Magnitude and Frequency of the Floods of January 1997 in Northern and Central California—Preliminary Determinations

By Richard A. Hunrichs, David A. Pratt, *and* Robert W. Meyer

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CONVERSION FACTORS

Multiply	By	To obtain
inch (in.)	2.54	centimeter
foot (ft)	0.3048	meter
mile (mi)	1.609	kilometer
square mile (mi^2)	2.590	square kilometer
cubic foot (ft^3)	0.02832	cubic meter
acre-foot (acre-ft)	1,233	cubic meter
acre-foot (acre-ft)	0.001233	cubic hectometer
cubic foot per second (ft^3/s)	0.02832	cubic meter per second
cubic foot per second per square mile [$(ft^3/s)/mi^2$]	0.01093	cubic meter per second per square kilometer
acre-foot per square mile (acre-ft/mi^2)	0.003193	cubic hectometer per square kilometer

Water year: A water year is the 12-month period from October 1 to September 30, designated by the calendar year in which it ends and which includes 9 of the 12 months.

Acronyms:

FEMA Federal Emergency Management Agency
USGS U.S. Geological Survey
WRC Water Resources Council

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ABSTRACT

Preliminary determinations of the magnitude and frequency of peak flows resulting from the storms of December 1996 and January 1997 were made at 292 streamflow gaging stations located in 45 counties in northern and central California. Peak flows were the largest on record at 106 stations, and recurrence intervals were greater than 100 years at 32 stations. Two separate frequencies were determined for the 1997 peak flow at each streamflow station: a frequency based on an analysis that includes annual peak flows through the 1996 water year (ending September 30, 1996) and a frequency based on an analysis that includes the 1997 peak.

INTRODUCTION

The beginning of 1997 brought widespread flooding to northern and central California. Peak flows on January 1 and 2 were the largest ever recorded at many streamflow gaging stations. Runoff volumes also were exceptionally high, overwhelming flood-control systems in some areas. The flooding has been described as the largest and most extensive flood disaster in the State's history (Flood Emergency Action Team, 1997). State and Federal officials declared 48 of California's 58 counties as disaster areas, extending from the Oregon border in the north to San Luis Obispo County in the south (fig. 1). Nine deaths were attributed to the storms and more than 120,000 people were forced from their homes. Nearly 300 square miles were flooded and damages totaled almost $2 billion.

The flooding resulted from a weather pattern that brought a series of storm systems to the state during December 26, 1996, to January 3, 1997. Warm moist air from the southwest encountered the coast ranges and the Sierra Nevada, dropping large amounts of rain (fig. 2) on watersheds already saturated by storms earlier in December. The warm rains melted the existing snowpack at low elevations in the Sierra Nevada, adding to the runoff.

The U.S. Geological Survey (USGS), in cooperation with the Federal Emergency Management Agency (FEMA), has made preliminary determinations of the magnitude and frequency of peak flows at 292 streamflow gaging stations (fig. 3) located in 45 of the 48 declared counties. (Three declared counties—Kings, San Francisco, and Solano—had no streamflow data available.) Flood magnitude and frequency information was needed to evaluate flood-hazard mitigation efforts following the floods and is useful for the delineation of flood-prone areas, land-use planning, and structural design for flood protection, transportation, and water supply.

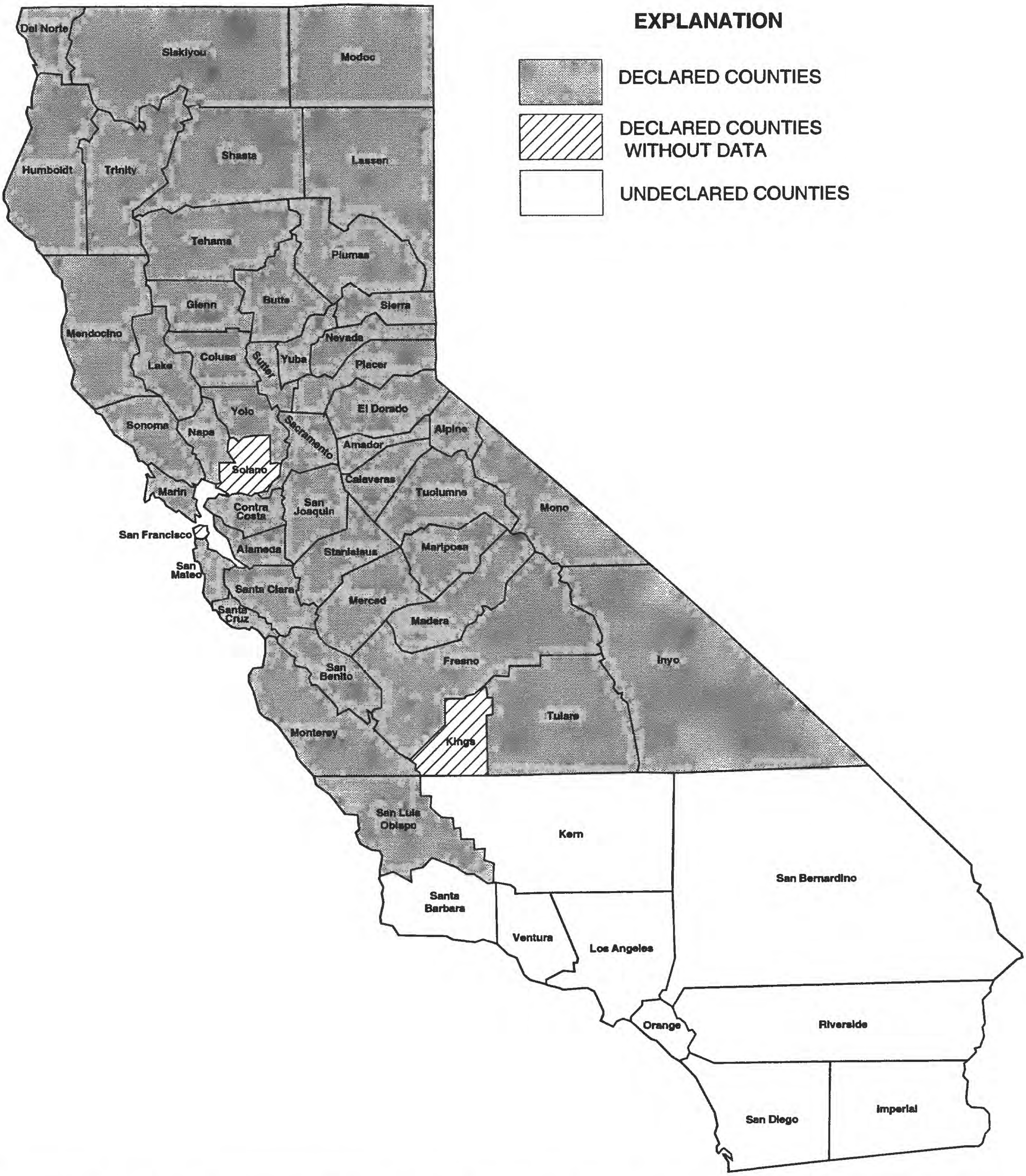

Figure 1. California counties declared as State and Federal disaster areas due to flooding in January 1997. Only streamflow stations in declared counties are included in this report.

