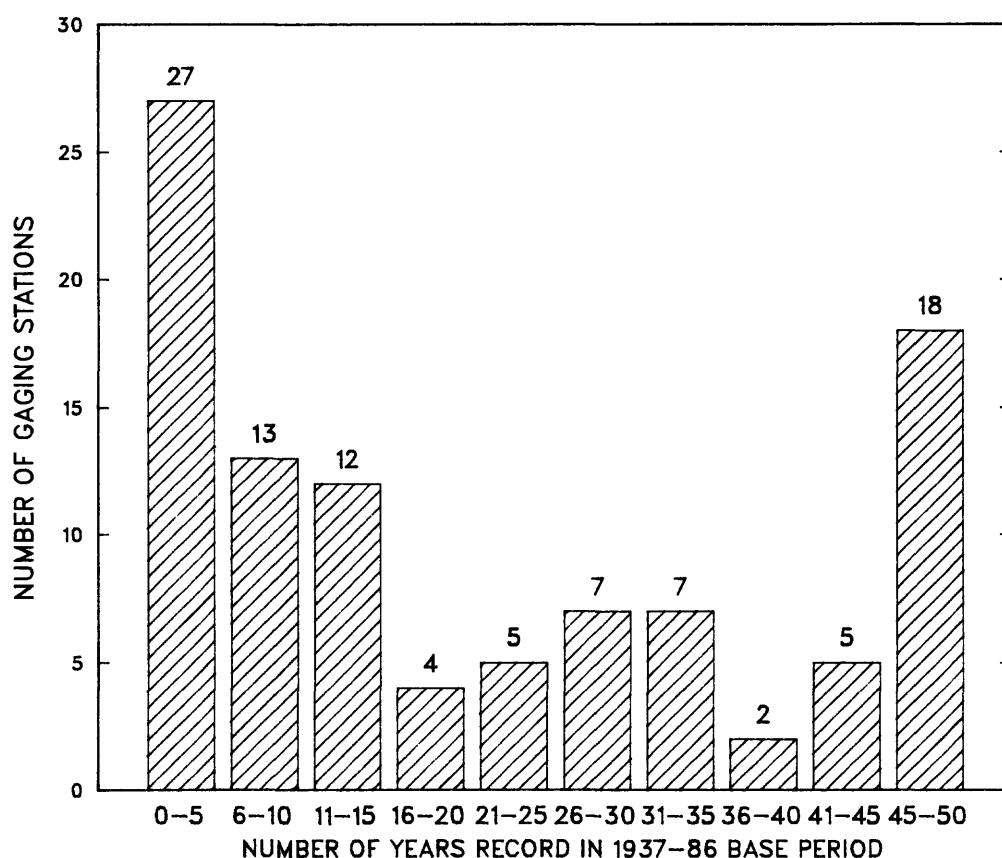


Figure 3.--Number of streamflow-gaging stations with various lengths of record in the 1937-86 base period.

To estimate reliability of the record-extension procedure for various lengths of actual flow record, 20 gaging stations with at least 35 years of record during the 1937-86 base period were tested. The monthly streamflow characteristics for these sites, computed for the 1937-86 base period, were considered to be completely reliable (zero error). A more rigorous test would have required that every site have the complete 50-year base period of record, but only 8 such sites were available. The 20 sites and their periods of record are identified in table 16.

To estimate the error when fewer than 50 years of actual flow record were available (for example 35 years), each test site successively had 35 years of record randomly selected, and all remaining years were removed from the record. The MOVE.1 record-extension procedure was then applied, using the complete data base of 154 stations previously used in the actual record-extension analysis, to fill in the missing years of record at the test site with only 35 years of record. The record-extension procedure was repeated for each station in turn. Adjusting only one of the 20 test sites at a time ensured that the complete streamflow record at each of the other 19 sites was available for filling in missing record at the station being adjusted. The monthly streamflow characteristics at each site then were recomputed from the extended record and were subtracted from the monthly streamflow characteristics computed from the original period of record. For each monthly streamflow characteristic, the standard deviation of the differences, analogous to the standard errors previously described for the estimation methods, was the error criterion for the record length (35 years in this example) being tested.

This procedure was repeated where the record available at each test site was 5, 15, and 25 years. The estimated standard errors for each monthly streamflow characteristic for each record length are given in table 17. The standard errors had the following ranges: 9 (0.04 log unit) to 54 (0.22 log unit) percent for 5 years of record, 5 (0.02 log unit) to 33 (0.14 log unit) percent for 15 years of record, 2 (0.01 log unit) to 31 (0.13 log unit) percent for 25 years of record, and 2 (0.01 log unit) to 23 (0.10 log unit) percent for 35 years of record. The average standard errors for all months, expressed in percentages, for selected monthly streamflow characteristics for the various lengths of record are shown in figure 4. The average standard error decreases substantially as the record length increases from 5 to 15 years and generally decreases slightly as the record length increases from 15 to 50 years. The results in table 17 can be used to assess the relative reliability of the estimates of monthly streamflow characteristics for each gaged estimation site identified in tables 1 and 10.

For estimates made at ungaged sites, weighted-average estimates based on three methods are generally considered to be the most reliable. If only one estimation method was used, the concurrent-measurement method generally provides more reliable estimates than any of the other individual estimating methods. Concurrent-measurement estimates based on more than seven measurements were no more reliable than those based on seven measurements, primarily because the choices for suitable correlating gaged sites were more limited for the ungaged sites with the larger number of measurements than for the ungaged sites with seven measurements.

The reader needs to be aware that the standard errors of estimate previously developed and described for the various methods did not account for errors in the monthly streamflow characteristics resulting from the record-extension procedure. The reported standard errors for the streamflow-estimation methods thus are probably smaller than the true errors. Nevertheless, a comparison of standard errors from table 17 with those from tables 14 and 15 indicates that the errors due to record extension are generally smaller than those due to the streamflow-estimation methods.

The reliability of the monthly streamflow estimates made using the drainage-area-ratio adjustment was not rigorously tested because only a few streams have gaging station pairs that are unaffected by substantial diversions. On the basis of experience gained during this study, the estimates made using drainage-area-

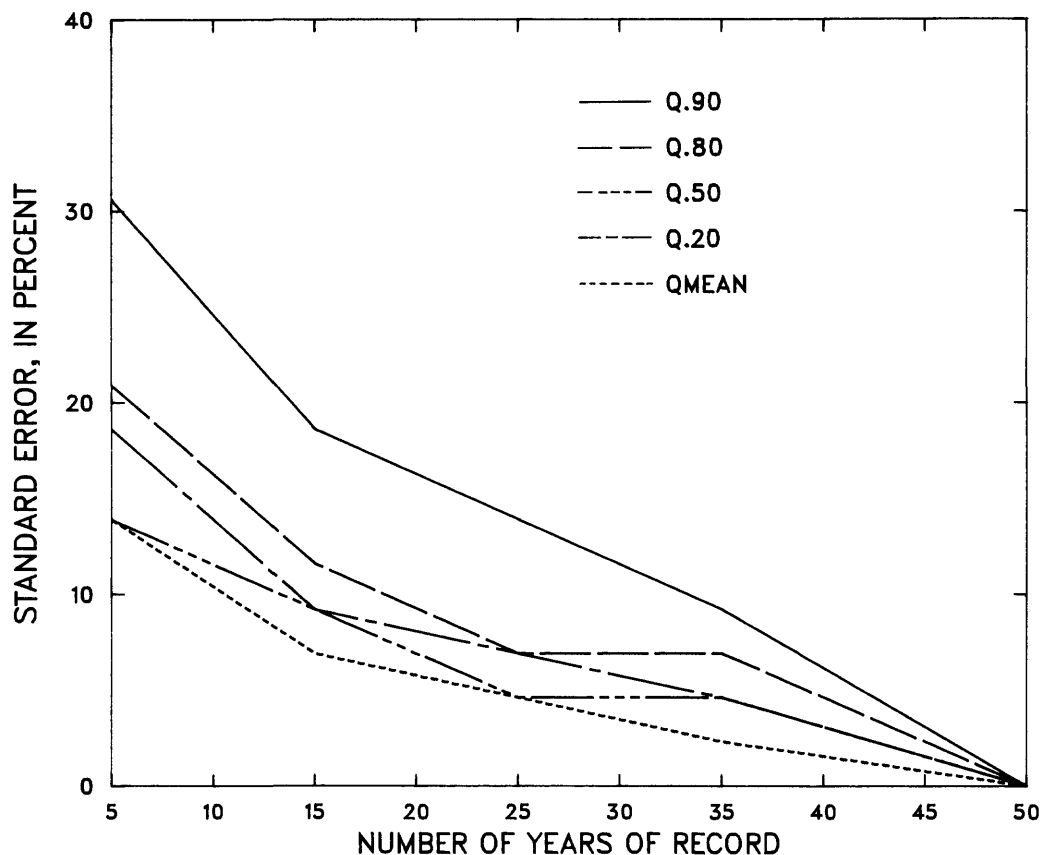


Figure 4.--Average standard errors of estimated monthly streamflow characteristics for various record lengths. Standard error for sites with 50 years of record is assumed to be zero.

ratio adjustment are thought to be at least as reliable as those made using basin characteristics.

#### SUMMARY AND CONCLUSIONS

Monthly mean streamflow that exceeded 90, 80, 50, and 20 percent of the time for all years and mean monthly streamflow for 1937-86 were estimated and are presented in tabular form for 312 sites in the upper Missouri River basin in Montana. Of the 312 sites, 100 had gaged record, 139 had miscellaneous-measurement record, and 73 had no streamflow record. Mean annual streamflow was also estimated for the 312 sites by multiplying each estimate of mean monthly streamflow by the number of days in the month, summing, and dividing by 365.

A streamflow record-extension procedure, based on the MOVE.1 curve-fitting technique, was used as necessary to extend streamflow records to the 1937-86 base period. Results from the record-extension procedure for 47 gaged sites subsequently used in the development of regression equations for estimating monthly streamflow characteristics at ungaged sites were checked to ensure that inter-station correlations did not increase.

Five methods were used to make the estimates at ungaged sites. Regression equations based on basin characteristics were derived from the 1937-86 record at 47 gaged sites. The explanatory variables used in the equations for all monthly streamflow characteristics for all months were drainage area and mean annual precipitation. The coefficients of determination ranged from 0.56 to 0.89, and the standard errors of estimate ranged from 35 to 97 percent. The basin-characteristics equations were used to estimate monthly streamflow characteristics at 179 of the 312 sites.

Regression equations based on active-channel width were also derived for the same 47 gaged sites used in the basin-characteristics method. Coefficients of determination in this case ranged from 0.49 to 0.88, and the standard errors of estimate ranged from 36 to 103 percent. The channel-width equations were used to estimate monthly streamflow characteristics at 138 of the 312 sites.

A concurrent-measurement method, using 7 to 12 concurrent measurements of streamflow at ungaged sites and nearby gaged sites, was developed based on the MOVE.1 curve-fitting technique. Twenty pairs of gaged sites were used to test the reliability of the concurrent-measurement method. Based on the test results, the standard errors of the concurrent-measurement method were estimated to range from 31 to 111 percent. The concurrent-measurement method was used to estimate monthly streamflow characteristics at the 139 sites with miscellaneous-measurement record.

A method was developed for weighting two or more estimates made using the basin-characteristics method, the channel-width method, and the concurrent-measurement method. The standard errors of the weighted-average estimates when all three estimating methods were used ranged from 24 to 63 percent. Weighted-average estimates of monthly streamflow characteristics were made and used as final estimates at 139 of the 312 sites.

A drainage-area-ratio adjustment method was developed for estimating monthly streamflow characteristics at ungaged sites located close to gaged sites or other estimation sites on the same stream. Standard errors were not determined for this method because of the small number of sites where the method was applicable. This method was used to estimate monthly streamflow characteristics at 7 of the 312 sites.

Estimates of monthly streamflow characteristics from gaged records were considered to be the most reliable, and estimates at sites with actual flow record from 1937-86 were considered to be completely reliable (zero error). Twenty gaged sites were used to test the reliability of the record-extension procedure when 5, 15, 25, and 35 years of record were available for 1937-86. The standard errors for the worst case, where only 5 years of record were available, ranged from 9 to 54 percent. For 35 years of record, the standard errors ranged from 2 to 23 percent. The standard errors decreased slightly as the length of record increased from 15 to 35 years.

Weighted-average estimates were considered to be the most reliable estimates made at ungaged sites. For ungaged sites where only one estimation method was used, the concurrent-measurement method generally provided the most reliable estimates. The reliability of the drainage-area-ratio adjustment method was not tested, but, based on experience with the method, the estimates are thought to be at least as reliable as those made using basin characteristics.

#### REFERENCES CITED

- Alley, W.M., and Burns, A.W., 1983, Mixed-station extension of monthly streamflow records: *Journal of Hydraulic Engineering*, v. 109, no. 10, p. 1272-1284.
- Boner, F.C., and Buswell, G.W., 1970, A proposed streamflow data program for Montana: U.S. Geological Survey Open-File Report 70-33, 96 p.
- Hackett, O.M., Visher, F.N., McMurtrey, R.G., and Steinhilber, W.L., 1960, Geology and ground-water resources of the Gallatin Valley, Gallatin County, Montana: U.S. Geological Survey Water-Supply Paper 1482, 282 p.
- Hirsch, R.M., 1982, A comparison of four streamflow record extension techniques: *Water Resources Research*, v. 18, no. 4, p. 1081-1088.
- Hirsch, R.M., and Gilroy, E.J., 1984. Methods of fitting a straight line to data--Examples in water resources: *Water Resources Bulletin*, v. 20, no. 5, p. 705-711.
- Matalas, N.C., and Jacobs, B.A., 1964, A correlation procedure for augmenting hydrologic data: U.S. Geological Survey Professional Paper 434-E, 7 p.
- Osterkamp, W.R., and Hedman, E.R., 1977, Variation of width and discharge for natural high-gradient stream channels: *Water Resources Research*, v. 13, no. 2, p. 256-258.
- Parrett, Charles, and Cartier, K.D., 1989, Methods for estimating monthly streamflow characteristics in western Montana: U.S. Geological Survey Open-File Report 89-40, 52 p.
- U.S. Army Corps of Engineers, 1971, HEC-4 monthly streamflow simulation: Hydrologic Engineering Center, 113 p.
- U.S. Soil Conservation Service, 1981, Average annual precipitation, Montana, based on 1941-1970 base period: Bozeman, Mont., 13 p.
- U.S. Water Resources Council, 1981, Guidelines for determining floodflow frequency: Bulletin 17B, 28 p.

## SUPPLEMENTAL DATA



Table 1.--Sites and methods used for estimating monthly streamflow characteristics

[--, -, not applicable]

Site No.	Stream name	Stream-flow-gaging station No.	Gage	Method for estimating streamflow				
				Basin char-acteristics	Chan-nel width	Con-cur-rent meas-urement	Weight-ed-average estimate	Drain-age-area-ratio adjust-ment
1	Hellroaring Creek near Lakeview	--	-	X	X	X	X	-
2	Corral Creek near Lakeview	--	-	X	X	X	X	-
3	Antelope Creek near Lakeview	--	-	X	X	X	X	-
4	Red Rock Creek near Lakeview	--	-	X	X	X	X	-
5	Tom Creek near Lakeview	--	-	X	X	X	X	-
6	Narrows Creek at mouth, near Lakeview	--	-	X	-	-	-	-
7	Odell Creek near Lakeview	--	-	X	X	X	X	-
8	Jones Creek near Lakeview	--	-	X	X	-	X	-
9	Red Rock River near Kennedy Ranch, near Lakeview	06011000	X	-	-	-	-	-
10	Peet Creek at county road, near Lakeview	--	-	X	X	-	X	-
11	Long Creek near Lakeview	--	-	X	X	X	X	-
12	East Fork Clover Creek at mouth, near Monida	--	-	X	-	-	-	-
13	Red Rock River below Lima Reservoir, near Monida	06012500	X	-	-	-	-	-
14	Cabin Creek above Simpson Creek, near Lima	--	-	X	X	-	X	-
15	Indian Creek above Simpson Creek, near Lima	--	-	X	X	-	X	-
16	Simpson Creek above Indian Creek, near Lima	--	-	X	X	-	X	-
17	Deadman Creek near Dell	--	-	X	X	X	X	-
18	Big Sheep Creek below Muddy Creek, near Dell	06013500	X	-	-	-	-	-
19	Red Rock River at Red Rock	06014500	X	-	-	-	-	-
20	Black Canyon Creek near Grant	--	-	X	X	X	X	-
21	Shennon Creek near mouth, near Grant	--	-	X	X	-	X	-
22	Frying Pan Creek near Grant	--	-	X	X	X	X	-
23	Trapper Creek at mouth, near Grant	--	-	X	X	-	X	-
24	Bear Creek near Grant	--	-	X	X	X	X	-
25	Bloody Dick Creek near Grant	--	-	X	X	X	X	-
26	Horse Prairie Creek near Grant	06015000	X	-	-	-	-	-
27	Rape Creek above reservoir, near Grant	--	-	X	X	-	X	-
28	Painter Creek near Grant	--	-	X	-	-	-	-
29	Browns Canyon Creek near Grant	--	-	X	-	-	-	-
30	Medicine Lodge Creek near Grant	--	-	X	X	X	X	-
32	Pole Creek near mouth, near Polaris	--	-	X	-	-	-	-
33	Reservoir Creek at mouth, near Polaris	--	-	X	-	-	-	-
34	East Fork Dyce Creek at mouth, near Polaris	--	-	X	X	-	X	-
35	West Fork Dyce Creek at mouth, near Polaris	--	-	X	X	-	X	-
36	Grasshopper Creek near Dillon	06015500	X	-	-	-	-	-
37	Beaverhead River at Barretts	06016000	X <sup>1</sup>	-	-	-	-	-
38	East Fork Blacktail Creek near Dillon	--	-	X	X	X	X	-
39	West Fork Blacktail Creek near Dillon	--	-	X	X	X	X	-
40	Blacktail Deer Creek near Dillon	06017500	X	-	-	-	-	-
41	Beaverhead River near Dillon	06018000	X	-	-	-	-	-
42	Beaverhead River near Twin Bridges	06018500	X	-	-	-	-	-
43	Corral Creek at mouth, near Alder	--	-	X	-	-	-	-
44	Coal Creek at mouth, near Alder	--	-	X	-	-	-	-
45	Ruby River above the forks, near Alder	--	-	X	-	-	-	-
46	East Fork Ruby River at mouth, near Alder	--	-	X	-	-	-	-
47	West Fork Ruby River at mouth, near Alder	--	-	X	-	-	-	-
48	Cottonwood Creek at mouth, near Alder	--	-	X	-	-	-	-
49	Warm Springs Creek at mouth, near Alder	--	-	X	-	-	-	-
50	North Fork Greenhorn Creek at mouth, near Alder	--	-	X	X	-	X	-
51	Ruby River above reservoir, near Alder	06019500	X	-	-	-	-	-
52	Mill Creek at Forest Service boundary, near Sheridan	--	-	X	X	X	X	-
53	Wisconsin Creek at Forest Service boundary, near Sheridan	--	-	X	X	X	X	-
54	Ruby River near Twin Bridges	06023000	X	-	-	-	-	-
55	Big Hole River near Jackson	06023500	X	-	-	-	-	-
56	Andrus Creek near mouth, near Jackson	--	-	X	-	-	-	-

Table 1.--Sites and methods used for estimating monthly streamflow characteristics--Continued

Site No.	Stream name	Method for estimating streamflow						
		Stream-flow-gaging station No.	Gage	Basin characteristics	Channel width	Concurrent measurement	Weighted-average estimate	Drainage-area-ratio adjustment
57	Fox Creek at mouth, near Jackson	--	-	X	-	-	-	-
58	Governor Creek near Jackson	--	-	X	X	X <sup>2</sup>	X	-
59	Warm Springs Creek at Jackson	--	-	X	X	X <sup>2</sup>	X	-
60	Miner Creek near Jackson	06024000	X	-	-	-	-	-
61	Big Lake Creek near mouth, near Wisdom	--	-	X	-	-	-	-
62	Steel Creek above Francis Creek, near Wisdom	--	-	X	X	X	X	-
63	Francis Creek at mouth, near Wisdom	--	-	X	-	X	X	-
64	Steel Creek near mouth, near Wisdom	--	-	X	X	X	X	-
65	Swamp Creek near mouth, near Wisdom	--	-	X	X	X <sup>2</sup>	X	-
66	Joseph Creek at mouth, near Wisdom	--	-	X	-	-	-	-
67	Trail Creek near Wisdom	06024500	X	-	-	-	-	-
68	Ruby Creek at mouth, near Wisdom	--	-	X	X	X	X	-
69	Tie Creek at Forest Service boundary, near Wisdom	--	-	X	-	-	-	-
70	Johnson Creek near Wisdom	--	-	X	X	X <sup>2</sup>	X	-
71	Mussigbrod Creek near Wisdom	--	-	X	X	X <sup>2</sup>	X	-
72	North Fork Big Hole River near mouth, near Wisdom	--	-	X	X	X <sup>2</sup>	X	-
73	Big Hole River below North Fork, near Wisdom	--	-	-	-	-	-	X
74	Pintlar Creek near Forest Service boundary, near Wisdom	--	-	X	X	X	X	-
75	Big Hole River below Mudd Creek, near Wisdom	--	-	-	-	X <sup>2</sup>	-	-
76	Fishtrap Creek at mouth, near Wise River	--	-	X	X	X	X	-
77	Lamarche Creek near Wise River	--	-	X	X	X	X	-
78	Seymour Creek near Wise River	--	-	X	-	-	-	-
79	Tenmile Creek at mouth, near Wise River	--	-	X	-	-	-	-
80	Sevenmile Creek at mouth, near Wise River	--	-	X	-	-	-	-
81	Corral Creek at mouth, near Wise River	--	-	X	-	-	-	-
82	Twelvemile Creek at mouth, near Wise River	--	-	X	-	-	-	-
83	Sullivan Creek at mouth, near Wise River	--	-	X	-	-	-	-
84	Oregon Creek near mouth, near Wise River	--	-	X	-	-	-	-
85	California Creek above American Creek, near Wise River	--	-	X	-	-	-	-
86	American Creek at mouth, near Wise River	--	-	X	-	-	-	-
87	Sixmile Creek at mouth, near Wise River	--	-	X	-	-	-	-
88	French Creek near mouth, near Wise River	--	-	X	-	-	-	-
89	Deep Creek near Wise River	--	-	X	X	X	X	-
90	Bear Creek near Wise River	--	-	X	X	X	X	-
91	Bryant Creek at mouth, near Wise River	--	-	X	-	-	-	-
92	Big Hole River near Wise River	06024580	X	-	-	-	-	-
93	Johnson Creek at mouth, near Wise River	--	-	X	-	-	-	-
94	Meadow Creek near Wise River	--	-	X	-	-	-	-
95	Jacobson Creek at mouth, near Wise River	--	-	X	-	-	-	-
96	Mono Creek at mouth, near Wise River	--	-	X	-	-	-	-
97	Wyman Creek at mouth, near Wise River	--	-	X	-	-	-	-
98	Lacy Creek at mouth, near Wise River	--	-	X	-	-	-	-
99	Gold Creek at mouth, near Wise River	--	-	X	-	-	-	-
100	Pattengail Creek at mouth, near Wise River	--	-	X	-	-	-	-
101	Sheep Creek at mouth, near Wise River	--	-	X	-	-	-	-
102	Wise River near Wise River	06024590	X	-	-	-	-	-
103	Adson Creek at mouth, near Wise River	--	-	X	-	-	-	-
104	Jerry Creek near Wise River	--	-	X	X	X	X	-
105	Divide Creek at Divide	--	-	X	X	X	X	-
106	Canyon Creek near Divide	--	-	X	X	X	X	-
107	Moose Creek near Divide	--	-	X	X	X	X	-
108	Trapper Creek near Melrose	--	-	X	X	X	X	-
109	Camp Creek at Melrose	--	-	X	X	X	X	-
110	Big Hole River near Melrose	06025500	X	-	-	-	-	-
111	Willow Creek near Glen	06025800	X	-	-	-	-	-

Table 1.--Sites and methods used for estimating monthly streamflow characteristics--Continued

Site No.	Stream name	Method for estimating streamflow						
		Stream-flow-gaging station No.	Gage	Basin characteristics	Channel width	Concurrent measurement	Weighted-average estimate	Drainage-area-ratio adjustment
112	Birch Creek near Glen	06026000	X	-	-	-	-	-
113	Hells Canyon Creek near Twin Bridges	--	-	X	X	X	X	-
114	Jefferson River near Twin Bridges	06026500	X	-	-	-	-	-
115	Whitetail Creek near Whitehall	06029000	X	-	-	-	-	-
117	Boulder River above High Ore Creek, near Basin	--	-	-	-	-	-	X
118	Boulder River near Boulder	06033000	X	-	-	-	-	-
119	Little Boulder River near Boulder	--	X <sup>3</sup>	-	-	-	-	-
120	Boulder River above Cabin Gulch, near Boulder	--	-	-	-	-	-	X
121	Boulder River near Cardwell	--	-	-	-	X <sup>4</sup>	-	-
122	South Boulder River near Jefferson Island	06034000	X	-	-	-	-	-
123	Jefferson River at Sappington	06034500	X	-	-	-	-	-
124	South Willow Creek near Pony	--	-	X	X	X	X	-
125	North Willow Creek at Pony	--	-	X	X	X	X	-
126	Willow Creek near Harrison	06035000	X	-	-	-	-	-
127	Norwegian Creek near Harrison	06035500	X	-	-	-	-	-
129	Jefferson River near Three Forks	06036650	X	-	-	-	-	-
130	Madison River near West Yellowstone	06037500	X	-	-	-	-	-
131	Duck Creek near West Yellowstone	--	-	X	X	X	X	-
132	Cougar Creek near West Yellowstone	--	-	X	X	X	X	-
133	Grayling Creek near West Yellowstone	--	-	X	X	X	X	-
134	Red Canyon Creek near West Yellowstone	--	-	X	X	X	X	-
135	South Fork Madison River near West Yellowstone	--	-	-	-	X	-	-
136	Watkins Creek near West Yellowstone	--	-	X	X	X	X	-
137	Trapper Creek near West Yellowstone	--	-	X	X	X	X	-
138	Madison River below Hebgen Lake, near Grayling	06038500	X	-	-	-	-	-
139	Cabin Creek near West Yellowstone	--	-	X	X	X	X	-
140	Beaver Creek near West Yellowstone	--	-	X	X	X	X	-
141	Elk River at mouth, near Cameron	--	-	X	-	-	-	-
142	Soap Creek at mouth, near Cameron	--	-	X	-	-	-	-
143	Antelope Creek at mouth, near Cameron	--	-	X	-	-	-	-
144	West Fork Madison River near Cameron	06039200	X	-	-	-	-	-
145	Squaw Creek near Cameron	--	-	X	X	X	X	-
146	Standard Creek near Cameron	--	-	X	X	X	X	-
147	Ruby Creek near Cameron	--	-	X	X	X	X	-
148	Indian Creek near Cameron	--	-	X	X	X	X	-
149	Madison River near Cameron	06040000	X	-	-	-	-	-
150	Blaine Spring Creek near Cameron	06040010	X <sup>5</sup>	-	-	-	-	-
151	O'Dell Creek near Ennis	--	-	-	-	X	-	-
152	Jack Creek near Ennis	06040300	X	-	-	-	-	-
153	Moore Creek at Ennis	--	-	X	X	X	X	-
154	North Fork Meadow Creek at Forest Service boundary, near Ennis	--	-	X	X	X	X	-
155	North Fork Meadow Creek at Highway 287, near Ennis	--	-	-	X	X	X	-
156	Madison River below Ennis Lake, near McAllister	06041000	X	-	-	-	-	-
157	Hot Springs Creek near Norris	--	-	X	X	X	X	-
158	Cherry Creek near Norris	--	-	X	X	X	X	-
159	Madison River near Three Forks	06042500	X	-	-	-	-	-
160	Cache Creek at mouth, near West Yellowstone	--	-	X	-	-	-	-
161	Taylor Creek near Grayling	06043000	X	-	-	-	-	-
162	Porcupine Creek near Gallatin Gateway	--	-	X	X	X	X	-
163	Gallatin River above West Fork, near Big Sky	--	-	-	-	-	-	X

Table 1.--Sites and methods used for estimating monthly streamflow characteristics--Continued

Site No.	Stream name	Stream-flow-gaging station No.	Gage	Method for estimating streamflow				Drain-age-area-ratio adjust-ment
				Basin char-acteris-tics	Chan-nel width	Con-cur-rent meas-ure-ment	Weight-ed-average estimate	
164	South Fork West Fork Gallatin River near Gallatin Gateway	--	-	X	X	X	X	-
165	Middle Fork West Fork Gallatin River near Gallatin Gateway	--	-	X	X	X	X	-
166	West Fork Gallatin River near Gallatin Gateway	--	-	X	X	X	X	-
167	Squaw Creek near Gallatin Gateway	--	-	X	X	X	X	-
168	Hellroaring Creek near Gallatin Gateway	--	-	X	X	X	X	-
169	South Fork Spanish Creek near Gallatin Gateway	--	-	X	X	X	X	-
170	Spanish Creek near Gallatin Gateway	--	-	X	X	X	X	-
171	Gallatin River near Gallatin Gateway	06043500	X	-	-	-	-	-
172	Big Bear Creek near Gallatin Gateway	--	X <sup>6</sup>	-	-	-	-	-
173	South Cottonwood Creek near Gallatin Gateway	06044500	X <sup>6</sup>	-	-	-	-	-
174	Baker Creek near Manhattan	--	X <sup>6</sup>	-	-	-	-	-
175	Rocky Creek near Bozeman	06046500	X <sup>6</sup>	-	-	-	-	-
176	Bear Canyon Creek near Bozeman	06047000	X <sup>6</sup>	-	-	-	-	-
177	Sourdough Creek near Bozeman	06047500	X <sup>6</sup>	-	-	-	-	-
178	East Gallatin River at Bozeman	06048000	X	-	-	-	-	-
179	Bridger Creek near Bozeman	06048500	X	-	-	-	-	-
180	East Gallatin River near Belgrade	06049000	X <sup>6</sup>	-	-	-	-	-
181	East Fork Hyalite Creek near Bozeman	--	X <sup>7</sup>	-	-	-	-	-
182	West Fork Hyalite Creek near Bozeman	--	X <sup>7</sup>	-	-	-	-	-
183	Hyalite Creek at Hyalite Ranger Station, near Bozeman	06050000	X	-	-	-	-	-
184	Hyalite Creek above Interstate 90, near Bozeman	--	-	-	X	X	X	-
185	Thompson Creek near Belgrade	--	X <sup>6</sup>	-	-	-	-	-
186	Ben Hart Creek near Belgrade	--	X <sup>6</sup>	-	-	-	-	-
187	Reese Creek near Belgrade	06051000	X <sup>6</sup>	-	-	-	-	-
188	East Gallatin River near Manhattan	--	-	X	X	X	X	-
189	Gallatin River near Logan	06052500	X	-	-	-	-	-
190	Sixteenmile Creek near Ringling	06053000	X	-	-	-	-	-
191	Sixteenmile Creek near Maudlow	--	-	-	-	-	-	X
192	Sixteenmile Creek near Toston	--	-	X	X	X	X	-
193	Missouri River near Toston	06054500	X	-	-	-	-	-
194	Crow Creek near Radersburg	06055500	X	-	-	-	-	-
195	Dry Creek near Toston	--	-	X	X	X	X	-
196	Deep Creek below North Fork, near Townsend	--	-	X	X	X	X	-
197	Duck Creek near Townsend	--	-	X	X	X	X	-
198	Confederate Gulch near Winston	--	-	X	X	X	X	-
199	Beaver Creek near Winston	--	X <sup>8</sup>	-	-	-	-	-
200	Avalanche Gulch near Winston	--	-	X	X	X	X	-
201	Spokane Creek near East Helena	--	-	X	X	X	X	-
202	McGuire Creek at county road, near East Helena	--	-	-	-	X	-	-
203	Trout Creek at mouth, near East Helena	--	-	X	X	X	X	-
204	Prickly Pear Creek near Clancy	06061500	X	-	-	-	-	-
205	Prickly Pear Creek at mouth, near East Helena	--	-	X	X	X	X	-
206	Tenmile Creek near Rimini	06062500	X	-	-	-	-	-
207	Tenmile Creek near Helena	06063000	X	-	-	-	-	-
208	Sevenmile Creek near mouth, near Helena	--	-	X	X	X	X	-
209	Tenmile Creek at mouth, near East Helena	--	-	-	X	X	X	-
210	Silver Creek at Interstate 15, near Helena	--	-	-	-	X	-	-
211	Beaver Creek at mouth, near East Helena	--	X <sup>8</sup>	-	-	-	-	-
212	Elkhorn Creek near mouth, near Wolf Creek	--	-	X	X	X	X	-
213	Willow Creek below Elkhorn Creek, near Wolf Creek	--	-	X	X	X	X	-

Table 1.--Sites and methods used for estimating monthly streamflow characteristics--Continued

Site No.	Stream name	Stream-flow-gaging station No.	Gage	Method for estimating streamflow				
				Basin char-acteris-tics	Chan-nel width	Con-cur-rent meas-ure-ment	Weight-ed-average estimate	Drain-age-area-ratio adjust-ment
214	Cottonwood Creek above Beartooth Ranch, near Wolf Creek	--	-	X	X	X	X	-
217	Virginia Creek at mouth, near Canyon Creek	--	-	X	X	X	X	-
218	Canyon Creek below Cottonwood Creek, near Canyon Creek	--	-	X	X	X	X	-
219	Little Prickly Pear Creek near Canyon Creek	06071000	X	-	-	-	-	-
220	Lyons Creek near Wolf Creek	--	-	X	X	X	X	-
221	Wolf Creek at mouth, at Wolf Creek	--	-	X	X	X	X	-
222	Little Prickly Pear Creek near Wolf Creek	06071300	X	-	-	-	-	-
223	Wegner Creek near Craig	--	-	X	X	-	X	-
224	Stickney Creek near Craig	--	-	X	-	-	-	-
226	Middle Fork Dearborn River at Highway 200, near Wolf Creek	--	-	X	X	X	X	-
227	South Fork Dearborn River at Highway 434, near Wolf Creek	--	-	X	X	X	X	-
228	Dearborn River near Craig	06073500	X	-	-	-	-	-
229	Flat Creek above Slew Creek, near Craig	--	-	X	X	X	X	-
230	Sheep Creek at mouth, near Cascade	--	-	X	X	X	X	-
232	North Fork Smith River at Highway 89, near White Sulphur Springs	--	-	-	X	X	X	-
233	South Fork Smith River at mouth, near White Sulphur Springs	--	-	X	X	X	X	-
234	Smith River below forks, near White Sulphur Springs	--	-	-	X	X	X	-
235	Big Birch Creek at mouth, near White Sulphur Springs	--	-	X	X	X	X	-
236	Newlan Creek below Charcoal Gulch, near White Sulphur Springs	--	-	X	X	X	X	-
237	Camas Creek near mouth, near White Sulphur Springs	--	-	X	X	X	X	-
238	Smith River near Fort Logan	06076690	X	-	-	-	-	-
239	Sheep Creek near White Sulphur Springs	06077000	X	-	-	-	-	-
240	Sheep Creek near mouth, near White Sulphur Springs	--	-	X	X	X	X	-
241	Eagle Creek near mouth, near White Sulphur Springs	--	-	X	X	X	X	-
242	Rock Creek River below Buffalo Canyon, near White Sulphur Springs	--	-	X	X	X	X	-
243	Tenderfoot Creek below South Fork, near White Sulphur Springs	--	-	X	X	X	X	-
244	Smith River near Eden	06077500	X	-	-	-	-	-
245	Hound Creek near mouth, near Cascade	--	-	X	X	X	X	-
246	Missouri River near Ulm	06078200	X	-	-	-	-	-
247	North Fork Sun River near Augusta	06078500	X	-	-	-	-	-
248	Sun River near Augusta	06080000	X	-	-	-	-	-
249	Sun River below diversion dam, near Augusta	06080900	X	-	-	-	-	-
250	Willow Creek near Anderson Lake, near Augusta	--	-	X	X	X	X	-
251	North Fork Willow Creek below Cutrock Creek, near Augusta	--	-	X	X	X	X	-
254	Smith Creek near Augusta	06082500	X	-	-	-	-	-
255	Ford Creek near Augusta	06083500	X	-	-	-	-	-
256	Elk Creek near Augusta	06084500	X	-	-	-	-	-
257	Sun River at Simms	06085800	X	-	-	-	-	-
260	Missouri River near Great Falls	06090300	X	-	-	-	-	-
261	Dry Fork at mouth, at Monarch	--	-	X	X	X	X	-

Table 1.--Sites and methods used for estimating monthly streamflow characteristics--Continued

Site No.	Stream name	Method for estimating streamflow						
		Stream-flow-gaging station No.	Gage	Basin characteristics	Channel width	Concurrent measurement	Weighted-average estimate	Drainage-area-ratio adjustment
262	Tillinghast Creek above Joice Creek, near Monarch	--	-	X	X	X	X	-
263	Pilgrim Creek at mouth, near Monarch	--	-	X	X	-	X	-
264	Logging Creek at Logging Creek Campground, near Monarch	--	-	X	X	X	X	-
265	Belt Creek near Monarch	06090500	X	-	-	-	-	-
266	Big Otter Creek above Never Sweat Creek, near Raynesford	--	-	-	X	X	X	-
267	Belt Creek near Portage	06090610	X	-	-	-	-	-
268	Highwood Creek below Smith Creek, near Highwood	--	-	X	X	X	X	-
269	Missouri River at Fort Benton	06090800	X	-	-	-	-	-
270	Shonkin Creek below Bishop Creek, near Highwood	--	-	X	X	X	X	-
271	South Fork Two Medicine River near East Glacier	--	-	X	X	X	X	-
273	South Fork Badger Creek near Browning	--	-	X	-	-	-	-
274	North Fork Badger Creek near Browning	--	-	X	-	-	-	-
278	Birch Creek at Swift Dam, near Valier	06094500	X	-	-	-	-	-
279	South Fork Dupuyer Creek near Dupuyer	--	-	X	-	-	-	-
280	North Fork Dupuyer Creek near Dupuyer	--	-	X	-	-	-	-
281	Dupuyer Creek below Scoffin Creek, near Dupuyer	--	-	X	X	X	X	-
282	Birch Creek near Valier	06098100	X	-	-	-	-	-
283	Cut Bank Creek near Browning	06098500	X	-	-	-	-	-
284	Cut Bank Creek at Cut Bank	06099000	X	-	-	-	-	-
285	Marias River at Sullivan Bridge, near Cut Bank	--	-	-	-	X	-	-
286	Marias River near Shelby	06099500	X	-	-	-	-	-
287	Marias River at "F" Bridge, above Tiber Reservoir, near Shelby	--	-	-	-	-	-	X
288	Marias River near Loma	06102050	X	-	-	-	-	-
290	Teton River near Strabane	--	-	-	-	X	-	-
291	McDonald Creek near Strabane	--	-	-	-	X	-	-
292	North Fork Deep Creek near Choteau	--	-	X	-	-	-	-
293	South Fork Deep Creek near Choteau	--	-	X	-	-	-	-
294	Deep Creek near Choteau	--	-	-	-	X	-	-
295	Teton River near Dutton	06108000	X	-	-	-	-	-
296	Missouri River at Virgelle	06109500	X	-	-	-	-	-
297	Lost Creek at mouth, near Utica	--	-	X	-	-	-	-
298	Yogo Creek at mouth, near Utica	--	-	X	X	X	X	-
299	Middle Fork Judith River near Utica	06109780	X	-	-	-	-	-
301	South Fork Judith River at Indian Hill Campground, near Utica	--	-	-	X	X	X	-
303	Judith River above Courtneys Creek, at Utica	--	-	-	X	X	X	-
306	East Fork Big Spring Creek at mouth, near Lewistown	--	-	X	X	X	X	-
307	Big Spring Creek above Cottonwood Creek, near Hanover	--	-	-	-	X	-	-
309	Cottonwood Creek at Highway 200, near Lewistown	--	-	-	X	X	X	-
310	Beaver Creek at county road, near Lewistown	--	-	X	X	X	X	-
311	Big Spring Creek at mouth, near Lewistown	--	-	-	-	X	-	-
312	Warm Springs Creek above Meadow Creek, near Hilger	--	-	-	-	X	-	-
313	Judith River near Winifred	06113500	X	-	-	-	-	-
315	Cow Creek below forks, near Cleveland	--	-	X	X	-	X	-
316	Missouri River near Landusky	06115200	X	-	-	-	-	-
317	North Fork Musselshell River near Delpine	06115500	X	-	-	-	-	-

Table 1.--Sites and methods used for estimating monthly streamflow characteristics--Continued

Site No.	Stream name	Stream-flow-gaging station No.	Gage	Method for estimating streamflow				
				Basin char-acteris-tics	Chan-nel width	Con-current meas-ure-ment	Weight-ed-average estimate	Drain-age-area-ratio adjust-ment
318	Checkerboard Creek near Checkerboard	--	-	X	X	X	X	-
319	Spring Creek below Whitetail Creek, near Checkerboard	--	-	X	X	X	X	-
320	North Fork Musselshell River near mouth, near Martinsdale	--	-	-	X	X	X	-
321	Alabaugh Creek at mouth, near Lennep	--	-	X	X	X	X	-
322	Cottonwood Creek below Loco Creek, near Martinsdale	--	-	X	X	X	X	-
323	South Fork Musselshell River above Martinsdale	06118500	X	-	-	-	-	-
324	Big Elk Creek at mouth, at Twodot	06120000	X	-	-	-	-	-
325	Musselshell River at Harlowton	06120500	X	-	-	-	-	-
326	American Fork near Harlowton	06121000	X	-	-	-	-	-
330	Careless Creek below Little Careless Creek, near Hedgesville	--	-	-	X	X	X	-
331	Swimming Woman Creek below Dry Coulee, near Franklin	--	-	-	X	X	X	-
333	Musselshell River near Roundup	06126500	X	-	-	-	-	-
335	Flatwillow Creek below the forks, near Grass Range	--	-	X	X	X	X	-
338	Musselshell River near Mosby	06130500	X	-	-	-	-	-
339	Big Dry Creek above Little Dry Creek, near Van Norman	--	-	-	-	-	-	X
340	Little Dry Creek near Van Norman	--	-	-	-	X	-	-
341	Big Dry Creek near Van Norman	06131000	X	-	-	-	-	-
Totals			100	179	138	139	139	7

<sup>1</sup>Monthly streamflow characteristics based on record after construction of Clark Canyon Reservoir.<sup>2</sup>Based on 12 streamflow measurements made in water years 1982-83.<sup>3</sup>U.S. Soil Conservation Service gage.<sup>4</sup>Based on 12 streamflow measurements made in water year 1986.<sup>5</sup>Gaged record available for 1 year (water years 1971-72).<sup>6</sup>Estimated monthly flows available for water years 1952-54.<sup>7</sup>Montana Department of Natural Resources and Conservation gage.<sup>8</sup>U.S. Forest Service gage.