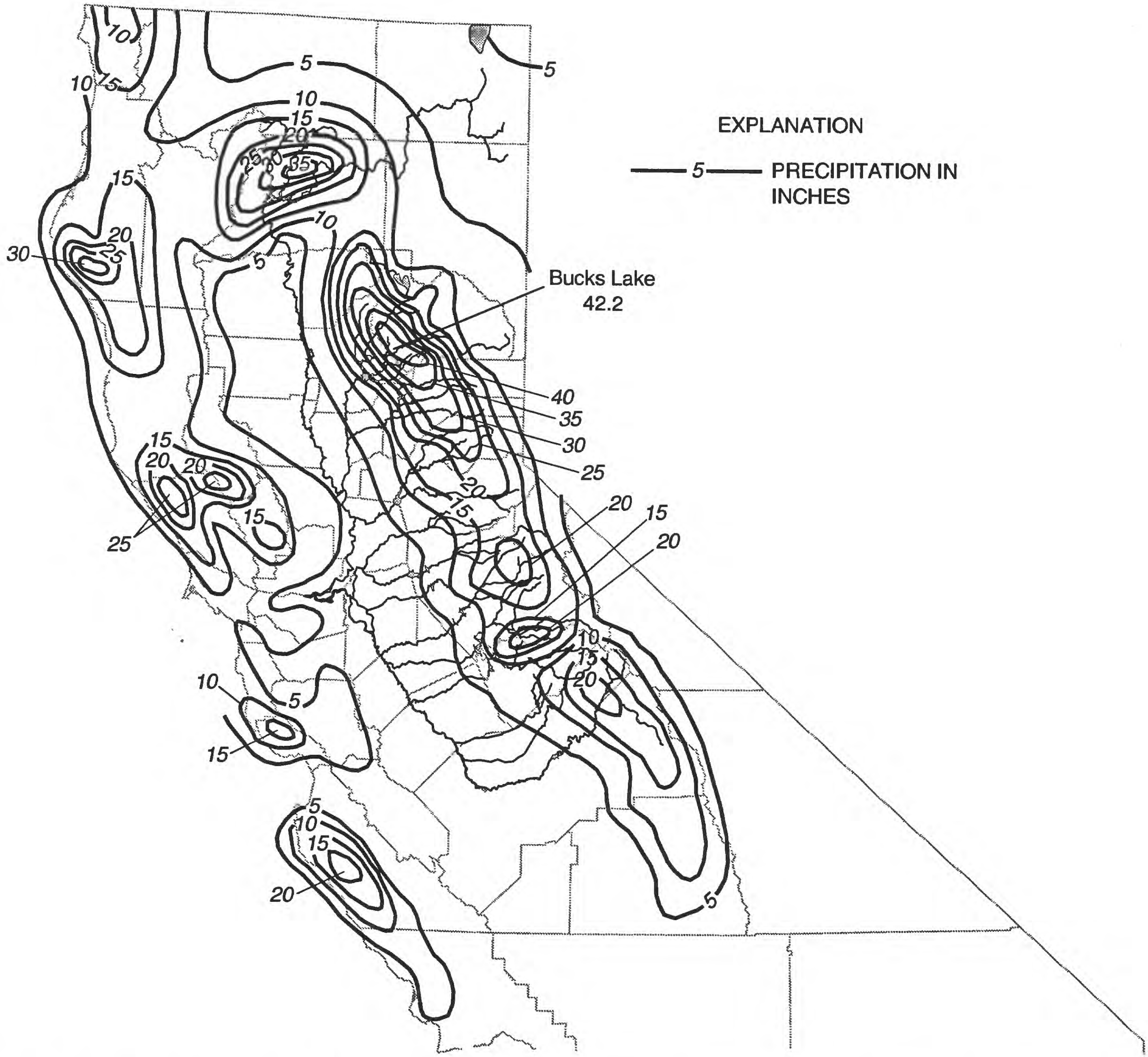

Figure 2. Total precipitation, in inches, for December 26, 1996, to January 3, 1997, in northern and central California (from Flood Emergency Action Team, 1997).

Figure 3. California map showing the location of 292 streamflow gaging stations. Preliminary determinations of the magnitude and frequency of 1997 peak flows at these stations are presented in this report.

METHODS

Flood Data Compilation

Station Selection

Streamflow stations were selected for this report based on several criteria. Only stations located within the 48 counties declared as disaster areas that had a minimum of 10 years of systematically collected annual peak-flow records (systematic records) were considered. In addition, stations were included only if the 1997 peak flow could be determined with reasonable accuracy. Both active stations and selected discontinued stations were included. Active stations include stations operated during the 1997 water year (October 1996 through September 1997) by the USGS and stations operated by others whose records are reviewed and published by the USGS. Discontinued stations were included if a peak stage could be recovered at the old gage location and a peak flow determined based on a previously determined relation between stage and flow. Special visits were made to discontinued stations, most of which had a minimum of 15 years of record extending through at least the 1986 water year (a significant flood year). Of about 360 stations considered for inclusion (280 active, 80 discontinued), 292 are included in this report (242 active, 50 discontinued).

Peak-Flow Determination

Streamflow stations in operation during the 1997 water year recorded stage (gage height) at regular intervals (typically 15 minutes). The maximum recorded value was used as the peak stage unless physical evidence (high-water marks) in the stream channel or the gage structure indicated a significantly different value. Recorded stages were confirmed by high-water marks, if possible. At discontinued stations, or at stations destroyed or disabled during the flood, high-water marks in the stream channel or in the gage structure were used to determine the peak stage.

In almost all cases, peak stages are converted to flow (discharge) using an established stage-discharge rating (relation between stage and discharge). A variety of information is used in defining a stage-discharge rating, including direct measurements of flow using current meters and indirect measurements of flow using field surveys of high-water marks and the geometry of the channel (and structures in the channel, if applicable). Theoretical considerations allow for limited extension of ratings beyond the range of measured flows. At a very few stations, discharge is determined using other instrumentation, such as ultrasonic velocity meters.

The peak stages and flows presented in this report, and the associated frequencies, are preliminary and subject to revision. Final stage and flow values will be published in the USGS report "Water Resources Data, California, Water Year 1997."

Peak-Flow Information

The Geological Survey maintains a long-term record of peak flows in the national Water Data Storage and Retrieval (WATSTORE) system. The WATSTORE data base contains peak-flow information at streamflow stations published by the Geological Survey. It includes information on peaks observed during the period of systematic data collection and, for some stations, historic peaks observed outside the period of systematic data collection. Published peak-flow information used in this analysis is available in USGS Water-Supply Paper compilation reports (WSP's 1314, 1315-A, 1315-B, 1734, 1735, 1927, 1929, 1930, 1931, 2127, 2129, 2130, 2131), annual Water Resources Data reports for California (1971-current), and in the Water-Supply Paper series "Magnitude and Frequency of Floods in the United States" (WSP's 1684, 1685, 1686). These data are also available over the Internet at: http://water.usgs.gov.

Flood-Frequency Analysis

Flood frequencies for the 1997 peak flows are presented in two ways in this report: annual exceedance probability, in percent, and recurrence interval. Exceedance probability and recurrence interval are reciprocal expressions of frequency. The exceedance probability is the chance that a peak flow of the magnitude experienced in 1997 will be equaled or exceeded in any one year. The recurrence interval expresses that same probability as the long-term

average interval between peaks equal to or exceeding the magnitude of the 1997 peak flow. Thus, a peak flow with a 1 percent chance of being equaled or exceeded in any given year has a 100-year recurrence interval (1 percent = 1/100). For ease of discussion, frequencies are generally expressed as recurrence intervals in this report.

Two separate frequencies were determined for the 1997 peak flow at each streamflow station: a frequency based on an analysis that includes annual peak flows through the 1996 water year (ending September 30, 1996), and a frequency based on an analysis that includes the 1997 peak. For the Cosumnes River at Michigan Bar (station 11335000, fig. 4), based on the frequency analysis of peaks through 1996 (fig. 4A), the recurrence interval of a peak equivalent to the 1997 peak is 263 years. However, based on the analysis that includes the 1997 peak (fig. 4B), the recurrence interval drops to 152 years. Figure 4 shows how the frequency curve and the plotting positions of the annual peaks change in response to the addition of a new peak of record.

A flood-frequency curve relates the magnitude of peak flow to frequency of occurrence. For this report, annual peak flows were used to define frequency curves using one of two methods:

- The Water Resources Council (WRC) method, which is a statistically-based analysis of annual peak flows recommended by the U.S. Water Resources Council in Guidelines for Determining Flood Flow Frequency: Bulletin 17B of the Hydrology Subcommittee (Interagency Advisory Committee on Water Data, 1982).
- The graphical method, in which a frequency curve is fit to annual peaks plotted on a logarithmic probability graph.

The WRC method is preferred, but is not appropriate for all stations. The WRC method assumes annual peak flows follow a specific statistical distribution. However, as indicated in Bulletin 17B, floods do not fit any one specific known statistical distribution. Peak flows generated by some watersheds or by different types of meteorologic events may not conform to the assumed statistical distribution. In particular, the WRC method may give unacceptable results at stations where peak flows are appreciably altered by reservoir regulation. Of the stations presented in this report, 137 (47 percent) are classified as regulated or partially regulated.

Graphical methods allow more flexibility in defining frequency curves. Frequency curves can be defined that characterize the composite effects of watershed conditions and meteorologic events on the annual peaks, without any assumptions concerning underlying statistical distributions. However, graphical methods have not been standardized and do not lend themselves to consistent and precise reproduction by different analysts.

The acceptability of the WRC method for a given station was determined by visually comparing the WRC-defined frequency curve to the annual peaks. Even at stations with significant regulation where the assumptions of the WRC method are not met, the WRC frequency curve was accepted if the curve showed good agreement with the plotted peaks. The graphical method was used only when the WRC frequency curve deviated significantly from the pattern of plotted peaks.

At a few stations the frequency of the 1997 peak could not be determined using either the WRC method or the graphical method. At those stations, the 1997 peak significantly exceeds any previous peaks and peak flows are subject to at least partial regulation. For stations with indeterminate frequency relations, a frequency limit (minimum recurrence interval; maximum exceedance probability) was estimated based on the length of record at the station.

Water Resources Council Method

Flood-frequency analysis using the WRC method assumes the logarithms of annual peak flows at a given station follow a Pearson Type III probability distribution. A log-Pearson Type III frequency curve is calculated based on the mean, standard deviation, and skewness of the logarithms of annual peak flows. Adjustments to the curve are made based on zero-flow years, peaks below a gage's base, regional skew information, low outliers, high outliers, and historic information. These procedures, as detailed in Bulletin 17B, were implemented using the USGS computer program J407 (Kirby, 1981).

The frequency curve for Indian Creek near Happy Camp (station 11521500, fig. 5) was defined using the WRC method. Figure 5A shows a bar chart of annual peaks flows for Indian Creek compared against the magnitude of flow for selected recurrence intervals as determined from a preliminary (unadjusted) frequency curve. Figure 5B shows the same annual peaks compared against flows for selected recurrence intervals as determined from the final

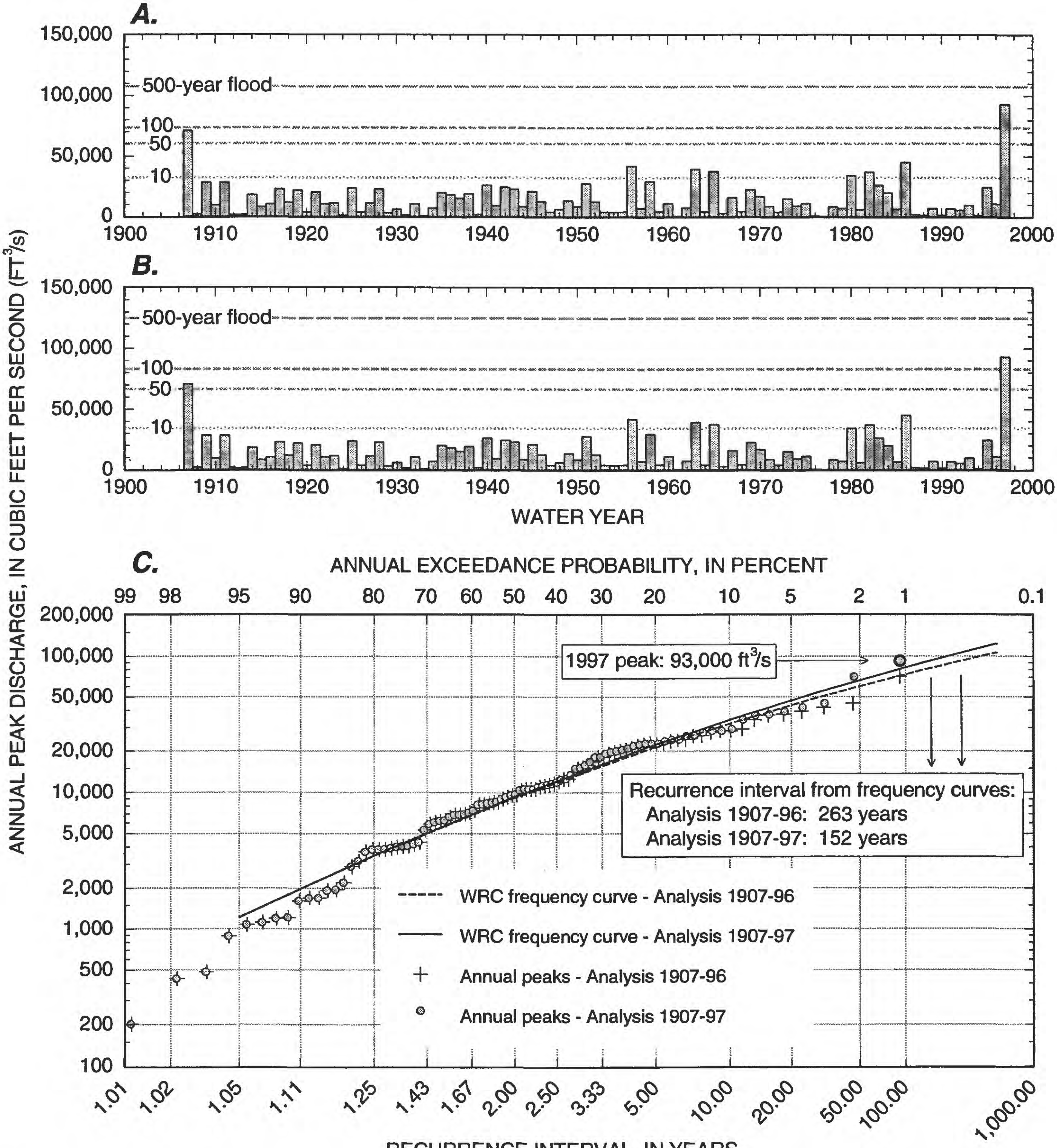

Figure 4. ***A.*** Annual peak flows for Cosumnes River at Michigan Bar, California (station 11335000), compared to flows for selected recurrence intervals based on an analysis of peaks for 1907–96 (1997 **not** included). ***B.*** Same as figure 4A except the recurrence intervals are based on an analysis of peaks for 1907–97 (1997 **is** included). ***C.*** Water Resources Council (WRC) frequency curves for the same station showing how the frequency curves and the plotting positions of the annual peaks change in response to the addition of a new peak of record in 1997. Two separate frequency curves are shown for comparison. One curve is from an analysis of peaks for 1907–96 (1997 **not** included). The other curve is from an identical analysis except that the 1997 peak **is** included.

(adjusted) frequency curve. Figure 5C shows both the unadjusted and adjusted frequency curves for Indian Creek. The two curves illustrate how the frequency curve can be improved as a result of changes in the analysis based on a number of factors discussed in more detail below.

The analyses for this report, following the guidelines in Bulletin 17B, considered the following factors:

Period of Record

The period of record selected for analysis for each station should represent relatively constant watershed conditions. If watershed changes, such as construction of a major reservoir, significantly affected peak flows, the period of record used for the analysis was reduced to correspond to a period of consistent conditions. The period of record was reduced at 90 of the 292 stations (31 percent) used in this report.

Putah Creek near Winters (station 11454000, fig. 6) is an example of the extreme effects of regulation that are possible. Lake Berryessa (usable capacity 1,592,000 acre-feet) controls over 98 percent of the drainage area at the Putah Creek station. The bar chart of annual peak flows in figures 6A and 6B shows a distinct reduction in the magnitude of peak flows following the completion of the dam at the beginning of the 1957 water year. The change is also reflected in the distinct frequency curves for the periods before and after regulation (fig. 6C). (The suitability of a graphically-fit frequency curve as compared to the WRC frequency curve for post-regulation conditions is discussed below.)

As a way to quantify the relative degree of regulation, the ratio of usable reservoir storage capacity to drainage area was used. No attempt was made to identify usable storage specifically designated for flood protection. A previous study by Benson (1962a) concluded that, in general, usable reservoir storage of less than 4.5 million cubic feet (103 acre-feet) per square mile would affect peak flows by less than 10 percent. Therefore, a threshold of 103 acre-feet/mi^2 was used to indicate significant regulation. At Putah Creek near Winters, for example, the storage ratio is 2,770 acre-feet/mi^2, well exceeding the threshold. Stations were classified as having "none" or "minor" regulation (in table 2, at back of report) if usable reservoir storage was less than the 103 acre-feet/mi^2 threshold. They were classified as having "partial" regulation or as "regulated" if usable reservoir storage was greater than the threshold.

At many stations, the degree of regulation continued to increase during the period of record. At those stations, the period of record used in the flood frequency analysis was reduced if the total usable storage increased to above 103 acre-feet/mi^2 or if an incremental increase in storage was larger than 103 acre-feet/mi^2.

Accounting for land-use changes, such as urbanization, or changes in reservoir operating criteria, which may affect peak flows, is beyond the scope of this report. At a few regulated stations, an obvious discontinuity in the magnitude of peak flows with time (not associated with new reservoir storage capacity) was used as the basis for limiting the period of record. A minimum of 10 years of annual peak-flow record was required.

Skewness

The skew coefficient calculated from the annual peak flows at a station (station skew) is sensitive to extreme events and may not be accurately defined at a station that has a short period of record. The accuracy of the skew coefficient can be improved by adjusting the station skew based on a generalized skew value computed using many stations from regions of similar hydrology that do not have significant regulation. Based on a statewide study of the magnitude and frequency of floods in California (Waananen and Crippen, 1977), the USGS (Richard M. Bloyd, U.S. Geological Survey, written commun., 1979) issued median skew values for six hydrologic regions in California (fig. 7), which are an alternative to the nationwide generalized skew map published in Bulletin 17B (Interagency Advisory Committee on Water Data, 1982).

At stations without significant regulation (regulation listed as "none" or "minor" in table 2), station skews are weighted with the generalized skew coefficients shown in figure 7 according to the procedures in Bulletin 17B ("WRC-Weighted" method). In general, the longer the station record, the greater the weight given to the station skew. As indicated earlier, regulation was not considered significant if the ratio of storage to drainage area was less than 103 acre-feet/mi^2.

At stations with significant regulation (regulation listed as "partial" or "regulated" in table 2), station skews were used directly in the frequency