Table 2.--Streamflow-gaging stations used for record-extension analysis

Site No.	Stream name	Station No.	Period of record since 1906 (water year)
9	Red Rock River near Kennedy Ranch, near Lakeview	06011000	1936-67
13	Red Rock River below Lima Reservoir, near Monida	06012500	1911-19; 1925-69; 1974-82; 1985-86
18	Big Sheep Creek below Muddy Creek, near Dell	06013500	1936; 1946-53; 1961-80
19	Red Rock River at Red Rock	06014500	1974-83
26	Horse Prairie Creek near Grant	06015000	1928; 1932; 1935-36; 1946-53
31	Beaverhead River near Grant	06015400	1963-84
36	Grasshopper Creek near Dillon	06015500	1921-33; 1946-58; 1960-61
37	Beaverhead River at Barretts	06016000	1908-86
40	Blacktail Deer Creek near Dillon	06017500	1946-66
41	Beaverhead River near Dillon	06018000	1951-52; 1963-84
42	Beaverhead River near Twin Bridges	06018500	1935-86
51	Ruby River above reservoir, near Alder	06019500	1938-86
54	Ruby River near Twin Bridges	06023000	1940-43; 1946-65; 1979-81
55	Big Hole River near Jackson	06023500	1948-54
60	Miner Creek near Jackson	06024000	1948-54
67	Trail Creek near Wisdom	06024500	1948-54; 1967-72
92	Big Hole River near Wise River	06024580	1979-81
102	Wise River near Wise River	06024590	1972-85
110	Big Hole River near Melrose	06025500	1924-86
111	Willow Creek near Glen	06025800	1962-66
112	Birch Creek near Glen	06026000	1946-53; 1955-77
114	Jefferson River near Twin Bridges	06026500	1940-43; 1958-72
115	Whitetail Creek near Whitehall	06029000	1950-68
116	Boulder River above Rock Creek, near Basin	06030500	1936; 1946-58
119	Little Boulder River near Boulder	06032999	1963-68; 1974-80; 1982
118	Boulder River near Boulder	06033000	1929-73; 1985-86
122	South Boulder River near Jefferson Island	06034000	1926-33
123	Jefferson River at Sappington	06034500	1938-70
126	Willow Creek near Harrison	06035000	1938-85
127	Norwegian Creek near Harrison	06035500	1938-43; 1946-51
128	Willow Creek near Willow Creek	06036500	1919-33; 1946-57
129	Jefferson River near Three Forks	06036650	1978-86
130	Madison River near West Yellowstone	06037500	1913-73; 1983-86
138	Madison River below Hebgen Lake, near Grayling	06038500	1939-86
144	West Fork Madison River near Cameron	06039200	1965-67
149	Madison River near Cameron	06040000	1952-63; 1968-71
150	Blaine Spring Creek near Cameron	06040010	1971-72
152	Jack Creek near Ennis	06040300	1973-85
156	Madison River below Ennis Lake, near McAllister	06041000	1939-86
159	Madison River near Three Forks	06042500	1929-32; 1942-50
161	Taylor Creek near Grayling	06043000	1946-57; 1966-67
171	Gallatin River near Gallatin Gateway	06043500	1930-82; 1985-86
172	Big Bear Creek near Gallatin Gateway	06044099	1951-54
173	South Cottonwood Creek near Gallatin Gateway	06044500	1951-54
174	Baker Creek near Manhattan	06045099	1951-54
175	Rocky Creek near Bozeman	06046500	1951-54
176	Bear Canyon Creek near Bozeman	06047000	1951-54
177	Sourdough Creek near Bozeman	06047500	1951-54
178	East Gallatin River at Bozeman	06048000	1939-61
179	Bridger Creek near Bozeman	06048500	1946-72
180	East Gallatin River near Belgrade	06049000	1951-54
182	West Fork Hyalite Creek near Bozeman	06049899	1975-86
181	East Fork Hyalite Creek near Bozeman	06049999	1975-86
183	Hyalite Creek at Hyalite Ranger Station, near Bozeman	06050000	1934-86
185	Thompson Creek near Belgrade	06050599	1951-54



Table 4.--Estimated monthly streamflow characteristics for October and November

[Q.XX, monthly mean streamflow for specified month exceeded XX percent of the years, in cubic feet per second; QM, mean monthly streamflow for specified month, in cubic feet per second]

Site No.	Stream name	October					November				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
1	Hellroaring Creek near Lakeview	6	7	9	11	9	5	6	7	8	7
2	Corral Creek near Lakeview	.7	.8	1	1	1	.6	.7	.9	1	.8
3	Antelope Creek near Lakeview	.1	.2	.2	.4	.3	.1	.2	.2	.3	.3
4	Red Rock Creek near Lakeview	11	12	14	17	15	10	11	12	14	12
5	Tom Creek near Lakeview	.4	.5	.7	1	1	.3	.4	.5	1	.8
6	Narrows Creek at mouth, near Lakeview	.1	.2	.3	.5	.4	.1	.2	.2	.3	.3
7	Odell Creek near Lakeview	5	6	7	9	8	4	5	6	7	6
8	Jones Creek near Lakeview	.5	.7	1	2	1	.4	.6	.9	1	1
9	Red Rock River near Kennedy Ranch, near Lakeview	38	49	66	88	67	41	48	70	84	67
10	Peet Creek at county road, near Lakeview	.5	.7	1	2	1	.5	.6	.9	1	1
11	Long Creek near Lakeview	2	3	3	5	4	2	2	3	4	3
12	East Fork Clover Creek at mouth, near Monida	.7	1	1	2	2	.6	.8	1	2	1
13	Red Rock River below Lima Reservoir, near Monida	11	17	45	84	57	5	12	23	58	40
14	Cabin Creek above Simpson Creek, near Lima	.2	.3	.5	.8	.6	.2	.3	.4	.6	.5
15	Indian Creek above Simpson Creek, near Lima	.3	.5	.7	1	.8	.3	.4	.6	1	.7
16	Simpson Creek above Indian Creek, near Lima	.4	.5	.8	1	1	.3	.5	.7	1	.8
17	Deadman Creek near Dell	3	4	5	7	5	3	4	5	6	5
18	Big Sheep Creek below Muddy Creek, near Dell	39	46	59	72	59	45	47	54	62	55
19	Red Rock River at Red Rock	180	210	290	360	300	190	220	260	300	270
20	Black Canyon Creek near Grant	2	2	2	3	3	2	2	2	3	2
21	Shennon Creek near mouth, near Grant	.4	.6	.8	1	1	.4	.5	.7	1	.7
22	Frying Pan Creek near Grant	1	2	2	3	2	1	2	2	2	2
23	Trapper Creek at mouth, near Grant	.3	.4	.7	1	.8	.3	.4	.6	.7	.6
24	Bear Creek near Grant	3	3	4	5	4	3	3	4	4	4
25	Bloody Dick Creek near Grant	11	13	17	22	18	11	13	15	19	16
26	Horse Prairie Creek near Grant	29	34	44	57	45	33	37	44	54	45
27	Rape Creek above reservoir, near Grant	.2	.3	.5	.7	.5	.2	.3	.4	.5	.4
28	Painter Creek near Grant	2	2	3	4	3	1	2	3	3	3
29	Browns Canyon Creek near Grant	1	1	2	3	2	.9	1	2	2	2
30	Medicine Lodge Creek near Grant	5	6	8	12	10	4	6	8	13	10
32	Pole Creek near mouth, near Polaris	.6	.8	1	2	1	.5	.7	1	1	1
33	Reservoir Creek at mouth, near Polaris	.9	1	2	2	2	.7	1	1	2	1
34	East Fork Dyce Creek at mouth, near Polaris	.5	.8	1	2	1	.5	.7	1	1	1
35	West Fork Dyce Creek at mouth, near Polaris	.3	.4	.6	1	.8	.2	.4	.6	.8	.6
36	Grasshopper Creek near Dillon	24	27	34	46	36	29	34	39	45	39
37	Beaverhead River at Barretts	200	230	360	480	380	190	250	410	520	390
38	East Fork Blacktail Creek near Dillon	15	17	21	22	19	16	16	19	19	17
39	West Fork Blacktail Creek near Dillon	5	7	10	12	9	7	7	9	11	9
40	Blacktail Deer Creek near Dillon	35	38	44	49	44	30	35	42	50	44
41	Beaverhead River near Dillon	140	180	330	520	380	280	340	490	610	500

Table 3.--Change in average inter-station correlation  
as a result of record extension

Station No.	Change in average inter-station correlation for specified month											
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
06011000	-0.04	0.10	-0.45	0.06	0.66	0.53	-0.17	0.05	0.12	0.10	-0.03	-0.01
06013500	.03	-.03	.01	.15	.25	-.01	-.04	-.06	.04	.12	.02	.15
06015500	-.11	-.04	.03	.14	.20	-.06	-.19	-.19	.04	.02	-.12	-.05
06017500	.06	-.10	-.06	-.02	.12	.05	.20	-.01	.09	.11	.06	.12
06019500	.11	.12	.07	.13	.11	.19	-.01	-.03	-.02	.06	-.02	.06
06024500	-.12	.12	.16	.30	.06	.12	.05	.02	-.01	.18	.03	.23
06024590	.10	.10	.13	-.01	.08	-.21	-.06	.03	-.06	-.13	-.08	.11
06029000	.15	.17	-.18	.24	.95	.44	-.07	.14	.09	.05	.15	.03
06030500	-.15	-.11	.09	.16	.36	.22	-.09	.04	.07	-.01	-.03	-.15
06033000	-.09	-.02	-.04	.00	.04	.02	-.05	.01	-.01	.02	-.08	-.07
06040300	-.16	-.21	-.16	-.03	.06	-.17	.07	.09	.09	-.17	-.22	.02
06043000	-.15	-.19	-.10	.31	.40	.23	-.05	-.23	.22	.25	.14	.10
06043500	-.02	.00	.00	.12	.18	.06	-.04	-.03	.08	.04	-.04	.01
06048000	-.10	.13	.03	.09	.18	.07	-.12	.10	-.02	-.01	-.02	.10
06048500	-.04	-.03	-.02	.07	.12	-.05	-.10	.10	.00	-.05	-.04	-.03
06050000	.01	-.01	-.02	.00	.10	.12	-.01	-.03	.05	.01	.03	.04
06055500	-.09	-.17	.19	.66	.10	-.15	-.20	.16	-.14	-.08	-.08	-.15
06061500	-.02	.01	.03	.01	.04	.03	.05	-.02	.00	.00	-.04	-.03
06062500	-.07	-.01	-.01	.05	.12	.05	-.08	.04	-.02	-.03	-.06	-.04
06073000	-.14	-.13	-.13	.02	.02	.09	.06	.01	-.08	-.05	-.13	-.11
06074500	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
06077000	.09	.12	.03	.11	.19	.15	-.06	-.05	-.01	.10	.01	.09
06078500	-.09	-.07	.06	-.06	.10	-.01	-.09	-.06	-.03	-.10	-.04	-.10
06090500	-.16	-.07	.06	-.01	-.01	-.06	-.11	.29	-.09	-.11	-.04	-.09
06092500	-.09	-.05	.05	.11	.21	-.03	-.22	.04	-.03	.06	-.03	-.08
06102500	.04	.06	-.13	.14	.27	.56	-.01	.33	-.01	.01	-.10	.07
06109800	-.17	.02	.03	.05	-.08	-.12	-.18	.06	-.07	-.07	-.12	-.13
06110000	-.02	.01	.08	.08	.12	.12	-.07	.11	.04	.00	-.09	.00
06115500	.01	.00	-.03	.09	.08	.04	.00	.03	.06	.05	-.01	.04
06118500	-.11	-.04	.04	.10	.00	.09	-.11	-.02	.00	.02	-.08	-.01
06191800	.00	-.14	.05	-.05	.43	.27	.06	.07	.01	-.18	-.11	.24
06193000	-.05	-.02	-.04	-.03	.07	.14	-.06	-.10	.10	.08	.01	-.09
06193500	-.07	-.01	-.09	.00	.02	.06	-.04	-.02	-.04	.06	-.09	-.04
06194000	-.04	-.04	-.07	-.03	.09	-.02	-.15	-.13	.00	.04	-.13	.02
12323500	-.11	.13	-.04	.05	-.04	-.03	-.06	.00	-.01	.00	-.08	-.01
12324100	-.12	-.04	-.14	.11	.20	-.06	-.05	.12	-.01	.00	-.13	-.09
12324590	-.16	-.12	-.13	-.06	.06	-.06	-.03	-.08	-.08	-.19	-.11	-.02
12330000	-.04	.02	.03	.03	.10	.09	-.05	-.05	.00	-.01	-.07	.00
12332000	-.03	-.01	-.02	.02	.11	.06	-.03	-.02	.03	.01	-.02	.05
12335500	-.05	.01	.07	.07	.07	.09	.00	-.01	-.01	.00	-.03	-.02
12343400	-.05	-.09	-.15	-.05	-.20	-.10	-.05	.14	.10	.12	-.04	.02
12346500	-.13	-.09	-.05	.00	.04	.02	-.03	.03	-.13	-.02	-.14	-.11
12356000	.07	.15	.18	.07	.09	.49	.13	-.11	.00	-.02	-.23	-.12
12356500	-.19	.25	-.21	.02	.02	.10	.10	-.19	-.05	-.02	-.10	-.11
12359500	-.02	-.06	-.04	.09	.04	.23	-.14	-.16	.04	.00	.01	-.12
12360000	-.14	-.07	-.09	.22	.17	.01	-.17	.31	-.02	-.04	-.14	-.22
12360500	-.11	.02	.02	.26	.16	.23	-.13	.10	.04	.08	-.19	.11

Table 2.--Streamflow-gaging stations used for record-extension analysis--Continued

Site No.	Stream name	Station No.	Period of record since 1906 (water year)
296	Missouri River at Virgelle	06109500	1935-86
299	Middle Fork Judith River near Utica	06109780	1972-80
300	South Fork Judith River near Utica	06109800	1958-79
302	Judith River near Utica	06110000	1920-76
304	Ross Fork near Hobson	06111000	1946-62
305	Big Spring Creek near Lewistown	06111500	1932-57
308	Cottonwood Creek near Moore	06112100	1957-63
313	Judith River near Winifred	06113500	1929-32
314	Wolf Creek near Stanford	06114500	1950-62
316	Missouri River near Landusky	06115200	1934-86
317	North Fork Musselshell River near Delpine	06115500	1940-80
323	South Fork Musselshell River above Martinsdale	06118500	1942-80
324	Big Elk Creek at mouth, at Twodot	06120000	1953-56
325	Musselshell River at Harlowton	06120500	1907-86
326	American Fork near Harlowton	06121000	1907-14; 1924-32
327	Lebo Creek near Harlowton	06121500	1907-14; 1924-32
328	American Fork below Lebo Creek, near Harlowton	06122000	1946-67
329	Musselshell River near Ryegate	06123500	1946-80
332	Big Coulee near Lavina	06125700	1957-72
333	Musselshell River near Roundup	06126500	1946-86
334	Musselshell River near Musselshell	06127500	1928-32; 1945-80; 1983-86
336	Box Elder Creek near Winnett	06129000	1930-38; 1959-72
337	McDonald Creek at Winnett	06129500	1930-45; 1953-56
338	Musselshell River near Mosby	06130500	1929-32; 1934-86
341	Big Dry Creek near Van Norman	06131000	1940-47; 1949-86
342	Missouri River below Fork Peck Dam	06132000	1934-86
343	Boxelder Creek near Rocky Boy	06137570	1976-86
344	Missouri River near Wolf Point	06177000	1929-86
345	Missouri River near Culbertson	06185500	1941-52; 1958-86
346	Tower Creek at Tower Falls, Yellowstone National Park	06187500	1922-43
347	Big Creek near Emigrant	06191800	1973-80; 1983-85
348	Shields River near Wilsall	06193000	1935-57
349	Shields River near Clyde Park	06193500	1921-23; 1929-67
350	Brackett Creek near Clyde Park	06194000	1921-23; 1934-57
351	Sweet Grass Creek above Melville	06200500	1913-25; 1937-69
352	German Gulch near Ramsay	12323500	1955-69
353	Racetrack Creek below Granite Creek, near Anaconda	12324100	1957-73
354	Little Blackfoot River near Garrison	12324590	1972-86
355	Boulder Creek at Maxville	12330000	1939-86
356	Middle Fork Rock Creek near Philipsburg	12332000	1938-86
357	Blackfoot River near Helmville	12335000	1941-54
358	Nevada Creek above reservoir, near Helmville	12335500	1940-86
359	East Fork Bitterroot River near Conner	12343400	1956-73
360	Skalkaho Creek near Hamilton	12346500	1949-53; 1957-80
361	Skyland Creek near Essex	12356000	1946-52
362	Bear Creek near Essex	12356500	1946-52
363	Spotted Bear River near Hungry Horse	12359500	1949-56
364	Twin Creek near Hungry Horse	12360000	1948-56; 1965-67
365	Lower Twin Creek near Hungry Horse	12360500	1948-56

Table 2.--Streamflow-gaging stations used for record-extension analysis--Continued

Site No.	Stream name	Station No.	Period of record since 1906 (water year)
186	Ben Hart Creek near Belgrade	06050699	1951-54
187	Reese Creek near Belgrade	06051000	1951-54
189	Gallatin River near Logan	06052500	1906; 1928-86
190	Sixteenmile Creek near Ringling	06053000	1950-55
193	Missouri River near Toston	06054500	1911-17; 1941-86
194	Crow Creek near Radersburg	06055500	1919-29; 1966-72
199	Beaver Creek near Winston	06057599	1984-86
204	Prickly Pear Creek near Clancy	06061500	1908-16; 1921-33; 1946-70; 1979-86
206	Tenmile Creek near Rimini	06062500	1915-86
207	Tenmile Creek near Helena	06063000	1908-54
211	Beaver Creek at mouth, near East Helena	06063099	1980-86
215	Missouri River below Holter Dam, near Wolf Creek	06066500	1946-86
216	Little Prickly Pear Creek near Marysville	06068500	1913-33
219	Little Prickly Pear Creek near Canyon Creek	06071000	1909-25
222	Little Prickly Pear Creek near Wolf Creek	06071300	1962-67
225	Dearborn River near Clemons	06073000	1921-23; 1929-53
228	Dearborn River near Craig	06073500	1946-69
231	Smith River near White Sulphur Springs	06074500	1923-31; 1934-36
238	Smith River near Fort Logan	06076690	1978-86
239	Sheep Creek near White Sulphur Springs	06077000	1941-73
244	Smith River near Eden	06077500	1951-70
246	Missouri River near Ulm	06078200	1957-86
247	North Fork Sun River near Augusta	06078500	1911-12; 1946-68
248	Sun River near Augusta	06080000	1906-40
249	Sun River below diversion dam, near Augusta	06080900	1968-81
252	Willow Creek near Augusta	06081500	1906-25
253	Sun River below Willow Creek, near Augusta	06082200	1968-75
254	Smith Creek near Augusta	06082500	1906-13
255	Ford Creek near Augusta	06083500	1906-13
256	Elk Creek near Augusta	06084500	1906-25
257	Sun River at Simms	06085800	1966-79
258	Muddy Creek near Vaughn	06088300	1968-86
259	Muddy Creek at Vaughn	06088500	1935-68; 1971-86
260	Missouri River near Great Falls	06090300	1957-86
265	Belt Creek near Monarch	06090500	1951-83
267	Belt Creek near Portage	06090610	1980-84
269	Missouri River at Fort Benton	06090800	1906-86
272	Two Medicine River near Browning	06092000	1907-24; 1951-77
275	Badger Creek near Browning	06092500	1951-73; 1980
276	Badger Creek below Four Horns Canal, near Browning	06093200	1974-86
277	Badger Creek near Family	06093500	1907-25
278	Birch Creek at Swift Dam, near Valier	06094500	1913-29
282	Birch Creek near Valier	06098100	1977-84
283	Cut Bank Creek near Browning	06098500	1918-25
284	Cut Bank Creek at Cut Bank	06099000	1906-20; 1923-24; 1952-74; 1978-79; 1982-86
286	Marias River near Shelby	06099500	1906-08; 1911-22; 1924-86
288	Marias River near Loma	06102050	1960-72
289	Teton River near Farmington	06102500	1947-55
294	Deep Creek near Choteau	06106000	1911-25
295	Teton River near Dutton	06108000	1954-86

Table 4.--Estimated monthly streamflow characteristics for October and November--Continued

Site No.	Stream name	October					November				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
82	Twelvemile Creek at mouth, near Wise River	1	2	3	4	3	1	2	2	3	3
83	Sullivan Creek at mouth, near Wise River	2	2	3	5	3	1	2	3	3	3
84	Oregon Creek near mouth, near Wise River	.2	.3	.4	.7	.5	.2	.2	.3	.5	.4
85	California Creek above American Creek, near Wise River	2	3	4	5	4	2	2	3	4	3
86	American Creek at mouth, near Wise River	.5	.7	1	2	1	.4	.6	.8	1	.9
87	Sixmile Creek at mouth, near Wise River	.3	.5	.7	1	.8	.3	.4	.6	.8	.6
88	French Creek near mouth, near Wise River	4	5	7	9	7	4	4	6	7	6
89	Deep Creek near Wise River	22	25	31	35	30	21	23	27	27	25
90	Bear Creek near Wise River	1	1	2	2	2	.9	1	1	1	1
91	Bryant Creek at mouth, near Wise River	2	2	3	4	3	1	2	3	3	3
92	Big Hole River near Wise River	160	200	280	430	320	200	230	290	390	300
93	Johnson Creek at mouth, near Wise River	1	1	2	3	2	.8	1	2	2	2
94	Meadow Creek near Wise River	2	2	3	5	4	2	2	3	4	3
95	Jacobson Creek at mouth, near Wise River	8	10	14	21	16	7	9	13	18	13
96	Mono Creek at mouth, near Wise River	.9	1	2	3	2	.8	1	2	2	2
97	Wyman Creek at mouth, near Wise River	4	6	8	11	9	4	5	7	9	7
98	Lacy Creek at mouth, near Wise River	3	4	5	7	6	2	3	4	6	5
99	Gold Creek at mouth, near Wise River	1	2	2	4	3	1	1	2	3	2
100	Pattengail Creek at mouth, near Wise River	11	14	19	27	21	11	13	17	22	18
101	Sheep Creek at mouth, near Wise River	2	2	3	5	4	1	2	3	4	3
102	Wise River near Wise River	35	41	54	85	61	35	40	48	57	49
103	Adson Creek at mouth, near Wise River	1	1	2	3	2	1	1	2	2	2
104	Jerry Creek near Wise River	6	7	9	11	10	5	6	7	8	7
105	Divide Creek at Divide	2	3	3	6	5	2	3	3	6	5
106	Canyon Creek near Divide	3	4	5	9	7	3	3	4	8	6
107	Moose Creek near Divide	5	5	6	7	6	5	5	6	7	6
108	Trapper Creek near Melrose	4	4	6	8	6	4	4	5	7	6
109	Camp Creek at Melrose	1	2	3	5	3	.9	1	2	4	3
110	Big Hole River near Melrose	310	360	490	710	530	350	400	490	650	520
111	Willow Creek near Glen	7	8	10	12	10	6	7	8	10	8
112	Birch Creek near Glen	11	12	15	20	16	7	8	10	13	11
113	Hells Canyon Creek near Twin Bridges	2	2	3	4	3	2	2	3	4	3
114	Jefferson River near Twin Bridges	770	900	1300	1700	1300	1100	1200	1500	1800	1500
115	Whitetail Creek near Whitehall	3	4	7	10	7	2	2	2	3	3
117	Boulder River above High Ore Creek, near Basin	14	19	29	47	32	19	22	28	36	30
118	Boulder River near Boulder	18	24	37	60	41	25	28	36	46	38
119	Little Boulder River near Boulder	8	10	12	15	12	7	7	9	12	10
120	Boulder River above Cabin Gulch, near Boulder	23	30	42	63	46	30	33	41	50	43
121	Boulder River near Cardwell	29	36	52	77	57	37	41	51	62	53
122	South Boulder River near Jefferson Island	13	14	18	25	19	11	12	14	19	15
123	Jefferson River at Sappington	870	1000	1500	1900	1500	1300	1500	1600	1900	1700
124	South Willow Creek near Pony	3	6	17	33	17	7	9	22	27	19
125	North Willow Creek at Pony	2	5	12	18	11	6	8	15	17	13
126	Willow Creek near Harrison	4	11	30	52	31	16	19	37	44	34
127	Norwegian Creek near Harrison	5	6	7	8	7	5	6	6	7	6

Table 4.--Estimated monthly streamflow characteristics for October and November--Continued

Site No.	Stream name	October					November				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
42	Beaverhead River near Twin Bridges	220	260	440	640	480	380	440	600	710	590
43	Corral Creek at mouth, near Alder	.4	.6	1	1	1	.4	.5	.7	1	.8
44	Coal Creek at mouth, near Alder	2	2	3	4	3	1	2	3	3	3
45	Ruby River above the forks, near Alder	6	8	11	14	11	6	7	9	12	10
46	East Fork Ruby River at mouth, near Alder	2	3	4	6	4	2	2	3	4	4
47	West Fork Ruby River at mouth, near Alder	3	3	5	7	5	2	3	4	5	4
48	Cottonwood Creek at mouth, near Alder	3	4	5	8	6	3	3	5	6	5
49	Warm Springs Creek at mouth, near Alder <sup>1</sup>	46	48	50	54	51	46	47	49	52	49
50	North Fork Greenhorn Creek at mouth, near Alder	1	2	3	4	3	1	2	2	3	2
51	Ruby River above reservoir, near Alder	91	100	120	140	120	100	110	120	140	120
52	Mill Creek at Forest Service boundary, near Sheridan	7	9	11	14	11	6	7	9	11	9
53	Wisconsin Creek at Forest Service boundary, near Sheridan	5	6	7	10	8	4	5	6	8	7
54	Ruby River near Twin Bridges	140	170	230	260	220	160	190	220	250	220
55	Big Hole River near Jackson	12	13	17	22	18	9	10	13	18	14
56	Andrus Creek near mouth, near Jackson	3	4	5	7	6	3	3	4	6	5
57	Fox Creek at mouth, near Jackson	2	2	3	5	4	2	2	3	4	3
58	Governor Creek near Jackson	14	16	19	25	21	13	15	18	20	18
59	Warm Springs Creek at Jackson	8	9	11	16	13	8	9	11	15	12
60	Miner Creek near Jackson	6	7	11	16	12	7	8	10	13	11
61	Big Lake Creek near mouth, near Wisdom	3	4	6	8	6	3	4	5	7	5
62	Steel Creek above Francis Creek, near Wisdom	2	2	3	4	3	2	2	3	3	3
63	Francis Creek at mouth, near Wisdom	3	4	4	6	5	3	3	4	5	4
64	Steel Creek near mouth, near Wisdom	5	6	8	11	9	5	6	7	8	7
65	Swamp Creek near mouth, near Wisdom	6	7	9	13	11	6	6	8	9	8
66	Joseph Creek at mouth, near Wisdom	2	3	4	7	5	2	3	4	5	4
67	Trail Creek near Wisdom	15	17	21	26	22	15	16	19	22	19
68	Ruby Creek at mouth, near Wisdom	4	5	7	10	8	4	5	6	9	7
69	Tie Creek at Forest Service boundary, near Wisdom	5	7	9	14	10	5	6	8	11	9
70	Johnson Creek near Wisdom	3	4	5	8	7	3	4	5	7	6
71	Mussigbrod Creek near Wisdom	2	3	4	6	5	2	2	3	4	4
72	North Fork Big Hole River near mouth, near Wisdom	29	34	43	58	47	28	31	39	48	41
73	Big Hole River below North Fork, near Wisdom	110	130	190	280	210	130	150	190	260	200
74	Pintlar Creek near Forest Service boundary, near Wisdom	5	6	7	12	9	4	5	6	8	7
75	Big Hole River below Mudd Creek, near Wisdom	120	150	210	310	230	140	160	210	280	220
76	Fishtrap Creek at mouth, near Wise River	5	7	8	15	12	5	6	7	12	9
77	Lamarche Creek near Wise River	11	12	16	22	18	9	10	13	18	14
78	Seymour Creek near Wise River	6	7	10	15	12	5	7	9	12	10
79	Tenmile Creek at mouth, near Wise River	2	2	4	5	4	2	2	3	4	3
80	Sevenmile Creek at mouth, near Wise River	.4	.6	.9	1	1	.3	.5	.7	1	.8
81	Corral Creek at mouth, near Wise River	.5	.7	1	2	1	.4	.6	.9	1	1

Table 4.--Estimated monthly streamflow characteristics for October and November--Continued

Site No.	Stream name	October					November				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
129	Jefferson River near Three Forks	1100	1300	1800	2200	1800	1400	1500	1900	2200	1900
130	Madison River near West Yellowstone	340	380	440	500	440	340	390	430	470	420
131	Duck Creek near West Yellowstone	22	24	28	32	27	20	21	25	26	23
132	Cougar Creek near West Yellowstone	7	9	11	20	16	6	8	10	18	14
133	Grayling Creek near West Yellowstone	16	19	23	34	28	13	15	18	25	21
134	Red Canyon Creek near West Yellowstone	.3	.4	.5	2	1	.2	.4	.6	2	1
135	South Fork Madison River near West Yellowstone	98	100	110	130	110	91	95	100	110	100
136	Watkins Creek near West Yellowstone	2	2	2	4	3	1	2	2	4	3
137	Trapper Creek near West Yellowstone	1	2	2	3	3	1	1	2	3	2
138	Madison River below Hebgen Lake, near Grayling	480	880	1400	1800	1300	690	830	1400	1900	1400
139	Cabin Creek near West Yellowstone	7	8	10	16	13	5	6	7	11	9
140	Beaver Creek near West Yellowstone	21	24	29	37	31	18	20	25	31	26
141	Elk River at mouth, near Cameron	11	14	19	29	22	10	12	18	25	19
142	Soap Creek at mouth, near Cameron	.6	.8	1	2	2	.5	.7	1	2	1
143	Antelope Creek at mouth, near Cameron <sup>2</sup>	14	15	16	19	17	13	14	15	17	16
144	West Fork Madison River near Cameron	42	44	51	59	54	37	41	45	56	48
145	Squaw Creek near Cameron	6	6	8	10	8	5	6	7	9	7
146	Standard Creek near Cameron	5	5	7	8	7	4	5	6	7	6
147	Ruby Creek near Cameron	3	3	4	5	4	3	3	4	5	4
148	Indian Creek near Cameron	19	23	28	37	31	16	19	24	31	25
149	Madison River near Cameron	970	1100	1700	2100	1600	880	1000	1600	2100	1600
150	Blaine Spring Creek near Cameron	24	24	27	30	27	22	23	24	26	25
151	O'Dell Creek near Ennis	110	110	110	110	110	100	100	100	110	100
152	Jack Creek near Ennis	19	21	23	25	23	14	15	18	19	18
153	Moore Creek at Ennis	.6	.7	.9	2	1	.5	.7	.8	2	1
154	North Fork Meadow Creek at Forest Service boundary, near Ennis	6	8	11	17	12	4	5	8	10	8
155	North Fork Meadow Creek at Highway 287, near Ennis	4	4	6	10	7	3	3	4	6	5
156	Madison River below Ennis Lake, near McAllister	1100	1400	2000	2400	1900	1100	1400	2100	2500	2000
157	Hot Springs Creek near Norris	5	6	7	10	8	4	5	6	8	7
158	Cherry Creek near Norris	20	22	27	31	26	17	19	22	25	22
159	Madison River near Three Forks	1100	1400	2000	2500	2000	1300	1400	1900	2300	1900
160	Cache Creek at mouth, near West Yellowstone	2	3	4	6	4	2	2	3	5	4
161	Taylor Creek near Grayling	22	25	29	37	31	17	20	25	34	26
162	Porcupine Creek near Gallatin Gateway	5	6	7	10	8	4	5	6	8	7
163	Gallatin River above West Fork, near Big Sky	190	210	240	320	250	160	170	210	250	210
164	South Fork West Fork Gallatin River near Gallatin Gateway	12	15	19	28	21	10	12	15	19	15
165	Middle Fork West Fork Gallatin River near Gallatin Gateway	5	6	8	12	9	5	5	7	9	7
166	West Fork Gallatin River near Gallatin Gateway	24	29	37	52	39	20	23	29	36	29
167	Squaw Creek near Gallatin Gateway	14	15	19	23	19	13	14	17	20	17
168	Hellroaring Creek near Gallatin Gateway	18	20	25	31	25	16	17	21	24	20

Table 4.--Estimated monthly streamflow characteristics for October and November--Continued

Site No.	Stream name	October					November				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
169	South Fork Spanish Creek near Gallatin Gateway	11	13	17	23	18	10	11	13	15	13
170	Spanish Creek near Gallatin Gateway	24	28	36	47	36	21	23	29	34	28
171	Gallatin River near Gallatin Gateway	350	380	450	590	470	300	330	380	470	390
172	Big Bear Creek near Gallatin Gateway	5	5	6	8	6	4	4	5	6	5
173	South Cottonwood Creek near Gallatin Gateway	15	16	19	23	20	13	14	16	20	16
174	Baker Creek near Manhattan <sup>3</sup>	64	70	100	130	100	71	92	110	120	110
175	Rocky Creek near Bozeman	8	10	13	20	15	9	10	13	19	14
176	Bear Canyon Creek near Bozeman	2	2	3	4	3	1	2	2	4	3
177	Sourdough Creek near Bozeman	10	11	15	17	15	10	11	13	15	13
178	East Gallatin River at Bozeman	34	42	51	62	54	38	46	51	57	51
179	Bridger Creek near Bozeman	7	8	10	15	11	6	7	9	13	10
180	East Gallatin River near Belgrade	40	44	61	80	63	39	44	58	72	58
181	East Fork Hyalite Creek near Bozeman	4	5	6	8	7	3	4	5	6	5
182	West Fork Hyalite Creek near Bozeman	9	10	12	16	13	7	8	10	12	10
183	Hyalite Creek at Hyalite Ranger Station, near Bozeman	24	28	36	52	39	17	19	27	34	27
184	Hyalite Creek above Interstate 90, near Bozeman	6	7	9	15	11	4	5	7	9	8
185	Thompson Creek near Belgrade	27	30	33	36	33	27	28	33	35	32
186	Ben Hart Creek near Belgrade	29	29	31	32	31	29	29	30	32	31
187	Reese Creek near Belgrade	6	7	8	11	8	7	7	8	10	9
188	East Gallatin River near Manhattan	170	180	210	230	190	160	170	190	210	180
189	Gallatin River near Logan	560	600	850	1100	840	610	780	890	1000	890
190	Sixteenmile Creek near Ringling	1	4	7	9	6	4	4	5	7	5
191	Sixteenmile Creek near Maudlow	17	18	29	37	30	18	20	28	33	28
192	Sixteenmile Creek near Toston	20	23	34	51	41	21	26	36	50	40
193	Missouri River near Toston	3100	3500	4400	5400	4500	3700	4000	4700	5600	4800
194	Crow Creek near Radersburg	12	13	15	19	16	9	10	12	15	12
195	Dry Creek near Toston	2	2	4	5	4	2	2	3	4	3
196	Deep Creek below North Fork, near Townsend	8	9	10	15	12	7	8	9	13	11
197	Duck Creek near Townsend	3	4	5	6	5	3	3	4	4	4
198	Confederate Gulch near Winston	5	6	7	9	7	4	5	6	7	6
199	Beaver Creek near Winston	2	3	5	8	6	2	3	5	7	5
200	Avalanche Gulch near Winston	.7	1	1	3	3	.8	1	2	4	3
201	Spokane Creek near East Helena	3	3	4	6	5	3	3	4	5	4
202	McGuire Creek at county road, near East Helena	6	7	8	8	8	7	7	7	8	7
203	Trout Creek at mouth, near East Helena	13	13	15	15	14	12	12	14	16	14
204	Prickly Pear Creek near Clancy	17	19	28	35	29	19	20	27	31	27
205	Prickly Pear Creek at mouth, near East Helena	22	24	30	36	31	24	25	31	35	31
206	Tenmile Creek near Rimini	.3	.5	1	3	3	.4	.6	1	3	2
207	Tenmile Creek near Helena	1	3	5	12	7	3	4	7	13	9
208	Sevenmile Creek near mouth, near Helena	1	1	2	4	3	1	1	2	4	3
209	Tenmile Creek at mouth, near East Helena	2	3	5	8	6	3	3	5	6	5
210	Silver Creek at Interstate 15, near Helena	8	8	11	12	11	8	9	11	11	11
211	Beaver Creek at mouth, near East Helena	5	6	8	11	8	6	6	7	11	8
212	Elkhorn Creek near mouth, near Wolf Creek	3	3	4	6	5	3	3	4	6	5
213	Willow Creek below Elkhorn Creek, near Wolf Creek	2	2	3	5	4	2	2	3	6	4



Table 4.--Estimated monthly streamflow characteristics for October and November--Continued

Site No.	Stream name	October					November				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
214	Cottonwood Creek above Beartooth Ranch, near Wolf Creek	.5	.6	.9	2	1	.4	.6	1	2	1
217	Virginia Creek at mouth, near Canyon Creek	3	4	6	9	7	3	4	7	9	7
218	Canyon Creek below Cottonwood Creek, near Canyon Creek	4	5	8	15	11	4	6	9	16	11
219	Little Prickly Pear Creek near Canyon Creek	12	13	18	25	20	11	15	20	26	21
220	Lyons Creek near Wolf Creek	5	5	7	9	7	5	6	7	9	7
221	Wolf Creek at mouth, at Wolf Creek	2	3	4	7	5	2	3	4	6	4
222	Little Prickly Pear Creek near Wolf Creek	35	44	58	85	65	42	49	64	79	64
223	Wegner Creek near Craig <sup>4</sup>	0	0	0	0	0	0	0	0	0	0
224	Stickney Creek near Craig <sup>5</sup>	0	0	0	0	0	0	0	0	0	0
226	Middle Fork Dearborn River at Highway 200, near Wolf Creek	7	8	11	16	13	7	8	10	12	10
227	South Fork Dearborn River at Highway 434, near Wolf Creek	6	7	10	14	11	6	7	9	11	9
228	Dearborn River near Craig	41	48	70	91	72	46	51	68	92	72
229	Flat Creek above Slew Creek, near Craig	7	8	13	17	13	8	9	12	17	13
230	Sheep Creek at mouth, near Cascade	13	16	23	25	21	10	12	17	18	15
232	North Fork Smith River at Highway 89, near White Sulphur Springs	3	4	6	11	8	3	4	7	14	8
233	South Fork Smith River at mouth, near White Sulphur Springs	8	9	12	17	13	9	10	11	14	12
234	Smith River below forks, near White Sulphur Springs	11	12	18	26	20	9	12	18	29	20
235	Big Birch Creek at mouth, near White Sulphur Springs	17	20	32	41	29	21	22	28	31	25
236	Newlan Creek below Charcoal Gulch, near White Sulphur Springs	3	3	5	8	6	4	5	6	8	6
237	Camas Creek near mouth, near White Sulphur Springs	3	4	5	9	7	3	5	6	9	7
238	Smith River near Fort Logan	90	96	120	140	120	98	100	110	120	110
239	Sheep Creek near White Sulphur Springs	11	12	15	18	16	9	10	13	15	13
240	Sheep Creek near mouth, near White Sulphur Springs	16	19	26	38	31	12	16	22	31	25
241	Eagle Creek near mouth, near White Sulphur Springs	2	2	3	6	5	1	2	3	4	4
242	Rock Creek below Buffalo Canyon, near White Sulphur Springs	8	9	11	15	13	6	8	10	13	11
243	Tenderfoot Creek below South Fork, near White Sulphur Springs	13	16	21	27	23	11	13	16	19	16
244	Smith River near Eden	92	110	140	190	170	89	100	130	200	150
245	Hound Creek near mouth, near Cascade	13	15	21	30	24	10	13	18	25	21
246	Missouri River near Ulm	3200	3700	4700	6000	4800	3500	4200	5000	6200	5300
247	North Fork Sun River near Augusta	65	71	94	140	110	67	69	86	110	92
248	Sun River near Augusta	100	110	110	120	110	55	170	240	360	270
249	Sun River below diversion dam, near Augusta	80	96	130	190	140	60	79	130	160	130
250	Willow Creek near Anderson Lake, near Augusta	2	2	3	5	4	2	2	3	4	3
251	North Fork Willow Creek below Cutrock Creek, near Augusta	3	3	3	4	3	3	3	3	4	3
254	Smith Creek near Augusta	6	7	14	21	15	4	6	12	16	12
255	Ford Creek near Augusta	12	13	16	18	16	6	7	10	14	11
256	Elk Creek near Augusta	19	32	45	65	48	21	25	33	53	39
257	Sun River at Simms	110	130	190	250	200	140	160	210	240	210
260	Missouri River near Great Falls	4100	5000	5500	6800	5800	4200	4900	5600	7300	5900
261	Dry Fork at mouth, at Monarch	7	8	11	17	14	6	7	10	14	11

Table 4.--Estimated monthly streamflow characteristics for October and November--Continued

Site No.	Stream name	October					November				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
262	Tillinghast Creek above Joice Creek, near Monarch	6	7	9	11	10	6	6	8	10	8
263	Pilgrim Creek at mouth, near Monarch	5	6	9	13	10	5	6	7	10	8
264	Logging Creek at Logging Creek Campground, near Monarch	6	7	9	10	9	6	6	8	8	7
265	Belt Creek near Monarch	35	41	52	74	65	29	31	45	62	49
266	Big Otter Creek above Never Sweat Creek, near Raynesford	2	4	5	6	5	4	5	5	7	6
267	Belt Creek near Portage	17	21	37	61	46	14	18	31	48	34
268	Highwood Creek below Smith Creek, near Highwood	5	6	7	10	9	4	5	6	7	6
269	Missouri River at Fort Benton	3800	4300	5400	6900	5600	4000	5000	5600	7200	6000
270	Shonkin Creek below Bishop Creek, near Highwood	3	4	5	8	6	3	3	4	4	4
271	South Fork Two Medicine River near East Glacier	12	14	21	31	23	10	14	24	37	23
273	South Fork Badger Creek near Browning	9	13	18	28	20	9	11	16	23	17
274	North Fork Badger Creek near Browning	9	11	16	25	19	8	10	15	21	16
278	Birch Creek at Swift Dam, near Valier	18	25	55	110	64	.3	1	4	19	12
279	South Fork Dupuyer Creek near Dupuyer	2	3	4	6	5	2	2	3	5	4
280	North Fork Dupuyer Creek near Dupuyer	2	3	5	7	5	2	3	4	6	4
281	Dupuyer Creek below Scoffin Creek, near Dupuyer	6	7	10	16	12	5	8	10	15	12
282	Birch Creek near Valier	29	36	47	53	45	25	30	44	57	44
283	Cut Bank Creek near Browning	23	31	56	94	66	25	34	52	78	56
284	Cut Bank Creek at Cut Bank	30	35	58	110	77	31	37	59	85	63
285	Marias River at Sullivan Bridge, near Cut Bank	180	210	310	510	380	190	210	310	420	330
286	Marias River near Shelby	180	210	320	530	390	190	210	320	430	340
287	Marias River at "F" Bridge, above Tiber Reservoir, near Shelby	210	240	370	620	460	220	240	370	510	400
288	Marias River near Loma	470	540	810	1100	860	330	370	630	840	640
290	Teton River near Strabane	13	15	20	24	20	7	16	20	25	21
291	McDonald Creek near Strabane	9	9	10	12	11	9	10	10	11	11
292	North Fork Deep Creek near Choteau	3	4	6	9	7	3	4	5	7	6
293	South Fork Deep Creek near Choteau	3	4	6	9	7	3	4	5	7	5
294	Deep Creek near Choteau	7	8	11	13	11	7	8	11	12	10
295	Teton River near Dutton	28	40	63	110	75	34	44	70	97	76
296	Missouri River at Virgelle	4000	4900	6100	7700	6300	4800	5400	6400	7600	6600
297	Lost Creek at mouth, near Utica	5	7	9	13	10	5	6	8	11	9
298	Yogo Creek at mouth, near Utica	.3	.5	1	4	3	.2	.7	1	4	3
299	Middle Fork Judith River near Utica	4	5	8	14	10	2	3	4	7	4
301	South Fork Judith River at Indian Hill Campground, near Utica	1	2	2	4	3	1	1	2	2	2
303	Judith River above Courtneys Creek, at Utica	7	10	13	21	17	5	8	10	15	12
306	East Fork Big Spring Creek at mouth, near Lewistown	5	6	8	12	9	4	5	7	10	8
307	Big Spring Creek above Cottonwood Creek, near Hanover	110	120	130	130	130	100	110	120	120	120
309	Cottonwood Creek at Highway 200, near Lewistown	3	3	4	7	6	2	3	4	5	4
310	Beaver Creek at county road, near Lewistown	2	4	7	9	7	5	6	8	11	9
311	Big Spring Creek at mouth, near Lewistown	98	110	130	140	130	85	94	110	120	110

Table 4.--Estimated monthly streamflow characteristics for October and November--Continued

Site No.	Stream name	October					November				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
312	Warm Springs Creek above Meadow Creek, near Hilger	100	100	110	120	110	97	100	110	110	110
313	Judith River near Winifred	240	240	420	550	410	240	240	450	580	420
315	Cow Creek below forks, near Cleveland	3	3	4	6	5	2	3	4	5	4
316	Missouri River near Landusky	4300	5300	6700	8100	6800	5100	5900	6800	8000	7100
317	North Fork Musselshell River near Delpine	4	5	6	9	7	5	6	7	9	7
318	Checkerboard Creek near Checkerboard	1	1	2	3	2	.7	1	1	2	2
319	Spring Creek below Whitetail Creek, near Checkerboard	3	4	6	8	6	3	3	4	5	5
320	North Fork Musselshell River near mouth, near Martinsdale	5	6	9	13	10	6	7	9	11	10
321	Alabaugh Creek at mouth, near Lennep	2	3	4	5	4	2	2	3	4	3
322	Cottonwood Creek below Loco Creek, near Martinsdale	10	13	17	22	18	8	10	12	14	12
323	South Fork Musselshell River above Martinsdale	11	18	30	40	31	13	18	28	35	28
324	Big Elk Creek at mouth, at Twodot	.6	.9	7	15	8	.3	.9	10	14	9
325	Musselshell River at Harlowton	19	45	71	110	76	35	54	76	110	81
326	American Fork near Harlowton	0	.2	2	5	3	0	0	2	4	2
330	Careless Creek below Little Careless Creek, near Hedgesville	.5	.6	.8	2	1	.4	.6	.7	1	1
331	Swimming Woman Creek below Dry Coulee, near Franklin	.5	.6	.9	2	1	.3	.5	.5	1	.9
333	Musselshell River near Roundup	12	25	68	110	73	15	33	64	120	74
335	Flatwillow Creek below the forks, near Grass Range	3	3	4	15	10	2	4	4	14	10
338	Musselshell River near Mosby	2	15	69	120	82	10	36	74	140	87
339	Big Dry Creek above Little Dry Creek, near Van Norman	0	0	.2	2	1	0	0	.2	1.3	.8
340	Little Dry Creek near Van Norman	.1	.2	2	5	3	.2	.4	1	3	2
341	Big Dry Creek near Van Norman	.1	.3	2	8	5	.3	.5	2	4	3

<sup>1</sup>Includes estimated spring flow of about 40 cubic feet per second, based on information provided by Montana Department of Fish, Wildlife and Parks.

<sup>2</sup>Includes estimated spring flow of about 10 cubic feet per second, based on information provided by Montana Department of Fish, Wildlife and Parks.

<sup>3</sup>Estimated long-term monthly streamflow characteristics may not reflect the current flow regime because of upstream streamflow regulation.

<sup>4</sup>Stream is known to be dry except for periods of runoff. Calculated flows were adjusted by subtracting 7 cubic feet per second.

<sup>5</sup>Stream is known to be dry except for periods of runoff. Calculated flows were adjusted by subtracting 8 cubic feet per second.

Table 5.--Estimated monthly streamflow characteristics for December and January

[Q.XX, monthly mean streamflow for specified month exceeded XX percent of the years, in cubic feet per second; QM, mean monthly streamflow for specified month, in cubic feet per second]

Site No.	Stream name	December					January				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
1	Hellroaring Creek near Lakeview	5	5	6	6	6	4	5	5	6	5
2	Corral Creek near Lakeview	.6	.6	.7	.7	.7	.5	.5	.6	.7	.6
3	Antelope Creek near Lakeview	.1	.1	.2	.3	.2	.1	.1	.2	.2	.2
4	Red Rock Creek near Lakeview	9	9	10	11	10	8	9	10	11	9
5	Tom Creek near Lakeview	.3	.4	.5	.7	.6	.3	.3	.5	.7	.5
6	Narrows Creek at mouth, near Lakeview	.1	.1	.2	.2	.2	.1	.1	.2	.2	.2
7	Odell Creek near Lakeview	4	4	5	5	5	4	4	5	5	5
8	Jones Creek near Lakeview	.5	.5	.7	1	.8	.4	.4	.7	.9	.7
9	Red Rock River near Kennedy Ranch, near Lakeview	12	17	29	42	31	13	25	33	60	39
10	Peet Creek at county road, near Lakeview	.4	.5	.6	.9	.7	.4	.4	.6	1	.7
11	Long Creek near Lakeview	2	2	3	3	3	2	2	2	3	2
12	East Fork Clover Creek at mouth, near Monida	.6	.7	.9	1	1	.5	.6	.8	1	.8
13	Red Rock River below Lima Reservoir, near Monida	10	16	23	33	26	11	17	23	28	23
14	Cabin Creek above Simpson Creek, near Lima	.2	.3	.4	.5	.4	.2	.2	.3	.4	.3
15	Indian Creek above Simpson Creek, near Lima	.3	.4	.5	.7	.6	.3	.3	.5	.6	.5
16	Simpson Creek above Indian Creek, near Lima	.4	.4	.6	.8	.7	.3	.3	.5	.6	.5
17	Deadman Creek near Dell	3	3	4	5	4	2	3	3	4	3
18	Big Sheep Creek below Muddy Creek, near Dell	38	40	47	52	46	34	37	40	47	42
19	Red Rock River at Red Rock	180	190	210	240	230	130	150	170	180	180
20	Black Canyon Creek near Grant	1	1	2	2	2	1	1	1	2	1
21	Shennon Creek near mouth, near Grant	.3	.4	.5	.7	.6	.3	.3	.5	.6	.5
22	Frying Pan Creek near Grant	1	1	1	2	1	.8	1	1	1	1
23	Trapper Creek at mouth, near Grant	.3	.3	.4	.6	.5	.2	.3	.4	.5	.4
24	Bear Creek near Grant	2	2	3	3	3	2	2	3	3	3
25	Bloody Dick Creek near Grant	8	9	13	16	13	8	9	11	13	12
26	Horse Prairie Creek near Grant	21	23	31	40	33	21	24	28	33	29
27	Rape Creek above reservoir, near Grant	.2	.2	.3	.4	.3	.1	.2	.3	.3	.2
28	Painter Creek near Grant	1	2	2	3	2	1	1	2	2	2
29	Browns Canyon Creek near Grant	.8	1	1	2	1	.7	.8	1	2	1
30	Medicine Lodge Creek near Grant	3	4	6	9	7	3	4	6	8	6
32	Pole Creek near mouth, near Polaris	.5	.6	.8	1	.9	.4	.5	.7	1	.7
33	Reservoir Creek at mouth, near Polaris	.6	.7	1	1	1	.5	.6	1	1	1
34	East Fork Dyce Creek at mouth, near Polaris	.5	.6	.8	1	1	.4	.5	.7	1	.7
35	West Fork Dyce Creek at mouth, near Polaris	.3	.3	.4	.6	.5	.2	.3	.4	.5	.4
36	Grasshopper Creek near Dillon	18	21	30	38	30	19	20	23	32	25
37	Beaverhead River at Barretts	180	230	350	420	350	180	230	300	350	300
38	East Fork Blacktail Creek near Dillon	12	13	16	16	15	11	13	13	15	13
39	West Fork Blacktail Creek near Dillon	5	6	7	8	7	4	5	6	7	6
40	Blacktail Deer Creek near Dillon	26	27	32	38	32	23	25	30	33	30
41	Beaverhead River near Dillon	280	330	470	560	460	210	270	380	440	370

Table 5.--Estimated monthly streamflow characteristics for December and January--Continued

Site No.	Stream name	December					January				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
42	Beaverhead River near Twin Bridges	340	410	510	610	520	270	340	430	510	440
43	Corral Creek at mouth, near Alder	.4	.4	.6	.8	.6	.3	.4	.5	.7	.5
44	Coal Creek at mouth, near Alder	1	2	2	3	2	1	1	2	2	2
45	Ruby River above the forks, near Alder	5	6	7	9	8	4	5	7	8	7
46	East Fork Ruby River at mouth, near Alder	2	2	3	4	3	2	2	3	3	2
47	West Fork Ruby River at mouth, near Alder	2	3	3	4	4	2	2	3	4	3
48	Cottonwood Creek at mouth, near Alder	3	3	4	5	4	2	2	3	4	3
49	Warm Springs Creek at mouth, near Alder <sup>1</sup>	45	46	47	49	48	44	45	47	48	47
50	North Fork Greenhorn Creek at mouth, near Alder	1	2	2	2	2	1	1	2	2	2
51	Ruby River above reservoir, near Alder	93	97	110	130	110	76	90	100	120	100
52	Mill Creek at Forest Service boundary, near Sheridan	6	6	7	8	7	5	6	7	7	6
53	Wisconsin Creek at Forest Service boundary, near Sheridan	4	4	5	6	5	3	4	5	6	5
54	Ruby River near Twin Bridges	140	150	160	200	180	120	120	140	170	150
55	Big Hole River near Jackson	8	9	11	14	12	7	8	10	12	10
56	Andrus Creek near mouth, near Jackson	2	3	3	4	4	2	2	3	4	3
57	Fox Creek at mouth, near Jackson	1	2	2	3	2	1	1	2	3	2
58	Governor Creek near Jackson	10	11	15	17	15	10	11	13	15	13
59	Warm Springs Creek at Jackson	6	7	9	13	10	6	7	8	10	9
60	Miner Creek near Jackson	6	6	8	10	8	5	5	7	9	7
61	Big Lake Creek near mouth, near Wisdom	3	3	4	5	4	2	3	4	5	4
62	Steel Creek above Francis Creek, near Wisdom	1	2	2	3	2	1	2	2	2	2
63	Francis Creek at mouth, near Wisdom	2	2	3	4	3	2	2	3	4	3
64	Steel Creek near mouth, near Wisdom	4	4	6	7	6	4	4	5	6	5
65	Swamp Creek near mouth, near Wisdom	4	5	6	8	7	4	5	6	7	6
66	Joseph Creek at mouth, near Wisdom	2	2	3	4	3	2	2	3	4	3
67	Trail Creek near Wisdom	9	11	16	19	16	11	12	14	15	14
68	Ruby Creek at mouth, near Wisdom	3	4	5	7	6	3	4	5	6	5
69	Tie Creek at Forest Service boundary, near Wisdom	5	5	7	9	8	4	5	6	8	6
70	Johnson Creek near Wisdom	2	3	4	6	5	3	3	4	5	4
71	Mussigbrod Creek near Wisdom	2	2	3	3	3	2	2	3	3	3
72	North Fork Big Hole River near mouth, near Wisdom	19	23	32	40	33	20	23	28	33	28
73	Big Hole River below North Fork, near Wisdom	100	120	150	180	150	85	98	130	160	130
74	Pintlar Creek near Forest Service boundary, near Wisdom	3	4	5	7	6	3	4	5	6	5
75	Big Hole River below Mudd Creek, near Wisdom	110	120	160	200	170	90	110	140	180	140
76	Fishtrap Creek at mouth, near Wise River	4	5	7	10	8	4	5	7	8	7
77	Lamarche Creek near Wise River	8	9	11	14	12	7	8	10	12	10
78	Seymour Creek near Wise River	5	6	8	10	8	4	5	7	9	7
79	Tenmile Creek at mouth, near Wise River	2	2	3	3	3	1	2	2	3	2
80	Sevenmile Creek at mouth, near Wise River	.3	.4	.5	.7	.6	.3	.3	.5	.7	.5
81	Corral Creek at mouth, near Wise River	.4	.5	.7	1	.7	.3	.4	.6	.8	.6

Table 5.--Estimated monthly streamflow characteristics for December and January--Continued

Site No.	Stream name	December					January				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
82	Twelvemile Creek at mouth, near Wise River	1	1	2	3	2	1	1	2	2	2
83	Sullivan Creek at mouth, near Wise River	1	2	2	3	2	1	1	2	3	2
84	Oregon Creek near mouth, near Wise River	.1	.2	.2	.3	.3	.1	.1	.2	.3	.2
85	California Creek above American Creek, near Wise River	2	2	2	3	2	1	2	2	3	2
86	American Creek at mouth, near Wise River	.4	.5	.6	.8	.7	.3	.4	.6	.8	.6
87	Sixmile Creek at mouth, near Wise River	.3	.3	.4	.6	.5	.2	.3	.4	.5	.4
88	French Creek near mouth, near Wise River	3	3	4	5	5	2	3	4	5	4
89	Deep Creek near Wise River	15	17	22	23	21	15	17	19	21	18
90	Bear Creek near Wise River	.8	.9	1	1	1	.6	.7	1	1	.9
91	Bryant Creek at mouth, near Wise River	1	2	2	3	2	1	1	2	2	2
92	Big Hole River near Wise River	160	180	220	280	230	130	150	200	250	200
93	Johnson Creek at mouth, near Wise River	.7	.9	1	2	1	.6	.8	1	1	1
94	Meadow Creek near Wise River	1	2	2	3	2	1	1	2	3	2
95	Jacobson Creek at mouth, near Wise River	7	8	11	14	12	6	7	10	12	10
96	Mono Creek at mouth, near Wise River	.8	.9	1	2	1	.6	.7	1	1	1
97	Wyman Creek at mouth, near Wise River	4	4	6	7	6	3	4	5	7	5
98	Lacy Creek at mouth, near Wise River	2	3	4	5	4	2	2	3	4	3
99	Gold Creek at mouth, near Wise River	1	1	2	2	2	.9	1	2	2	2
100	Pattengail Creek at mouth, near Wise River	9	11	14	18	15	8	10	13	16	13
101	Sheep Creek at mouth, near Wise River	2	2	2	3	2	1	1	2	3	2
102	Wise River near Wise River	35	37	44	50	44	31	34	37	43	38
103	Adson Creek at mouth, near Wise River	1	1	1	2	2	.7	.9	1	2	1
104	Jerry Creek near Wise River	4	5	6	7	6	4	4	5	6	5
105	Divide Creek at Divide	2	2	3	5	4	2	2	3	4	3
106	Canyon Creek near Divide	2	3	4	6	5	2	3	4	5	4
107	Moose Creek near Divide	3	4	5	6	5	3	4	4	5	4
108	Trapper Creek near Melrose	3	4	4	6	5	3	3	4	5	4
109	Camp Creek at Melrose	.7	1	1	2	2	.7	.8	1	2	1
110	Big Hole River near Melrose	280	310	390	470	400	230	270	350	430	350
111	Willow Creek near Glen	5	6	7	8	7	5	6	7	8	7
112	Birch Creek near Glen	6	6	8	10	8	6	6	8	10	8
113	Hells Canyon Creek near Twin Bridges	2	2	2	3	2	2	2	2	3	2
114	Jefferson River near Twin Bridges	970	1000	1300	1500	1300	840	890	1000	1200	1100
115	Whitetail Creek near Whitehall	2	2	2	2	2	1	1	1	2	1
117	Boulder River above High Ore Creek, near Basin	16	19	23	30	24	13	17	24	28	23
118	Boulder River near Boulder	21	24	30	38	31	17	22	30	35	29
119	Little Boulder River near Boulder	6	6	8	10	8	5	5	8	9	8
120	Boulder River above Cabin Gulch, near Boulder	26	30	35	43	36	22	28	36	40	34
121	Boulder River near Cardwell	32	37	43	53	45	27	34	44	50	42
122	South Boulder River near Jefferson Island	8	9	11	15	12	8	9	11	14	11
123	Jefferson River at Sappington	1100	1200	1300	1600	1400	910	960	1100	1400	1200
124	South Willow Creek near Pony	8	11	16	19	15	6	9	11	15	12
125	North Willow Creek at Pony	7	9	11	13	11	6	7	8	11	9
126	Willow Creek near Harrison	18	23	30	35	29	15	20	24	29	24
127	Norwegian Creek near Harrison	5	5	5	6	5	3	3	4	5	4

Table 5.--Estimated monthly streamflow characteristics for December and January--Continued

Site No.	Stream name	December					January				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
129	Jefferson River near Three Forks	970	1100	1400	1800	1400	1000	1100	1300	1500	1300
130	Madison River near West Yellowstone	340	370	430	460	420	330	360	420	450	410
131	Duck Creek near West Yellowstone	18	19	21	22	20	16	18	19	21	19
132	Cougar Creek near West Yellowstone	6	7	9	14	11	6	7	10	12	10
133	Grayling Creek near West Yellowstone	12	13	16	19	17	10	12	15	18	15
134	Red Canyon Creek near West Yellowstone	.3	.5	.7	2	1	.4	.4	.8	1	1
135	South Fork Madison River near West Yellowstone	85	88	94	100	95	83	87	93	98	93
136	Watkins Creek near West Yellowstone	1	2	2	3	2	1	1	2	3	2
137	Trapper Creek near West Yellowstone	1	1	2	2	2	1	1	2	2	2
138	Madison River below Hebgen Lake, near Grayling	700	770	890	1100	970	690	760	910	1100	890
139	Cabin Creek near West Yellowstone	5	6	7	9	8	4	5	7	8	7
140	Beaver Creek near West Yellowstone	17	18	21	23	21	15	17	19	22	19
141	Elk River at mouth, near Cameron	10	12	15	20	17	8	10	13	17	14
142	Soap Creek at mouth, near Cameron	.6	.6	.8	1	1	.4	.5	.8	1	.8
143	Antelope Creek at mouth, near Cameron <sup>2</sup>	13	13	14	16	15	12	13	14	15	14
144	West Fork Madison River near Cameron	31	35	40	49	42	30	31	36	44	38
145	Squaw Creek near Cameron	5	5	6	7	6	4	5	6	7	6
146	Standard Creek near Cameron	4	4	5	5	5	3	4	4	5	4
147	Ruby Creek near Cameron	3	3	3	4	3	2	2	3	4	3
148	Indian Creek near Cameron	15	17	19	23	20	14	16	18	21	18
149	Madison River near Cameron	920	1000	1100	1300	1200	890	950	1100	1200	1100
150	Blaine Spring Creek near Cameron	21	21	23	25	23	21	22	23	24	23
151	O'Dell Creek near Ennis	99	100	100	100	100	95	97	100	100	99
152	Jack Creek near Ennis	14	15	16	17	16	11	12	14	16	14
153	Moore Creek at Ennis	.5	.6	.8	1	1	.5	.6	.8	1	.8
154	North Fork Meadow Creek at Forest Service boundary, near Ennis	3	4	6	7	6	3	4	5	6	5
155	North Fork Meadow Creek at Highway 287, near Ennis	2	3	4	5	4	2	2	3	4	3
156	Madison River below Ennis Lake, near McAllister	1200	1300	1500	1700	1500	1100	1200	1500	1600	1400
157	Hot Springs Creek near Norris	4	4	5	6	5	3	4	5	6	5
158	Cherry Creek near Norris	13	14	17	20	17	9	12	15	18	15
159	Madison River near Three Forks	1500	1500	1800	1900	1700	1100	1200	1500	1600	1400
160	Cache Creek at mouth, near West Yellowstone	2	2	3	4	3	2	2	3	3	3
161	Taylor Creek near Grayling	17	18	20	22	20	16	17	19	21	19
162	Porcupine Creek near Gallatin Gateway	4	4	5	6	5	3	4	5	6	5
163	Gallatin River above West Fork, near Big Sky	140	150	170	210	180	130	140	170	190	170
164	South Fork West Fork Gallatin River near Gallatin Gateway	8	9	12	15	12	7	9	11	14	11
165	Middle Fork West Fork Gallatin River near Gallatin Gateway	4	4	5	7	6	3	4	5	6	5
166	West Fork Gallatin River near Gallatin Gateway	17	18	23	28	24	15	17	21	25	21
167	Squaw Creek near Gallatin Gateway	12	12	14	17	14	10	11	13	15	13
168	Hellroaring Creek near Gallatin Gateway	13	14	17	20	17	12	13	15	18	15

Table 5.--Estimated monthly streamflow characteristics for December and January--Continued

Site No.	Stream name	December					January				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
169	South Fork Spanish Creek near Gallatin Gateway	8	9	10	12	10	7	8	10	11	9
170	Spanish Creek near Gallatin Gateway	17	18	22	27	22	15	17	20	24	20
171	Gallatin River near Gallatin Gateway	260	280	320	390	330	250	270	310	350	310
172	Big Bear Creek near Gallatin Gateway	3	3	4	5	4	3	3	4	4	4
173	South Cottonwood Creek near Gallatin Gateway	11	11	13	16	14	10	11	13	15	13
174	Baker Creek near Manhattan <sup>3</sup>	75	84	94	110	95	66	74	83	98	84
175	Rocky Creek near Bozeman	7	9	11	16	12	7	8	10	14	11
176	Bear Canyon Creek near Bozeman	.7	1	2	3	2	.6	1	1	2	2
177	Sourdough Creek near Bozeman	8	9	11	12	11	7	8	10	12	10
178	East Gallatin River at Bozeman	35	41	46	52	47	31	36	40	46	41
179	Bridger Creek near Bozeman	5	5	8	12	9	4	4	6	11	7
180	East Gallatin River near Belgrade	31	37	47	59	49	28	32	38	55	42
181	East Fork Hyalite Creek near Bozeman	2	3	3	5	4	2	2	3	4	4
182	West Fork Hyalite Creek near Bozeman	5	6	8	10	9	5	6	7	9	8
183	Hyalite Creek at Hyalite Ranger Station, near Bozeman	13	15	21	25	21	10	13	18	21	18
184	Hyalite Creek above Interstate 90, near Bozeman	4	4	6	7	6	3	4	5	7	5
185	Thompson Creek near Belgrade	24	26	30	32	29	24	27	31	34	30
186	Ben Hart Creek near Belgrade	29	29	30	32	30	28	28	29	30	30
187	Reese Creek near Belgrade	6	6	8	9	8	4	6	7	8	7
188	East Gallatin River near Manhattan	140	140	160	180	160	130	140	150	160	150
189	Gallatin River near Logan	650	730	790	910	800	580	650	710	830	720
190	Sixteenmile Creek near Ringling	2	2	4	6	4	.2	.8	3	5	3
191	Sixteenmile Creek near Maudlow	15	16	22	27	23	13	16	18	24	20
192	Sixteenmile Creek near Toston	18	21	29	40	33	17	20	25	35	28
193	Missouri River near Toston	3200	3300	3800	4300	3900	2700	3000	3400	3900	3400
194	Crow Creek near Radersburg	6	7	9	11	9	4	5	7	9	7
195	Dry Creek near Toston	2	2	3	3	3	1	2	2	3	2
196	Deep Creek below North Fork, near Townsend	5	6	8	11	9	4	5	7	9	7
197	Duck Creek near Townsend	2	3	3	4	3	2	2	3	3	3
198	Confederate Gulch near Winston	3	4	5	5	5	3	3	4	5	4
199	Beaver Creek near Winston	1	2	4	5	4	1	2	3	4	3
200	Avalanche Gulch near Winston	.8	1	2	3	2	1	1	2	2	2
201	Spokane Creek near East Helena	3	3	4	4	4	3	3	3	4	3
202	McGuire Creek at county road, near East Helena	6	6	7	7	7	6	6	7	7	7
203	Trout Creek at mouth, near East Helena	11	11	13	14	13	10	11	11	13	12
204	Prickly Pear Creek near Clancy	16	17	22	26	23	13	16	18	24	20
205	Prickly Pear Creek at mouth, near East Helena	21	22	26	30	27	19	21	23	28	25
206	Tenmile Creek near Rimini	.4	.6	1	2	2	.3	.5	1	2	1
207	Tenmile Creek near Helena	2	3	6	10	7	3	4	5	10	7
208	Sevenmile Creek near mouth, near Helena	1	1	2	3	2	1	1	2	3	2
209	Tenmile Creek at mouth, near East Helena	2	2	3	5	4	2	2	3	4	3
210	Silver Creek at Interstate 15, near Helena	8	8	9	10	10	7	8	8	10	9
211	Beaver Creek at mouth, near East Helena	5	6	7	9	8	5	5	6	8	7
212	Elkhorn Creek near mouth, near Wolf Creek	3	3	4	5	4	2	3	3	5	4
213	Willow Creek below Elkhorn Creek, near Wolf Creek	2	2	3	4	3	2	2	3	3	3



Table 5.--Estimated monthly streamflow characteristics for December and January--Continued

Site No.	Stream name	December					January				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
214	Cottonwood Creek above Beartooth Ranch, near Wolf Creek	.4	.5	.7	1	.9	.4	.4	.7	1	.7
217	Virginia Creek at mouth, near Canyon Creek	4	6	9	11	8	3	4	6	7	6
218	Canyon Creek below Cottonwood Creek, near Canyon Creek	6	8	13	19	14	4	5	9	12	9
219	Little Prickly Pear Creek near Canyon Creek	15	20	27	33	26	12	14	19	24	20
220	Lyons Creek near Wolf Creek	5	5	6	8	7	4	5	5	7	6
221	Wolf Creek at mouth, at Wolf Creek	2	2	3	4	4	2	2	3	4	3
222	Little Prickly Pear Creek near Wolf Creek	45	50	57	67	58	32	38	50	61	51
223	Wegner Creek near Craig <sup>4</sup>	0	0	0	0	0	0	0	0	0	0
224	Stickney Creek near Craig <sup>5</sup>	0	0	0	0	0	0	0	0	0	0
226	Middle Fork Dearborn River at Highway 200, near Wolf Creek	6	7	9	11	9	5	6	8	9	8
227	South Fork Dearborn River at Highway 434, near Wolf Creek	5	6	8	9	8	4	5	7	8	6
228	Dearborn River near Craig	40	47	62	83	67	36	41	53	67	56
229	Flat Creek above Slew Creek, near Craig	6	8	11	14	11	6	7	9	11	9
230	Sheep Creek at mouth, near Cascade	8	9	12	13	11	6	8	11	12	10
232	North Fork Smith River at Highway 89, near White Sulphur Springs	2	3	4	6	4	2	3	4	5	4
233	South Fork Smith River at mouth, near White Sulphur Springs	7	7	10	12	10	6	7	9	12	9
234	Smith River below forks, near White Sulphur Springs	8	9	12	16	13	7	8	11	13	11
235	Big Birch Creek at mouth, near White Sulphur Springs	13	14	21	27	20	10	12	17	26	18
236	Newlan Creek below Charcoal Gulch, near White Sulphur Springs	3	4	5	6	5	3	3	4	5	4
237	Camas Creek near mouth, near White Sulphur Springs	3	4	5	7	6	3	3	5	6	5
238	Smith River near Fort Logan	79	84	98	110	99	73	80	95	110	95
239	Sheep Creek near White Sulphur Springs	7	8	11	12	11	6	7	10	11	9
240	Sheep Creek near mouth, near White Sulphur Springs	10	13	18	24	20	10	12	17	22	17
241	Eagle Creek near mouth, near White Sulphur Springs	1	2	2	3	3	1	2	3	3	2
242	Rock Creek below Buffalo Canyon, near White Sulphur Springs	5	6	8	11	9	5	6	8	10	8
243	Tenderfoot Creek below South Fork, near White Sulphur Springs	9	10	13	15	13	7	9	12	14	11
244	Smith River near Eden	54	66	110	150	120	51	61	93	140	100
245	Hound Creek near mouth, near Cascade	8	11	15	20	16	9	10	14	18	15
246	Missouri River near Ulm	4000	4500	5300	6100	5400	3700	4200	5300	6400	5300
247	North Fork Sun River near Augusta	59	63	71	94	79	50	54	65	74	66
248	Sun River near Augusta	41	99	180	260	200	26	92	170	240	180
249	Sun River below diversion dam, near Augusta	73	85	130	170	130	75	82	110	160	120
250	Willow Creek near Anderson Lake, near Augusta	2	2	2	3	3	1	2	2	3	2
251	North Fork Willow Creek below Cutrock Creek, near Augusta	2	3	3	3	3	2	2	3	3	3
254	Smith Creek near Augusta	5	6	8	12	10	4	5	7	10	7
255	Ford Creek near Augusta	4	6	10	13	10	4	6	8	10	8
256	Elk Creek near Augusta	18	19	23	27	24	12	17	26	37	31
257	Sun River at Simms	130	140	180	210	190	120	140	180	240	190
260	Missouri River near Great Falls	4300	4800	5800	6800	5800	3800	4600	5400	7100	5700
261	Dry Fork at mouth, at Monarch	5	5	8	11	9	4	5	7	9	7