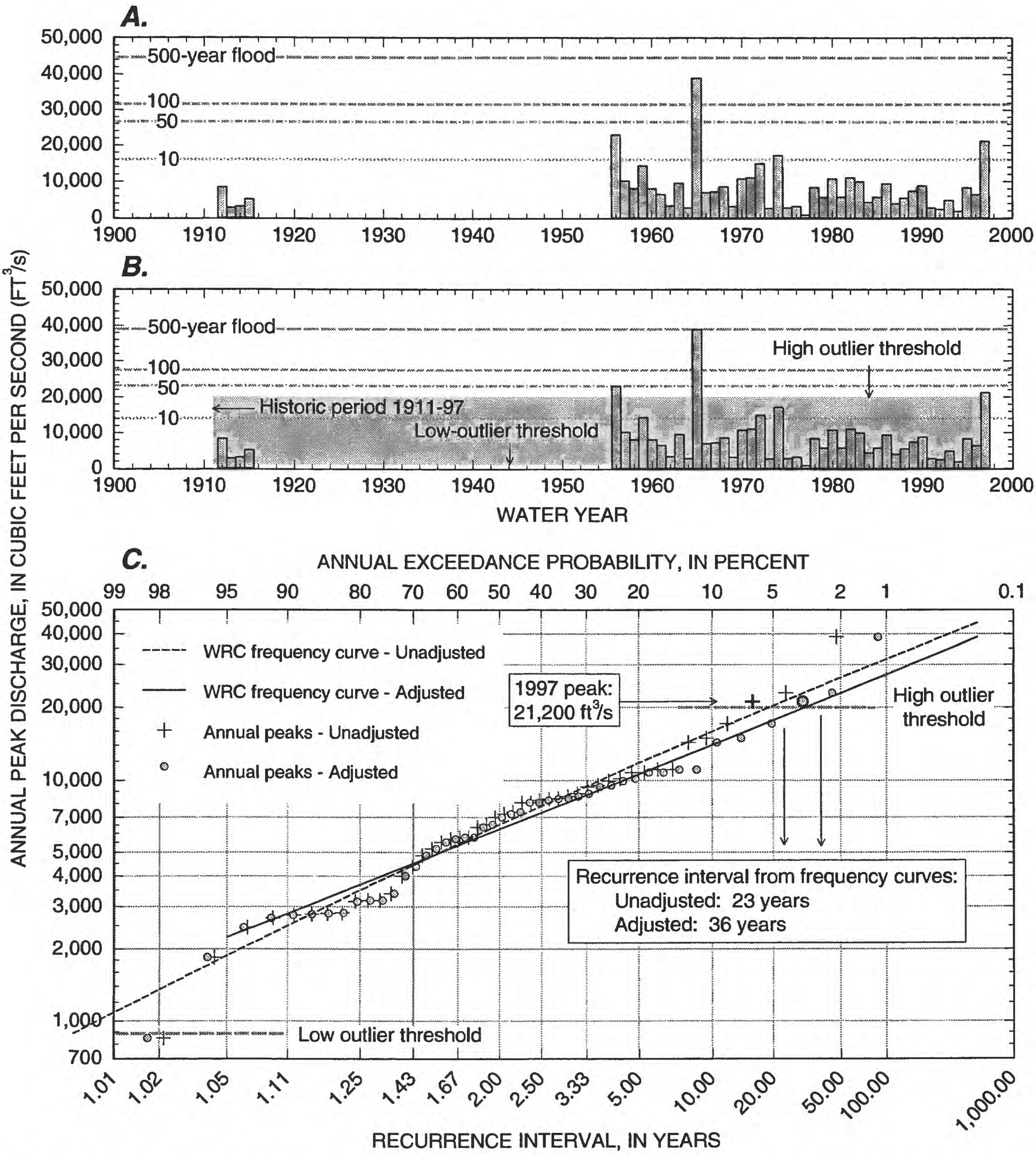

Figure 5. ***A.*** Annual peak flows for Indian Creek near Happy Camp, California (station 11521500), compared to flows for selected recurrence intervals based on an unadjusted Water Resources Council (WRC) frequency curve. ***B.*** Same as figure 5A except the recurrence intervals are based on an adjusted WRC frequency curve. The shaded area delineates the historic period, high-outlier threshold, and low-outlier threshold that are, in part, the basis for adjustments to the frequency curve. The three peaks greater than the high outlier threshold (1956, 1965, and 1998) are judged to be the greatest in the entire 97-year historic period. ***C.*** Unadjusted and adjusted WRC frequency curves for the same station showing how the frequency curve and the plotting positions of the annual peaks can be improved based on adjustments used in the WRC method.

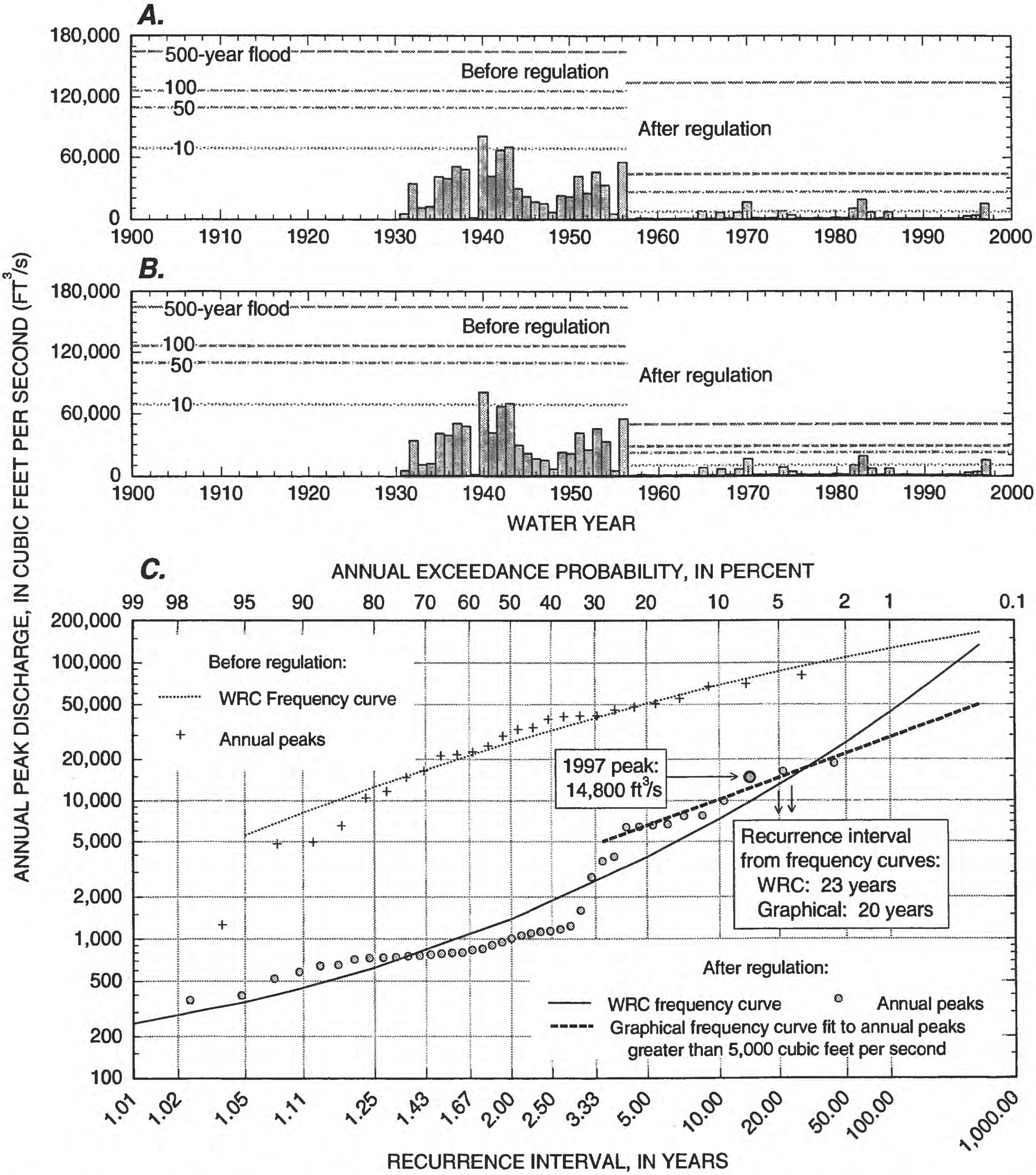

Figure 6. ***A.*** Annual peak flows for Putah Creek near Winters, California (station 11454000), before and after regulation by a large reservoir (Lake Berryessa). The peak flows are compared to flows for selected recurrence intervals based on pre- and post-regulation Water Resources Council (WRC) frequency curves. The post-regulation WRC frequency curve is not appropriate and the post-regulation recurrence intervals are shown for comparison only. ***B.*** Same as figure 6A except the post-regulation recurrence intervals are based on a graphically-fit frequency curve. Extension of the graphical frequency curve to 100- and 500-year recurrence intervals is not appropriate and they are shown for comparison only. ***C.*** Separate WRC frequency curves for periods before and after regulation and a graphically-fit curve for the period after regulation. **The post-regulation WRC frequency curve and the extension of the graphically-fit frequency curve are not appropriate and are shown for comparison only.**