Table 5.--Estimated monthly streamflow characteristics for December and January--Continued

Site No.	Stream name	December					January				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
262	Tillinghast Creek above Joice Creek, near Monarch	4	5	7	8	7	3	4	6	7	6
263	Pilgrim Creek at mouth, near Monarch	4	4	5	7	6	3	4	6	8	6
264	Logging Creek at Logging Creek Campground, near Monarch	5	5	6	7	6	4	4	6	6	5
265	Belt Creek near Monarch	18	22	37	47	35	14	17	29	38	29
266	Big Otter Creek above Never Sweat Creek, near Raynesford	4	5	5	6	6	4	4	5	6	5
267	Belt Creek near Portage	10	12	22	34	24	7	9	17	27	17
268	Highwood Creek below Smith Creek, near Highwood	4	4	5	6	5	3	4	5	6	5
269	Missouri River at Fort Benton	3800	4300	5400	6900	5600	4000	5000	5600	7200	6000
270	Shonkin Creek below Bishop Creek, near Highwood	2	3	3	3	3	2	3	3	4	3
271	South Fork Two Medicine River near East Glacier	9	10	14	19	15	8	9	12	14	12
273	South Fork Badger Creek near Browning	10	11	14	19	16	8	9	12	16	13
274	North Fork Badger Creek near Browning	9	10	13	18	15	7	8	11	15	12
278	Birch Creek at Swift Dam, near Valier	0	1	7	17	13	.6	1	8	13	8
279	South Fork Dupuyer Creek near Dupuyer	2	2	3	4	3	2	2	3	3	3
280	North Fork Dupuyer Creek near Dupuyer	2	3	3	5	4	2	2	3	4	3
281	Dupuyer Creek below Scoffin Creek, near Dupuyer	7	9	13	16	13	6	7	9	12	10
282	Birch Creek near Valier	34	37	39	51	44	18	25	34	45	35
283	Cut Bank Creek near Browning	13	22	36	59	42	5	17	31	49	33
284	Cut Bank Creek at Cut Bank	17	23	35	61	44	17	23	33	50	38
285	Marias River at Sullivan Bridge, near Cut Bank	150	170	240	360	280	120	150	210	300	230
286	Marias River near Shelby	150	170	250	370	290	120	150	210	310	240
287	Marias River at "F" Bridge, above Tiber Reservoir, near Shelby	170	190	290	440	340	140	180	240	360	280
288	Marias River near Loma	110	180	370	650	390	110	160	300	500	330
290	Teton River near Strabane	8	15	19	23	19	7	14	16	20	16
291	McDonald Creek near Strabane	8	9	9	11	10	8	9	9	10	10
292	North Fork Deep Creek near Choteau	3	3	4	6	5	2	3	4	5	4
293	South Fork Deep Creek near Choteau	3	3	4	6	5	2	3	4	5	4
294	Deep Creek near Choteau	7	7	9	10	9	6	7	7	9	8
295	Teton River near Dutton	30	39	58	94	68	37	42	55	66	55
296	Missouri River at Virgelle	4600	5200	6500	7400	6400	4100	4900	6000	7700	6300
297	Lost Creek at mouth, near Utica	5	5	7	9	7	4	5	6	8	6
298	Yogo Creek at mouth, near Utica	.4	.7	1	3	2	.7	.7	2	2	2
299	Middle Fork Judith River, near Utica	.3	.5	2	3	2	0	0	.1	.3	0
301	South Fork Judith River at Indian Hill Campground, near Utica	1	1	2	2	2	1	1	2	2	2
303	Judith River above Courtneys Creek, at Utica	5	7	9	12	10	5	6	8	10	8
306	East Fork Big Spring Creek at mouth, near Lewistown	3	4	6	9	7	4	4	6	8	6
307	Big Spring Creek above Cottonwood Creek, near Hanover	92	100	110	120	110	96	98	100	110	110
309	Cottonwood Creek at Highway 200, near Lewistown	2	2	3	4	3	2	2	3	4	3
310	Beaver Creek at county road, near Lewistown	6	7	9	10	9	5	6	7	10	8
311	Big Spring Creek at mouth, near Lewistown	70	82	96	110	98	76	80	89	100	92

Table 5.--Estimated monthly streamflow characteristics for December and January--Continued

Site No.	Stream name	December					January				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
312	Warm Springs Creek above Meadow Creek, near Hilger	96	100	100	110	100	96	100	110	110	100
313	Judith River near Winifred	240	250	470	590	420	240	240	490	600	430
315	Cow Creek below forks, near Cleveland	2	3	3	4	4	2	2	3	3	3
316	Missouri River near Landusky	4900	5600	6900	7900	6900	4600	5200	6600	8300	6700
317	North Fork Musselshell River near Delpine	5	5	6	7	6	4	4	6	7	6
318	Checkerboard Creek near Checkerboard	.7	.9	1	2	1	.7	.8	1	2	1
319	Spring Creek below Whitetail Creek, near Checkerboard	2	3	3	4	4	2	2	3	4	3
320	North Fork Musselshell River near mouth, near Martinsdale	5	6	8	9	8	5	5	7	9	7
321	Alabough Creek at mouth, near Lennep	1	2	2	3	3	1	2	2	3	2
322	Cottonwood Creek below Loco Creek, near Martinsdale	7	8	10	11	10	6	7	9	11	8
323	South Fork Musselshell River above Martinsdale	11	14	21	27	22	8	11	17	23	18
324	Big Elk Creek at mouth, at Twodot	.2	.6	8	11	7	.1	.3	6	8	5
325	Musselshell River at Harlowton	37	47	67	91	72	31	43	56	74	61
326	American Fork near Harlowton	1	2	3	5	3	.8	1	2	3	2
330	Careless Creek below Little Careless Creek, near Hedgesville	.5	.6	.8	1	1	.4	.5	.8	1	.8
331	Swimming Woman Creek below Dry Coulee, near Franklin	.4	.5	.6	.8	.7	.4	.4	.6	.8	.6
333	Musselshell River near Roundup	16	25	57	110	71	24	34	52	110	69
335	Flatwillow Creek below the forks, near Grass Range	2	3	5	11	8	3	3	6	9	7
338	Musselshell River near Mosby	17	31	67	130	82	11	21	70	120	86
339	Big Dry Creek above Little Dry Creek, near Van Norman	0	0	.4	.8	1	0	0	0	.8	1
340	Little Dry Creek near Van Norman	0	.2	.8	2	2	0	0	.1	1	2
341	Big Dry Creek near Van Norman	0	.2	1	2	3	0	0	.1	2	3

<sup>1</sup>Includes estimated spring flow of about 40 cubic feet per second, based on information provided by Montana Department of Fish, Wildlife and Parks.

<sup>2</sup>Includes estimated spring flow of about 10 cubic feet per second, based on information provided by Montana Department of Fish, Wildlife and Parks.

<sup>3</sup>Estimated long-term monthly streamflow characteristics may not reflect the current flow regime because of upstream streamflow regulation.

<sup>4</sup>Stream is known to be dry except for periods of runoff. Calculated flows were adjusted by subtracting 7 cubic feet per second.

<sup>5</sup>Stream is known to be dry except for periods of runoff. Calculated flows were adjusted by subtracting 8 cubic feet per second.

Table 6.--Estimated monthly streamflow characteristics for February and March

[Q.XX, monthly mean streamflow for specified month exceeded XX percent of the years, in cubic feet per second; QM, mean monthly streamflow for specified month, in cubic feet per second]

Site No.	Stream name	February					March				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
1	Hellroaring Creek near Lakeview	4	4	5	7	5	4	4	4	5	4
2	Corral Creek near Lakeview	.5	.5	.6	.8	.7	.5	.5	.5	.6	.5
3	Antelope Creek near Lakeview	.1	.1	.2	.2	.2	.2	.2	.2	.2	.2
4	Red Rock Creek near Lakeview	8	9	10	12	10	8	8	9	10	9
5	Tom Creek near Lakeview	.2	.3	.4	.5	.4	.2	.3	.4	.4	.4
6	Narrows Creek at mouth, near Lakeview	.1	.1	.2	.2	.2	.1	.1	.2	.3	.2
7	Odell Creek near Lakeview	3	4	5	6	5	3	4	4	4	4
8	Jones Creek near Lakeview	.4	.5	.6	.9	.7	.4	.5	.8	1	.9
9	Red Rock River near Kennedy Ranch, near Lakeview	16	31	47	63	49	26	42	56	98	67
10	Peet Creek at county road, near Lakeview	.4	.5	.7	1	.7	.5	.6	.8	1	1
11	Long Creek near Lakeview	2	2	2	3	2	2	2	2	2	2
12	East Fork Clover Creek at mouth, near Monida	.5	.6	.8	1	.9	.6	.7	1	2	1
13	Red Rock River below Lima Reservoir, near Monida	8	14	22	31	22	7	13	21	28	21
14	Cabin Creek above Simpson Creek, near Lima	.2	.2	.3	.4	.3	.2	.2	.4	.6	.4
15	Indian Creek above Simpson Creek, near Lima	.3	.3	.4	.5	.4	.3	.3	.5	.7	.6
16	Simpson Creek above Indian Creek, near Lima	.3	.3	.4	.6	.5	.3	.4	.6	.8	.6
17	Deadman Creek near Dell	2	2	3	4	3	3	3	4	5	5
18	Big Sheep Creek below Muddy Creek, near Dell	32	35	39	46	41	36	39	46	53	48
19	Red Rock River at Red Rock	140	140	160	180	170	120	140	170	200	190
20	Black Canyon Creek near Grant	1	1	2	2	2	1	2	2	3	2
21	Shennon Creek near mouth, near Grant	.3	.4	.5	.7	.5	.3	.4	.6	1	.7
22	Frying Pan Creek near Grant	.8	1	1	2	1	1	1	2	3	2
23	Trapper Creek at mouth, near Grant	.2	.3	.4	.5	.4	.3	.3	.5	.8	.6
24	Bear Creek near Grant	2	2	2	4	3	2	2	3	4	3
25	Bloody Dick Creek near Grant	7	8	10	16	12	8	9	12	17	13
26	Horse Prairie Creek near Grant	21	25	30	41	32	29	31	39	63	47
27	Rape Creek above reservoir, near Grant	.1	.2	.2	.3	.3	.2	.2	.3	.5	.4
28	Painter Creek near Grant	1	1	2	2	2	1	2	2	3	2
29	Browns Canyon Creek near Grant	.7	.9	1	2	1	.8	1	1	2	2
30	Medicine Lodge Creek near Grant	2	4	6	8	6	5	6	9	13	11
32	Pole Creek near mouth, near Polaris	.4	.5	.7	1	.8	.5	.6	.9	1	1
33	Reservoir Creek at mouth, near Polaris	.6	.7	1	1	1	.7	.8	1	2	2
34	East Fork Dyce Creek at mouth, near Polaris	.4	.5	.6	.9	.7	.5	.6	.8	1	1
35	West Fork Dyce Creek at mouth, near Polaris	.2	.3	.3	.5	.4	.2	.3	.5	.7	.5
36	Grasshopper Creek near Dillon	19	21	27	33	27	27	32	44	73	53
37	Beaverhead River at Barretts	180	230	310	360	300	200	270	330	420	340
38	East Fork Blacktail Creek near Dillon	11	11	13	19	15	12	13	14	20	15
39	West Fork Blacktail Creek near Dillon	4	5	6	8	6	5	6	8	10	9
40	Blacktail Deer Creek near Dillon	20	27	34	40	34	31	36	41	53	44
41	Beaverhead River near Dillon	260	300	380	470	380	280	320	410	520	420

Table 6.--Estimated monthly streamflow characteristics for February and March--Continued

Site No.	Stream name	February					March				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
42	Beaverhead River near Twin Bridges	340	380	450	520	450	360	400	500	590	500
43	Corral Creek at mouth, near Alder	.3	.4	.5	.7	.6	.4	.4	.7	1	.8
44	Coal Creek at mouth, near Alder	1	1	2	3	2	1	2	2	3	3
45	Ruby River above the forks, near Alder	5	5	7	9	7	5	6	8	12	9
46	East Fork Ruby River at mouth, near Alder	2	2	2	3	3	2	2	3	4	3
47	West Fork Ruby River at mouth, near Alder	2	2	3	4	3	2	3	4	5	4
48	Cottonwood Creek at mouth, near Alder	2	3	3	4	4	2	3	4	6	4
49	Warm Springs Creek at mouth, near Alder <sup>1</sup>	44	45	47	49	47	45	46	48	51	49
50	North Fork Greenhorn Creek at mouth, near Alder	1	1	2	2	2	1	1	2	3	2
51	Ruby River above reservoir, near Alder	84	90	100	110	100	89	94	110	120	110
52	Mill Creek at Forest Service boundary, near Sheridan	5	5	6	8	7	5	5	5	6	5
53	Wisconsin Creek at Forest Service boundary, near Sheridan	3	4	5	6	5	3	3	4	4	4
54	Ruby River near Twin Bridges	110	120	130	150	130	110	120	150	210	170
55	Big Hole River near Jackson	7	8	10	13	11	8	9	11	15	12
56	Andrus Creek near mouth, near Jackson	2	2	3	4	3	2	3	4	6	4
57	Fox Creek at mouth, near Jackson	1	1	2	3	2	1	2	2	3	3
58	Governor Creek near Jackson	9	10	12	18	13	9	10	13	18	15
59	Warm Springs Creek at Jackson	5	6	8	12	9	6	7	10	13	11
60	Miner Creek near Jackson	5	6	7	9	7	5	6	8	10	8
61	Big Lake Creek near mouth, near Wisdom	2	3	4	5	4	3	3	4	6	5
62	Steel Creek above Francis Creek, near Wisdom	1	1	2	3	2	1	1	2	3	2
63	Francis Creek at mouth, near Wisdom	2	2	3	4	3	2	2	3	4	3
64	Steel Creek near mouth, near Wisdom	3	4	5	7	5	3	4	5	7	6
65	Swamp Creek near mouth, near Wisdom	4	4	5	8	5	3	4	5	7	5
66	Joseph Creek at mouth, near Wisdom	2	2	3	4	3	2	2	3	4	3
67	Trail Creek near Wisdom	9	9	12	21	14	9	10	13	20	15
68	Ruby Creek at mouth, near Wisdom	3	3	4	7	5	3	3	5	7	6
69	Tie Creek at Forest Service boundary, near Wisdom	4	5	6	8	6	5	5	7	10	8
70	Johnson Creek near Wisdom	2	3	3	5	4	2	3	4	6	5
71	Mussigbrod Creek near Wisdom	1	2	2	3	2	1	1	2	2	2
72	North Fork Big Hole River near mouth, near Wisdom	17	20	26	41	28	18	20	28	40	32
73	Big Hole River below North Fork, near Wisdom	100	110	130	180	140	120	130	160	210	180
74	Pintlar Creek near Forest Service boundary, near Wisdom	3	3	4	6	4	2	3	4	5	4
75	Big Hole River below Mudd Creek, near Wisdom	110	120	140	190	150	130	140	170	230	190
76	Fishtrap Creek at mouth, near Wise River	3	4	6	8	6	3	4	6	7	6
77	Lamarche Creek near Wise River	6	8	10	12	10	7	8	10	13	11
78	Seymour Creek near Wise River	4	5	7	9	7	5	6	8	10	9
79	Tenmile Creek at mouth, near Wise River	1	2	2	3	2	2	2	3	3	3
80	Sevenmile Creek at mouth, near Wise River	.3	.4	.5	.7	.5	.3	.4	.6	1	.7
81	Corral Creek at mouth, near Wise River	.4	.5	.6	.9	.7	.4	.5	.8	1	.9

Table 6.--Estimated monthly streamflow characteristics for February and March--Continued

Site No.	Stream name	February					March				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
82	Twelvemile Creek at mouth, near Wise River	1	1	2	2	2	1	2	2	3	2
83	Sullivan Creek at mouth, near Wise River	1	1	2	2	2	1	2	2	3	2
84	Oregon Creek near mouth, near Wise River	.1	.2	.2	.3	.3	.1	.2	.3	.5	.4
85	California Creek above American Creek, near Wise River	1	2	2	3	2	2	2	3	4	3
86	American Creek at mouth, near Wise River	.4	.4	.6	.8	.6	.4	.5	.8	1	.9
87	Sixmile Creek at mouth, near Wise River	.2	.3	.4	.6	.4	.3	.3	.5	.8	.6
88	French Creek near mouth, near Wise River	3	3	4	6	4	3	4	5	8	6
89	Deep Creek near Wise River	14	15	18	27	20	14	15	17	26	19
90	Bear Creek near Wise River	.6	.7	.9	1	.9	.6	.6	.7	1	.8
91	Bryant Creek at mouth, near Wise River	1	1	2	3	2	1	2	2	3	3
92	Big Hole River near Wise River	160	170	200	270	210	180	200	240	320	280
93	Johnson Creek at mouth, near Wise River	.7	.8	1	2	1	.8	1	1	2	2
94	Meadow Creek near Wise River	1	2	2	3	2	1	2	2	3	3
95	Jacobson Creek at mouth, near Wise River	6	7	9	12	10	7	8	10	14	11
96	Mono Creek at mouth, near Wise River	.7	.8	1	2	1	.7	1	1	2	1
97	Wyman Creek at mouth, near Wise River	3	4	5	7	5	4	5	6	8	7
98	Lacy Creek at mouth, near Wise River	2	2	3	4	3	2	3	4	5	4
99	Gold Creek at mouth, near Wise River	1	1	1	2	2	1	1	2	2	2
100	Pattengail Creek at mouth, near Wise River	8	10	13	16	13	10	12	15	20	16
101	Sheep Creek at mouth, near Wise River	1	1	2	3	2	1	2	2	3	3
102	Wise River near Wise River	31	32	36	40	36	30	34	40	45	40
103	Adson Creek at mouth, near Wise River	.8	1	1	2	1	.9	1	2	2	2
104	Jerry Creek near Wise River	4	4	5	7	5	4	4	5	7	6
105	Divide Creek at Divide	1	2	3	3	3	2	2	4	4	4
106	Canyon Creek near Divide	2	3	4	4	4	2	3	4	5	5
107	Moose Creek near Divide	3	3	4	6	5	4	4	5	7	5
108	Trapper Creek near Melrose	3	3	4	5	4	3	4	5	6	5
109	Camp Creek at Melrose	.5	1	2	2	1	1	2	2	5	3
110	Big Hole River near Melrose	280	290	340	450	370	320	350	420	550	470
111	Willow Creek near Glen	5	6	6	8	7	5	6	7	8	7
112	Birch Creek near Glen	5	6	7	8	7	5	6	7	9	7
113	Hells Canyon Creek near Twin Bridges	1	2	2	3	2	2	2	2	3	3
114	Jefferson River near Twin Bridges	880	970	1100	1300	1100	910	1000	1200	1500	1200
115	Whitetail Creek near Whitehall	1	1	2	3	2	1	1	2	3	2
117	Boulder River above High Ore Creek, near Basin	15	19	26	33	26	23	26	34	48	39
118	Boulder River near Boulder	19	25	33	42	33	30	34	43	62	50
119	Little Boulder River near Boulder	5	6	8	10	8	7	8	10	15	11
120	Boulder River above Cabin Gulch, near Boulder	25	30	38	47	39	35	39	47	65	54
121	Boulder River near Cardwell	30	37	47	58	48	43	48	58	79	67
122	South Boulder River near Jefferson Island	7	8	11	14	11	4	9	10	14	11
123	Jefferson River at Sappington	960	1000	1200	1400	1300	1100	1300	1400	1600	1400
124	South Willow Creek near Pony	7	9	12	17	14	12	13	16	23	17
125	North Willow Creek at Pony	7	7	9	12	11	10	11	12	16	13
126	Willow Creek near Harrison	17	20	25	31	27	25	26	30	36	31
127	Norwegian Creek near Harrison	4	4	5	5	5	5	6	7	7	7

Table 6.--Estimated monthly streamflow characteristics for February and March--Continued

Site No.	Stream name	February					March				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
129	Jefferson River near Three Forks	880	1100	1400	1700	1400	1300	1400	1700	1900	1600
130	Madison River near West Yellowstone	340	370	410	440	410	340	380	410	430	410
131	Duck Creek near West Yellowstone	17	18	20	23	21	18	19	20	24	20
132	Cougar Creek near West Yellowstone	5	7	9	10	8	5	6	9	9	9
133	Grayling Creek near West Yellowstone	9	12	14	17	14	8	9	11	11	11
134	Red Canyon Creek near West Yellowstone	.2	.4	.6	.7	.6	.3	.4	.8	.8	1
135	South Fork Madison River near West Yellowstone	82	87	93	98	92	84	87	92	100	93
136	Watkins Creek near West Yellowstone	1	1	2	2	2	1	1	2	2	2
137	Trapper Creek near West Yellowstone	1	1	1	2	2	1	1	1	2	1
138	Madison River below Hebgen Lake, near Grayling	570	680	790	950	820	390	550	800	1100	810
139	Cabin Creek near West Yellowstone	4	5	6	7	6	3	3	4	4	4
140	Beaver Creek near West Yellowstone	14	16	19	24	20	14	15	17	18	17
141	Elk River at mouth, near Cameron	8	10	13	16	13	10	11	14	18	15
142	Soap Creek at mouth, near Cameron	.5	.5	.7	1	.8	.5	.6	1	1	1
143	Antelope Creek at mouth, near Cameron <sup>2</sup>	13	13	14	15	14	13	14	15	17	16
144	West Fork Madison River near Cameron	28	31	38	45	39	32	34	42	53	45
145	Squaw Creek near Cameron	4	5	6	7	6	5	5	6	6	6
146	Standard Creek near Cameron	3	4	4	5	5	3	3	4	5	4
147	Ruby Creek near Cameron	2	2	3	4	3	2	3	3	4	3
148	Indian Creek near Cameron	13	15	18	22	19	13	13	15	17	16
149	Madison River near Cameron	780	880	1000	1200	1000	710	810	1000	1300	1100
150	Blaine Spring Creek near Cameron	21	21	22	24	23	21	22	23	24	23
151	O'Dell Creek near Ennis	94	95	98	99	98	94	95	99	100	98
152	Jack Creek near Ennis	11	12	13	14	13	11	11	14	15	13
153	Moore Creek at Ennis	.4	.6	.7	.8	.7	.4	.5	.9	.9	1
154	North Fork Meadow Creek at Forest Service boundary, near Ennis	3	3	5	6	5	2	3	4	6	4
155	North Fork Meadow Creek at Highway 287, near Ennis	2	2	3	4	3	2	2	3	3	3
156	Madison River below Ennis Lake, near McAllister	1000	1200	1400	1600	1400	980	1200	1400	1700	1400
157	Hot Springs Creek near Norris	3	4	5	6	5	3	4	5	6	6
158	Cherry Creek near Norris	14	15	17	20	18	14	15	18	24	20
159	Madison River near Three Forks	1100	1200	1400	1600	1400	990	1200	1400	1800	1500
160	Cache Creek at mouth, near West Yellowstone	2	2	2	3	3	2	2	3	4	3
161	Taylor Creek near Grayling	14	16	19	24	20	14	14	16	18	17
162	Porcupine Creek near Gallatin Gateway	3	4	5	6	5	3	3	4	4	4
163	Gallatin River above West Fork, near Big Sky	130	140	170	190	160	130	150	160	200	170
164	South Fork West Fork Gallatin River near Gallatin Gateway	7	9	11	13	10	7	8	10	12	10
165	Middle Fork West Fork Gallatin River near Gallatin Gateway	3	4	5	6	5	4	4	5	6	5
166	West Fork Gallatin River near Gallatin Gateway	15	17	21	25	21	14	16	19	24	20
167	Squaw Creek near Gallatin Gateway	11	12	13	16	14	12	13	14	17	15
168	Hellroaring Creek near Gallatin Gateway	12	13	16	19	16	13	14	15	20	16

Table 6.--Estimated monthly streamflow characteristics for February and March--Continued

Site No.	Stream name	February					March				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
169	South Fork Spanish Creek near Gallatin Gateway	7	8	9	11	9	7	7	8	11	8
170	Spanish Creek near Gallatin Gateway	15	17	21	25	21	16	18	20	27	21
171	Gallatin River near Gallatin Gateway	240	270	310	350	310	250	270	310	370	310
172	Big Bear Creek near Gallatin Gateway	3	3	3	4	3	3	3	3	4	4
173	South Cottonwood Creek near Gallatin Gateway	10	11	12	15	13	10	11	13	16	13
174	Baker Creek near Manhattan <sup>3</sup>	68	75	85	99	88	81	87	100	110	100
175	Rocky Creek near Bozeman	6	9	11	14	12	10	11	15	22	17
176	Bear Canyon Creek near Bozeman	.5	1	2	3	2	1	2	3	5	4
177	Sourdough Creek near Bozeman	7	8	10	11	10	8	8	10	12	11
178	East Gallatin River at Bozeman	31	37	45	51	44	43	51	56	66	60
179	Bridger Creek near Bozeman	5	5	7	10	8	7	8	11	24	15
180	East Gallatin River near Belgrade	27	33	46	59	49	42	52	61	90	69
181	East Fork Hyalite Creek near Bozeman	2	2	3	4	3	2	3	3	4	3
182	West Fork Hyalite Creek near Bozeman	5	6	7	9	7	5	5	7	8	7
183	Hyalite Creek at Hyalite Ranger Station, near Bozeman	12	13	17	21	17	11	14	17	23	18
184	Hyalite Creek above Interstate 90, near Bozeman	3	4	5	6	5	3	3	4	5	5
185	Thompson Creek near Belgrade	21	25	30	35	29	20	23	30	34	29
186	Ben Hart Creek near Belgrade	27	28	29	32	29	27	28	29	32	30
187	Reese Creek near Belgrade	5	5	7	8	7	6	6	7	9	8
188	East Gallatin River near Manhattan	140	140	160	180	170	150	160	170	210	180
189	Gallatin River near Logan	600	650	740	840	750	700	740	860	950	850
190	Sixteenmile Creek near Ringling	.8	2	4	6	5	2	3	11	32	26
191	Sixteenmile Creek near Maudlow	16	17	21	29	24	20	23	28	41	31
192	Sixteenmile Creek near Toston	18	22	28	37	31	26	31	41	58	47
193	Missouri River near Toston	3100	3400	3800	4200	3800	3200	3500	3900	4800	4100
194	Crow Creek near Radersburg	8	8	9	10	9	7	7	9	12	10
195	Dry Creek near Toston	2	2	2	3	3	2	2	3	5	3
196	Deep Creek below North Fork, near Townsend	6	6	8	9	8	6	7	9	10	10
197	Duck Creek near Townsend	2	3	3	3	3	2	2	3	4	3
198	Confederate Gulch near Winston	4	4	4	5	5	4	4	4	6	5
199	Beaver Creek near Winston	1	1	3	4	3	1	2	4	6	4
200	Avalanche Gulch near Winston	.7	1	2	2	2	1	2	2	3	3
201	Spokane Creek near East Helena	3	3	4	4	4	3	3	4	5	5
202	McGuire Creek at county road, near East Helena	6	7	7	8	7	7	7	7	8	8
203	Trout Creek at mouth, near East Helena	11	11	12	14	13	13	14	15	18	16
204	Prickly Pear Creek near Clancy	16	18	21	28	24	20	23	27	38	30
205	Prickly Pear Creek at mouth, near East Helena	21	22	25	31	28	26	28	32	39	34
206	Tenmile Creek near Rimini	.3	.6	1	2	1	.6	.9	2	3	2
207	Tenmile Creek near Helena	3	4	6	7	6	3	5	7	11	8
208	Sevenmile Creek near mouth, near Helena	1	1	2	2	2	2	2	3	4	3
209	Tenmile Creek at mouth, near East Helena	2	2	3	5	4	3	3	5	9	6
210	Silver Creek at Interstate 15, near Helena	8	8	9	11	10	9	9	11	13	11
211	Beaver Creek at mouth, near East Helena	5	6	7	9	8	6	7	8	10	9
212	Elkhorn Creek near mouth, near Wolf Creek	3	3	4	4	4	3	4	4	5	5
213	Willow Creek below Elkhorn Creek, near Wolf Creek	1	2	2	2	2	1	2	3	3	3



Table 6.--Estimated monthly streamflow characteristics for February and March--Continued

Site No.	Stream name	February					March				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
214	Cottonwood Creek above Beartooth Ranch, near Wolf Creek	.3	.4	.6	.6	.5	.3	.4	.7	.7	.8
217	Virginia Creek at mouth, near Canyon Creek	4	6	7	10	8	7	9	15	28	17
218	Canyon Creek below Cottonwood Creek, near Canyon Creek	6	8	11	15	12	10	14	26	49	30
219	Little Prickly Pear Creek near Canyon Creek	16	19	23	28	24	22	26	39	56	43
220	Lyons Creek near Wolf Creek	5	5	6	7	6	5	6	8	10	9
221	Wolf Creek at mouth, at Wolf Creek	2	2	3	4	3	2	3	4	5	4
222	Little Prickly Pear Creek near Wolf Creek	41	49	62	77	65	44	60	79	100	81
223	Wegner Creek near Craig <sup>4</sup>	0	0	0	0	0	0	0	0	0	0
224	Stickney Creek near Craig <sup>5</sup>	0	0	0	0	0	0	0	0	0	0
226	Middle Fork Dearborn River at Highway 200, near Wolf Creek	6	6	8	10	8	5	7	9	12	10
227	South Fork Dearborn River at Highway 434, near Wolf Creek	5	5	7	9	7	4	6	8	12	9
228	Dearborn River near Craig	42	46	57	71	61	42	54	77	100	84
229	Flat Creek above Slew Creek, near Craig	7	7	10	13	11	7	10	15	22	16
230	Sheep Creek at mouth, near Cascade	7	8	10	13	10	7	8	9	12	9
232	North Fork Smith River at Highway 89, near White Sulphur Springs	2	2	3	3	3	1	2	2	2	2
233	South Fork Smith River at mouth, near White Sulphur Springs	6	8	11	17	12	9	12	16	25	19
234	Smith River below forks, near White Sulphur Springs	6	7	9	10	9	5	6	8	8	8
235	Big Birch Creek at mouth, near White Sulphur Springs	12	15	26	57	33	20	31	49	100	60
236	Newlan Creek below Charcoal Gulch, near White Sulphur Springs	3	4	5	7	5	4	5	7	13	9
237	Camas Creek near mouth, near White Sulphur Springs	3	4	5	6	5	4	5	7	10	8
238	Smith River near Fort Logan	77	88	110	150	120	93	110	140	180	150
239	Sheep Creek near White Sulphur Springs	7	7	9	11	9	7	8	9	11	9
240	Sheep Creek near mouth, near White Sulphur Springs	9	12	16	18	15	10	12	16	18	17
241	Eagle Creek near mouth, near White Sulphur Springs	1	2	2	2	2	1	1	2	2	2
242	Rock Creek below Buffalo Canyon, near White Sulphur Springs	5	6	8	9	7	6	6	8	10	9
243	Tenderfoot Creek below South Fork, near White Sulphur Springs	8	9	11	14	11	7	8	10	11	10
244	Smith River near Eden	66	88	130	190	150	82	110	160	240	170
245	Hound Creek near mouth, near Cascade	9	12	14	16	14	8	11	17	23	19
246	Missouri River near Ulm	3200	4400	5100	6500	5300	3700	4500	5700	6800	5700
247	North Fork Sun River near Augusta	47	52	64	74	65	48	53	61	80	68
248	Sun River near Augusta	29	140	180	260	220	58	150	200	310	230
249	Sun River below diversion dam, near Augusta	63	89	120	160	120	61	98	120	190	140
250	Willow Creek near Anderson Lake, near Augusta	2	2	2	3	2	2	2	3	4	3
251	North Fork Willow Creek below Cutrock Creek, near Augusta	2	3	3	4	3	3	3	4	5	4
254	Smith Creek near Augusta	4	5	8	16	10	8	10	13	17	17
255	Ford Creek near Augusta	5	6	8	11	9	7	7	9	15	12
256	Elk Creek near Augusta	18	22	30	46	33	18	19	28	53	34
257	Sun River at Simms	120	130	180	250	190	48	84	140	250	170
260	Missouri River near Great Falls	3700	4700	5900	7500	5900	4300	5100	6100	8100	6500
261	Dry Fork at mouth, at Monarch	4	5	7	9	7	5	6	8	9	8

Table 6.--Estimated monthly streamflow characteristics for February and March--Continued

Site No.	Stream name	February					March				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
262	Tillinghast Creek above Joice Creek, near Monarch	4	5	6	8	6	5	5	6	8	7
263	Pilgrim Creek at mouth, near Monarch	4	5	6	8	7	5	5	7	10	8
264	Logging Creek at Logging Creek Campground, near Monarch	4	5	6	7	6	5	5	6	7	6
265	Belt Creek near Monarch	15	21	29	41	31	19	24	31	43	35
266	Big Otter Creek above Never Sweat Creek, near Raynesford	4	5	6	8	7	3	6	9	15	13
267	Belt Creek near Portage	8	11	17	28	19	9	13	24	37	27
268	Highwood Creek below Smith Creek, near Highwood	3	4	4	5	4	3	3	3	4	4
269	Missouri River at Fort Benton	3700	4700	6000	7600	6100	4300	5300	6300	8000	6600
270	Shonkin Creek below Bishop Creek, near Highwood	2	3	3	3	3	1	2	2	2	2
271	South Fork Two Medicine River near East Glacier	6	7	9	11	9	6	7	8	10	9
273	South Fork Badger Creek near Browning	8	9	12	15	12	9	10	13	16	14
274	North Fork Badger Creek near Browning	7	8	11	14	11	8	9	12	15	12
278	Birch Creek at Swift dam, near Valier	.2	2	8	43	27	2	2	4	36	16
279	South Fork Dupuyer Creek near Dupuyer	2	2	2	3	3	2	2	3	4	3
280	North Fork Dupuyer Creek near Dupuyer	2	2	3	4	3	2	3	3	5	4
281	Dupuyer Creek below Scoffin Creek, near Dupuyer	7	9	11	14	12	10	12	20	32	22
282	Birch Creek near Valier	38	41	51	65	55	22	29	71	210	160
283	Cut Bank Creek near Browning	11	24	35	62	51	21	38	71	200	120
284	Cut Bank Creek at Cut Bank	16	25	35	91	57	37	44	94	250	150
285	Marias River at Sullivan Bridge, near Cut Bank	130	160	260	490	310	230	260	390	830	570
286	Marias River near Shelby	130	160	260	510	320	230	260	400	900	610
287	Marias River at "F" Bridge, above Tiber Reservoir, near Shelby	150	190	310	600	370	270	310	470	1000	710
288	Marias River near Loma	140	220	420	630	420	130	220	390	750	480
290	Teton River near Strabane	7	14	17	21	17	4	6	14	18	13
291	McDonald Creek near Strabane	8	9	9	11	10	10	10	11	14	12
292	North Fork Deep Creek near Choteau	3	3	4	5	4	3	3	5	6	5
293	South Fork Deep Creek near Choteau	2	3	4	5	4	3	3	4	6	5
294	Deep Creek near Choteau	7	7	8	11	9	8	9	10	14	11
295	Teton River near Dutton	40	47	67	95	86	62	72	120	200	170
296	Missouri River at Virgelle	3900	5200	6700	8400	6600	4600	5700	7200	9100	7600
297	Lost Creek at mouth, near Utica	4	5	6	8	6	5	6	7	10	8
298	Yogo Creek at mouth, near Utica	.3	.8	1	2	1	.6	.9	3	3	3
299	Middle Fork Judith River near Utica	0	0	.1	.8	.5	0	.2	.7	2	1
301	South Fork Judith River at Indian Hill Campground, near Utica	1	1	2	2	1	.7	.8	1	1	1
303	Judith River above Courtneys Creek, at Utica	4	5	7	8	6	3	4	6	6	6
306	East Fork Big Spring Creek at mouth, near Lewistown	4	5	6	6	6	3	5	7	9	8
307	Big Spring Creek above Cottonwood Creek, near Hanover	100	100	110	110	110	90	99	110	130	110
309	Cottonwood Creek at Highway 200, near Lewistown	1	2	3	3	2	1	2	2	3	3
310	Beaver Creek at county road, near Lewistown	5	8	11	17	15	3	10	26	61	47
311	Big Spring Creek at mouth, near Lewistown	83	88	95	100	94	68	81	98	130	110

Table 6.--Estimated monthly streamflow characteristics for February and March--Continued

Site No.	Stream name	February					March				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
312	Warm Springs Creek above Meadow Creek, near Hilger	95	100	100	110	100	97	100	110	110	110
313	Judith River near Winifred	240	250	530	640	480	260	310	590	710	540
315	Cow Creek below forks, near Cleveland	2	2	3	3	3	2	3	4	5	4
316	Missouri River near Landusky	4200	5500	7200	9300	7300	5500	6600	8400	11000	8900
317	North Fork Musselshell River, near Delpine	4	5	6	7	6	5	6	8	12	9
318	Checkerboard Creek near Checkerboard	.6	.8	1	1	1	.6	.8	1	1	1
319	Spring Creek below Whitetail Creek, near Checkerboard	2	3	3	4	3	2	2	3	5	4
320	North Fork Musselshell River near mouth, near Martinsdale	5	6	7	9	8	6	7	9	14	11
321	Alabaugh Creek at mouth, near Lennep	1	2	2	2	2	1	1	2	2	2
322	Cottonwood Creek below Loco Creek, near Martinsdale	6	7	9	10	8	5	5	6	7	6
323	South Fork Musselshell River above Martinsdale	11	14	20	26	21	14	17	29	53	37
324	Big Elk Creek at mouth, at Twodot	.1	.3	7	9	6	.3	.7	8	12	7
325	Musselshell River at Harlowton	36	46	65	97	70	53	62	87	150	110
326	American Fork near Harlowton	.1	.3	1	2	2	0	0	1	5	2
330	Careless Creek below Little Careless Creek, near Hedgesville	.4	.6	1	2	1	.2	.6	4	20	13
331	Swimming Woman Creek below Dry Coulee, near Franklin	.3	.4	.5	.6	.5	.2	.3	.5	.5	.6
333	Musselshell River near Roundup	24	37	93	160	110	50	80	140	290	220
335	Flatwillow Creek below the forks, near Grass Range	2	3	5	5	4	3	4	7	7	8
338	Musselshell River near Mosby	25	48	120	280	220	72	120	270	630	550
339	Big Dry Creek above Little Dry Creek, near Van Norman	0	0	1	50	34	.3	3	30	400	190
340	Little Dry Creek near Van Norman	0	0	2	42	28	2	4	32	210	110
341	Big Dry Creek near Van Norman	0	0	3	98	62	3	7	73	640	300

<sup>1</sup>Includes estimated spring flow of about 40 cubic feet per second, based on information provided by Montana Department of Fish, Wildlife and Parks.

<sup>2</sup>Includes estimated spring flow of about 10 cubic feet per second, based on information provided by Montana Department of Fish, Wildlife and Parks.

<sup>3</sup>Estimated long-term monthly streamflow characteristics may not reflect the current flow regime because of upstream streamflow regulation.

<sup>4</sup>Stream is known to be dry except for periods of runoff. Calculated flows were adjusted by subtracting 7 cubic feet per second.

<sup>5</sup>Stream is known to be dry except for periods of runoff. Calculated flows were adjusted by subtracting 8 cubic feet per second.

Table 7.--Estimated monthly streamflow characteristics for April and May

[Q.XX, monthly mean streamflow for specified month exceeded XX percent of the years, in cubic feet per second; QM, mean monthly streamflow for specified month, in cubic feet per second]

Site No.	Stream name	April					May				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
1	Hellroaring Creek near Lakeview	5	7	13	25	16	41	52	70	93	71
2	Corral Creek near Lakeview	.6	.9	2	3	2	4	5	7	10	8
3	Antelope Creek near Lakeview	.3	.3	.5	1	.7	2	2	2	3	2
4	Red Rock Creek near Lakeview	10	13	21	39	26	58	75	97	130	98
5	Tom Creek near Lakeview	.5	1	2	5	3	9	11	11	16	12
6	Narrows Creek at mouth, near Lakeview	.4	.6	1	1	1	2	2	3	5	3
7	Odell Creek near Lakeview	5	6	12	22	15	35	44	56	75	57
8	Jones Creek near Lakeview	1	2	3	4	3	5	7	9	13	10
9	Red Rock River near Kennedy Ranch, near Lakeview	190	220	350	520	350	170	240	360	490	380
10	Peet Creek at county road, near Lakeview	1	2	3	5	3	5	7	11	15	11
11	Long Creek near Lakeview	3	4	7	13	9	17	23	29	40	30
12	East Fork Clover Creek at mouth, near Monida	2	2	4	5	4	6	8	12	17	13
13	Red Rock River below Lima Reservoir, near Monida	16	21	40	73	55	180	220	290	450	330
14	Cabin Creek above Simpson Creek, near Lima	.5	.7	1	2	1	2	3	3	5	4
15	Indian Creek above Simpson Creek, near Lima	.7	1	2	2	2	4	4	5	7	6
16	Simpson Creek above Indian Creek, near Lima	.8	1	2	3	2	4	5	6	8	6
17	Deadman Creek near Dell	5	7	9	14	10	15	19	21	31	22
18	Big Sheep Creek below Muddy Creek, near Dell	49	62	79	100	86	31	40	63	99	72
19	Red Rock River at Red Rock	170	190	270	370	280	78	100	250	470	310
20	Black Canyon Creek near Grant	3	4	5	8	6	9	11	15	22	16
21	Shennon Creek near mouth, near Grant	.9	1	2	3	2	3	4	6	9	6
22	Frying Pan Creek near Grant	3	3	5	7	5	6	8	13	19	14
23	Trapper Creek at mouth, near Grant	.7	1	2	3	2	3	4	5	7	6
24	Bear Creek near Grant	4	6	9	14	10	12	16	31	43	33
25	Bloody Dick Creek near Grant	17	25	42	65	47	72	90	160	210	160
26	Horse Prairie Creek near Grant	64	70	100	160	110	100	130	210	340	250
27	Rape Creek above reservoir, near Grant	.4	.6	1	2	1	2	2	3	4	3
28	Painter Creek near Grant	3	5	7	11	8	16	20	28	37	29
29	Browns Canyon Creek near Grant	2	3	5	7	5	10	13	18	25	19
30	Medicine Lodge Creek near Grant	9	11	18	33	23	39	49	55	85	59
32	Pole Creek near mouth, near Polaris	1	2	3	5	4	7	9	12	16	13
33	Reservoir Creek at mouth, near Polaris	2	2	4	6	4	5	7	11	16	12
34	East Fork Dyce Creek at mouth, near Polaris	1	1	2	4	3	5	6	8	11	9
35	West Fork Dyce Creek at mouth, near Polaris	.6	.8	1	2	2	3	4	5	7	5
36	Grasshopper Creek near Dillon	54	62	71	91	74	42	57	100	160	110
37	Beaverhead River at Barretts	220	270	370	590	420	200	300	580	830	570
38	East Fork Blacktail Creek near Dillon	19	26	37	50	38	48	64	110	140	110
39	West Fork Blacktail Creek near Dillon	9	11	15	20	16	17	23	28	42	30
40	Blacktail Deer Creek near Dillon	39	42	54	67	55	45	63	78	120	88
41	Beaverhead River near Dillon	210	270	380	650	430	36	98	180	460	270

Table 7.--Estimated monthly streamflow characteristics for April and May--Continued

Site No.	Stream name	April					May				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
42	Beaverhead River near Twin Bridges	290	360	490	710	520	62	140	240	560	340
43	Corral Creek at mouth, near Alder	1	2	3	4	3	5	6	8	12	9
44	Coal Creek at mouth, near Alder	3	4	7	11	8	13	17	25	34	26
45	Ruby River above the forks, near Alder	11	14	23	35	25	40	50	75	100	79
46	East Fork Ruby River at mouth, near Alder	4	6	9	14	10	20	24	34	46	36
47	West Fork Ruby River at mouth, near Alder	5	7	11	17	12	22	28	40	55	42
48	Cottonwood Creek at mouth, near Alder	6	8	12	19	14	27	32	46	63	49
49	Warm Springs Creek at mouth, near Alder <sup>1</sup>	51	54	63	75	65	81	91	117	150	121
50	North Fork Greenhorn Creek at mouth, near Alder	3	4	6	9	7	11	14	19	27	21
51	Ruby River above reservoir, near Alder	110	120	160	220	170	260	300	410	530	430
52	Mill Creek at Forest Service boundary, near Sheridan	7	9	17	31	21	54	66	90	120	94
53	Wisconsin Creek at Forest Service boundary, near Sheridan	5	7	13	26	17	52	62	74	100	77
54	Ruby River near Twin Bridges	92	100	190	290	200	63	120	250	360	250
55	Big Hole River near Jackson	13	15	22	43	29	85	96	130	170	140
56	Andrus Creek near mouth, near Jackson	5	7	12	18	13	20	25	38	53	40
57	Fox Creek at mouth, near Jackson	3	5	8	11	8	15	18	26	36	28
58	Governor Creek near Jackson	18	28	46	72	51	74	95	170	230	180
59	Warm Springs Creek at Jackson	13	19	31	47	34	50	62	110	150	110
60	Miner Creek near Jackson	15	18	23	29	24	43	50	75	110	82
61	Big Lake Creek near mouth, near Wisdom	6	8	13	20	15	26	32	47	64	50
62	Steel Creek above Francis Creek, near Wisdom	3	5	8	13	9	11	14	32	45	35
63	Francis Creek at mouth, near Wisdom	4	6	12	20	14	21	29	48	66	50
64	Steel Creek near mouth, near Wisdom	7	12	20	34	24	34	44	78	110	82
65	Swamp Creek near mouth, near Wisdom	7	14	28	50	33	52	68	150	210	160
66	Joseph Creek at mouth, near Wisdom	5	7	11	16	12	28	33	45	59	47
67	Trail Creek near Wisdom	20	35	63	110	73	230	270	370	480	380
68	Ruby Creek at mouth, near Wisdom	7	12	21	35	24	40	50	90	130	97
69	Tie Creek at Forest Service boundary, near Wisdom	10	13	21	33	24	51	61	86	110	89
70	Johnson Creek near Wisdom	6	10	17	29	20	38	45	74	110	79
71	Mussigbrod Creek near Wisdom	3	6	15	32	19	38	47	160	260	170
72	North Fork Big Hole River near mouth, near Wisdom	40	69	120	200	140	190	250	570	810	610
73	Big Hole River below North Fork, near Wisdom	260	410	570	920	670	820	1000	1500	2400	1700
74	Pintlar Creek near Forest Service boundary, near Wisdom	6	13	31	58	36	60	73	280	460	310
75	Big Hole River below Mudd Creek, near Wisdom	280	450	620	1000	720	890	1100	1700	2700	1900
76	Fishtrap Creek at mouth, near Wise River	8	14	30	60	39	95	110	190	270	200
77	Lamarche Creek near Wise River	10	15	29	58	38	99	120	160	230	170
78	Seymour Creek near Wise River	11	15	24	36	26	58	69	95	130	99
79	Tenmile Creek at mouth, near Wise River	4	5	9	13	10	24	29	39	50	40
80	Sevenmile Creek at mouth, near Wise River	1	1	2	4	3	5	6	8	11	9
81	Corral Creek at mouth, near Wise River	1	2	3	4	3	5	7	10	14	10

Table 7.--Estimated monthly streamflow characteristics for April and May--Continued

Site No.	Stream name	April					May				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
82	Twelvemile Creek at mouth, near Wise River	3	4	7	10	7	16	20	28	36	29
83	Sullivan Creek at mouth, near Wise River	3	5	7	11	8	19	23	31	40	32
84	Oregon Creek near mouth, near Wise River	.5	.7	1	2	1	2	3	4	6	5
85	California Creek above American Creek, near Wise River	4	5	8	12	9	11	15	23	33	25
86	American Creek at mouth, near Wise River	1	2	3	4	3	4	6	9	12	9
87	Sixmile Creek at mouth, near Wise River	.8	1	2	3	2	4	5	7	9	7
88	French Creek near mouth, near Wise River	7	9	14	22	16	20	26	41	59	44
89	Deep Creek near Wise River	25	40	66	99	71	100	130	250	330	260
90	Bear Creek near Wise River	.8	1	3	7	4	9	12	17	23	17
91	Bryant Creek at mouth, near Wise River	3	4	7	11	8	13	16	24	33	25
92	Big Hole River near Wise River	400	630	870	1400	1000	1200	1500	2300	3600	2600
93	Johnson Creek at mouth, near Wise River	2	3	5	7	5	7	9	14	20	15
94	Meadow Creek near Wise River	4	5	8	12	8	15	19	27	37	29
95	Jacobson Creek at mouth, near Wise River	15	20	32	50	36	95	110	150	190	150
96	Mono Creek at mouth, near Wise River	2	3	5	7	5	10	12	17	23	18
97	Wyman Creek at mouth, near Wise River	8	11	18	28	20	39	47	67	91	70
98	Lacy Creek at mouth, near Wise River	6	7	12	18	13	28	33	47	62	49
99	Gold Creek at mouth, near Wise River	3	4	6	9	7	15	18	25	32	26
100	Pattengail Creek at mouth, near Wise River	20	26	41	64	46	88	110	150	210	160
101	Sheep Creek at mouth, near Wise River	4	5	8	12	8	19	22	31	41	32
102	Wise River near Wise River	45	56	75	110	83	260	300	500	780	530
103	Adson Creek at mouth, near Wise River	2	3	5	8	6	11	14	20	27	21
104	Jerry Creek near Wise River	5	8	15	29	19	37	49	72	99	74
105	Divide Creek at Divide	4	5	9	20	13	24	31	40	60	43
106	Canyon Creek near Divide	5	6	12	27	18	46	54	65	96	69
107	Moose Creek near Divide	7	9	13	18	14	17	22	37	51	39
108	Trapper Creek near Melrose	5	6	10	18	13	30	35	41	58	43
109	Camp Creek at Melrose	2	3	7	13	8	13	17	24	51	29
110	Big Hole River near Melrose	660	1000	1300	2100	1500	1900	2300	3300	5000	3600
111	Willow Creek near Glen	7	8	10	15	11	23	26	37	48	37
112	Birch Creek near Glen	8	9	11	17	12	26	33	45	69	51
113	Hells Canyon Creek near Twin Bridges	3	3	5	10	7	13	17	21	30	22
114	Jefferson River near Twin Bridges	1300	1600	2100	3000	2300	2000	2400	3700	5300	4000
115	Whitetail Creek near Whitehall	3	3	4	5	4	8	13	23	37	25
117	Boulder River above High Ore Creek, near Basin	46	62	110	190	130	220	260	410	550	420
118	Boulder River near Boulder	59	79	140	240	160	280	330	520	700	530
119	Little Boulder River near Boulder	9	11	17	27	20	51	55	68	85	71
120	Boulder River above Cabin Gulch, near Boulder	62	79	120	200	140	230	260	380	490	390
121	Boulder River near Cardwell	76	98	150	240	180	280	320	470	600	480
122	South Boulder River near Jefferson Island	6	10	15	25	17	33	36	41	49	44
123	Jefferson River at Sappington	1500	1800	2300	3300	2600	2200	2700	4000	5700	4400
124	South Willow Creek near Pony	14	19	30	45	31	61	74	90	140	94
125	North Willow Creek at Pony	11	13	18	23	18	31	38	44	63	46
126	Willow Creek near Harrison	25	30	41	54	42	21	33	.58	99	63
127	Norwegian Creek near Harrison	8	8	10	12	10	7	9	12	14	12

Table 7.--Estimated monthly streamflow characteristics for April and May--Continued

Site No.	Stream name	April					May				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
129	Jefferson River near Three Forks	1500	2100	2700	3300	2700	1800	2300	4300	6200	4400
130	Madison River near West Yellowstone	410	430	460	540	480	640	680	800	990	830
131	Duck Creek near West Yellowstone	22	26	35	59	41	90	110	140	190	140
132	Cougar Creek near West Yellowstone	10	14	28	63	41	130	150	160	220	170
133	Grayling Creek near West Yellowstone	13	21	44	96	61	190	230	290	400	300
134	Red Canyon Creek near West Yellowstone	1	2	3	8	5	21	23	23	28	21
135	South Fork Madison River near West Yellowstone	94	100	110	130	110	170	190	210	240	220
136	Watkins Creek near West Yellowstone	2	3	6	13	9	33	37	37	50	38
137	Trapper Creek near West Yellowstone	2	2	4	8	6	19	21	22	29	22
138	Madison River below Hebgen Lake, near Grayling	260	400	800	1400	920	230	310	590	1200	730
139	Cabin Creek near West Yellowstone	5	10	23	54	33	120	140	180	250	180
140	Beaver Creek near West Yellowstone	20	26	45	82	55	160	190	230	310	240
141	Elk River at mouth, near Cameron	21	27	44	68	49	140	160	210	270	220
142	Soap Creek at mouth, near Cameron	2	2	3	5	4	8	10	14	18	14
143	Antelope Creek at mouth, near Cameron <sup>2</sup>	17	19	24	32	26	36	42	58	76	60
144	West Fork Madison River near Cameron	45	53	79	110	84	160	180	250	330	250
145	Squaw Creek near Cameron	7	8	13	22	15	47	54	57	76	59
146	Standard Creek near Cameron	5	6	10	17	12	25	32	46	62	48
147	Ruby Creek near Cameron	4	4	7	12	9	18	22	26	36	27
148	Indian Creek near Cameron	19	25	45	87	58	170	200	250	330	260
149	Madison River near Cameron	510	750	1200	1700	1200	790	1000	1500	2000	1600
150	Blaine Spring Creek near Cameron	23	23	25	29	26	31	34	38	43	38
151	O'Dell Creek near Ennis	99	100	110	120	110	130	140	150	160	150
152	Jack Creek near Ennis	14	17	23	35	25	55	70	93	130	98
153	Moore Creek at Ennis	1	1	3	6	4	8	10	12	17	12
154	North Fork Meadow Creek at Forest Service boundary, near Ennis	5	8	16	30	19	47	58	83	120	88
155	North Fork Meadow Creek at Highway 287, near Ennis	3	5	10	21	14	34	41	52	75	54
156	Madison River below Ennis Lake, near McAllister	900	1000	1500	2100	1600	1100	1300	1900	2500	1900
157	Hot Springs Creek near Norris	6	7	11	20	14	23	30	39	55	41
158	Cherry Creek near Norris	21	25	38	61	43	72	93	140	200	150
159	Madison River near Three Forks	940	1100	1500	2100	1600	1100	1300	2000	2500	2000
160	Cache Creek at mouth, near West Yellowstone	4	6	10	15	10	28	33	43	55	45
161	Taylor Creek near Grayling	19	22	32	45	34	120	160	210	280	230
162	Porcupine Creek near Gallatin Gateway	5	7	13	26	17	51	60	70	96	73
163	Gallatin River above West Fork, near Big Sky	170	200	230	340	260	580	740	960	1200	970
164	South Fork West Fork Gallatin River near Gallatin Gateway	11	17	30	64	41	110	140	190	260	190
165	Middle Fork West Fork Gallatin River near Gallatin Gateway	6	8	12	23	15	39	47	63	87	66
166	West Fork Gallatin River near Gallatin Gateway	21	31	54	110	70	180	220	320	430	320
167	Squaw Creek near Gallatin Gateway	16	18	25	43	30	72	86	100	130	100
168	Hellroaring Creek near Gallatin Gateway	17	22	32	56	38	98	120	150	200	150

Table 7.--Estimated monthly streamflow characteristics for April and May--Continued

Site No.	Stream name	April					May				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
169	South Fork Spanish Creek near Gallatin Gateway	9	14	24	48	31	81	100	140	190	150
170	Spanish Creek near Gallatin Gateway	22	30	46	85	57	120	150	230	320	240
171	Gallatin River near Gallatin Gateway	320	370	440	640	490	1100	1400	1800	2200	1800
172	Big Bear Creek near Gallatin Gateway	4	4	6	11	8	19	26	33	50	38
173	South Cottonwood Creek near Gallatin Gateway	13	16	19	27	20	45	57	72	89	73
174	Baker Creek near Manhattan <sup>3</sup>	89	110	130	170	140	130	190	270	350	280
175	Rocky Creek near Bozeman	24	28	45	72	50	52	68	100	140	110
176	Bear Canyon Creek near Bozeman	5	6	11	20	13	16	20	30	43	32
177	Sourdough Creek near Bozeman	11	13	19	28	23	41	45	63	93	69
178	East Gallatin River at Bozeman	84	98	160	220	170	140	180	260	350	270
179	Bridger Creek near Bozeman	24	32	59	90	62	63	96	140	220	160
180	East Gallatin River near Belgrade	86	110	160	250	190	150	230	360	460	370
181	East Fork Hyalite Creek near Bozeman	6	6	7	9	8	22	26	30	38	31
182	West Fork Hyalite Creek near Bozeman	9	9	12	15	13	38	44	55	69	56
183	Hyalite Creek at Hyalite Ranger Station, near Bozeman	19	23	35	52	39	92	100	130	170	140
184	Hyalite Creek above Interstate 90, near Bozeman	5	8	16	34	22	57	68	82	120	85
185	Thompson Creek near Belgrade	21	27	32	41	33	26	30	40	44	37
186	Ben Hart Creek near Belgrade	27	29	31	33	31	29	30	35	37	34
187	Reese Creek near Belgrade	7	8	13	18	13	22	26	40	54	42
188	East Gallatin River near Manhattan	180	200	240	350	260	440	570	780	1000	780
189	Gallatin River near Logan	780	900	1100	1400	1100	1100	1500	2100	2700	2200
190	Sixteenmile Creek near Ringling	7	9	30	75	49	4	8	19	69	34
191	Sixteenmile Creek near Maudlow	34	37	56	83	58	58	72	120	170	130
192	Sixteenmile Creek near Toston	48	51	77	130	91	130	160	210	310	230
193	Missouri River near Toston	3700	4000	5600	7200	5700	4600	5200	8700	12000	8800
194	Crow Creek near Radersburg	10	13	20	34	23	79	88	120	160	130
195	Dry Creek near Toston	4	5	9	15	10	19	24	31	44	33
196	Deep Creek below North Fork, near Townsend	10	12	20	37	26	54	66	80	110	83
197	Duck Creek near Townsend	3	4	8	14	10	21	26	33	45	34
198	Confederate Gulch near Winston	5	7	12	21	14	30	38	50	68	52
199	Beaver Creek near Winston	4	7	16	30	18	27	32	51	80	55
200	Avalanche Gulch near Winston	3	3	6	11	8	19	23	23	30	22
201	Spokane Creek near East Helena	3	5	9	15	10	16	21	28	39	29
202	McGuire Creek at county road, near East Helena	8	8	9	10	9	9	10	11	12	12
203	Trout Creek at mouth, near East Helena	16	16	18	23	19	29	35	40	56	42
204	Prickly Pear Creek near Clancy	33	34	50	71	52	52	63	100	130	110
205	Prickly Pear Creek at mouth, near East Helena	35	36	48	74	55	83	110	130	190	140
206	Tenmile Creek near Rimini	3	6	13	24	16	37	54	79	100	84
207	Tenmile Creek near Helena	9	14	30	44	33	42	53	89	120	97
208	Sevenmile Creek near mouth, near Helena	3	4	6	10	7	12	15	16	24	17
209	Tenmile Creek at mouth, near East Helena	7	8	14	24	15	22	28	48	73	53
210	Silver Creek at Interstate 15, near Helena	12	12	15	19	16	16	17	23	27	24
211	Beaver Creek at mouth, near East Helena	9	11	15	20	16	18	20	25	29	28
212	Elkhorn Creek near mouth, near Wolf Creek	5	5	8	11	8	13	16	20	27	21
213	Willow Creek below Elkhorn Creek, near Wolf Creek	3	4	7	15	10	27	31	34	50	36



Table 7.--Estimated monthly streamflow characteristics for April and May--Continued

Site No.	Stream name	April					May				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
214	Cottonwood Creek above Beartooth Ranch, near Wolf Creek	.8	1	3	6	4	9	11	15	24	17
217	Virginia Creek at mouth, near Canyon Creek	7	12	25	38	25	25	31	54	94	62
218	Canyon Creek below Cottonwood Creek, near Canyon Creek	12	20	45	76	48	49	59	98	190	120
219	Little Prickly Pear Creek near Canyon Creek	20	32	60	110	67	28	43	100	180	120
220	Lyons Creek near Wolf Creek	6	9	13	19	14	24	28	34	49	37
221	Wolf Creek at mouth, at Wolf Creek	5	6	11	20	13	29	36	41	58	42
222	Little Prickly Pear Creek near Wolf Creek	76	92	150	230	180	130	170	330	560	380
223	Wegner Creek near Craig <sup>4</sup>	0	2	7	15	8	15	23	39	59	41
224	Stickney Creek near Craig <sup>5</sup>	0	1	5	12	7	12	17	31	46	34
226	Middle Fork Dearborn River at Highway 200, near Wolf Creek	5	13	27	50	32	64	82	120	160	120
227	South Fork Dearborn River at Highway 434, near Wolf Creek	4	12	27	50	31	51	66	120	180	120
228	Dearborn River near Craig	31	91	180	350	200	270	360	670	1000	680
229	Flat Creek above Slew Creek near Craig	7	18	34	53	35	31	41	100	160	110
230	Sheep Creek at mouth, near Cascade	11	15	31	56	36	57	77	190	310	210
232	North Fork Smith River at Highway 89, near White Sulphur Springs	3	5	11	24	16	47	80	330	820	410
233	South Fork Smith River at mouth, near White Sulphur Springs	15	18	27	42	30	38	49	67	100	73
234	Smith River below forks, near White Sulphur Springs	9	14	27	59	39	110	140	240	380	260
235	Big Birch Creek at mouth, near White Sulphur Springs	43	51	81	100	76	39	49	130	250	170
236	Newlan Creek below Charcoal Gulch, near White Sulphur Springs	7	11	16	22	17	16	20	30	48	33
237	Camas Creek near mouth, near White Sulphur Springs	7	10	16	29	20	38	47	52	76	54
238	Smith River near Fort Logan	130	140	190	260	210	160	200	270	380	320
239	Sheep Creek near White Sulphur Springs	10	12	18	30	21	55	64	89	130	96
240	Sheep Creek near mouth, near White Sulphur Springs	18	25	51	110	69	150	190	290	460	320
241	Eagle Creek near mouth, near White Sulphur Springs	3	4	8	19	12	29	37	47	71	50
242	Rock Creek below Buffalo Canyon, near White Sulphur Springs	9	11	20	37	25	51	63	83	120	88
243	Tenderfoot Creek below South Fork, near White Sulphur Springs	11	17	36	73	46	110	140	210	310	220
244	Smith River near Eden	180	210	360	560	420	360	460	860	1500	990
245	Hound Creek near mouth, near Cascade	24	31	61	100	70	99	130	270	430	300
246	Missouri River near Ulm	3800	4200	6700	8800	6800	5200	6300	9200	13000	9800
247	North Fork Sun River near Augusta	67	88	160	300	200	810	960	1200	1500	1300
248	Sun River near Augusta	140	230	520	940	600	1300	1900	2900	3800	2800
249	Sun River below diversion dam, near Augusta	57	110	230	420	290	290	340	770	1400	910
250	Willow Creek near Anderson Lake, near Augusta	4	4	7	13	9	21	25	27	38	28
251	North Fork Willow Creek below Cutrock Creek, near Augusta	4	4	5	7	6	10	12	13	18	14
254	Smith Creek near Augusta	6	7	17	34	25	42	52	70	100	75
255	Ford Creek near Augusta	8	9	18	23	17	29	37	61	89	64
256	Elk Creek near Augusta	21	25	36	66	45	55	86	220	330	220
257	Sun River at Simms	100	150	300	610	390	160	330	790	1700	1100
260	Missouri River near Great Falls	4600	5000	7600	10000	7700	6100	7600	11000	16000	12000
261	Dry Fork at mouth, at Monarch	9	12	23	44	30	62	76	100	150	110

Table 7.--Estimated monthly streamflow characteristics for April and May--Continued

Site No.	Stream name	April					May				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
262	Tillinghast Creek above Joice Creek, near Monarch	7	9	15	24	17	30	38	53	74	56
263	Pilgrim Creek at mouth, near Monarch	12	16	26	40	28	46	61	93	130	96
264	Logging Creek at Logging Creek Campground, near Monarch	7	8	12	20	14	25	32	44	59	45
265	Belt Creek near Monarch	34	46	88	180	120	230	340	550	950	630
266	Big Otter Creek above Never Sweat Creek, near Raynesford	7	9	12	18	14	21	26	30	42	31
267	Belt Creek near Portage	30	46	100	270	140	260	320	540	1200	770
268	Highwood Creek below Smith Creek, near Highwood	4	7	15	33	21	55	70	84	110	85
269	Missouri River at Fort Benton	4800	5100	7700	10000	7900	6700	8000	12000	18000	12000
270	Shonkin Creek below Bishop Creek, near Highwood	2	5	13	29	18	43	57	79	110	81
271	South Fork Two Medicine River near East Glacier	10	15	28	61	39	130	150	300	520	340
273	South Fork Badger Creek near Browning	19	26	41	64	45	150	170	210	270	220
274	North Fork Badger Creek near Browning	18	24	38	59	42	140	150	200	240	200
278	Birch Creek at Swift Dam, near Valier	6	7	13	110	54	63	150	240	370	250
279	South Fork Dupuyer Creek near Dupuyer	4	6	10	15	10	22	27	38	50	39
280	North Fork Dupuyer Creek near Dupuyer	5	7	11	17	12	32	38	50	65	52
281	Dupuyer Creek below Scoffin Creek, near Dupuyer	11	18	35	57	39	63	77	100	150	110
282	Birch Creek near Valier	17	23	71	150	100	22	32	68	140	94
283	Cut Bank Creek near Browning	67	83	120	150	120	340	360	410	430	400
284	Cut Bank Creek at Cut Bank	80	94	200	360	240	280	360	550	670	520
285	Marias River at Sullivan Bridge, near Cut Bank	400	500	960	1300	970	1300	1600	2300	3200	2400
286	Marias River near Shelby	420	520	1100	1500	1100	1400	1800	2600	3700	2700
287	Marias River at "F" Bridge, above Tiber Reservoir, near Shelby	490	610	1200	1700	1200	1700	2100	3000	4300	3200
288	Marias River near Loma	400	490	830	1300	890	1000	1100	1400	1700	1400
290	Teton River near Strabane	6	11	25	47	30	26	46	86	120	87
291	McDonald Creek near Strabane	11	11	13	15	14	14	15	16	16	16
292	North Fork Deep Creek near Choteau	7	9	15	23	16	40	47	63	82	65
293	South Fork Deep Creek near Choteau	7	9	14	22	15	37	44	60	78	62
294	Deep Creek near Choteau	12	13	18	25	19	19	22	34	43	36
295	Teton River near Dutton	73	100	150	250	180	59	110	340	440	330
296	Missouri River at Virgelle	5300	6200	8500	12000	9100	7100	9900	13000	19000	14000
297	Lost Creek at mouth, near Utica	10	13	21	33	23	46	55	79	110	83
298	Yogo Creek at mouth, near Utica	2	3	6	14	9	25	29	29	39	28
299	Middle Fork Judith River near Utica	6	8	12	18	14	71	96	130	160	130
301	South Fork Judith River at Indian Hill Campground, near Utica	1	3	6	15	9	27	32	37	52	37
303	Judith River above Courtneys Creek, at Utica	5	10	26	60	39	100	120	170	230	170
306	East Fork Big Spring Creek at mouth, near Lewistown	10	12	23	38	27	44	54	89	140	98
307	Big Spring Creek above Cottonwood Creek, near Hanover	130	140	180	220	190	220	260	320	380	330
309	Cottonwood Creek at Highway 200, near Lewistown	3	5	11	23	14	31	40	66	120	75
310	Beaver Creek at county road, near Lewistown	15	20	28	39	33	30	39	50	71	55
311	Big Spring Creek at mouth, near Lewistown	130	150	230	330	250	350	460	690	900	710

Table 7.--Estimated monthly streamflow characteristics for April and May--Continued

Site No.	Stream name	April					May				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
312	Warm Springs Creek above Meadow Creek, near Hilger	95	100	110	110	110	92	98	100	110	100
313	Judith River near Winifred	260	290	500	730	520	280	360	530	720	540
315	Cow Creek below forks, near Cleveland	4	5	8	12	9	12	15	21	31	23
316	Missouri River near Landusky	6000	7000	9200	14000	10000	7700	10000	14000	21000	16000
317	North Fork Musselshell River near Delpine	7	11	17	27	19	10	16	24	40	26
318	Checkerboard Creek near Checkerboard	1	2	4	9	6	13	16	20	31	22
319	Spring Creek below Whitetail Creek, near Checkerboard	5	8	16	27	18	28	35	78	130	87
320	North Fork Musselshell River near mouth, near Martinsdale	9	14	23	38	27	48	57	68	100	70
321	Alabaugh Creek at mouth, near Lennep	2	4	8	17	11	23	30	43	68	47
322	Cottonwood Creek below Loco Creek, near Martinsdale	7	13	30	64	40	94	120	190	290	200
323	South Fork Musselshell River above Martinsdale	43	54	99	160	110	100	170	310	430	320
324	Big Elk Creek at mouth, at Twodot	2	5	14	25	15	15	21	40	62	43
325	Musselshell River at Harlowton	45	71	130	240	170	64	130	300	630	390
326	American Fork near Harlowton	0	.3	3	7	4	.1	.8	3	10	7
330	Careless Creek below Little Careless Creek, near Hedgesville	1	3	5	13	9	10	12	13	20	15
331	Swimming Woman Creek below Dry Coulee, near Franklin	.5	1	3	6	4	10	12	14	21	15
333	Musselshell River near Roundup	38	55	110	320	200	93	120	310	700	440
335	Flatwillow Creek below the forks, near Grass Range	8	11	21	49	33	87	100	120	170	130
338	Musselshell River near Mosby	54	88	180	540	350	64	100	360	960	630
339	Big Dry Creek above Little Dry Creek, near Van Norman	.2	1	4	27	58	.1	1	3	17	18
340	Little Dry Creek near Van Norman	2	2	6	23	42	1	2	5	17	17
341	Big Dry Creek near Van Norman	3	4	10	50	100	1	3	8	34	35

<sup>1</sup>Includes estimated spring flow of about 40 cubic feet per second, based on information provided by Montana Department of Fish, Wildlife and Parks.

<sup>2</sup>Includes estimated spring flow of about 10 cubic feet per second, based on information provided by Montana Department of Fish, Wildlife and Parks.

<sup>3</sup>Estimated long-term monthly streamflow characteristics may not reflect the current flow regime because of upstream streamflow regulation.

<sup>4</sup>Stream is known to be dry except for periods of runoff. Calculated flows were adjusted by subtracting 7 cubic feet per second.

<sup>5</sup>Stream is known to be dry except for periods of runoff. Calculated flows were adjusted by subtracting 8 cubic feet per second.