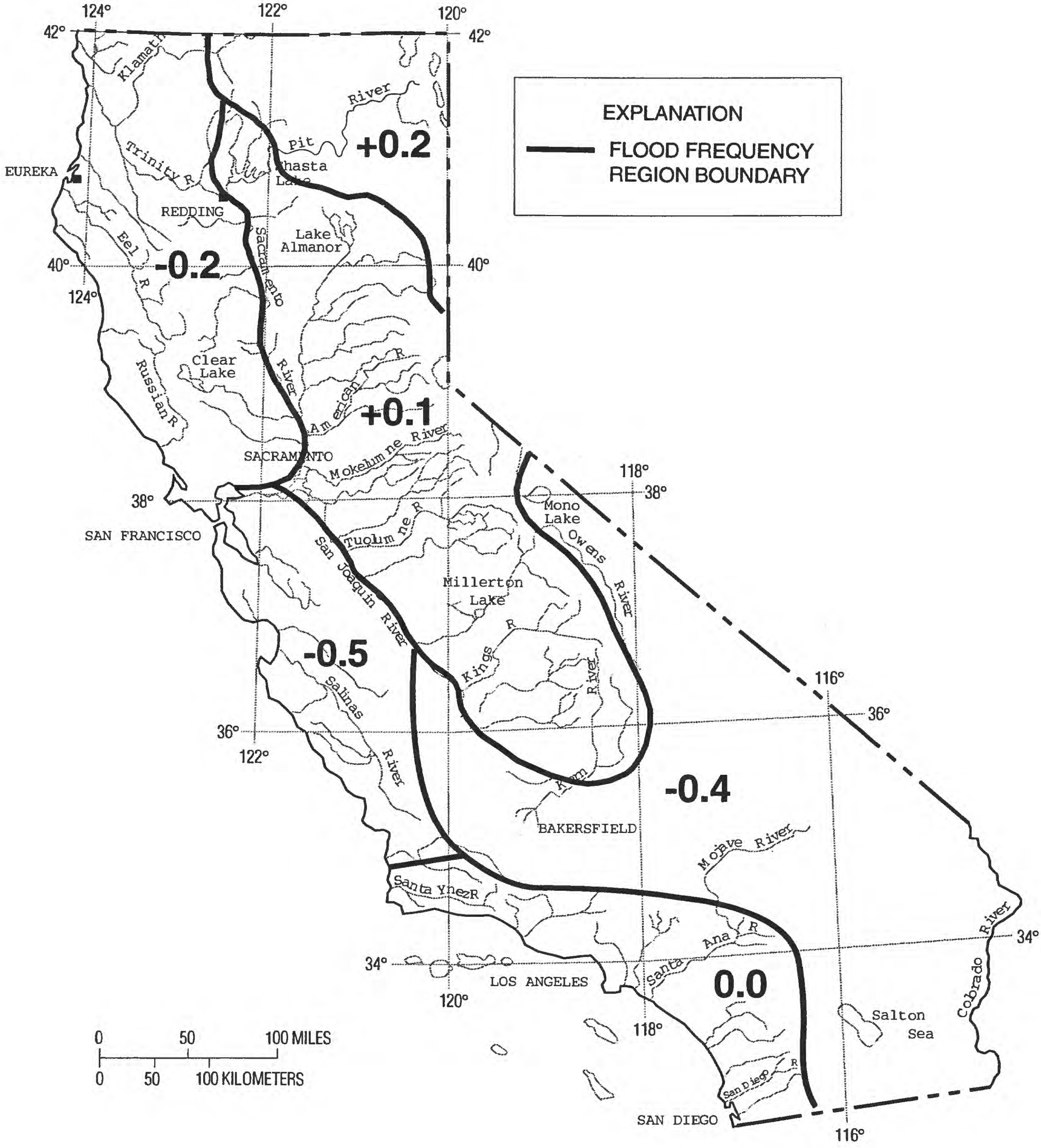

Figure 7. Generalized skew coefficients for California, by region (Bloyd, U.S. Geological Survey, written commun., 1979).

analyses ("WRC-Station" method). The effects of regulation on the flow regime override the regional hydrologic conditions represented in the generalized skews.

These general guidelines concerning skew options may not have been applied if unusual conditions were identified at a particular station. For example, if the station skew at a long-term unregulated station is significantly different from the regional skew (difference greater than 0.5) it may be appropriate to use the station skew directly. Or, if reservoir storage is not used to regulate peak flows during the flood season, the regional skew may be appropriate even if the usable storage exceeds the threshold for significant regulation.

Low Outliers

Low annual peak flows that depart significantly from the trend of the remaining peaks are excluded from the systematic record used to define the frequency curve. A conditional probability adjustment, as described in Bulletin 17B, is applied to account for peaks below the low-outlier threshold. (The same adjustment is used to account for peaks below the detection limit of the gage and for zero-flow years.) A default low-outlier threshold was initially computed for all stations using Bulletin 17B guidelines. The threshold was either accepted or adjusted based on a visual inspection of the annual peaks on a frequency plot. For example, at Indian Creek near Happy Camp (fig. 5), the annual peak during the exceptionally dry 1977 water year falls below the default low-outlier threshold and departs from the trend established by the next lowest group of peaks.

High Outliers

Annual peak flows greater than the high-outlier threshold are treated in a special way by the analysis. They are considered to be a complete record of peaks greater than the threshold for a period (historic period—see definition that follows) that exceeds the length of the systematic record. That is, no other peaks besides the high outliers were greater than the threshold during the historic period. Peaks considered high outliers can occur before, during, or after the period of systematic record. A high-outlier threshold can be selected by the analyst, or the analysis will default to the lowest historic peak if one is known. A high-outlier threshold is always applied in the analysis in conjunction with a historic period. If no historic period is defined, a high-outlier threshold has no effect on the final determination of a frequency curve. Using Indian Creek as an example (fig. 5), based on peak-flow records at nearby stations, this report considers the three highest observed peaks (1956, 1965, and 1997 water years) to be the three highest peaks for the period 1911–97. The high-outlier threshold was set below these three peaks by the analyst in order to consider that information in the analysis.

Historic Peaks

Historic peaks are annual peaks that occurred outside the period of systematic record. Historic peaks are available for 71 stations (24 percent). Typically, information on historic peaks is available because they were extreme events. All of the historic peaks used in this study were based on direct measurement or historical accounts. In order to influence the plotting position of the frequency curve, historic peaks must be above the high-outlier threshold and be used in conjunction with an extended (historic) period exceeding the length of the systematic record. (Simply adding historic peaks to the systematic record would adversely bias the results.) If a historic peak is less than the high-outlier threshold, that historic peak is not considered in the analysis. At Indian Creek (fig. 5), the 1956 water year peak is a historic peak because it falls outside of the period of systematic data collection, which began in 1957. No information on prehistoric floods, based on geological evidence, was included in these analyses.

Historic Period

At many streamflow stations there is information about peak flows that occurred either before or after the period of systematic data collection. This information and records from nearby stations often are used to define an extended period during which the largest peak flows, either systematic or historic, are known. This extended historic period is used in conjunction with a high-outlier threshold and historic peaks, if available, to adjust the frequency curve. A historic period (with a corresponding high-outlier threshold) was defined for 237 (81 percent) of the stations in this report. The underlying assumption is that the peaks in the systematic record that fall below the high-outlier threshold are not only representative of the period of systematic record in which they occurred, but of the longer historic period as well. For the example station on Indian Creek (fig. 5), peak flow records at nearby stations indicate that the three largest observed peaks (systematic and historic) are the largest for at least the period 1911–97.

Plotting Position

There are a variety of formulas that can be used to compute the plotting position of annual peaks. The WRC method does not use plotting position to estimate the frequency curve and makes no recommendation concerning alternate plotting position formulas. However, the Weibull plotting position formula (defined in the "Graphical Method" section under "Plotting Position") is recognized to be analytically simple and intuitively easy to understand (Bulletin 17B, by Interagency Advisory Committee on Water Data, 1982). The Weibull formula (including adjustments for historic periods) is used in Bulletin 17B to facilitate data and analysis comparisons. Bulletin 17B recommends that frequency curves adjusted for low-outliers and historic periods be verified by comparison to the plotted peaks. The Weibull plotting position formula is incorporated into computer programs implementing the methods in Bulletin 17B. Many WRC frequency curves show good graphical agreement with peaks plotted at the Weibull plotting position.

Graphical Method

At stations where the WRC method was judged to give inappropriate results, a frequency curve was graphically fit to annual peaks on a logarithmic-probability graph. The curve was not fit to all of the annual peaks, but only to those in a limited range that displayed a relatively continuous trend and included the 1997 peak. The objective was to define a reasonable frequency curve in the vicinity of the 1997 peak and not necessarily through the entire range of flows. The range of peaks selected for the graphical fit was determined based on discontinuities or changes in slope in the trend of the plotted peaks. Because the 1997 peaks were so large, the range selected for the graphical fit generally included all of the peaks above a distinguishing discontinuity or change in slope.

The graphical method was applied after an initial analysis using the WRC method. The selection of a homogeneous period of record and any adjustments to plotting positions that were part of the WRC analysis for each station were retained for use in the graphical interpretation.

Putah Creek near Winters (station 11454000, fig. 6) is an example of a regulated station where the graphical method was used. Merced River at Pohono Bridge near Yosemite (station 11266500, fig. 8) is an example of an unregulated station where the graphical method was used. At both stations, the graphically-fit frequency curves shown in figures 6C and 8C were used for the final frequency determination. The WRC frequency curves are also shown for comparison. As is apparent from the divergence of the plotted peaks from the WRC curve, the annual peaks at these stations do not conform to the probability distribution assumed by the WRC method.

Both Putah Creek and the Merced River exhibit discontinuities in the pattern of plotted peaks on the frequency graph. For Putah Creek, the discontinuity is the result of regulation by Lake Berryessa. For the Merced River, the cause of the discontinuity is not known. A similar pattern is found on several other unregulated streams draining high elevations in the Sierra Nevada. Annual peaks on such streams are a mixed population of rainfall-runoff peaks and snowmelt-runoff peaks. On the Merced River, the six largest peaks all occurred during the winter storm season and are presumed to be rainfall peaks. Almost all of the remaining annual peaks occurred during the snowmelt season. This is considered a possible explanation for the unusual frequency relation. However, separate analysis of rainfall runoff peaks would only accentuate the discontinuity. (Annual peaks generated by snowmelt mask even smaller rainfall peaks.) A mixed population of rainfall and snowmelt peaks does not explain the distinct flattening of the frequency relation at the upper end.

More detailed methods of frequency analysis are available for regulated stations and stations with mixed populations, but were beyond the scope of this study.