Table 8.--Estimated monthly streamflow characteristics for June and July

[Q.XX, monthly mean streamflow for specified month exceeded XX percent of the years,  
in cubic feet per second; QM, mean monthly streamflow for specified month, in cubic feet per second]

Site No.	Stream name	June					July				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
1	Hellroaring Creek near Lakeview	39	51	77	100	80	18	24	34	43	37
2	Corral Creek near Lakeview	4	5	8	10	8	2	3	4	4	4
3	Antelope Creek near Lakeview	1	1	3	4	3	.3	.3	.6	1	.7
4	Red Rock Creek near Lakeview	48	63	95	140	100	24	30	41	52	43
5	Tom Creek near Lakeview	7	9	14	21	15	2	3	4	7	5
6	Narrows Creek at mouth, near Lakeview	1	1	3	4	3	.4	.5	.8	1	1
7	Odell Creek near Lakeview	30	39	60	85	64	13	18	25	33	27
8	Jones Creek near Lakeview	4	5	10	14	10	2	2	3	5	3
9	Red Rock River near Kennedy Ranch, near Lakeview	120	170	270	350	280	40	57	110	170	120
10	Peet Creek at county road, near Lakeview	4	5	10	14	10	2	2	3	4	3
11	Long Creek near Lakeview	15	19	32	46	34	7	9	12	18	13
12	East Fork Clover Creek at mouth, near Monida	5	6	11	16	12	2	2	4	5	4
13	Red Rock River below Lima Reservoir, near Monida	280	380	460	590	470	250	270	330	410	340
14	Cabin Creek above Simpson Creek, near Lima	2	2	4	6	5	.7	1	2	2	2
15	Indian Creek above Simpson Creek, near Lima	3	4	7	9	7	1	2	2	3	2
16	Simpson Creek above Indian Creek, near Lima	3	4	7	10	8	1	2	2	4	3
17	Deadman Creek near Dell	10	12	24	39	26	4	5	8	13	9
18	Big Sheep Creek below Muddy Creek, near Dell	45	51	91	140	94	41	47	64	80	67
19	Red Rock River at Red Rock	90	120	190	420	250	150	180	240	290	250
20	Black Canyon Creek near Grant	6	8	15	22	16	3	3	6	8	6
21	Shennon Creek near mouth, near Grant	2	3	6	9	7	1	1	2	3	2
22	Frying Pan Creek near Grant	4	7	11	17	13	2	3	5	6	5
23	Trapper Creek at mouth, near Grant	2	3	5	8	6	.9	1	2	3	2
24	Bear Creek near Grant	11	17	29	40	31	5	7	9	12	10
25	Bloody Dick Creek near Grant	62	92	150	220	160	23	29	44	66	47
26	Horse Prairie Creek near Grant	83	130	220	330	240	42	58	100	140	100
27	Rape Creek above reservoir, near Grant	1	2	3	5	3	.5	.7	1	2	1
28	Painter Creek near Grant	12	15	26	38	29	4	5	8	13	9
29	Browns Canyon Creek near Grant	7	10	17	24	18	3	3	5	8	6
30	Medicine Lodge Creek near Grant	33	41	75	120	83	8	10	24	47	28
32	Pole Creek near mouth, near Polaris	5	6	11	16	12	2	2	3	5	4
33	Reservoir Creek at mouth, near Polaris	4	5	10	15	11	2	2	4	5	4
34	East Fork Dyce Creek at mouth, near Polaris	5	6	10	13	10	2	2	3	5	4
35	West Fork Dyce Creek at mouth, near Polaris	3	3	6	8	6	1	1	2	3	2
36	Grasshopper Creek near Dillon	37	52	120	200	140	12	18	42	69	48
37	Beaverhead River at Barretts	350	480	840	1100	830	290	340	580	870	630
38	East Fork Blacktail Creek near Dillon	42	63	97	140	100	25	30	40	47	40
39	West Fork Blacktail Creek near Dillon	13	17	32	51	35	6	8	13	19	14
40	Blacktail Deer Creek near Dillon	70	85	120	160	120	40	48	77	100	81
41	Beaverhead River near Dillon	27	110	230	610	370	28	80	160	330	240

Table 8.--Estimated monthly streamflow characteristics for June and July--Continued

Site No.	Stream name	June					July				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
42	Beaverhead River near Twin Bridges	49	160	300	680	430	49	120	230	400	300
43	Corral Creek at mouth, near Alder	3	4	8	11	8	1	2	2	4	3
44	Coal Creek at mouth, near Alder	10	13	24	34	26	4	5	8	12	9
45	Ruby River above the forks, near Alder	33	44	77	110	83	12	16	26	40	29
46	East Fork Ruby River at mouth, near Alder	15	19	33	48	36	5	7	11	16	12
47	West Fork Ruby River at mouth, near Alder	17	22	39	57	42	6	8	13	19	14
48	Cottonwood Creek at mouth, near Alder	20	26	45	66	49	7	9	15	22	16
49	Warm Springs Creek at mouth, near Alder <sup>1</sup>	74	85	118	160	125	52	56	66	80	69
50	North Fork Greenhorn Creek at mouth, near Alder	9	12	21	30	22	3	4	7	10	8
51	Ruby River above reservoir, near Alder	240	280	440	650	480	98	110	180	260	200
52	Mill Creek at Forest Service boundary, near Sheridan	62	80	120	150	120	25	36	53	70	58
53	Wisconsin Creek at Forest Service boundary, near Sheridan	51	63	96	130	99	17	24	38	54	41
54	Ruby River near Twin Bridges	84	170	340	550	380	89	120	240	350	240
55	Big Hole River near Jackson	140	160	200	240	200	24	40	78	110	85
56	Andrus Creek near mouth, near Jackson	16	21	37	55	40	6	8	12	19	14
57	Fox Creek at mouth, near Jackson	11	14	25	37	27	4	5	8	12	9
58	Governor Creek near Jackson	63	95	160	230	170	27	33	49	69	51
59	Warm Springs Creek at Jackson	46	66	110	160	120	16	19	30	50	33
60	Miner Creek near Jackson	100	110	140	160	140	28	36	57	93	70
61	Big Lake Creek near mouth, near Wisdom	20	27	46	68	50	7	9	15	23	17
62	Steel Creek above Francis Creek, near Wisdom	10	17	29	40	31	4	5	8	11	9
63	Francis Creek at mouth, near Wisdom	16	24	42	63	45	6	7	12	18	12
64	Steel Creek near mouth, near Wisdom	28	43	73	110	78	11	14	21	31	22
65	Swamp Creek near mouth, near Wisdom	41	70	130	180	130	16	20	30	43	32
66	Joseph Creek at mouth, near Wisdom	21	26	43	61	47	7	9	13	20	15
67	Trail Creek near Wisdom	87	170	270	410	280	36	40	57	73	58
68	Ruby Creek at mouth, near Wisdom	34	50	88	130	94	11	13	21	35	23
69	Tie Creek at Forest Service boundary, near Wisdom	40	51	85	120	93	13	17	27	42	30
70	Johnson Creek near Wisdom	31	43	75	110	80	8	10	17	30	19
71	Mussigbrod Creek near Wisdom	28	53	120	190	120	8	9	16	27	17
72	North Fork Big Hole River near mouth, near Wisdom	180	300	520	740	550	66	83	130	190	140
73	Big Hole River below North Fork, near Wisdom	710	1200	1900	3100	2100	170	290	590	920	650
74	Pintlar Creek near Forest Service boundary, near Wisdom	53	100	220	330	230	15	18	32	49	34
75	Big Hole River below Mudd Creek, near Wisdom	770	1300	2200	3500	2300	180	320	650	1000	710
76	Fishtrap Creek at mouth, near Wise River	70	99	170	270	190	16	19	34	64	38
77	Lamarche Creek near Wise River	87	130	210	290	210	26	37	67	94	71
78	Seymour Creek near Wise River	45	57	95	140	100	14	19	30	47	34
79	Tenmile Creek at mouth, near Wise River	18	22	36	52	39	6	7	11	17	12
80	Sevenmile Creek at mouth, near Wise River	3	4	8	11	8	1	2	2	4	3
81	Corral Creek at mouth, near Wise River	4	5	9	13	10	1	2	3	4	3

Table 8.--Estimated monthly streamflow characteristics for June and July--Continued

Site No.	Stream name	June					July				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
82	Twelvemile Creek at mouth, near Wise River	12	15	26	37	28	4	5	8	12	9
83	Sullivan Creek at mouth, near Wise River	14	17	29	41	31	5	6	9	13	10
84	Oregon Creek near mouth, near Wise River	2	2	4	5	4	.6	.7	1	2	1
85	California Creek above American Creek, near Wise River	9	12	23	34	25	4	5	8	12	9
86	American Creek at mouth, near Wise River	3	4	8	12	9	1	2	3	4	3
87	Sixmile Creek at mouth, near Wise River	3	3	6	9	7	1	1	2	3	2
88	French Creek near mouth, near Wise River	16	22	41	62	45	6	8	14	22	16
89	Deep Creek near Wise River	84	130	210	300	230	43	53	73	89	74
90	Bear Creek near Wise River	6	10	17	24	18	3	4	6	7	6
91	Bryant Creek at mouth, near Wise River	10	13	23	34	25	4	5	8	11	8
92	Big Hole River near Wise River	1100	1800	2900	4700	3200	260	450	900	1400	990
93	Johnson Creek at mouth, near Wise River	5	7	13	19	14	2	3	4	7	5
94	Meadow Creek near Wise River	11	15	26	38	28	4	5	8	13	9
95	Jacobson Creek at mouth, near Wise River	74	92	150	210	160	22	30	46	71	51
96	Mono Creek at mouth, near Wise River	7	9	16	23	17	3	3	5	7	6
97	Wyman Creek at mouth, near Wise River	30	39	67	97	73	10	14	22	33	24
98	Lacy Creek at mouth, near Wise River	21	26	45	65	49	7	9	14	22	16
99	Gold Creek at mouth, near Wise River	11	13	23	33	25	4	5	7	11	8
100	Pattengail Creek at mouth, near Wise River	73	95	160	230	170	23	32	52	82	59
101	Sheep Creek at mouth, near Wise River	13	17	29	42	32	5	6	9	14	10
102	Wise River near Wise River	330	580	830	1200	860	93	140	240	350	260
103	Adson Creek at mouth, near Wise River	8	10	18	27	20	3	4	6	9	6
104	Jerry Creek near Wise River	31	46	76	110	80	13	18	29	36	30
105	Divide Creek at Divide	21	29	52	78	55	6	8	15	26	17
106	Canyon Creek near Divide	38	51	88	130	93	8	12	24	41	26
107	Moose Creek near Divide	15	22	37	52	39	8	9	13	18	14
108	Trapper Creek near Melrose	24	30	50	73	53	8	10	17	25	18
109	Camp Creek at Melrose	12	19	49	97	54	3	4	15	32	18
110	Big Hole River near Melrose	1600	2700	4200	6400	4400	440	730	1400	2100	1500
111	Willow Creek near Glen	36	46	63	81	64	16	19	28	39	30
112	Birch Creek near Glen	69	79	100	140	110	37	46	63	81	66
113	Hells Canyon Creek near Twin Bridges	13	16	26	37	27	5	7	10	15	11
114	Jefferson River near Twin Bridges	2000	3100	5400	7800	5500	550	910	2000	3100	2100
115	Whitetail Creek near Whitehall	22	24	39	51	39	19	22	25	28	25
117	Boulder River above High Ore Creek, near Basin	120	180	360	600	380	20	38	66	150	94
118	Boulder River near Boulder	160	230	460	770	490	26	48	84	190	120
119	Little Boulder River near Boulder	25	37	59	91	66	8	13	19	27	20
120	Boulder River above Cabin Gulch, near Boulder	140	190	340	530	360	31	52	83	170	110
121	Boulder River near Cardwell	170	240	420	650	450	38	64	100	210	140
122	South Boulder River near Jefferson Island	110	120	150	170	150	49	55	71	86	71
123	Jefferson River at Sappington	2000	3300	5800	8700	6000	600	930	2100	3400	2400
124	South Willow Creek near Pony	42	60	110	180	130	10	12	46	80	50
125	North Willow Creek at Pony	23	31	53	80	59	5	8	23	36	25
126	Willow Creek near Harrison	30	55	96	150	110	7	13	58	96	62
127	Norwegian Creek near Harrison	6	7	10	13	10	3	4	6	10	7

Table 8.--Estimated monthly streamflow characteristics for June and July--Continued

Site No.	Stream name	June					July				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
129	Jefferson River near Three Forks	2600	3600	6200	10000	6900	630	1000	1900	3200	2300
130	Madison River near West Yellowstone	530	630	850	1000	850	360	420	520	670	530
131	Duck Creek near West Yellowstone	72	91	140	210	150	34	43	58	75	61
132	Cougar Creek near West Yellowstone	120	140	210	320	230	27	36	63	120	73
133	Grayling Creek near West Yellowstone	210	280	430	540	430	63	94	160	230	170
134	Red Canyon Creek near West Yellowstone	16	18	30	43	31	2	3	6	14	8
135	South Fork Madison River near West Yellowstone	220	230	280	320	280	140	150	190	220	190
136	Watkins Creek near West Yellowstone	28	32	51	70	53	6	9	15	27	18
137	Trapper Creek near West Yellowstone	14	16	26	38	28	4	5	8	13	9
138	Madison River below Hebgen Lake, near Grayling	220	590	1200	1800	1200	660	780	1000	1300	1000
139	Cabin Creek near West Yellowstone	140	180	300	370	300	31	47	88	150	100
140	Beaver Creek near West Yellowstone	160	200	290	390	300	60	84	120	170	130
141	Elk River at mouth, near Cameron	110	140	210	300	230	31	44	66	100	73
142	Soap Creek at mouth, near Cameron	6	7	12	18	13	2	2	4	6	4
143	Antelope Creek at mouth, near Cameron <sup>2</sup>	30	37	58	80	62	17	20	26	34	28
144	West Fork Madison River near Cameron	150	180	270	380	280	70	100	140	180	140
145	Squaw Creek near Cameron	39	45	68	99	73	13	17	25	38	28
146	Standard Creek near Cameron	31	40	60	75	61	14	20	29	37	31
147	Ruby Creek near Cameron	17	20	32	47	34	7	9	13	19	14
148	Indian Creek near Cameron	170	220	320	430	330	61	87	130	190	140
149	Madison River near Cameron	1300	1600	2500	3500	2600	1100	1300	1600	2000	1600
150	Blaine Spring Creek near Cameron	36	41	47	51	45	30	33	39	43	38
151	O'Dell Creek near Ennis	150	150	160	170	160	120	130	140	140	140
152	Jack Creek near Ennis	92	110	150	190	150	40	54	71	87	71
153	Moore Creek at Ennis	6	7	13	21	14	2	2	4	7	4
154	North Fork Meadow Creek at Forest Service boundary, near Ennis	54	71	110	140	110	21	34	56	70	58
155	North Fork Meadow Creek at highway, near Ennis	33	42	67	97	71	11	17	28	41	30
156	Madison River below Ennis Lake, near McAllister	1500	1800	2900	3900	3000	1200	1400	1700	2400	1900
157	Hot Springs Creek near Norris	20	26	42	63	45	10	13	19	25	20
158	Cherry Creek near Norris	75	110	160	220	170	34	46	67	94	77
159	Madison River near Three Forks	1600	1800	3000	4100	3100	1100	1300	1700	2500	1900
160	Cache Creek at mouth, near West Yellowstone	20	25	40	57	44	6	8	12	19	14
161	Taylor Creek near Grayling	290	330	440	500	420	98	130	190	280	200
162	Porcupine Creek near Gallatin Gateway	48	58	90	120	94	16	22	34	50	37
163	Gallatin River above West Fork, near Big Sky	1000	1100	1700	2200	1700	390	480	710	1000	760
164	South Fork West Fork Gallatin River near Gallatin Gateway	120	160	290	380	290	34	48	87	140	97
165	Middle Fork West Fork Gallatin River near Gallatin Gateway	43	54	94	120	94	13	19	32	48	36
166	West Fork Gallatin River near Gallatin Gateway	200	260	450	600	460	61	88	150	220	170
167	Squaw Creek near Gallatin Gateway	61	72	110	170	120	23	29	43	62	46
168	Hellroaring Creek near Gallatin Gateway	89	110	170	240	180	34	45	68	93	73

Table 8.--Estimated monthly streamflow characteristics for June and July--Continued

Site No.	Stream name	June					July				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
169	South Fork Spanish Creek near Gallatin Gateway	84	110	190	250	190	29	40	66	94	72
170	Spanish Creek near Gallatin Gateway	140	190	320	410	320	54	78	120	170	130
171	Gallatin River near Gallatin Gateway	2000	2100	3200	4000	3100	730	900	1300	1900	1400
172	Big Bear Creek near Gallatin Gateway	28	44	64	82	62	12	15	21	33	24
173	South Cottonwood Creek near Gallatin Gateway	76	86	120	150	120	31	38	53	75	57
174	Baker Creek near Manhattan <sup>3</sup>	160	210	410	590	410	37	54	110	230	140
175	Rocky Creek near Bozeman	35	47	80	120	87	9	17	29	44	31
176	Bear Canyon Creek near Bozeman	10	13	23	37	26	2	4	7	13	8
177	Sourdough Creek near Bozeman	42	47	73	100	76	18	21	34	44	34
178	East Gallatin River at Bozeman	97	110	190	270	200	41	45	67	94	74
179	Bridger Creek near Bozeman	40	54	98	150	100	15	18	28	56	38
180	East Gallatin River near Belgrade	120	150	300	530	330	36	44	91	170	110
181	East Fork Hyalite Creek near Bozeman	43	50	61	71	61	15	17	27	40	30
182	West Fork Hyalite Creek near Bozeman	80	88	100	110	100	25	33	55	84	62
183	Hyalite Creek at Hyalite Ranger Station, near Bozeman	150	170	210	260	220	69	91	130	170	130
184	Hyalite Creek above Interstate 90, near Bozeman	50	62	99	150	110	17	24	39	57	41
185	Thompson Creek near Belgrade	27	32	38	41	37	30	31	35	37	35
186	Ben Hart Creek near Belgrade	31	32	35	38	35	30	32	34	36	34
187	Reese Creek near Belgrade	17	25	44	75	50	6	8	14	23	16
188	East Gallatin River near Manhattan	430	560	830	1200	900	220	290	390	500	410
189	Gallatin River near Logan	1300	1700	3200	4400	3200	340	480	990	1800	1100
190	Sixteenmile Creek near Ringling	7	13	38	78	46	0	.5	6	16	10
191	Sixteenmile Creek near Maudlow	44	72	150	260	170	18	29	52	110	64
192	Sixteenmile Creek near Toston	110	140	260	420	290	28	41	78	160	96
193	Missouri River near Toston	5400	7100	12000	18000	12000	1800	2700	4600	7000	5100
194	Crow Creek near Radersburg	81	120	160	230	170	27	34	53	93	65
195	Dry Creek near Toston	13	17	32	53	36	4	5	9	17	11
196	Deep Creek below North Fork, near Townsend	45	57	92	140	100	14	18	29	51	34
197	Duck Creek near Townsend	15	21	33	50	36	6	8	12	17	13
198	Confederate Gulch near Winston	24	33	51	76	56	10	12	18	28	21
199	Beaver Creek near Winston	23	43	68	110	74	6	10	19	30	21
200	Avalanche Gulch near Winston	14	15	28	46	31	2	2	5	15	7
201	Spokane Creek near East Helena	11	15	27	42	29	5	6	9	14	10
202	McGuire Creek at county road, near East Helena	9	10	12	14	12	7	8	9	11	9
203	Trout Creek at mouth, near East Helena	25	30	48	74	53	13	15	20	29	22
204	Prickly Pear Creek near Clancy	41	63	120	200	130	18	28	47	88	57
205	Prickly Pear Creek at mouth, near East Helena	66	85	140	230	160	27	35	51	83	57
206	Tenmile Creek near Rimini	16	25	70	110	76	1	2	8	19	12
207	Tenmile Creek near Helena	18	27	85	150	97	5	7	13	22	17
208	Sevenmile Creek near mouth, near Helena	9	11	21	35	24	2	2	5	12	6
209	Tenmile Creek at mouth, near East Helena	16	25	61	110	69	5	7	14	36	19
210	Silver Creek at Interstate 15, near Helena	13	17	26	35	27	8	11	15	21	16
211	Beaver Creek at mouth, near East Helena	15	17	23	31	27	7	9	11	18	13
212	Elkhorn Creek near mouth, near Wolf Creek	12	14	24	36	26	4	5	9	14	10
213	Willow Creek below Elkhorn Creek, near Wolf Creek	19	21	39	63	43	4	4	8	19	10



Table 8.--Estimated monthly streamflow characteristics for June and July--Continued

Site No.	Stream name	June					July				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
214	Cottonwood Creek above Beartooth Ranch, near Wolf Creek	6	7	14	24	16	1	2	3	6	4
217	Virginia Creek at mouth, near Canyon Creek	22	30	77	130	85	5	7	15	31	20
218	Canyon Creek below Cottonwood Creek, near Canyon Creek	44	58	170	330	190	6	8	24	64	35
219	Little Prickly Pear Creek near Canyon Creek	48	61	160	310	180	6	13	31	69	43
220	Lyons Creek near Wolf Creek	19	23	41	61	45	6	8	13	23	16
221	Wolf Creek at mouth, at Wolf Creek	20	25	45	74	51	5	6	11	24	14
222	Little Prickly Pear Creek near Wolf Creek	70	95	190	300	220	51	62	92	160	110
223	Wegner Creek near Craig <sup>4</sup>	8	15	34	56	38	0	0	6	13	8
224	Stickney Creek near Craig <sup>5</sup>	8	14	31	51	35	0	0	6	13	7
226	Middle Fork Dearborn River at Highway 200, near Wolf Creek	42	61	110	170	130	15	19	33	53	36
227	South Fork Dearborn River at Highway 434, near Wolf Creek	34	56	120	170	130	13	17	31	53	36
228	Dearborn River near Craig	140	300	710	1100	810	56	89	180	340	210
229	Flat Creek above Slew Creek, near Craig	28	52	120	160	130	11	17	34	61	42
230	Sheep Creek at mouth, near Cascade	68	110	220	310	230	33	53	80	97	84
232	North Fork Smith River at Highway 89, near White Sulphur Springs	31	48	160	340	190	9	13	23	40	25
233	South Fork Smith River at mouth, near White Sulphur Springs	28	39	82	130	88	10	13	25	42	29
234	Smith River below forks, near White Sulphur Springs	72	98	190	330	220	23	31	49	76	51
235	Big Birch Creek at mouth, near White Sulphur Springs	37	65	270	410	260	14	23	63	100	79
236	Newlan Creek below Charcoal Gulch, near White Sulphur Springs	13	18	35	52	38	5	7	13	23	16
237	Camas Creek near mouth, near White Sulphur Springs	27	32	58	96	65	7	8	15	32	19
238	Smith River near Fort Logan	120	180	390	540	390	81	100	170	230	190
239	Sheep Creek near White Sulphur Springs	49	63	100	160	110	22	30	41	55	43
240	Sheep Creek near mouth, near White Sulphur Springs	130	190	350	530	380	41	62	100	160	110
241	Eagle Creek near mouth, near White Sulphur Springs	22	28	53	84	58	6	8	13	24	15
242	Rock Creek below Buffalo Canyon, near White Sulphur Springs	42	54	94	140	100	15	21	31	49	35
243	Tenderfoot Creek below South Fork, near White Sulphur Springs	85	120	220	330	240	33	48	72	99	76
244	Smith River near Eden	360	530	920	1400	1100	96	190	370	740	450
245	Hound Creek near mouth, near Cascade	83	120	220	360	260	27	41	75	120	82
246	Missouri River near Ulm	4500	7200	12000	18000	13000	3100	4000	6600	10000	7300
247	North Fork Sun River near Augusta	720	830	1300	2000	1400	260	310	460	700	500
248	Sun River near Augusta	1300	1900	3000	4700	3300	390	680	1000	1700	1200
249	Sun River below diversion dam, near Augusta	360	690	1300	2900	1800	71	160	250	480	330
250	Willow Creek near Anderson Lake, near Augusta	14	17	30	48	33	3	4	8	15	9
251	North Fork Willow Creek below Cutrock Creek, near Augusta	8	9	16	24	17	3	3	5	8	6
254	Smith Creek near Augusta	34	43	69	110	86	25	30	47	59	48
255	Ford Creek near Augusta	29	45	62	110	81	27	31	40	56	44
256	Elk Creek near Augusta	98	190	310	490	340	32	52	78	150	100
257	Sun River at Simms	420	710	1400	3200	2100	66	96	270	600	420
260	Missouri River near Great Falls	6300	8500	15000	21000	16000	3900	4900	7800	12000	8500
261	Dry Fork at mouth, at Monarch	51	66	110	170	130	15	21	37	60	42

Table 8.--Estimated monthly streamflow characteristics for June and July--Continued

Site No.	Stream name	June					July				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
262	Tillinghast Creek above Joice Creek, near Monarch	26	33	54	80	60	11	15	22	30	24
263	Pilgrim Creek at mouth, near Monarch	31	45	79	120	88	11	14	23	37	27
264	Logging Creek at Logging Creek Campground, near Monarch	19	25	40	60	44	10	13	17	21	18
265	Belt Creek near Monarch	250	330	570	1000	700	75	110	200	320	220
266	Big Otter Creek above Never Sweat Creek, near Raynesford	14	17	29	50	33	6	7	10	14	11
267	Belt Creek near Portage	250	390	710	1700	1100	57	85	150	330	220
268	Highwood Creek below Smith Creek, near Highwood	36	47	78	130	88	12	15	23	36	25
269	Missouri River at Fort Benton	6800	9000	16000	23000	17000	3900	5200	7900	12000	8800
270	Shonkin Creek below Bishop Creek, near Highwood	25	35	61	100	70	10	12	18	26	18
271	South Fork Two Medicine River near East Glacier	92	120	240	380	260	25	35	59	95	63
273	South Fork Badger Creek near Browning	120	140	210	300	230	31	43	65	100	71
274	North Fork Badger Creek near Browning	100	130	190	270	210	28	39	59	91	65
278	Birch Creek at Swift Dam, near Valier	110	270	370	630	500	150	170	240	430	300
279	South Fork Dupuyer Creek near Dupuyer	17	21	36	52	39	6	7	11	17	13
280	North Fork Dupuyer Creek near Dupuyer	23	29	48	68	52	7	10	15	22	16
281	Dupuyer Creek below Scoffin Creek, near Dupuyer	47	60	120	200	130	10	13	27	55	34
282	Birch Creek near Valier	31	55	99	220	140	19	25	43	97	62
283	Cut Bank Creek near Browning	310	370	470	680	530	74	130	170	260	190
284	Cut Bank Creek at Cut Bank	280	350	510	810	600	78	110	190	350	230
285	Marias River at Sullivan Bridge, near Cut Bank	1100	1300	2200	3600	2800	310	460	730	1300	950
286	Marias River near Shelby	1200	1500	2500	4300	3200	320	490	790	1500	1000
287	Marias River at "F" Bridge, above Tiber Reservoir, near Shelby	1400	1700	2900	5000	3800	370	570	920	1700	1200
288	Marias River near Loma	570	750	1500	2600	1900	460	680	1300	2000	1300
290	Teton River near Strabane	36	59	99	140	100	21	32	48	82	61
291	McDonald Creek near Strabane	14	15	16	17	16	11	12	13	15	13
292	North Fork Deep Creek near Choteau	30	37	61	87	66	9	12	19	29	21
293	South Fork Deep Creek near Choteau	28	35	57	83	63	9	12	18	27	20
294	Deep Creek near Choteau	15	22	39	60	43	7	11	17	30	20
295	Teton River near Dutton	64	140	320	560	420	32	64	140	270	170
296	Missouri River at Virgelle	7800	12000	18000	26000	20000	4400	5600	10000	14000	10000
297	Lost Creek at mouth, near Utica	36	47	79	120	86	12	16	26	40	29
298	Yogo Creek at mouth, near Utica	18	20	36	59	41	3	4	8	20	10
299	Middle Fork Judith River near Utica	120	160	220	350	250	25	34	66	90	69
301	South Fork Judith River at Indian Hill Campground, near Utica	18	24	42	74	48	5	5	9	15	10
303	Judith River above Courtneys Creek, at Utica	77	100	190	300	210	23	33	62	100	67
306	East Fork Big Spring Creek at mouth, near Lewistown	35	46	83	130	96	10	14	26	45	30
307	Big Spring Creek above Cottonwood Creek, near Hanover	170	210	260	320	280	140	160	190	210	190
309	Cottonwood Creek at Highway 200, near Lewistown	27	37	73	120	87	7	10	20	35	23
310	Beaver Creek at county road, near Lewistown	21	27	49	79	56	9	11	16	25	18
311	Big Spring Creek at mouth, near Lewistown	220	310	460	680	540	150	190	260	330	270

Table 8.--Estimated monthly streamflow characteristics for June and July--Continued

Site No.	Stream name	June					July				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
312	Warm Springs Creek above Meadow Creek, near Hilger	94	100	110	120	110	98	100	110	110	110
313	Judith River near Winifred	250	300	550	720	550	260	320	560	670	550
315	Cow Creek below forks, near Cleveland	12	16	28	40	30	5	6	11	16	12
316	Missouri River near Landusky	8400	13000	20000	29000	22000	5000	6200	11000	15000	12000
317	North Fork Musselshell River near Delpine	10	14	27	41	29	6	8	13	23	15
318	Checkerboard Creek near Checkerboard	10	12	23	36	25	3	4	6	11	7
319	Spring Creek below Whitetail Creek, near Checkerboard	21	30	58	93	68	8	11	20	29	21
320	North Fork Musselshell River near mouth, near Martinsdale	31	39	70	120	78	11	14	22	37	25
321	Alabaugh Creek at mouth, near Lennep	18	25	49	76	54	6	8	14	22	15
322	Cottonwood Creek below Loco Creek, near Martinsdale	73	110	200	310	220	28	40	61	85	65
323	South Fork Musselshell River above Martinsdale	94	140	290	510	340	19	28	66	120	78
324	Big Elk Creek at mouth, at Twodot	16	29	55	98	62	3	5	11	23	15
325	Musselshell River at Harlowton	87	150	460	770	510	48	67	140	210	170
326	American Fork near Harlowton	.1	2	11	70	56	0	.3	2	9	5
330	Careless Creek below Little Careless Creek, near Hedgesville	6	7	13	24	15	2	2	3	5	3
331	Swimming Woman Creek below Dry Coulee, near Franklin	7	9	17	27	19	2	3	4	8	5
333	Musselshell River near Roundup	130	200	520	1000	720	94	120	220	330	290
335	Flatwillow Creek below the forks, near Grass Range	90	120	200	300	220	12	17	43	89	51
338	Musselshell River near Mosby	70	150	590	1800	1000	14	51	140	500	350
339	Big Dry Creek above Little Dry Creek, near Van Norman	.1	1	14	80	43	0	.5	4	25	31
340	Little Dry Creek near Van Norman	1	2	14	55	34	.3	1	5	22	26
341	Big Dry Creek near Van Norman	2	3	28	140	77	.4	1	9	47	57

<sup>1</sup>Includes estimated spring flow of about 40 cubic feet per second, based on information provided by Montana Department of Fish, Wildlife and Parks.

<sup>2</sup>Includes estimated spring flow of about 10 cubic feet per second, based on information provided by Montana Department of Fish, Wildlife and Parks.

<sup>3</sup>Estimated long-term monthly streamflow characteristics may not reflect the current flow regime because of upstream streamflow regulation.

<sup>4</sup>Stream is known to be dry except for periods of runoff. Calculated flows were adjusted by subtracting 7 cubic feet per second.

<sup>5</sup>Stream is known to be dry except for periods of runoff. Calculated flows were adjusted by subtracting 8 cubic feet per second.

Table 9.--Estimated monthly streamflow characteristics for August and September

[Q.XX, monthly mean streamflow for specified month exceeded XX percent of the years, in cubic feet per second; QM, mean monthly streamflow for specified month, in cubic feet per second]

Site No.	Stream name	August					September				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
1	Hellroaring Creek near Lakeview	10	11	16	21	16	8	9	11	14	12
2	Corral Creek near Lakeview	1	1	2	3	2	1	1	1	2	1
3	Antelope Creek near Lakeview	.2	.2	.3	.4	.3	.2	.2	.2	.3	.2
4	Red Rock Creek near Lakeview	14	17	22	28	23	12	14	16	20	18
5	Tom Creek near Lakeview	1	1	2	2	2	.6	.7	1	1	1
6	Narrows Creek at mouth, near Lakeview	.3	.3	.6	.8	.6	.2	.2	.4	.5	.4
7	Odell Creek near Lakeview	8	9	12	16	13	6	7	8	11	9
8	Jones Creek near Lakeview	1	1	2	3	2	.7	1	1	2	1
9	Red Rock River near Kennedy Ranch, near Lakeview	20	27	46	76	53	20	32	47	69	49
10	Peet Creek at county road, near Lakeview	1	1	2	2	2	.7	1	1	2	1
11	Long Creek near Lakeview	4	5	6	8	6	3	3	4	5	5
12	East Fork Clover Creek at mouth, near Monida	1	1	2	3	2	.9	1	2	2	2
13	Red Rock River below Lima Reservoir, near Monida	110	160	260	310	240	33	52	140	250	150
14	Cabin Creek above Simpson Creek, near Lima	.6	.6	1	1	1	.3	.4	.6	.9	.7
15	Indian Creek above Simpson Creek, near Lima	.9	1	2	2	1	.5	.6	.8	1	1
16	Simpson Creek above Indian Creek, near Lima	1	1	2	2	2	.6	.7	1	1	1
17	Deadman Creek near Dell	3	4	6	9	6	2	3	4	6	5
18	Big Sheep Creek below Muddy Creek, near Dell	34	51	63	81	65	32	40	51	64	52
19	Red Rock River at Red Rock	100	120	150	240	180	170	190	230	290	250
20	Black Canyon Creek near Grant	2	2	3	4	3	2	2	2	3	3
21	Shennon Creek near mouth, near Grant	.7	.8	1	2	1	.5	.6	1	1	1
22	Frying Pan Creek near Grant	2	2	3	3	3	1	1	2	3	2
23	Trapper Creek at mouth, near Grant	.6	.7	1	2	1	.4	.5	.7	1	.9
24	Bear Creek near Grant	3	4	5	6	5	3	3	4	5	4
25	Bloody Dick Creek near Grant	13	16	20	26	21	10	13	16	21	17
26	Horse Prairie Creek near Grant	30	34	44	55	45	26	28	36	50	39
27	Rape Creek above reservoir, near Grant	.4	.5	.8	1	.8	.3	.3	.5	.8	.6
28	Painter Creek near Grant	3	3	5	6	5	2	2	3	4	4
29	Browns Canyon Creek near Grant	2	2	3	4	3	1	2	2	3	2
30	Medicine Lodge Creek near Grant	5	6	9	13	10	4	6	7	11	8
32	Pole Creek near mouth, near Polaris	1	1	2	3	2	.8	1	1	2	2
33	Reservoir Creek at mouth, near Polaris	1	1	2	3	2	1	1	2	3	2
34	East Fork Dyce Creek at mouth, near Polaris	1	1	2	3	2	.8	1	1	2	1
35	West Fork Dyce Creek at mouth, near Polaris	.7	.8	1	2	1	.5	.5	.7	1	.8
36	Grasshopper Creek near Dillon	12	16	26	38	28	11	12	17	28	20
37	Beaverhead River at Barretts	230	290	440	740	530	180	240	360	510	410
38	East Fork Blacktail Creek near Dillon	16	18	23	29	24	14	16	20	24	20
39	West Fork Blacktail Creek near Dillon	5	7	11	16	11	4	6	8	11	8
40	Blacktail Deer Creek near Dillon	30	40	46	58	48	32	37	43	52	44
41	Beaverhead River near Dillon	49	65	150	260	210	130	150	330	450	360

Table 9.--Estimated monthly streamflow characteristics for August and September--Continued

Site No.	Stream name	August					September				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
42	Beaverhead River near Twin Bridges	80	100	200	330	260	190	220	410	570	440
43	Corral Creek at mouth, near Alder	.8	1	2	2	2	.6	.7	1	2	1
44	Coal Creek at mouth, near Alder	2	3	4	6	5	2	2	3	4	4
45	Ruby River above the forks, near Alder	7	9	14	19	14	6	8	10	15	12
46	East Fork Ruby River at mouth, near Alder	3	4	6	8	6	3	3	4	6	5
47	West Fork Ruby River at mouth, near Alder	4	5	7	9	7	3	4	5	7	6
48	Cottonwood Creek at mouth, near Alder	4	5	8	11	8	4	4	6	8	6
49	Warm Springs Creek at mouth, near Alder <sup>1</sup>	47	49	54	59	54	46	48	50	54	51
50	North Fork Greenhorn Creek at mouth, near Alder	2	3	4	5	4	2	2	3	4	3
51	Ruby River above reservoir, near Alder	76	97	120	150	120	84	91	110	140	110
52	Mill Creek at Forest Service boundary, near Sheridan	12	14	21	29	22	9	10	13	17	14
53	Wisconsin Creek at Forest Service boundary, near Sheridan	8	10	14	20	15	6	7	9	12	10
54	Ruby River near Twin Bridges	66	100	140	190	140	140	150	190	280	210
55	Big Hole River near Jackson	14	17	22	29	23	13	14	17	23	18
56	Andrus Creek near mouth, near Jackson	4	4	7	10	7	3	4	5	7	6
57	Fox Creek at mouth, near Jackson	3	3	5	6	5	2	2	3	5	4
58	Governor Creek near Jackson	16	19	23	30	25	12	15	19	25	20
59	Warm Springs Creek at Jackson	9	10	14	18	14	7	8	11	14	11
60	Miner Creek near Jackson	13	14	17	22	19	6	7	9	13	10
61	Big Lake Creek near mouth, near Wisdom	5	5	8	11	8	4	4	6	8	7
62	Steel Creek above Francis Creek, near Wisdom	3	3	4	5	4	2	2	3	4	3
63	Francis Creek at mouth, near Wisdom	4	4	6	8	6	3	3	5	6	5
64	Steel Creek near mouth, near Wisdom	7	8	10	13	10	5	6	8	10	8
65	Swamp Creek near mouth, near Wisdom	9	11	13	17	14	6	8	10	14	11
66	Joseph Creek at mouth, near Wisdom	4	5	7	9	7	3	4	5	6	5
67	Trail Creek near Wisdom	19	21	24	32	26	13	16	20	25	20
68	Ruby Creek at mouth, near Wisdom	6	7	9	12	9	4	5	7	9	7
69	Tie Creek at Forest Service boundary, near Wisdom	8	9	14	18	14	6	7	10	13	11
70	Johnson Creek near Wisdom	4	5	7	9	7	3	4	5	7	6
71	Mussigbrod Creek near Wisdom	4	5	6	8	7	3	4	5	6	5
72	North Fork Big Hole River near mouth, near Wisdom	34	41	52	71	55	25	32	41	56	44
73	Big Hole River below North Fork, near Wisdom	86	130	190	280	210	83	93	130	200	160
74	Pintlar Creek near Forest Service boundary, near Wisdom	7	9	11	15	12	5	6	8	11	9
75	Big Hole River below Mudd Creek, near Wisdom	93	140	200	300	220	93	100	140	240	170
76	Fishtrap Creek at mouth, near Wise River	8	10	12	16	13	6	7	9	13	10
77	Lamarche Creek near Wise River	13	18	24	32	25	11	13	17	23	19
78	Seymour Creek near Wise River	9	10	15	20	15	7	8	11	14	12
79	Tenmile Creek at mouth, near Wise River	4	4	6	8	6	3	3	4	5	4
80	Sevenmile Creek at mouth, near Wise River	.8	1	2	2	2	.6	.7	1	1	1
81	Corral Creek at mouth, near Wise River	1	1	2	2	2	.7	.8	1	2	1

Table 9.--Estimated monthly streamflow characteristics for August and September--Continued

Site No.	Stream name	August					September				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
82	Twelvemile Creek at mouth, near Wise River	3	3	5	6	5	2	2	3	4	3
83	Sullivan Creek at mouth, near Wise River	3	3	5	6	5	2	2	3	4	4
84	Oregon Creek near mouth, near Wise River	.4	.5	.8	1	.8	.3	.3	.5	.7	.6
85	California Creek above American Creek, near Wise River	2	3	5	7	5	2	3	4	5	4
86	American Creek at mouth, near Wise River	.8	1	2	2	2	.6	.8	1	2	1
87	Sixmile Creek at mouth, near Wise River	.6	.7	1	2	1	.5	.6	.8	1	1
88	French Creek near mouth, near Wise River	4	5	8	12	9	4	5	7	9	7
89	Deep Creek near Wise River	25	29	36	47	39	20	24	30	39	32
90	Bear Creek near Wise River	2	2	3	4	3	1	2	2	3	2
91	Bryant Creek at mouth, near Wise River	2	3	4	6	5	2	2	3	4	4
92	Big Hole River near Wise River	130	190	290	420	310	130	140	190	300	240
93	Johnson Creek at mouth, near Wise River	1	2	3	4	3	1	1	2	3	2
94	Meadow Creek near Wise River	3	3	5	7	5	2	3	3	5	4
95	Jacobson Creek at mouth, near Wise River	13	15	21	28	22	10	12	14	19	16
96	Mono Creek at mouth, near Wise River	2	2	3	4	3	1	1	2	3	2
97	Wyman Creek at mouth, near Wise River	6	8	11	15	12	5	6	8	11	9
98	Lacy Creek at mouth, near Wise River	4	5	8	10	8	3	4	5	7	6
99	Gold Creek at mouth, near Wise River	2	3	4	5	4	2	2	3	4	3
100	Pattengail Creek at mouth, near Wise River	14	17	25	35	26	12	14	19	26	21
101	Sheep Creek at mouth, near Wise River	3	3	5	7	5	2	3	3	5	4
102	Wise River near Wise River	56	72	89	120	93	44	50	63	86	69
103	Adson Creek at mouth, near Wise River	2	2	3	4	3	1	2	2	3	3
104	Jerry Creek near Wise River	8	10	13	17	14	6	8	10	12	10
105	Divide Creek at Divide	3	4	5	7	6	3	3	4	5	4
106	Canyon Creek near Divide	4	6	8	10	8	3	4	5	7	6
107	Moose Creek near Divide	5	6	7	9	7	4	5	6	7	6
108	Trapper Creek near Melrose	5	6	8	10	8	4	5	6	7	6
109	Camp Creek at Melrose	2	3	4	7	4	1	2	3	5	3
110	Big Hole River near Melrose	240	340	490	700	520	240	260	340	560	410
111	Willow Creek near Glen	10	14	17	21	17	8	10	12	15	12
112	Birch Creek near Glen	13	18	28	37	28	8	10	12	16	13
113	Hells Canyon Creek near Twin Bridges	3	3	5	6	5	2	3	3	4	4
114	Jefferson River near Twin Bridges	310	520	770	1100	840	580	710	1000	1300	1000
115	Whitetail Creek near Whitehall	20	22	28	33	27	10	13	17	21	18
117	Boulder River above High Ore Creek, near Basin	9	12	20	35	24	10	13	20	33	24
118	Boulder River near Boulder	12	15	25	45	31	12	17	26	42	30
119	Little Boulder River near Boulder	4	5	8	12	10	5	6	9	16	11
120	Boulder River above Cabin Gulch, near Boulder	16	20	30	50	36	17	22	32	47	36
121	Boulder River near Cardwell	20	25	38	61	45	21	27	39	58	44
122	South Boulder River near Jefferson Island	25	28	32	37	32	15	17	23	29	23
123	Jefferson River at Sappington	250	410	690	1200	790	560	710	1100	1800	1200
124	South Willow Creek near Pony	5	7	8	14	10	4	5	8	21	12
125	North Willow Creek at Pony	3	4	6	10	7	3	3	6	13	8
126	Willow Creek near Harrison	3	4	8	18	11	4	5	13	34	20
127	Norwegian Creek near Harrison	3	4	7	9	8	5	5	7	10	7

Table 9.--Estimated monthly streamflow characteristics for August and September--Continued

Site No.	Stream name	August					September				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
129	Jefferson River near Three Forks	450	540	850	1400	1000	790	890	1300	1800	1300
130	Madison River near West Yellowstone	330	370	440	510	440	340	380	420	490	430
131	Duck Creek near West Yellowstone	23	27	33	41	35	22	24	29	35	30
132	Cougar Creek near West Yellowstone	12	15	21	29	22	9	11	14	18	15
133	Grayling Creek near West Yellowstone	26	33	46	69	50	19	23	30	40	33
134	Red Canyon Creek near West Yellowstone	.9	1	2	2	2	.5	.6	.8	1	1
135	South Fork Madison River near West Yellowstone	110	120	130	140	130	100	110	120	130	120
136	Watkins Creek near West Yellowstone	3	4	5	7	5	2	2	3	4	3
137	Trapper Creek near West Yellowstone	2	3	4	5	4	2	2	3	3	3
138	Madison River below Hebgen Lake, near Grayling	800	910	1100	1200	1100	690	890	1200	1400	1200
139	Cabin Creek near West Yellowstone	12	16	21	32	23	8	11	13	18	15
140	Beaver Creek near West Yellowstone	30	36	51	70	54	25	28	35	44	37
141	Elk River at mouth, near Cameron	19	21	29	38	30	14	16	20	25	21
142	Soap Creek at mouth, near Cameron	1	2	2	3	2	1	1	1	2	2
143	Antelope Creek at mouth, near Cameron <sup>2</sup>	15	16	19	22	19	14	15	16	19	17
144	West Fork Madison River near Cameron	44	55	67	84	69	43	46	57	64	56
145	Squaw Creek near Cameron	8	9	12	16	13	7	7	9	11	9
146	Standard Creek near Cameron	7	9	12	17	13	6	6	8	10	9
147	Ruby Creek near Cameron	4	5	6	8	6	3	4	4	6	5
148	Indian Creek near Cameron	29	36	50	70	53	24	27	34	43	36
149	Madison River near Cameron	1000	1200	1300	1500	1300	1000	1200	1400	1600	1400
150	Blaine Spring Creek near Cameron	25	26	29	35	30	23	25	26	28	26
151	O'Dell Creek near Ennis	110	110	120	120	120	110	110	110	120	110
152	Jack Creek near Ennis	23	26	33	41	34	21	22	27	32	27
153	Moore Creek at Ennis	1	1	2	2	2	.8	1	1	2	1
154	North Fork Meadow Creek at Forest Service boundary, near Ennis	10	13	31	43	29	8	10	15	21	16
155	North Fork Meadow Creek at Highway 287, near Ennis	6	8	15	20	14	4	6	8	11	9
156	Madison River below Ennis Lake, near McAllister	1200	1400	1600	1800	1600	1200	1300	1700	2000	1700
157	Hot Springs Creek near Norris	6	8	13	15	12	6	7	8	11	9
158	Cherry Creek near Norris	20	23	35	48	36	19	22	28	36	29
159	Madison River near Three Forks	1000	1200	1500	1700	1500	1200	1300	1600	1800	1600
160	Cache Creek at mouth, near West Yellowstone	4	4	6	8	6	3	3	4	5	5
161	Taylor Creek near Grayling	42	49	65	89	68	30	32	40	49	42
162	Porcupine Creek near Gallatin Gateway	8	9	13	18	14	6	7	9	11	9
163	Gallatin River above West Fork, near Big Sky	250	270	320	390	330	210	220	280	320	280
164	South Fork West Fork Gallatin River near Gallatin Gateway	17	21	28	40	31	14	16	22	30	24
165	Middle Fork West Fork Gallatin River near Gallatin Gateway	7	9	12	17	13	6	7	9	12	10
166	West Fork Gallatin River near Gallatin Gateway	32	39	52	72	56	27	31	42	55	44
167	Squaw Creek near Gallatin Gateway	15	18	23	28	24	15	16	19	23	20
168	Hellroaring Creek near Gallatin Gateway	21	24	32	41	33	19	21	26	33	27

Table 9.--Estimated monthly streamflow characteristics for August and September--Continued

Site No.	Stream name	August					September				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
169	South Fork Spanish Creek near Gallatin Gateway	16	19	25	34	27	13	15	20	26	21
170	Spanish Creek near Gallatin Gateway	30	36	49	67	52	26	30	40	51	41
171	Gallatin River near Gallatin Gateway	460	510	600	730	620	390	420	520	610	520
172	Big Bear Creek near Gallatin Gateway	6	8	9	13	10	5	6	7	8	7
173	South Cottonwood Creek near Gallatin Gateway	19	21	25	31	26	17	18	21	25	21
174	Baker Creek near Manhattan <sup>3</sup>	36	43	55	78	60	53	64	86	110	87
175	Rocky Creek near Bozeman	7	10	14	21	16	9	10	13	18	15
176	Bear Canyon Creek near Bozeman	.8	2	3	5	4	1	2	3	4	3
177	Sourdough Creek near Bozeman	12	14	20	25	20	10	12	17	19	16
178	East Gallatin River at Bozeman	27	29	45	60	49	35	42	52	60	52
179	Bridger Creek near Bozeman	7	8	12	18	14	5	7	9	12	11
180	East Gallatin River near Belgrade	25	27	44	66	51	32	35	50	71	55
181	East Fork Hyalite Creek near Bozeman	6	6	10	12	9	5	6	8	10	8
182	West Fork Hyalite Creek near Bozeman	11	13	17	23	18	10	12	15	17	14
183	Hyalite Creek at Hyalite Ranger Station, near Bozeman	35	45	84	100	78	29	34	46	60	50
184	Hyalite Creek above Interstate 90, near Bozeman	9	11	21	27	20	7	8	11	16	13
185	Thompson Creek near Belgrade	28	30	32	35	32	27	29	32	35	32
186	Ben Hart Creek near Belgrade	29	30	32	34	32	29	29	31	33	31
187	Reese Creek near Belgrade	5	6	8	11	9	5	6	7	11	8
188	East Gallatin River near Manhattan	160	180	220	280	230	160	170	200	240	200
189	Gallatin River near Logan	330	390	480	670	530	470	560	740	920	740
190	Sixteenmile Creek near Ringling	0	0	.8	5	3	0	1	3	4	3
191	Sixteenmile Creek near Maudlow	12	14	30	48	32	15	16	24	40	28
192	Sixteenmile Creek near Toston	17	21	36	57	39	18	21	29	46	33
193	Missouri River near Toston	1400	1800	2400	3300	2600	2400	2600	3400	4600	3500
194	Crow Creek near Radersburg	13	15	23	32	24	12	14	17	23	18
195	Dry Creek near Toston	3	3	5	7	5	2	3	3	6	4
196	Deep Creek below North Fork, near Townsend	8	10	14	18	15	8	9	11	14	12
197	Duck Creek near Townsend	4	5	7	8	7	3	4	5	7	5
198	Confederate Gulch near Winston	6	7	10	13	10	5	6	8	10	8
199	Beaver Creek near Winston	2	4	6	8	6	2	2	4	6	4
200	Avalanche Gulch near Winston	1	1	2	3	2	.8	1	1	2	2
201	Spokane Creek near East Helena	3	4	5	7	5	3	3	4	5	5
202	McGuire Creek at county road, near East Helena	6	6	8	9	8	6	6	7	8	8
203	Trout Creek at mouth, near East Helena	11	11	15	17	15	12	12	14	15	13
204	Prickly Pear Creek near Clancy	13	15	29	44	30	16	17	24	37	27
205	Prickly Pear Creek at mouth, near East Helena	19	22	32	40	33	21	22	28	35	29
206	Tenmile Creek near Rimini	.4	.5	1	3	2	.3	.5	1	3	2
207	Tenmile Creek near Helena	.3	.6	2	8	5	.8	1	3	7	5
208	Sevenmile Creek near mouth, near Helena	1	1	2	3	2	1	1	2	3	2
209	Tenmile Creek at mouth, near East Helena	3	4	6	12	7	2	3	5	9	6
210	Silver Creek at Interstate 15, near Helena	7	7	11	14	11	8	8	10	13	11
211	Beaver Creek at mouth, near East Helena	4	4	7	11	8	4	5	6	12	8
212	Elkhorn Creek near mouth, near Wolf Creek	2	3	5	7	5	2	3	4	5	4
213	Willow Creek below Elkhorn Creek, near Wolf Creek	3	3	4	6	4	2	2	3	4	3



Table 9.--Estimated monthly streamflow characteristics for August and September--Continued

Site No.	Stream name	August					September				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
214	Cottonwood Creek above Beartooth Ranch, near Wolf Creek	1	1	2	2	2	.6	.8	1	2	1
217	Virginia Creek at mouth, near Canyon Creek	3	3	4	7	5	4	5	7	11	8
218	Canyon Creek below Cottonwood Creek, near Canyon Creek	3	4	5	8	6	5	6	10	15	10
219	Little Prickly Pear Creek near Canyon Creek	2	3	5	13	8	13	15	21	27	21
220	Lyons Creek near Wolf Creek	3	4	7	9	7	3	4	6	7	6
221	Wolf Creek at mouth, at Wolf Creek	3	3	5	8	6	2	3	4	6	5
222	Little Prickly Pear Creek near Wolf Creek	20	27	54	97	76	30	36	59	84	63
223	Wegner Creek near Craig <sup>4</sup>	0	0	0	0	0	0	0	0	0	0
224	Stickney Creek near Craig <sup>5</sup>	0	0	0	0	0	0	0	0	0	0
226	Middle Fork Dearborn River at Highway 200, near Wolf Creek	8	10	14	20	15	6	8	11	15	12
227	South Fork Dearborn River at Highway 434, near Wolf Creek	7	9	13	18	14	5	7	9	14	11
228	Dearborn River near Craig	17	33	68	100	70	20	32	52	75	56
229	Flat Creek above Slew Creek, near Craig	5	7	13	21	14	4	6	9	14	10
230	Sheep Creek at mouth, near Cascade	17	24	36	56	38	14	19	26	36	28
232	North Fork Smith River at Highway 89, near White Sulphur Springs	6	8	12	21	13	4	6	9	13	9
233	South Fork Smith River at mouth, near White Sulphur Springs	5	7	12	16	11	8	9	11	14	12
234	Smith River below forks, near White Sulphur Springs	15	19	27	39	29	11	15	22	29	22
235	Big Birch Creek at mouth, near White Sulphur Springs	5	8	22	40	20	16	18	25	32	25
236	Newlan Creek below Charcoal Gulch, near White Sulphur Springs	3	3	8	13	8	3	3	6	9	6
237	Camas Creek near mouth, near White Sulphur Springs	4	5	8	11	8	3	4	6	9	7
238	Smith River near Fort Logan	41	55	100	130	95	90	98	110	120	110
239	Sheep Creek near White Sulphur Springs	14	18	23	30	23	12	14	18	22	18
240	Sheep Creek near mouth, near White Sulphur Springs	21	29	41	62	44	17	23	30	42	33
241	Eagle Creek near mouth, near White Sulphur Springs	3	4	6	8	6	2	3	4	6	5
242	Rock Creek below Buffalo Canyon, near White Sulphur Springs	9	12	16	22	17	8	10	12	16	13
243	Tenderfoot Creek below South Fork, near White Sulphur Springs	18	24	33	47	35	15	19	25	34	27
244	Smith River near Eden	58	83	140	230	160	62	85	120	190	150
245	Hound Creek near mouth, near Cascade	16	22	36	49	37	15	17	25	33	26
246	Missouri River near Ulm	2300	2700	4100	5900	4300	2500	3100	4200	5300	4300
247	North Fork Sun River near Augusta	100	130	160	210	160	90	95	110	140	120
248	Sun River near Augusta	760	840	1100	1300	1100	240	260	370	540	390
249	Sun River below diversion dam, near Augusta	64	73	86	140	110	54	64	100	130	110
250	Willow Creek near Anderson Lake, near Augusta	2	3	4	5	4	2	2	3	4	3
251	North Fork Willow Creek below Cutrock Creek, near Augusta	2	2	3	4	3	2	3	3	3	3
254	Smith Creek near Augusta	6	8	12	17	13	4	6	9	16	11
255	Ford Creek near Augusta	12	15	19	27	20	12	14	17	21	18
256	Elk Creek near Augusta	20	26	37	49	38	20	23	30	38	31
257	Sun River at Simms	55	87	150	240	170	49	68	120	180	130
260	Missouri River near Great Falls	3200	3800	5100	7200	5400	3300	3800	4900	6300	5100
261	Dry Fork at mouth, at Monarch	8	11	16	23	17	7	9	12	19	14

Table 9.--Estimated monthly streamflow characteristics for August and September--Continued

Site No.	Stream name	August					September				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
262	Tillinghast Creek above Joice Creek, near Monarch	7	9	12	16	13	6	8	10	14	11
263	Pilgrim Creek at mouth, near Monarch	6	7	11	16	12	5	7	9	13	10
264	Logging Creek at Logging Creek Campground, near Monarch	7	8	11	14	11	6	7	9	12	10
265	Belt Creek near Monarch	36	56	79	120	87	36	47	63	100	74
266	Big Otter Creek above Never Sweat Creek, near Raynesford	2	4	6	8	7	1	2	5	6	5
267	Belt Creek near Portage	16	27	54	91	59	14	18	35	60	42
268	Highwood Creek below Smith Creek, near Highwood	7	9	11	15	12	6	7	9	12	10
269	Missouri River at Fort Benton	3200	3800	5200	6900	5400	3300	3700	4900	6300	5200
270	Shonkin Creek below Bishop Creek, near Highwood	6	7	9	11	10	4	5	7	9	8
271	South Fork Two Medicine River near East Glacier	17	22	34	52	36	13	17	28	36	27
273	South Fork Badger Creek near Browning	19	21	28	36	28	14	15	18	23	20
274	North Fork Badger Creek near Browning	17	19	26	33	26	13	14	17	22	18
278	Birch Creek at Swift Dam, near Valier	9	21	98	160	100	53	59	91	170	110
279	South Fork Dupuyer Creek near Dupuyer	4	4	6	8	6	3	3	4	6	5
280	North Fork Dupuyer Creek near Dupuyer	5	5	8	10	8	3	4	5	7	5
281	Dupuyer Creek below Scoffin Creek, near Dupuyer	6	7	8	12	10	7	8	12	16	13
282	Birch Creek near Valier	12	14	20	33	23	13	16	28	50	37
283	Cut Bank Creek near Browning	38	49	63	90	69	24	36	44	60	55
284	Cut Bank Creek at Cut Bank	29	35	66	110	77	26	40	51	100	67
285	Marias River at Sullivan Bridge, near Cut Bank	150	190	310	480	350	130	190	280	480	330
286	Marias River near Shelby	150	190	320	510	360	130	190	290	500	340
287	Marias River at "P" Bridge, above Tiber Reservoir, near Shelby	180	220	370	590	420	150	220	330	590	400
288	Marias River near Loma	350	540	980	1600	1100	330	420	720	1100	880
290	Teton River near Strabane	17	22	30	43	33	19	20	24	29	25
291	McDonald Creek near Strabane	9	9	11	12	11	9	10	10	12	11
292	North Fork Deep Creek near Choteau	6	7	10	13	10	4	5	6	9	7
293	South Fork Deep Creek near Choteau	6	6	9	12	9	4	5	6	8	7
294	Deep Creek near Choteau	5	6	11	16	12	6	7	9	14	11
295	Teton River near Dutton	16	45	67	120	80	26	39	59	90	69
296	Missouri River at Virgelle	3500	4300	5800	8100	6200	3900	4300	5400	7100	5900
297	Lost Creek at mouth, near Utica	7	9	13	18	14	6	7	10	13	11
298	Yogo Creek at mouth, near Utica	1	2	2	3	2	.5	.7	2	3	2
299	Middle Fork Judith River near Utica	4	5	14	31	18	2	3	11	19	12
301	South Fork Judith River at Indian Hill Campground, near Utica	3	4	4	5	4	2	2	3	4	4
303	Judith River above Courtneys Creek, at Utica	12	16	23	34	25	9	12	16	24	19
306	East Fork Big Spring Creek at mouth, near Lewistown	6	8	13	18	13	6	6	9	12	10
307	Big Spring Creek above Cottonwood Creek, near Hanover	120	130	160	170	160	120	120	140	150	140
309	Cottonwood Creek at Highway 200, near Lewistown	4	5	7	11	8	3	4	5	9	7
310	Beaver Creek at county road, near Lewistown	3	5	8	13	10	2	3	6	8	7
311	Big Spring Creek at mouth, near Lewistown	120	140	180	210	180	110	120	150	170	150

Table 9.--Estimated monthly streamflow characteristics for August and September--Continued

Site No.	Stream name	August					September				
		Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
312	Warm Springs Creek above Meadow Creek, near Hilger	100	100	110	110	110	100	110	110	110	110
313	Judith River near Winifred	240	250	480	670	470	240	240	470	640	440
315	Cow Creek below forks, near Cleveland	3	4	6	9	7	3	3	4	6	5
316	Missouri River near Landusky	3900	4700	6600	8700	6800	4300	4600	5900	7700	6400
317	North Fork Musselshell River near Delpine	3	4	9	13	9	4	4	8	11	8
318	Checkerboard Creek near Checkerboard	2	2	3	4	3	1	2	2	3	2
319	Spring Creek below Whitetail Creek, near Checkerboard	5	6	10	14	10	4	5	7	9	7
320	North Fork Musselshell River near mouth, near Martinsdale	6	8	13	18	13	5	7	10	14	11
321	Alabaugh Creek at mouth, near Lennep	3	4	6	9	6	2	3	4	6	5
322	Cottonwood Creek below Loco Creek, near Martinsdale	15	20	27	39	29	12	15	20	28	22
323	South Fork Musselshell River above Martinsdale	6	12	21	44	27	5	10	21	36	25
324	Big Elk Creek at mouth, at Twodot	.9	1	3	7	4	.5	1	5	10	6
325	Musselshell River at Harlowton	22	36	84	130	83	13	35	65	100	70
326	American Fork near Harlowton	0	0	.5	2	1	0	0	.7	2	.9
330	Careless Creek below Little Careless Creek, near Hedgesville	1	1	2	2	2	.7	1	1	2	1
331	Swimming Woman Creek below Dry Coulee, near Franklin	1	1	2	2	2	.7	1	1	2	2
333	Musselshell River near Roundup	32	70	180	270	170	40	48	110	190	120
335	Flatwillow Creek below the forks, near Grass Range	4	5	8	16	10	3	4	6	10	7
338	Musselshell River near Mosby	5	20	87	220	120	9	20	73	180	130
339	Big Dry Creek above Little Dry Creek, near Van Norman	0	0	2	6	7	0	0	.5	4	9
340	Little Dry Creek near Van Norman	.1	.3	2	8	9	0	.1	1	5	10
341	Big Dry Creek near Van Norman	.1	.3	4	14	16	0	.1	2	9	19

<sup>1</sup>Includes estimated spring flow of about 40 cubic feet per second, based on information provided by Montana Department of Fish, Wildlife and Parks.

<sup>2</sup>Includes estimated spring flow of about 10 cubic feet per second, based on information provided by Montana Department of Fish, Wildlife and Parks.

<sup>3</sup>Estimated long-term monthly streamflow characteristics may not reflect the current flow regime because of upstream streamflow regulation.

<sup>4</sup>Stream is known to be dry except for periods of runoff. Calculated flows were adjusted by subtracting 7 cubic feet per second.

<sup>5</sup>Stream is known to be dry except for periods of runoff. Calculated flows were adjusted by subtracting 8 cubic feet per second.

Table 10.--Estimated mean annual streamflow  
[ft<sup>3</sup>s, cubic feet per second; --, not applicable]

Site No.	Stream name	Stream-flow-gaging station No.	Mean annual stream-flow (ft <sup>3</sup> /s)
1	Hellroaring Creek near Lakeview	--	22
2	Corral Creek near Lakeview	--	2
3	Antelope Creek near Lakeview	--	.7
4	Red Rock Creek near Lakeview	--	31
5	Tom Creek near Lakeview	--	3
6	Narrows Creek at mouth, near Lakeview	--	.9
7	Odell Creek near Lakeview	--	18
8	Jones Creek near Lakeview	--	2
9	Red Rock River near Kennedy Ranch, near Lakeview	06011000	130
10	Peet Creek at county road, near Lakeview	--	2
11	Long Creek near Lakeview	--	9
12	East Fork Clover Creek at mouth, near Monida	--	3
13	Red Rock River below Lima Reservoir, near Monida	06012500	150
14	Cabin Creek above Simpson Creek, near Lima	--	1
15	Indian Creek above Simpson Creek, near Lima	--	1
16	Simpson Creek above Indian Creek, near Lima	--	2
17	Deadman Creek near Dell	--	8
18	Big Sheep Creek below Muddy Creek, near Dell	06013500	60
19	Red Rock River at Red Rock	06014500	240
20	Black Canyon Creek near Grant	--	5
21	Shennon Creek near mouth, near Grant	--	1
22	Frying Pan Creek near Grant	--	4
23	Trapper Creek at mouth, near Grant	--	1
24	Bear Creek near Grant	--	9
25	Bloody Dick Creek near Grant	--	44
26	Horse Prairie Creek near Grant	06015000	84
27	Rape Creek above reservoir, near Grant	--	1
28	Painter Creek near Grant	--	8
29	Browns Canyon Creek near Grant	--	5
30	Medicine Lodge Creek near Grant	--	21
32	Pole Creek near mouth, near Polaris	--	3
33	Reservoir Creek at mouth, near Polaris	--	3
34	East Fork Dyce Creek at mouth, near Polaris	--	2
35	West Fork Dyce Creek at mouth, near Polaris	--	1
36	Grasshopper Creek near Dillon	06015500	52
37	Beaverhead River at Barretts	06016000	450
38	East Fork Blacktail Creek near Dillon	--	35
39	West Fork Blacktail Creek near Dillon	--	13
40	Blacktail Deer Creek near Dillon	06017500	55
41	Beaverhead River near Dillon	06018000	370
42	Beaverhead River near Twin Bridges	06018500	440
43	Corral Creek at mouth, near Alder	--	2
44	Coal Creek at mouth, near Alder	--	7
45	Ruby River above the forks, near Alder	--	24
46	East Fork Ruby River at mouth, near Alder	--	10
47	West Fork Ruby River at mouth, near Alder	--	12
48	Cottonwood Creek at mouth, near Alder	--	14
49	Warm Springs Creek at mouth, near Alder	--	64
50	North Fork Greenhorn Creek at mouth, near Alder	--	6
51	Ruby River above reservoir, near Alder	06019500	180
52	Mill Creek at Forest Service boundary, near Sheridan	--	31
53	Wisconsin Creek at Forest Service boundary, near Sheridan	--	24
54	Ruby River near Twin Bridges	06023000	210
55	Big Hole River near Jackson	06023500	47
56	Andrus Creek near mouth, near Jackson	--	12

Table 10.--Estimated mean annual streamflow--Continued

Site No.	Stream name	Stream-flow-gaging station No.	Mean annual stream-flow (ft <sup>3</sup> /s)
57	Fox Creek at mouth, near Jackson	--	8
58	Governor Creek near Jackson	--	49
59	Warm Springs Creek at Jackson	--	32
60	Miner Creek near Jackson	06024000	33
61	Big Lake Creek near mouth, near Wisdom	--	14
62	Steel Creek above Francis Creek, near Wisdom	--	8
63	Francis Creek at mouth, near Wisdom	--	12
64	Steel Creek near mouth, near Wisdom	--	21
65	Swamp Creek near mouth, near Wisdom	--	35
66	Joseph Creek at mouth, near Wisdom	--	12
67	Trail Creek near Wisdom	06024500	78
68	Ruby Creek at mouth, near Wisdom	--	24
69	Tie Creek at Forest Service boundary, near Wisdom	--	25
70	Johnson Creek near Wisdom	--	20
71	Mussigbrod Creek near Wisdom	--	29
72	North Fork Big Hole River near mouth, near Wisdom	--	150
73	Big Hole River below North Fork, near Wisdom	--	540
74	Pintlar Creek near Forest Service boundary, near Wisdom	--	55
75	Big Hole River below Mudd Creek, near Wisdom	--	590
76	Fishtrap Creek at mouth, near Wise River	--	44
77	Lamarche Creek near Wise River	--	50
78	Seymour Creek near Wise River	--	28
79	Tenmile Creek at mouth, near Wise River	--	10
80	Sevenmile Creek at mouth, near Wise River	--	2
81	Corral Creek at mouth, near Wise River	--	2
82	Twelvemile Creek at mouth, near Wise River	--	7
83	Sullivan Creek at mouth, near Wise River	--	8
84	Oregon Creek near mouth, near Wise River	--	1
85	California Creek above American Creek, near Wise River	--	7
86	American Creek at mouth, near Wise River	--	2
87	Sixmile Creek at mouth, near Wise River	--	1
88	French Creek near mouth, near Wise River	--	14
89	Deep Creek near Wise River	--	70
90	Bear Creek near Wise River	--	4
91	Bryant Creek at mouth, near Wise River	--	7
92	Big Hole River near Wise River	06024580	820
93	Johnson Creek at mouth, near Wise River	--	4
94	Meadow Creek near Wise River	--	8
95	Jacobson Creek at mouth, near Wise River	--	42
96	Mono Creek at mouth, near Wise River	--	4
97	Wyman Creek at mouth, near Wise River	--	20
98	Lacy Creek at mouth, near Wise River	--	13
99	Gold Creek at mouth, near Wise River	--	7
100	Pattengail Creek at mouth, near Wise River	--	48
101	Sheep Creek at mouth, near Wise River	--	8
102	Wise River near Wise River	06024590	180
103	Adson Creek at mouth, near Wise River	--	5
104	Jerry Creek near Wise River	--	22
105	Divide Creek at Divide	--	13
106	Canyon Creek near Divide	--	20
107	Moose Creek near Divide	--	12
108	Trapper Creek near Melrose	--	14
109	Camp Creek at Melrose	--	10
110	Big Hole River near Melrose	06025500	1,200
111	Willow Creek near Glen	06025800	18

Table 10.--Estimated mean annual streamflow--Continued

Site No.	Stream name	Stream-flow-gaging station No.	Mean annual stream-flow (ft <sup>3</sup> /s)
112	Birch Creek near Glen	06026000	28
113	Hells Canyon Creek near Twin Bridges	--	7
114	Jefferson River near Twin Bridges	06026500	1,900
115	Whitetail Creek near Whitehall	06029000	12
117	Boulder River above High Ore Creek, near Basin	--	100
118	Boulder River near Boulder	06033000	130
119	Little Boulder River near Boulder	--	21
120	Boulder River above Cabin Gulch, near Boulder	--	110
121	Boulder River near Cardwell	--	140
122	South Boulder River near Jefferson Island	06034000	34
123	Jefferson River at Sappington	06034500	2,200
124	South Willow Creek near Pony	--	35
125	North Willow Creek at Pony	--	19
126	Willow Creek near Harrison	06035000	40
127	Norwegian Creek near Harrison	06035500	7
129	Jefferson River near Three Forks	06036650	2,300
130	Madison River near West Yellowstone	06037500	510
131	Duck Creek near West Yellowstone	--	49
132	Cougar Creek near West Yellowstone	--	51
133	Grayling Creek near West Yellowstone	--	96
134	Red Canyon Creek near West Yellowstone	--	6
135	South Fork Madison River near West Yellowstone	--	140
136	Watkins Creek near West Yellowstone	--	11
137	Trapper Creek near West Yellowstone	--	7
138	Madison River below Hebgen Lake, near Grayling	06038500	1,000
139	Cabin Creek near West Yellowstone	--	58
140	Beaver Creek near West Yellowstone	--	79
141	Elk River at mouth, near Cameron	--	60
142	Soap Creek at mouth, near Cameron	--	3
143	Antelope Creek at mouth, near Cameron	--	25
144	West Fork Madison River near Cameron	06039200	95
145	Squaw Creek near Cameron	--	19
146	Standard Creek near Cameron	--	17
147	Ruby Creek near Cameron	--	9
148	Indian Creek near Cameron	--	84
149	Madison River near Cameron	06040000	1,400
150	Blaine Spring Creek near Cameron	06040010	28
151	O'Dell Creek near Ennis	--	120
152	Jack Creek near Ennis	06040300	41
153	Moore Creek at Ennis	--	3
154	North Fork Meadow Creek at Forest Service boundary, near Ennis	--	30
155	North Fork Meadow Creek at Highway 287, near Ennis	--	18
156	Madison River below Ennis Lake, near McAllister	06041000	1,800
157	Hot Springs Creek near Norris	--	14
158	Cherry Creek near Norris	--	52
159	Madison River near Three Forks	06042500	1,800
160	Cache Creek at mouth, near West Yellowstone	--	12
161	Taylor Creek near Grayling	06043000	94
162	Porcupine Creek near Gallatin Gateway	--	23
163	Gallatin River above West Fork, near Big Sky	--	450
164	South Fork West Fork Gallatin River near Gallatin Gateway	--	62
165	Middle Fork West Fork Gallatin River near Gallatin Gateway	--	22
166	West Fork Gallatin River near Gallatin Gateway	--	110
167	Squaw Creek near Gallatin Gateway	--	36
168	Hellroaring Creek near Gallatin Gateway	--	50

Table 10.--Estimated mean annual streamflow--Continued

Site No.	Stream name	Stream-flow-gaging station No.	Mean annual stream-flow (ft <sup>3</sup> /s)
169	South Fork Spanish Creek near Gallatin Gateway	--	46
170	Spanish Creek near Gallatin Gateway	--	82
171	Gallatin River near Gallatin Gateway	06043500	840
172	Big Bear Creek near Gallatin Gateway	--	14
173	South Cottonwood Creek near Gallatin Gateway	06044500	33
174	Baker Creek near Manhattan	--	140
175	Rocky Creek near Bozeman	06046500	32
176	Bear Canyon Creek near Bozeman	06047000	8
177	Sourdough Creek near Bozeman	06047500	25
178	East Gallatin River at Bozeman	06048000	92
179	Bridger Creek near Bozeman	06048500	37
180	East Gallatin River near Belgrade	06049000	120
181	East Fork Hyalite Creek near Bozeman	--	14
182	West Fork Hyalite Creek near Bozeman	--	26
183	Hyalite Creek at Hyalite Ranger Station, near Bozeman	06050000	66
184	Hyalite Creek above Interstate 90, near Bozeman	--	27
185	Thompson Creek near Belgrade	--	32
186	Ben Hart Creek near Belgrade	--	31
187	Reese Creek near Belgrade	06051000	15
188	East Gallatin River near Manhattan	--	320
189	Gallatin River near Logan	06052500	1,100
190	Sixteenmile Creek near Ringling	06053000	16
191	Sixteenmile Creek near Maudlow	--	53
192	Sixteenmile Creek near Toston	--	83
193	Missouri River near Toston	06054500	5,200
194	Crow Creek near Radersburg	06055500	41
195	Dry Creek near Toston	--	9
196	Deep Creek below North Fork, near Townsend	--	27
197	Duck Creek near Townsend	--	10
198	Confederate Gulch near Winston	--	16
199	Beaver Creek near Winston	--	16
200	Avalanche Gulch near Winston	--	7
201	Spokane Creek near East Helena	--	9
202	McGuire Creek at county road, near East Helena	--	8
203	Trout Creek at mouth, near East Helena	--	20
204	Prickly Pear Creek near Clancy	06061500	46
205	Prickly Pear Creek at mouth, near East Helena	--	54
206	Tenmile Creek near Rimini	06062500	16
207	Tenmile Creek near Helena	06063000	24
208	Sevenmile Creek near mouth, near Helena	--	6
209	Tenmile Creek at mouth, near East Helena	--	16
210	Silver Creek at Interstate 15, near Helena	--	13
211	Beaver Creek at mouth, near East Helena	--	12
212	Elkhorn Creek near mouth, near Wolf Creek	--	8
213	Willow Creek below Elkhorn Creek, near Wolf Creek	--	10
214	Cottonwood Creek above Beartooth Ranch, near Wolf Creek	--	4
217	Virginia Creek at mouth, near Canyon Creek	--	21
218	Canyon Creek below Cottonwood Creek, near Canyon Creek	--	41
219	Little Prickly Pear Creek near Canyon Creek	06071000	49
220	Lyons Creek near Wolf Creek	--	13
221	Wolf Creek at mouth, at Wolf Creek	--	12
222	Little Prickly Pear Creek near Wolf Creek	06071300	120
223	Wegner Creek near Craig	--	7
224	Stickney Creek near Craig	--	5
226	Middle Fork Dearborn River at Highway 200, near Wolf Creek	--	33

Table 10.--Estimated mean annual streamflow--Continued

Site No.	Stream name	Stream-flow-gaging station No.	Mean annual stream-flow (ft <sup>3</sup> /s)
227	South Fork Dearborn River at Highway 434, near Wolf Creek	--	32
228	Dearborn River near Craig	06073500	200
229	Flat Creek above Slew Creek, near Craig	--	34
230	Sheep Creek at mouth, near Cascade	--	58
232	North Fork Smith River at Highway 89, near White Sulphur Springs	--	58
233	South Fork Smith River at mouth, near White Sulphur Springs	--	26
234	Smith River below forks, near White Sulphur Springs	--	58
235	Big Birch Creek at mouth, near White Sulphur Springs	--	67
236	Newlan Creek below Charcoal Gulch, near White Sulphur Springs	--	12
237	Camas Creek near mouth, near White Sulphur Springs	--	17
238	Smith River near Fort Logan	06076690	170
239	Sheep Creek near White Sulphur Springs	06077000	31
240	Sheep Creek near mouth, near White Sulphur Springs	--	90
241	Eagle Creek near mouth, near White Sulphur Springs	--	13
242	Rock Creek River below Buffalo Canyon, near White Sulphur Springs	--	27
243	Tenderfoot Creek below South Fork, near White Sulphur Springs	--	60
244	Smith River near Eden	06077500	340
245	Hound Creek near mouth, near Cascade	--	73
246	Missouri River near Ulm	06078200	6,400
247	North Fork Sun River near Augusta	06078500	350
248	Sun River near Augusta	06080000	890
249	Sun River below diversion dam, near Augusta	06080900	360
250	Willow Creek near Anderson Lake, near Augusta	--	8
251	North Fork Willow Creek below Cutrock Creek, near Augusta	--	5
254	Smith Creek near Augusta	06082500	27
255	Ford Creek near Augusta	06083500	25
256	Elk Creek near Augusta	06084500	81
257	Sun River at Simms	06085800	450
260	Missouri River near Great Falls	06090300	7,500
261	Dry Fork at mouth, at Monarch	--	33
262	Tillinghast Creek above Joice Creek, near Monarch	--	18
263	Pilgrim Creek at mouth, near Monarch	--	25
264	Logging Creek at Logging Creek Campground, near Monarch	--	15
265	Belt Creek near Monarch	06090500	170
266	Big Otter Creek above Never Sweat Creek, near Raynesford	--	11
267	Belt Creek near Portage	06090610	210
268	Highwood Creek below Smith Creek, near Highwood	--	22
269	Missouri River at Fort Benton	06090800	7,700
270	Shonkin Creek below Bishop Creek, near Highwood	--	18
271	South Fork Two Medicine River near East Glacier	--	71
273	South Fork Badger Creek near Browning	--	59
274	North Fork Badger Creek near Browning	--	53
278	Birch Creek at Swift Dam, near Valier	06094500	120
279	South Fork Dupuyer Creek near Dupuyer	--	11
280	North Fork Dupuyer Creek near Dupuyer	--	14
281	Dupuyer Creek below Scoffin Creek, near Dupuyer	--	34
282	Birch Creek near Valier	06098100	69
283	Cut Bank Creek near Browning	06098500	140
284	Cut Bank Creek at Cut Bank	06099000	180
285	Marias River at Sullivan Bridge, near Cut Bank	--	830



Table 10.--Estimated mean annual streamflow--Continued

Site No.	Stream name	Stream-flow-gaging station No.	Mean annual stream-flow (ft <sup>3</sup> /s)
286	Marias River near Shelby	06099500	910
287	Marias River at "F" Bridge, above Tiber Reservoir, near Shelby	--	1,100
288	Marias River near Loma	06102050	880
290	Teton River near Strabane	--	36
291	McDonald Creek near Strabane	--	12
292	North Fork Deep Creek near Choteau	--	18
293	South Fork Deep Creek near Choteau	--	17
294	Deep Creek near Choteau	--	16
295	Teton River near Dutton	06108000	150
296	Missouri River at Virgelle	06109500	8,700
297	Lost Creek at mouth, near Utica	--	24
298	Yogo Creek at mouth, near Utica	--	8
299	Middle Fork Judith River near Utica	06109780	42
301	South Fork Judith River at Indian Hill Campground, near Utica	--	10
303	Judith River above Courtneys Creek, at Utica	--	49
306	East Fork Big Spring Creek at mouth, near Lewistown	--	26
307	Big Spring Creek above Cottonwood Creek, near Hanover	--	170
309	Cottonwood Creek at Highway 200, near Lewistown	--	19
310	Beaver Creek at county road, near Lewistown	--	22
311	Big Spring Creek at mouth, near Lewistown	--	230
312	Warm Springs Creek above Meadow Creek, near Hilger	--	110
313	Judith River near Winifred	06113500	480
315	Cow Creek below forks, near Cleveland	--	9
316	Missouri River near Landusky	06115200	9,700
317	North Fork Musselshell River near Delpine	06115500	12
318	Checkerboard Creek near Checkerboard	--	6
319	Spring Creek below Whitetail Creek, near Checkerboard	--	19
320	North Fork Musselshell River near mouth, near Martinsdale	--	23
321	Alabaugh Creek at mouth, near Lennep	--	12
322	Cottonwood Creek below Loco Creek, near Martinsdale	--	53
323	South Fork Musselshell River above Martinsdale	06118500	88
324	Big Elk Creek at mouth, at Twodot	06120000	15
325	Musselshell River at Harlowton	06120500	160
326	American Fork near Harlowton	06121000	7
330	Careless Creek below Little Careless Creek, near Hedgesville	--	5
331	Swimming Woman Creek below Dry Coulee, near Franklin	--	4
333	Musselshell River near Roundup	06126500	210
335	Flatwillow Creek below the forks, near Grass Range	--	41
338	Musselshell River near Mosby	06130500	310
339	Big Dry Creek above Little Dry Creek, near Van Norman	--	33
340	Little Dry Creek near Van Norman	--	23
341	Big Dry Creek near Van Norman	06131000	56

Table 11.--Results of basin-characteristics regression analysis

[R<sup>2</sup>, coefficient of determination; Q.XX, monthly mean streamflow for specified month exceeded XX percent of the years, in cubic feet per second; QM, mean monthly streamflow for specified month, in cubic feet per second; A, drainage area, in square miles; P, mean annual precipitation, in inches]