Plotting Position

When graphical methods were widely used prior to the adoption of the WRC statistical methods, the Weibull formula was recommended over alternatives (Dalrymple, 1960, Benson, 1962b; Riggs, 1968).

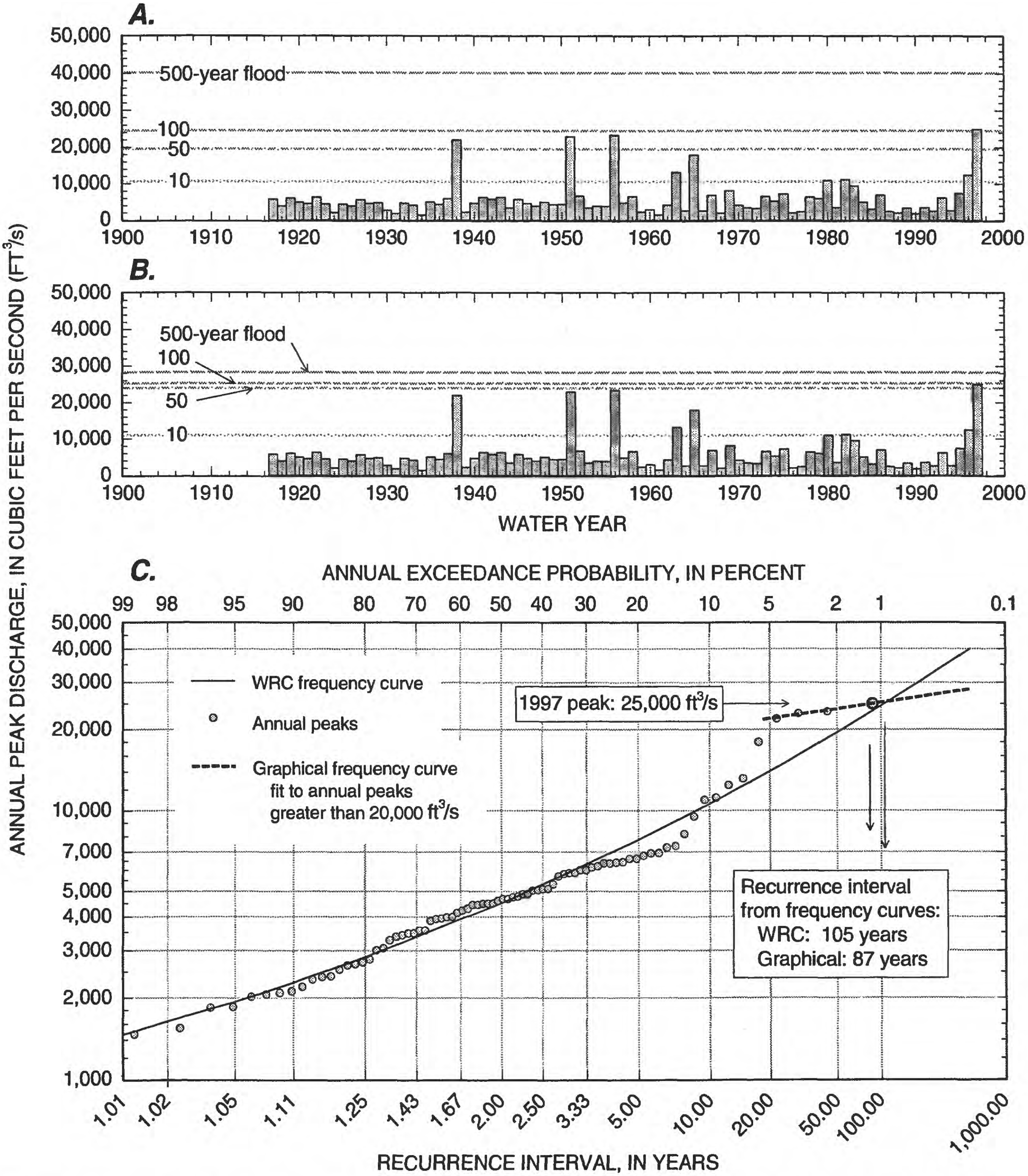

Figure 8. ***A.*** Annual peak flows for Merced River at Pohono Bridge near Yosemite, California (station 11266500), compared to flows for selected recurrence intervals based on the Water Resources Council (WRC) frequency curve. ***B.*** Same as figure 8A except the recurrence intervals are based on a graphically-fit frequency curve. ***C.*** WRC and graphically-fit frequency curves. The graphically-fit curve is preferred for the range of peaks used in its definition, but it is uncertain which curve better represents the frequency relation beyond the observed peaks.

The Weibull plotting position formula computes the probability of an annual peak as:

$$P = \frac{1}{T} = \frac{m}{(n+1)}$$

where:
P = annual exceedance probability
T = recurrence interval, in years
m = rank of the annual peak flow with the largest equal to 1
n = number of years of annual peak-flow record

At stations with historic periods and associated high outliers or historic peaks, adjustments to the plotting positions (of all annual peaks) were made as described in Bulletin 17B (Interagency Advisory Committee on Water Data, 1982)

Graphical Fitting

A recognized weakness of the graphical method is its subjectivity, with variable results depending on the individual analyst. In order to reduce subjectivity, linear regression was used to fit a line to plotted peaks over a limited range. Some subjectivity remains, however, because not all stations have clearly defined breaks in the trend of plotted peaks. Selection of the range of peak flows to be fit remains open to interpretation at some stations.

The linear regression was done on the logarithm of flow versus transformed probability (using an inverse normal probability function). The regression line plots as a straight line on a logarithmic-probability graph.

Extension of the graphically-fit frequency curve beyond the points used in its definition is not intended. Careful consideration must also be given to extending WRC frequency curves, especially if regulation is a factor. It is particularly important to avoid extending graphically-fit curves as they lack the theoretical underpinnings (assumed log-Pearson Type III probability distribution) of the WRC method.

Both Putah Creek near Winters (fig. 6) and Merced River near Pohono Bridge near Yosemite (fig. 8) illustrate the uncertainty associated with frequency curve extension. In figures 6C and 8C, frequency curves defined using the WRC and graphical methods are shown extended to the 500-year recurrence interval. At both stations the WRC and graphical frequency curves diverge sharply at the upper end. This divergence is emphasized when comparing the magnitudes of flow for selected recurrence intervals that are shown in the bar charts of annual peak (figs. 6A, B and 8A, B). For post-regulation conditions at the Putah Creek station, the 500-year recurrence interval flow from the WRC frequency curve (fig. 6A) is 2.7 times as large as that from the graphically-fit curve (fig. 6B). For the Merced River station, the 500-year recurrence interval flow from the WRC frequency curve (fig. 8A) is 1.4 times as large as that from the graphically-fit curve (fig. 8B). While the graphically-fit curve is preferred in the range of flow of the peaks used in its definition, it is uncertain which curve better represents the frequency relation beyond the observed peaks. Extension of either curve beyond the observed peaks is not recommended.

Indeterminate Frequency Relations

At some stations, the 1997 peak flow surpasses the next highest peak by a large margin. At such stations, the frequency determination for the 1997 peak is, to a large degree, an extension of trends defined by lower peaks, and using either the graphical or WRC method results in a frequency that is, at best, highly uncertain. The uncertainty associated with an extension becomes critical at regulated stations because the trend defined by lower peaks may have little relevance to the true shape of the frequency curve in the range of the 1997 peak flow. At San Joaquin River below Friant (station 11251000, fig. 9), for example, the 1997 peak flow is 3.9 times as large as the next highest post-regulation peak. A sufficient number of annual peaks with extremely high flows are not available to define the upper end of the frequency relation with any confidence using the methods of this study.

The frequency relation is classified as "indeterminate" at several of the stations presented in this report. Neither the WRC methods nor graphical methods were judged to give adequate results. However, even though a specific frequency relation cannot be defined using the methods of this study, enough information is available to make a reasonable estimate of a minimum recurrence interval (maximum exceedance probability) for those stations based on the Weibull plotting position formula for the 1997 peak. For all stations with an indeterminate frequency, the 1997 peak is exceptionally large and plots well above the frequency trend defined by lower peaks. The assumption is that the true frequency curve passes below the plotted peak.

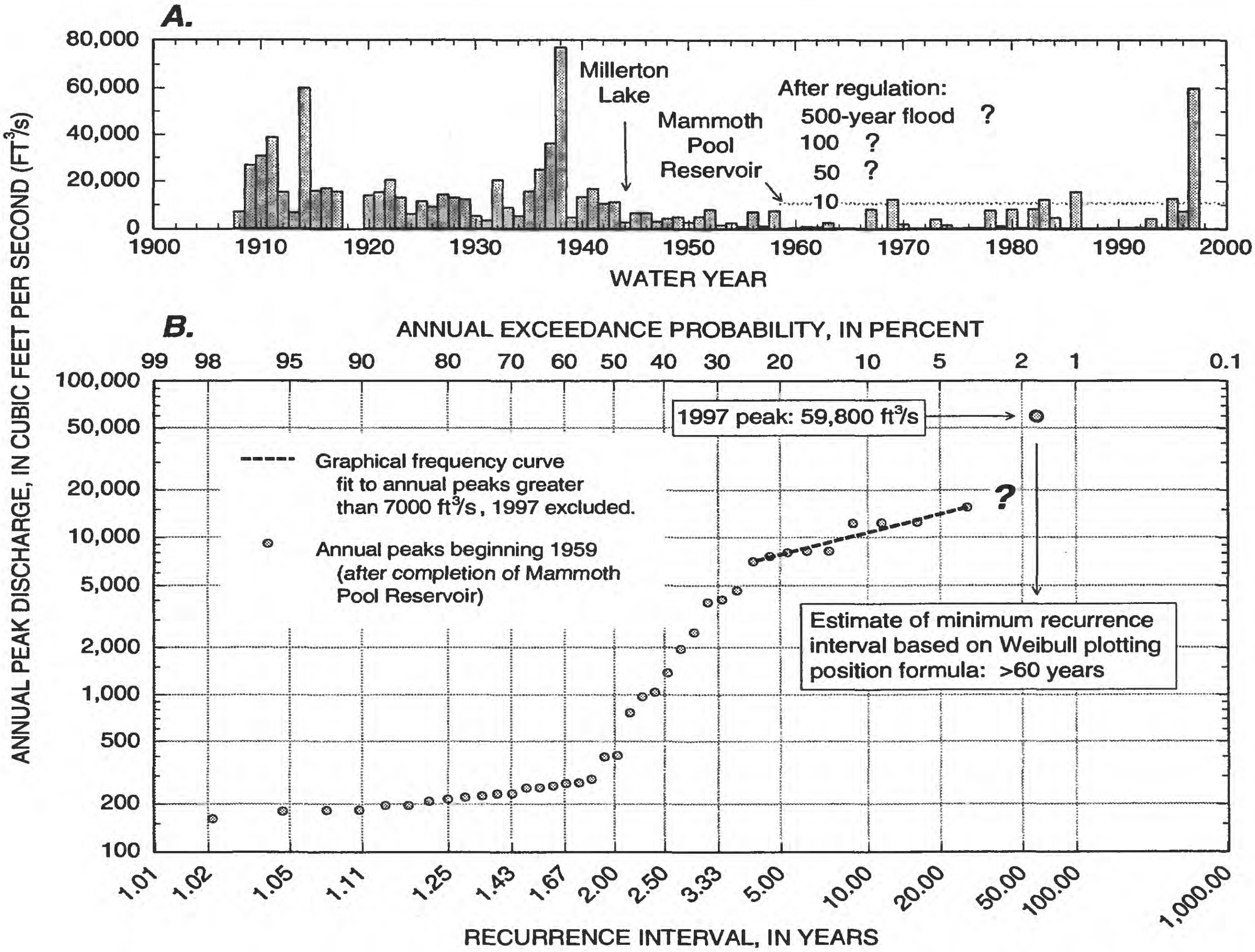

Figure 9. *A.* Annual peak flows for San Joaquin River below Friant, California (station 11251000). Peak flows at this station are regulated, with reservoir storage capacity having incrementally increased through much of its period of record. *B.* A frequency curve graph showing the plotting positions for annual peaks (beginning in 1959 when the pattern of regulation stabilized) and a graphical frequency curve for flow between 7,000 ft^3/s and 16,000 ft^3/s only. Neither the Water Resources Council (WRC) nor the graphical methods used in this study adequately define a frequency curve in the range of the 1997 peak flow.

Table 1. Analysis methods used to determine the frequency of the 1997 peak flow for stations presented in this report, summarized according to the degree of regulation

Analysis method	Degree of regulation				Total
	None	Minor	Partial	Regulated	
WRC-Weighted	103	32	1	0	136
WRC-Station	1	1	39	14	55
Graphical	14	4	19	49	86
Indeterminate	0	0	2	13	15
Total	118	37	61	76	292

Ideally, severely regulated stations would be analyzed by more detailed methods. Flow records prior to regulation, if available, and reconstructed records of unregulated flow (after regulation) can be analyzed to define a frequency curve for unregulated conditions. Regulated flows of a given frequency can then be estimated based on the unregulated flows and reservoir operating criteria. Such studies, while beyond the scope of this report, were undertaken by the U.S. Army Corps of Engineers for several regulated basins following the 1997 floods.

Summary of Methods Used

The methods used to define the frequency of the 1997 peak at the stations presented in this report are summarized in table 1 according to the degree of regulation. The WRC method was used at 191 stations (65 percent) and the graphical method at 86 stations (29 percent). The frequency relation was indeterminate at 15 stations (5 percent).

RESULTS

Preliminary determinations of the magnitude and frequency of the 1997 annual peak flow at 292 streamflow gaging stations are presented in table 2.

The significant figures used to report frequencies are not intended to reflect a measure of true precision. Significant figures in excess of what may be justified by the actual precision of the frequency analyses were retained in order to allow better comparison of the results presented in this report—specifically, when the 1997 peak was either excluded or included in the analysis. Any frequency determinations greater than a 500-year recurrence interval are reported only as greater than 500 years (exceedance probability less than 0.20 percent).

Additional station information and details of the analyses are presented in table 3 (at back of report). Table 3 lists stations in order of ascending station number and can be used to cross-reference the listing by county in table 2.

SUMMARY AND CONCLUSIONS

Preliminary determinations of the magnitude and frequency of the 1997 annual peak flow at 292 streamflow stations, which are presented by county in table 2, indicate that the 1997 peak was the largest on record at 106 stations (36 percent) and the second largest at an additional 46 stations (16 percent). The 1997 peak was more than twice as large as the next highest peak at 20 stations (7 percent).

The 1997 peak flows had recurrence intervals greater than 100 years at 32 stations (11 percent) based on frequency analyses that include the 1997 peak. Based on analyses of the record prior to the 1997 peak, the number of stations increases to 49 (17 percent). Recurrence intervals greater than 100 years occurred primarily on streams draining the central and northern Sierra Nevada (both east and west sides) ranging from Tuolumne County on the south to Plumas County on the north. A few streams in the coast range near the juncture of Lake, Mendocino, and Sonoma Counties also had recurrence intervals greater than 100 years.

At almost all the stations, the recurrence interval of the 1997 peak decreased when the 1997 peak was included in the frequency analysis. Only 6 stations (2 percent) show an increase in the recurrence interval of the 1997 peak when the 1997 peak is included in the analysis.

The average period of record for all stations is 41 years (including systematic and historic peaks). At stations where historic periods could be defined, the historic periods averaged 73 years. Overall, the average period available for analysis at all stations is 66 years (including historic periods where applicable).

The annual peak flow for the 1997 water year occurred on January 1 or 2, 1997, at 214 stations (73 percent). Peak flows on some north-coast streams occurred a day or two earlier. Peak flows on several regulated streams and those at downstream locations were delayed up to several days. Twenty-eight stations (10 percent) had an annual peak flow not associated with the late December/early January storms. In the extreme north, the annual peak on the Smith River occurred in mid-November. Several central-coast streams had annual peaks on December 10, 1996 (primarily in Santa Cruz County) or in late January 1997. For stations with annual peaks not associated with the late December/early January storms, this report presents the magnitude and frequency for the early January peak (if available) as well as the annual peak.

Uncertainties in the frequency determinations vary from station to station and are not quantified for this report.

Summary of Table 2—Magnitude and Frequency of 1997 Peak Flows

Table 2 lists the magnitude and frequency of 1997 peak flows for streamflow gaging stations by county. Ancillary information about the station is also included. The stations are located on county maps in figures 10-54. The following information is presented for each station:

1. Station Number. A number that uniquely identifies each streamflow gaging station. Permanent numbers have been assigned based on a downstream-order numbering system.
2. Station Name. The name of the stream and a nearby reference location.
3. Drainage Area. The area, in square miles, upstream of a station from which direct surface runoff from precipitation normally drains by gravity into the stream.
4. Regulation. The degree to which peak flows at the station may be regulated. The classification is based primarily on the ratio of usable reservoir storage to drainage area.
   None: No identified reservoir storage.
   Minor: Reservoir storage is less than 103 acre-feet/mi^2.
   Partial: Reservoir storage is greater than 103 acre-feet/mi^2 but generally less than 700 acre-feet/mi^2.
   Regulated: Reservoir storage is generally greater than 700 acre-feet/mi^2.

   The storage ratio was not the only criterion for distinguishing between the "partial" and "regulated" categories. The percentage of the basin subject to regulation and the degree to which peak flows are actually influenced by the storage (as evidenced by the pattern of annual peaks as plotted on the frequency curve graph) were also considered. For example, a station with a storage ratio of 860 acre-feet/mi^2 is classified as partially regulated because only 24 percent of the basin is subject to regulation by one large reservoir. Another station, with a storage ratio of only 310 acre-feet/mi^2, is classified as regulated because it is immediately below a reservoir.
5. Period of Record. The total number of water years for which annual peak flows are available for analysis. Peaks from the period of systematic data collection and historic peaks are included. The specific years in the period of record are listed in table 3.
6. Historic Period. The total number of water years in the historic period. The historic period defines an extended period, beyond the period of record, during which the largest peak flows are known. The specific years in the historic period are listed in table 3.

(7-14) 1997 Peak. Information about the 997 annual peak and, at some stations, a secondary peak that occurred in early January. (A secondary peak is listed only if the annual peak was not associated with the early January flooding.)