Month	Stream-flow characteristic		Equation		R <sup>2</sup>	Standard error (logarithm, base 10)	Standard error (percent)
October	Q.90	=	0.00132 A <sup>1.030</sup>	p <sup>1.38</sup>	0.67	0.32	85
	Q.80	=	0.00155 A <sup>0.996</sup>	p <sup>1.44</sup>	.71	.28	72
	Q.50	=	0.00219 A <sup>0.965</sup>	p <sup>1.47</sup>	.76	.24	59
	Q.20	=	0.00234 A <sup>0.924</sup>	p <sup>1.60</sup>	.82	.20	47
	QM	=	0.00234 A <sup>0.935</sup>	p <sup>1.51</sup>	.80	.21	50
November	Q.90	=	0.00095 A <sup>1.050</sup>	p <sup>1.43</sup>	.68	.32	83
	Q.80	=	0.00135 A <sup>1.010</sup>	p <sup>1.43</sup>	.73	.27	70
	Q.50	=	0.00141 A <sup>0.994</sup>	p <sup>1.53</sup>	.77	.24	59
	Q.20	=	0.00129 A <sup>0.967</sup>	p <sup>1.67</sup>	.81	.21	52
	QM	=	0.00145 A <sup>0.972</sup>	p <sup>1.56</sup>	.79	.22	55
December	Q.90	=	0.00047 A <sup>0.987</sup>	p <sup>1.69</sup>	.65	.32	86
	Q.80	=	0.00059 A <sup>0.987</sup>	p <sup>1.66</sup>	.70	.29	75
	Q.50	=	0.00069 A <sup>0.994</sup>	p <sup>1.68</sup>	.75	.25	63
	Q.20	=	0.00078 A <sup>0.970</sup>	p <sup>1.75</sup>	.79	.23	56
	QM	=	0.00069 A <sup>0.974</sup>	p <sup>1.73</sup>	.77	.24	60
January	Q.90	=	0.00044 A <sup>1.000</sup>	p <sup>1.64</sup>	.64	.34	91
	Q.80	=	0.00056 A <sup>1.010</sup>	p <sup>1.61</sup>	.68	.31	80
	Q.50	=	0.00091 A <sup>0.978</sup>	p <sup>1.59</sup>	.72	.27	70
	Q.20	=	0.00107 A <sup>0.963</sup>	p <sup>1.63</sup>	.75	.25	63
	QM	=	0.00079 A <sup>0.980</sup>	p <sup>1.63</sup>	.73	.26	67
February	Q.90	=	0.00069 A <sup>1.010</sup>	p <sup>1.51</sup>	.64	.33	90
	Q.80	=	0.00089 A <sup>1.010</sup>	p <sup>1.48</sup>	.68	.31	80
	Q.50	=	0.00112 A <sup>0.998</sup>	p <sup>1.50</sup>	.71	.28	72
	Q.20	=	0.00186 A <sup>0.969</sup>	p <sup>1.46</sup>	.73	.26	65
	QM	=	0.00123 A <sup>0.990</sup>	p <sup>1.50</sup>	.72	.27	70
March	Q.90	=	0.00071 A <sup>1.020</sup>	p <sup>1.53</sup>	.65	.33	89
	Q.80	=	0.00105 A <sup>1.020</sup>	p <sup>1.47</sup>	.67	.32	84
	Q.50	=	0.00234 A <sup>0.991</sup>	p <sup>1.34</sup>	.70	.28	73
	Q.20	=	0.00513 A <sup>0.981</sup>	p <sup>1.21</sup>	.70	.28	72
	QM	=	0.00316 A <sup>0.992</sup>	p <sup>1.28</sup>	.71	.28	71

Table 11.--Results of basin-characteristics regression analysis--Continued

Month	Stream- flow charac- teristic		Equation			R <sup>2</sup>	Standard error (loga- rithm, base 10)	Stand- ard error (percent)
April	Q.90	=	0.00251	A <sup>0.915</sup>	p <sup>1.50</sup>	.57	.35	97
	Q.80	=	0.00347	A <sup>0.892</sup>	p <sup>1.51</sup>	.57	.34	93
	Q.50	=	0.00631	A <sup>0.886</sup>	p <sup>1.48</sup>	.66	.29	73
	Q.20	=	0.00832	A <sup>0.902</sup>	p <sup>1.51</sup>	.71	.25	64
	QM	=	0.00631	A <sup>0.905</sup>	p <sup>1.49</sup>	.71	.26	64
May	Q.90	=	0.00069	A <sup>0.833</sup>	p <sup>2.43</sup>	.80	.22	53
	Q.80	=	0.00138	A <sup>0.834</sup>	p <sup>2.28</sup>	.82	.20	48
	Q.50	=	0.00372	A <sup>0.853</sup>	p <sup>2.07</sup>	.83	.19	45
	Q.20	=	0.00794	A <sup>0.864</sup>	p <sup>1.92</sup>	.85	.17	41
	QM	=	0.00457	A <sup>0.854</sup>	p <sup>2.02</sup>	.84	.18	43
June	Q.90	=	0.00050	A <sup>0.905</sup>	p <sup>2.38</sup>	.83	.20	49
	Q.80	=	0.00089	A <sup>0.918</sup>	p <sup>2.27</sup>	.85	.19	46
	Q.50	=	0.00309	A <sup>0.904</sup>	p <sup>2.07</sup>	.89	.15	37
	Q.20	=	0.00513	A <sup>0.915</sup>	p <sup>2.02</sup>	.89	.15	35
	QM	=	0.00324	A <sup>0.906</sup>	p <sup>2.08</sup>	.89	.15	35
July	Q.90	=	0.00066	A <sup>0.874</sup>	p <sup>2.00</sup>	.67	.29	76
	Q.80	=	0.00060	A <sup>0.907</sup>	p <sup>2.08</sup>	.74	.26	64
	Q.50	=	0.00132	A <sup>0.932</sup>	p <sup>1.96</sup>	.83	.20	48
	Q.20	=	0.00182	A <sup>0.953</sup>	p <sup>1.97</sup>	.87	.17	40
	QM	=	0.00155	A <sup>0.936</sup>	p <sup>1.94</sup>	.85	.18	43
August	Q.90	=	0.00060	A <sup>0.829</sup>	p <sup>1.93</sup>	.56	.35	95
	Q.80	=	0.00091	A <sup>0.868</sup>	p <sup>1.82</sup>	.61	.32	85
	Q.50	=	0.00269	A <sup>0.851</sup>	p <sup>1.63</sup>	.66	.28	71
	Q.20	=	0.00427	A <sup>0.884</sup>	p <sup>1.55</sup>	.74	.24	59
	QM	=	0.00282	A <sup>0.876</sup>	p <sup>1.60</sup>	.70	.26	65
September	Q.90	=	0.00066	A <sup>0.907</sup>	p <sup>1.76</sup>	.58	.35	95
	Q.80	=	0.00112	A <sup>0.908</sup>	p <sup>1.65</sup>	.63	.31	83
	Q.50	=	0.00251	A <sup>0.920</sup>	p <sup>1.48</sup>	.68	.28	71
	Q.20	=	0.00537	A <sup>0.917</sup>	p <sup>1.35</sup>	.76	.23	57
	QM	=	0.00316	A <sup>0.912</sup>	p <sup>1.45</sup>	.73	.25	62

Table 12.--Results of channel-width regression analysis

[R<sup>2</sup>, coefficient of determination; Q.XX, monthly mean streamflow for specified month exceeded XX percent of the years, in cubic feet per second; QM, mean monthly streamflow for specified month, in cubic feet per second; W<sub>AC</sub>, active-channel width, in feet]

Month	Stream- flow charac- teristic		Equation	R <sup>2</sup>	Standard error (loga- rithm, base 10)	Stand- ard error (percent)
October	Q.90	=	0.0191 W <sub>AC</sub> <sup>1.90</sup>	0.60	0.34	93
	Q.80	=	0.0263 W <sub>AC</sub> <sup>1.86</sup>	.65	.31	80
	Q.50	=	0.0417 W <sub>AC</sub> <sup>1.82</sup>	.70	.26	66
	Q.20	=	0.0676 W <sub>AC</sub> <sup>1.77</sup>	.76	.22	55
	QM	=	0.0525 W <sub>AC</sub> <sup>1.78</sup>	.75	.23	57
November	Q.90	=	0.0151 W <sub>AC</sub> <sup>1.95</sup>	.62	.34	92
	Q.80	=	0.0234 W <sub>AC</sub> <sup>1.88</sup>	.65	.30	79
	Q.50	=	0.0324 W <sub>AC</sub> <sup>1.86</sup>	.70	.27	69
	Q.20	=	0.0457 W <sub>AC</sub> <sup>1.83</sup>	.74	.24	61
	QM	=	0.0380 W <sub>AC</sub> <sup>1.83</sup>	.72	.25	64
December	Q.90	=	0.0200 W <sub>AC</sub> <sup>1.83</sup>	.57	.35	97
	Q.80	=	0.0229 W <sub>AC</sub> <sup>1.83</sup>	.61	.33	87
	Q.50	=	0.0269 W <sub>AC</sub> <sup>1.86</sup>	.67	.29	75
	Q.20	=	0.0372 W <sub>AC</sub> <sup>1.84</sup>	.71	.26	67
	QM	=	0.0309 W <sub>AC</sub> <sup>1.84</sup>	.69	.28	71
January	Q.90	=	0.0148 W <sub>AC</sub> <sup>1.87</sup>	.57	.36	101
	Q.80	=	0.0166 W <sub>AC</sub> <sup>1.89</sup>	.62	.33	89
	Q.50	=	0.0251 W <sub>AC</sub> <sup>1.84</sup>	.65	.30	78
	Q.20	=	0.0324 W <sub>AC</sub> <sup>1.84</sup>	.69	.27	69
	QM	=	0.0251 W <sub>AC</sub> <sup>1.85</sup>	.67	.29	75
February	Q.90	=	0.0151 W <sub>AC</sub> <sup>1.87</sup>	.57	.36	99
	Q.80	=	0.0170 W <sub>AC</sub> <sup>1.89</sup>	.62	.33	88
	Q.50	=	0.0224 W <sub>AC</sub> <sup>1.88</sup>	.66	.30	78
	Q.20	=	0.0331 W <sub>AC</sub> <sup>1.84</sup>	.69	.28	70
	QM	=	0.0245 W <sub>AC</sub> <sup>1.87</sup>	.67	.29	76
March	Q.90	=	0.0166 W <sub>AC</sub> <sup>1.90</sup>	.58	.36	98
	Q.80	=	0.0195 W <sub>AC</sub> <sup>1.89</sup>	.60	.34	92
	Q.50	=	0.0309 W <sub>AC</sub> <sup>1.83</sup>	.64	.31	81
	Q.20	=	0.0468 W <sub>AC</sub> <sup>1.81</sup>	.63	.31	81
	QM	=	0.0355 W <sub>AC</sub> <sup>1.82</sup>	.64	.31	81

Table 12.--Results of channel-width regression analysis--Continued

Month	Stream-flow characteristic		Equation	R <sup>2</sup>	Standard error (logarithm, base 10)	Standard error (percent)
April	Q.90	=	0.0447 W <sub>AC</sub> <sup>1.81</sup>	.57	.35	95
	Q.80	=	0.0617 W <sub>AC</sub> <sup>1.78</sup>	.59	.34	90
	Q.50	=	0.1040 W <sub>AC</sub> <sup>1.77</sup>	.67	.28	70
	Q.20	=	0.1493 W <sub>AC</sub> <sup>1.80</sup>	.72	.25	62
	QM	=	0.1102 W <sub>AC</sub> <sup>1.79</sup>	.71	.25	63
May	Q.90	=	0.1247 W <sub>AC</sub> <sup>1.91</sup>	.80	.22	53
	Q.80	=	0.1758 W <sub>AC</sub> <sup>1.88</sup>	.83	.19	46
	Q.50	=	0.2673 W <sub>AC</sub> <sup>1.86</sup>	.86	.16	39
	Q.20	=	0.4027 W <sub>AC</sub> <sup>1.84</sup>	.88	.15	36
	QM	=	0.2985 W <sub>AC</sub> <sup>1.84</sup>	.87	.16	38
June	Q.90	=	0.1054 W <sub>AC</sub> <sup>1.92</sup>	.77	.24	58
	Q.80	=	0.1321 W <sub>AC</sub> <sup>1.94</sup>	.81	.21	52
	Q.50	=	0.2844 W <sub>AC</sub> <sup>1.87</sup>	.85	.17	42
	Q.20	=	0.4055 W <sub>AC</sub> <sup>1.88</sup>	.87	.16	39
	QM	=	0.2979 W <sub>AC</sub> <sup>1.88</sup>	.86	.17	40
July	Q.90	=	0.0562 W <sub>AC</sub> <sup>1.78</sup>	.62	.31	81
	Q.80	=	0.0646 W <sub>AC</sub> <sup>1.83</sup>	.68	.28	72
	Q.50	=	0.1009 W <sub>AC</sub> <sup>1.85</sup>	.77	.23	56
	Q.20	=	0.1406 W <sub>AC</sub> <sup>1.88</sup>	.81	.21	50
	QM	=	0.1127 W <sub>AC</sub> <sup>1.85</sup>	.79	.21	52
August	Q.90	=	0.0537 W <sub>AC</sub> <sup>1.64</sup>	.49	.37	103
	Q.80	=	0.0550 W <sub>AC</sub> <sup>1.70</sup>	.56	.34	92
	Q.50	=	0.1000 W <sub>AC</sub> <sup>1.63</sup>	.60	.30	78
	Q.20	=	0.1216 W <sub>AC</sub> <sup>1.67</sup>	.66	.27	67
	QM	=	0.0933 W <sub>AC</sub> <sup>1.67</sup>	.64	.28	72
September	Q.90	=	0.0316 W <sub>AC</sub> <sup>1.75</sup>	.54	.36	101
	Q.80	=	0.0380 W <sub>AC</sub> <sup>1.76</sup>	.59	.33	88
	Q.50	=	0.0513 W <sub>AC</sub> <sup>1.75</sup>	.64	.29	76
	Q.20	=	0.0794 W <sub>AC</sub> <sup>1.72</sup>	.69	.25	64
	QM	=	0.0631 W <sub>AC</sub> <sup>1.72</sup>	.67	.27	68

Table 13.--Streamflow-gaging stations used in test of concurrent-measurement method

Stream used as pseudo-ungaged site			Stream used as correlating gaged site			Water year of record
Site No.	Name	Station No.	Site No.	Name	Station No.	
18	Big Sheep Creek below Muddy Creek, near Dell	06013500	67	Trail Creek near Wisdom	06024500	1971
36	Grasshopper Creek near Dillon	06015500	67	Trail Creek near Wisdom	06024500	1950
40	Blacktail Deer Creek near Dillon	06017500	67	Trail Creek near Wisdom	06024500	1949
51	Ruby River above reservoir, near Alder	06019500	9	Red Rock River near Kennedy Ranch, near Lakeview	06011000	1940
115	Whitetail Creek near Whitehall	06029000	116	Boulder River above Rock Creek, near Basin	06030500	1951
152	Jack Creek near Ennis	06040300	102	Wise River near Wise River	06024590	1984
161	Taylor Creek near Grayling	06043000	171	Gallatin River near Gallatin Gateway	06043500	1956
178	East Gallatin River at Bozeman	06048000	189	Gallatin River near Logan	06052500	1955
179	Bridger Creek near Bozeman	06048500	171	Gallatin River near Gallatin Gateway	06043500	1968
183	Hyalite Creek at Hyalite Ranger Station, near Bozeman	06050000	171	Gallatin River near Gallatin Gateway	06043500	1967
194	Crow Creek near Radersburg	06055500	204	Prickly Pear Creek near Clancy	06061500	1967
206	Tenmile Creek near Rimini	06062500	204	Prickly Pear Creek near Clancy	06061500	1949
239	Sheep Creek near White Sulphur Springs	06077000	244	Smith River near Eden	06077500	1958
275	Badger Creek near Browning	06092500	272	Two Medicine River near Browning	06092000	1972
317	North Fork Musselshell River near Delpine	06115500	323	South Fork Musselshell River above Martinsdale	06118500	1957
347	Big Creek near Emigrant	06191800	130	Madison River near West Yellowstone	06037500	1984
352	German Gulch near Ramsay	12323500	356	Middle Fork Rock Creek near Philipsburg	12332000	1969
353	Racetrack Creek below Granite Creek, near Anaconda	12324100	356	Middle Fork Rock Creek near Philipsburg	12332000	1970
355	Boulder Creek at Maxville	12330000	356	Middle Fork Rock Creek near Philipsburg	12332000	1966
360	Skalkaho Creek near Hamilton	12346500	359	East Fork Bitterroot River near Conner	12343400	1958

Table 14.--Standard errors for three methods

[Q.XX, monthly mean streamflow for specified month exceeded XX percent of the years, in cubic feet per second; QM, mean monthly streamflow for specified month, in cubic feet per second]

Month	Standard error, in log units, for specified method and monthly streamflow characteristic														
	Basin-characteristics method					Channel-width method					Concurrent-measurement method				
	Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM	Q.90	Q.80	Q.50	Q.20	QM
October	0.32	0.28	0.24	0.20	0.21	0.34	0.31	0.26	0.22	0.23	0.22	0.20	0.16	0.17	0.18
November	.32	.27	.24	.21	.22	.34	.30	.27	.24	.25	.20	.18	.15	.15	.17
December	.32	.29	.25	.23	.24	.35	.32	.29	.26	.28	.21	.21	.18	.18	.18
January	.34	.31	.27	.25	.26	.36	.33	.30	.27	.29	.26	.23	.23	.20	.21
February	.33	.31	.28	.26	.27	.36	.33	.30	.27	.29	.22	.22	.19	.13	.15
March	.33	.32	.28	.28	.28	.36	.34	.31	.31	.31	.15	.16	.16	.16	.16
April	.35	.34	.28	.25	.26	.35	.33	.28	.25	.25	.20	.24	.25	.26	.26
May	.21	.20	.19	.17	.18	.22	.19	.16	.15	.16	.33	.27	.20	.19	.18
June	.20	.19	.15	.15	.15	.23	.21	.17	.16	.17	.29	.23	.20	.27	.20
July	.29	.25	.20	.17	.18	.31	.28	.23	.20	.21	.33	.24	.19	.18	.17
August	.35	.32	.28	.24	.26	.37	.34	.30	.26	.28	.39	.35	.25	.22	.24
September	.35	.31	.28	.23	.25	.36	.33	.29	.25	.27	.30	.29	.23	.21	.23

Table 15.--Weights and standard errors for various combinations of methods

[Q.XX, monthly mean streamflow for specified month exceeded XX percent of the years, in cubic feet per second; QM, mean monthly streamflow for specified month, in cubic feet per second; log, logarithm, base 10; pct, percent]

Combinations of methods	Weights for specified month and monthly flow characteristic				
	Q.90	Q.80	Q.50	Q.20	QM
<u>OCTOBER</u>					
Basin-characteristics method	0.000	0.000	0.000	0.179	0.153
Channel-width method	.342	.353	.298	.261	.299
Concurrent-measurement method	.658	.647	.702	.559	.548
Weighted standard error (log)	.15	.13	.12	.12	.12
Weighted standard error (pct)	35	31	29	29	28
Basin-characteristics method	.685	.716	.693	.682	.666
Channel-width method	.315	.284	.307	.318	.334
Weighted standard error (log)	.31	.28	.23	.19	.20
Weighted standard error (pct)	82	71	58	45	47
Concurrent-measurement method	.668	.647	.717	.572	.555
Basin-characteristics method	.332	.353	.283	.428	.445
Weighted standard error (log)	.17	.15	.14	.13	.13
Weighted standard error (pct)	41	37	32	31	31
Concurrent-measurement method	.658	.647	.702	.614	.591
Channel-width method	.342	.353	.298	.386	.409
Weighted standard error (log)	.15	.13	.12	.13	.12
Weighted standard error (pct)	35	31	29	30	28
<u>NOVEMBER</u>					
Basin-characteristics method	.000	.065	.068	.292	.241
Channel-width method	.294	.255	.203	.072	.147
Concurrent-measurement method	.706	.680	.729	.636	.612
Weighted standard error (log)	.15	.13	.13	.12	.12
Weighted standard error (pct)	36	32	30	28	29
Basin-characteristics method	.683	.760	.767	.765	.751
Channel-width method	.317	.240	.233	.235	.249
Weighted standard error (log)	.31	.27	.23	.21	.22
Weighted standard error (pct)	81	69	58	51	54



Table 15.--Weights and standard errors for various combinations of methods--Continued

Combinations of methods	Weights for specified month and monthly flow characteristic				
	Q.90	Q.80	Q.50	Q.20	QM
<u>NOVEMBER--Continued</u>					
Concurrent-measurement method	.710	.678	.733	.643	.621
Basin-characteristics method	.290	.322	.267	.357	.379
Weighted standard error (log)	.16	.14	.13	.12	.13
Weighted standard error (pct)	39	33	31	28	30
Concurrent-measurement method	.706	.695	.748	.706	.668
Channel-width method	.294	.305	.252	.294	.332
Weighted standard error (log)	.15	.13	.13	.13	.13
Weighted standard error (pct)	36	32	30	30	31
<u>DECEMBER</u>					
Basin-characteristics method	.034	.090	.140	.304	.234
Channel-width method	.302	.272	.213	.088	.155
Concurrent-measurement method	.663	.638	.647	.607	.611
Weighted standard error (log)	.14	.13	.13	.13	.13
Weighted standard error (pct)	34	32	30	31	30
Basin-characteristics method	.806	.833	.824	.806	.810
Channel-width method	.194	.167	.176	.194	.190
Weighted standard error (log)	.32	.29	.25	.22	.24
Weighted standard error (pct)	85	75	63	56	59
Concurrent-measurement method	.654	.629	.644	.612	.613
Basin-characteristics method	.346	.371	.356	.388	.387
Weighted standard error (log)	.15	.14	.13	.13	.13
Weighted standard error (pct)	36	34	31	32	31
Concurrent-measurement method	.670	.655	.678	.673	.659
Channel-width method	.330	.345	.322	.327	.341
Weighted standard error (log)	.14	.13	.13	.14	.13
Weighted standard error (pct)	34	32	31	33	31

Table 15.--Weights and standard errors for various combinations of methods--Continued

Combinations of methods	Weights for specified month and monthly flow characteristic				
	Q.90	Q.80	Q.50	Q.20	QM
<u>JANUARY</u>					
Basin-characteristics method	.146	.099	.192	.254	.239
Channel-width method	.250	.286	.244	.158	.178
Concurrent-measurement method	.604	.615	.564	.588	.583
Weighted standard error (log)	.17	.16	.15	.14	.14
Weighted standard error (pct)	42	38	37	34	34
Basin-characteristics method	.766	.730	.731	.678	.726
Channel-width method	.234	.270	.269	.322	.274
Weighted standard error (log)	.33	.30	.27	.24	.26
Weighted standard error (pct)	90	79	68	61	65
Concurrent-measurement method	.603	.614	.566	.600	.590
Basin-characteristics method	.397	.386	.434	.400	.410
Weighted standard error (log)	.18	.17	.16	.15	.15
Weighted standard error (pct)	43	40	38	35	35
Concurrent-measurement method	.624	.632	.596	.632	.623
Channel-width method	.376	.368	.404	.368	.377
Weighted standard error (log)	.17	.16	.16	.15	.15
Weighted standard error (pct)	42	38	38	35	36
<u>FEBRUARY</u>					
Basin-characteristics method	.024	.116	.159	.103	.125
Channel-width method	.294	.254	.204	.168	.172
Concurrent-measurement method	.681	.629	.636	.728	.703
Weighted standard error (log)	.16	.15	.12	.10	.11
Weighted standard error (pct)	39	36	29	24	25
Basin-characteristics method	.699	.678	.650	.614	.640
Channel-width method	.301	.322	.350	.386	.360
Weighted standard error (log)	.33	.30	.27	.25	.26
Weighted standard error (pct)	88	78	69	62	67
Concurrent-measurement method	.682	.636	.649	.748	.718
Basin-characteristics method	.318	.364	.351	.252	.282
Weighted standard error (log)	.17	.16	.13	.11	.11
Weighted standard error (pct)	42	38	31	25	26

Table 15.--Weights and standard errors for various combinations of methods--Continued

Combinations of methods	Weights for specified month and monthly flow characteristic				
	Q.90	Q.80	Q.50	Q.20	QM
<u>FEBRUARY--Continued</u>					
Concurrent-measurement method	.686	.652	.666	.753	.729
Channel-width method	.314	.348	.334	.247	.271
Weighted standard error (log)	.16	.15	.13	.10	.11
Weighted standard error (pct)	39	36	30	25	26
<u>MARCH</u>					
Basin-characteristics method	.105	.145	.244	.152	.256
Channel-width method	.120	.089	.020	.000	.000
Concurrent-measurement method	.775	.766	.736	.848	.744
Weighted standard error (log)	.12	.13	.14	.16	.14
Weighted standard error (pct)	29	32	33	38	34
Basin-characteristics method	.698	.683	.676	.667	.681
Channel-width method	.302	.317	.324	.333	.319
Weighted standard error (log)	.32	.31	.27	.27	.27
Weighted standard error (pct)	87	81	70	69	68
Concurrent-measurement method	.783	.775	.739	.848	.744
Basin-characteristics method	.217	.225	.261	.152	.256
Weighted standard error (log)	.13	.13	.14	.16	.14
Weighted standard error (pct)	30	32	33	38	34
Concurrent-measurement method	.795	.796	.790	.937	.814
Channel-width method	.205	.204	.210	.063	.186
Weighted standard error (log)	.12	.14	.15	.16	.15
Weighted standard error (pct)	29	32	35	39	36
<u>APRIL</u>					
Basin-characteristics method	.209	.176	.193	.311	.295
Channel-width method	.000	.123	.253	.389	.315
Concurrent-measurement method	.791	.701	.553	.300	.391
Weighted standard error (log)	.18	.22	.23	.23	.22
Weighted standard error (pct)	45	53	57	57	55

Table 15.--Weights and standard errors for various combinations of methods--Continued

Combinations of methods	Weights for specified month and monthly flow characteristic				
	Q.90	Q.80	Q.50	Q.20	QM
<u>FEBRUARY--Continued</u>					
Concurrent-measurement method	.686	.652	.666	.753	.729
Channel-width method	.314	.348	.334	.247	.271
Weighted standard error (log)	.16	.15	.13	.10	.11
Weighted standard error (pct)	39	36	30	25	26
<u>MARCH</u>					
Basin-characteristics method	.105	.145	.244	.152	.256
Channel-width method	.120	.089	.020	.000	.000
Concurrent-measurement method	.775	.766	.736	.848	.744
Weighted standard error (log)	.12	.13	.14	.16	.14
Weighted standard error (pct)	29	32	33	38	34
Basin-characteristics method	.698	.683	.676	.667	.681
Channel-width method	.302	.317	.324	.333	.319
Weighted standard error (log)	.32	.31	.27	.27	.27
Weighted standard error (pct)	87	81	70	69	68
Concurrent-measurement method	.783	.775	.739	.848	.744
Basin-characteristics method	.217	.225	.261	.152	.256
Weighted standard error (log)	.13	.13	.14	.16	.14
Weighted standard error (pct)	30	32	33	38	34
Concurrent-measurement method	.795	.796	.790	.937	.814
Channel-width method	.205	.204	.210	.063	.186
Weighted standard error (log)	.12	.14	.15	.16	.15
Weighted standard error (pct)	29	32	35	39	36
<u>APRIL</u>					
Basin-characteristics method	.209	.176	.193	.311	.295
Channel-width method	.000	.123	.253	.389	.315
Concurrent-measurement method	.791	.701	.553	.300	.391
Weighted standard error (log)	.18	.22	.23	.23	.22
Weighted standard error (pct)	45	53	57	57	55

Table 15.--Weights and standard errors for various combinations of methods--Continued

Combinations of methods	Weights for specified month and monthly flow characteristic				
	Q.90	Q.80	Q.50	Q.20	QM
<u>APRIL--Continued</u>					
Basin-characteristics method	.472	.442	.428	.438	.476
Channel-width method	.528	.558	.572	.562	.524
Weighted standard error (log)	.33	.32	.26	.23	.24
Weighted standard error (pct)	89	85	67	58	59
Concurrent-measurement method	.791	.730	.632	.467	.491
Basin-characteristics method	.209	.270	.368	.533	.509
Weighted standard error (log)	.18	.22	.23	.24	.23
Weighted standard error (pct)	45	54	58	59	57
Concurrent-measurement method	.820	.729	.602	.411	.475
Channel-width method	.180	.271	.398	.589	.525
Weighted standard error (log)	.19	.22	.23	.23	.23
Weighted standard error (pct)	46	54	58	58	57
<u>MAY</u>					
Basin-characteristics method	.506	.457	.228	.260	.235
Channel-width method	.494	.543	.510	.460	.472
Concurrent-measurement method	.000	.000	.262	.281	.293
Weighted standard error (log)	.19	.17	.14	.12	.13
Weighted standard error (pct)	47	42	34	28	32
Basin-characteristics method	.506	.457	.376	.391	.397
Channel-width method	.494	.543	.624	.609	.603
Weighted standard error (log)	.19	.17	.15	.13	.14
Weighted standard error (pct)	47	42	36	31	34
Concurrent-measurement method	.043	.142	.448	.426	.463
Basin-characteristics method	.957	.858	.552	.574	.537
Weighted standard error (log)	.21	.20	.16	.14	.15
Weighted standard error (pct)	53	48	39	33	36
Concurrent-measurement method	.040	.142	.359	.356	.389
Channel-width method	.960	.858	.641	.644	.611
Weighted standard error (log)	.21	.19	.15	.13	.14
Weighted standard error (pct)	53	46	35	30	33

Table 15.--Weights and standard errors for various combinations of methods--Continued

Combinations of methods	Weights for specified month and monthly flow characteristic				
	Q.90	Q.80	Q.50	Q.20	QM
<u>JUNE</u>					
Basin-characteristics method	.450	.348	.369	.431	.383
Channel-width method	.282	.327	.303	.350	.323
Concurrent-measurement method	.269	.325	.328	.219	.294
Weighted standard error (log)	.18	.16	.12	.11	.11
Weighted standard error (pct)	43	39	28	25	26
Basin-characteristics method	.713	.645	.618	.573	.598
Channel-width method	.287	.355	.382	.427	.402
Weighted standard error (log)	.20	.18	.14	.13	.13
Weighted standard error (pct)	48	44	33	30	31
Concurrent-measurement method	.271	.341	.366	.256	.337
Basin-characteristics method	.729	.659	.634	.744	.663
Weighted standard error (log)	.19	.17	.13	.12	.12
Weighted standard error (pct)	45	42	30	29	29
Concurrent-measurement method	.385	.443	.441	.297	.408
Channel-width method	.615	.557	.559	.703	.592
Weighted standard error (log)	.19	.17	.13	.13	.13
Weighted standard error (pct)	46	41	30	30	30
<u>JULY</u>					
Basin-characteristics method	.032	.012	.129	.377	.187
Channel-width method	.505	.419	.324	.222	.269
Concurrent-measurement method	.463	.569	.547	.401	.544
Weighted standard error (log)	.21	.18	.15	.14	.13
Weighted standard error (pct)	51	44	35	33	31
Basin-characteristics method	.685	.752	.718	.697	.695
Channel-width method	.315	.248	.282	.303	.305
Weighted standard error (log)	.29	.25	.19	.16	.17
Weighted standard error (pct)	74	63	46	38	41
Concurrent-measurement method	.436	.535	.533	.444	.559
Basin-characteristics method	.564	.465	.467	.556	.441
Weighted standard error (log)	.22	.19	.16	.14	.14
Weighted standard error (pct)	55	47	37	34	33

Table 15.--Weights and standard errors for various combinations of methods--Continued

Combinations of methods	Weights for specified month and monthly flow characteristic				
	Q.90	Q.80	Q.50	Q.20	QM
<u>JULY--Continued</u>					
Concurrent-measurement method	.468	.572	.595	.583	.628
Channel-width method	.532	.428	.405	.417	.372
Weighted standard error (log)	.21	.18	.15	.15	.13
Weighted standard error (pct)	51	44	35	35	32
<u>AUGUST</u>					
Basin-characteristics method	.000	.000	.000	.000	.000
Channel-width method	.519	.519	.387	.334	.399
Concurrent-measurement method	.481	.481	.613	.666	.601
Weighted standard error (log)	.25	.23	.21	.20	.19
Weighted standard error (pct)	63	56	51	48	47
Basin-characteristics method	.857	.788	.780	.752	.763
Channel-width method	.143	.212	.220	.248	.237
Weighted standard error (log)	.35	.32	.28	.23	.25
Weighted standard error (pct)	95	84	70	58	64
Concurrent-measurement method	.443	.446	.603	.637	.573
Basin-characteristics method	.557	.554	.397	.363	.427
Weighted standard error (log)	.27	.25	.22	.21	.21
Weighted standard error (pct)	69	62	55	50	51
Concurrent-measurement method	.481	.481	.613	.666	.601
Channel-width method	.519	.519	.387	.334	.399
Weighted standard error (log)	.25	.23	.21	.20	.19
Weighted standard error (pct)	63	56	51	48	47
<u>SEPTEMBER</u>					
Basin-characteristics method	.000	.000	.000	.007	.000
Channel-width method	.410	.442	.392	.376	.424
Concurrent-measurement method	.590	.558	.608	.617	.576
Weighted standard error (log)	.21	.20	.18	.17	.17
Weighted standard error (pct)	53	48	43	42	40

Table 15.--Weights and standard errors for various combinations of methods--Continued

Combinations of methods	Weights for specified month and monthly flow characteristic				
	Q.90	Q.80	Q.50	Q.20	QM
<u>SEPTEMBER--Continued</u>					
Basin-characteristics method	.720	.665	.670	.678	.683
Channel-width method	.280	.335	.330	.322	.317
Weighted standard error (log)	.34	.31	.27	.22	.24
Weighted standard error (pct)	94	81	69	54	60
Concurrent-measurement method	.596	.555	.616	.594	.552
Basin-characteristics method	.404	.445	.384	.406	.448
Weighted standard error (log)	.24	.23	.20	.19	.19
Weighted standard error (pct)	61	56	49	45	46
Concurrent-measurement method	.590	.558	.608	.620	.576
Channel-width method	.410	.442	.392	.380	.424
Weighted standard error (log)	.21	.20	.18	.17	.17
Weighted standard error (pct)	53	48	43	42	40



Table 16.--Streamflow-gaging stations used in test of record-extension procedure

Site No.	Name	Station No.	Period of record (water year)
37	Beaverhead River at Barretts	06016000	1908-86
42	Beaverhead River near Twin Bridges	06018500	1935-86
51	Ruby River above reservoir, near Alder	06019500	1938-86
110	Big Hole River near Melrose	06025500	1924-86
118	Boulder River near Boulder	06033000	1929-73;1985-86
126	Willow Creek near Harrison	06035000	1938-86
130	Madison River near West Yellowstone	06037500	1913-73;1983-86
156	Madison River below Ennis Lake, near McAllister	06041000	1939-86
171	Gallatin River near Gallatin Gateway	06043500	1930-82;1985-86
183	Hyalite Creek at Hyalite Ranger Station, near Bozeman	06050000	1934-86
189	Gallatin River near Logan	06052500	1906;1928-86
193	Missouri River near Toston	06054500	1911-17;1941-86
259	Muddy Creek at Vaughn	06088500	1935-68;1971-86
286	Marias River near Shelby	06099500	1906-08;1911-22;1924-86
316	Missouri River near Landusky	06115200	1934-86
325	Musselshell River at Harlowton	06120500	1907-86
333	Musselshell River near Roundup	06126500	1946-86
355	Boulder Creek at Maxville	12330000	1939-86
356	Middle Fork Rock Creek near Philipsburg	12332000	1938-86
358	Nevada Creek above reservoir, near Helmville	12335500	1939-86

Table 17.--Standard errors for record-extension  
procedure for various record lengths

[Q.XX, monthly mean streamflow for specified month exceeded XX percent  
of the years, in cubic feet per second; QM, mean monthly streamflow  
for specified month, in cubic feet per second]

Standard error, in log units, for specified record  
length and monthly streamflow characteristic

Month	Q.90	Q.80	Q.50	Q.20	QM
<u>5 years of record</u>					
October	0.22	0.13	0.06	0.04	0.05
November	.14	.10	.05	.06	.05
December	.12	.09	.05	.04	.04
January	.09	.05	.04	.07	.06
February	.08	.07	.04	.07	.05
March	.07	.04	.07	.11	.09
April	.14	.09	.07	.08	.07
May	.17	.10	.08	.10	.08
June	.16	.11	.09	.09	.08
July	.18	.13	.12	.11	.08
August	.11	.09	.06	.10	.08
September	.13	.07	.04	.05	.04
<u>15 years of record</u>					
October	.10	.08	.03	.03	.02
November	.05	.05	.03	.02	.02
December	.04	.04	.03	.02	.02
January	.06	.04	.02	.05	.03
February	.04	.02	.02	.04	.02
March	.05	.03	.04	.05	.03
April	.04	.04	.03	.04	.02
May	.11	.05	.05	.06	.04
June	.13	.05	.06	.05	.03
July	.12	.06	.06	.05	.04
August	.07	.07	.05	.03	.03
September	.14	.03	.05	.04	.03

Table 17.--Standard errors for record-extension  
procedure for various record lengths--Continued

Standard error, in log units, for specified record length and monthly streamflow characteristic					
Month	Q.90	Q.80	Q.50	Q.20	QM
<u>25 years of record</u>					
October	.10	.03	.02	.03	.01
November	.05	.04	.01	.02	.01
December	.04	.03	.01	.02	.01
January	.06	.04	.03	.02	.01
February	.04	.02	.02	.03	.02
March	.03	.03	.05	.05	.03
April	.05	.03	.02	.04	.02
May	.05	.06	.03	.02	.02
June	.06	.03	.02	.02	.02
July	.05	.05	.03	.03	.03
August	.05	.03	.03	.02	.02
September	.13	.03	.03	.03	.02
<u>35 years of record</u>					
October	.03	.03	.01	.02	.01
November	.02	.02	.02	.02	.01
December	.02	.02	.01	.02	.01
January	.03	.02	.01	.02	.01
February	.04	.02	.01	.04	.01
March	.01	.01	.01	.01	.01
April	.03	.05	.02	.01	.01
May	.06	.04	.02	.02	.01
June	.06	.03	.02	.03	.01
July	.07	.04	.02	.02	.01
August	.02	.02	.02	.05	.03
September	.10	.03	.02	.04	.02