7. Date. Date of the peak flow at the gaging station.
8. Stage. The maximum water-surface elevation of the stream, in feet, at the gaging station. The stage (gage height) is measured relative to an arbitrary gage datum and does not necessarily represent the depth of the stream.
9. Flow. The maximum flow (discharge) of the stream, in cubic feet per second, at the gaging station.
10. Unit Runoff. The ratio of peak flow, in cubic feet per second, to drainage area, in square miles.

(11, 12) Exceedance Probability. The probability, in percent, that an annual peak flow of the magnitude listed for the 1997 peak will be equaled or exceeded in any one year. Exceedance probabilities determined to be less than 0.20 percent are reported as <0.20.

11. 1996. The exceedance probability of the 1997 peak based on a frequency analysis that includes annual peak flows through only the 1996 water year. The 1997 peak **is not** included in the frequency analysis.
12. 1997. The exceedance probability of the 1997 peak based on a frequency analysis that includes annual peak flows through 1997. The 1997 peak **is** included in the frequency analysis.

(13, 14) Recurrence Interval. The **average** interval, in years, between annual peak flows equal to or exceeding the magnitude listed for the 1997 peak. Recurrence intervals determined to be greater than 500 years are reported as >500.

13. 1996. Recurrence interval of the 1997 peak based on a frequency analysis that includes annual peak flows through only the 1996 water year. The 1997 peak **is not** included in the frequency analysis.
14. 1997. Recurrence interval of the 1997 peak based on a frequency analysis that includes annual peak flows through 1997. The 1997 peak **is** included in the frequency analysis.

Summary of Table 3—Location and Frequency Analysis Information

Table 3 lists location and frequency analysis information for streamflow gaging stations. The stations are listed by station number in ascending order. The following information is presented for each station:

1. Station Number. A number that uniquely identifies each streamflow gaging station. Permanent numbers have been assigned based on a downstream-order numbering system.
2. County. The county in which the streamflow gaging station is located. On streams that define a county boundary, the gaging station is listed based on the location of the gage structure.
3. Latitude, in degrees, minutes, seconds.
4. Longitude, in degrees, minutes, seconds.
5. Period of Record. The specific water years for which annual peaks flows are available for analysis. Peaks from the period of systematic data collection and historic peaks are included. Historic peaks are indicated with a "H" following the year. The total number of years in the period of record are listed in table 2.
6. Historic Period. The specific water years in the historic period. The historic period defines an extended period, beyond the period of record, during which the largest peak flows are known. The total number of years in the historic period is listed in table 2. (At a few stations, the listed historic period begins after the earliest year of systematic record. At those stations, isolated years early in the systematic record are considered part of the historic period and are included as part of the total number of years in the historic period as listed in table 2 even though not listed here as part of the continuous historic period.)
7. Low Threshold. One of two different values are listed, depending on the analysis method used at a particular station. For stations analyzed with the WRC method, the value listed is the WRC low-outlier threshold, in cubic feet per second. For stations analyzed

with the graphical method, the value listed is the lower limit, in cubic feet per second, of peak flows used to graphically-fit a frequency curve. No low thresholds are listed for stations with indeterminate frequency relations.

8. High Threshold. The high-outlier threshold used by the WRC method. The high-outlier threshold is used in conjunction with the historic period to adjust the WRC frequency curve and to adjust the plotting positions of annual peaks.

9. Analysis Method. The frequency analysis method used to define the frequency of the 1997 peak:

   Graphical: The graphical method was used to define the frequency curve in the range of the 1997 peak.

   Indeterminate: The frequency of the 1997 peak could not be adequately defined with the methods used in this study.

   WRC-Station: The WRC method, with the station skew option, was used to define the frequency curve.

   WRC-Weighted: The WRC method, with the weighted skew option, was used to define the frequency curve.

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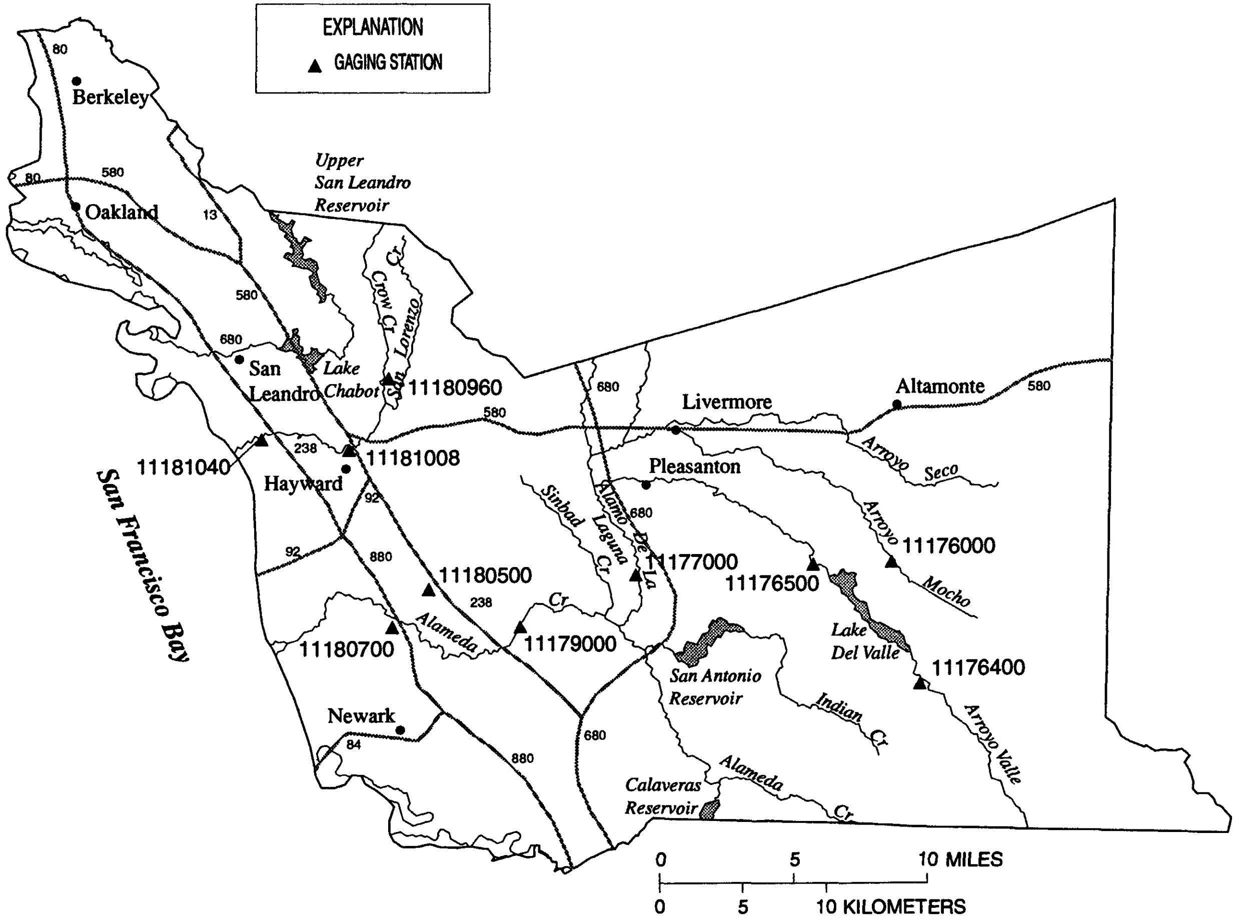

Figure 10. Location of streamflow gaging stations in Alameda County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county

[ft, foot; ft^3/s, cubic foot per second; $[(ft^3/s)/mi^2]$; cubic foot per second per square mile; mi^2, square mile]

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	Stage (ft)	Flow (ft^3/s)	Unit runoff $[(ft^3/s)/mi^2]$	Exceedance probability, (percent) 1996	Exceedance probability, (percent) 1997	Recurrence interval, (years) 1996	Recurrence interval, (years) 1997
				ALAMEDA COUNTY									
11176000	Arroyo Mocho near Livermore	38.2	None	53	85	1/2/97	6.86	627	16.4	22.5	22.5	4	4
11176400	Arroyo Valle below Lang Canyon near Livermore	130.	None	34	41	1/2/97	3.92	3,010	23.2	25.3	25.0	4	4
11176500	Arroyo Valle near Livermore	147.	Regulated	28	30	1/3/97	6.59	1,260	8.57	33.6	33.6	3	3
11177000	Arroyo De La Laguna near Pleasanton	405.	Partial	24	--	1/1/97	14.78	4,379	10.8	25.2	26.0	4	4
11179000	Alameda Creek near Niles	633.	Partial	28	39	1/26/97	11.64	10,900	17.2	13.2	14.2	8	7
						1/2/97	10.11	8,040	12.7	21.8	23.2	5	4
11180500	Dry Creek at Union City	9.39	None	42	--	1/2/97	4.25	768	81.8	16.3	16.9	6	6
11180700	Patterson Creek at Union City	639.	Partial	39	39	1/2/97	15.79	9,930	15.5	15.2	15.7	7	6
11180960	Cull Creek above Cull Creek Reservoir near Castro Valley	5.79	None	19	34	1/2/97	7.06	1,240	214	7.0	8.8	14	11
11181008	Castro Valley Creek at Hayward	5.51	None	26	34	1/2/97	8.14	1,240	225	3.7	5.0	27	20
11181040	San Lorenzo Creek at San Lorenzo	44.6	Minor	21	--	1/2/97	8.69	4,310	96.6	10.9	12.2	9	8

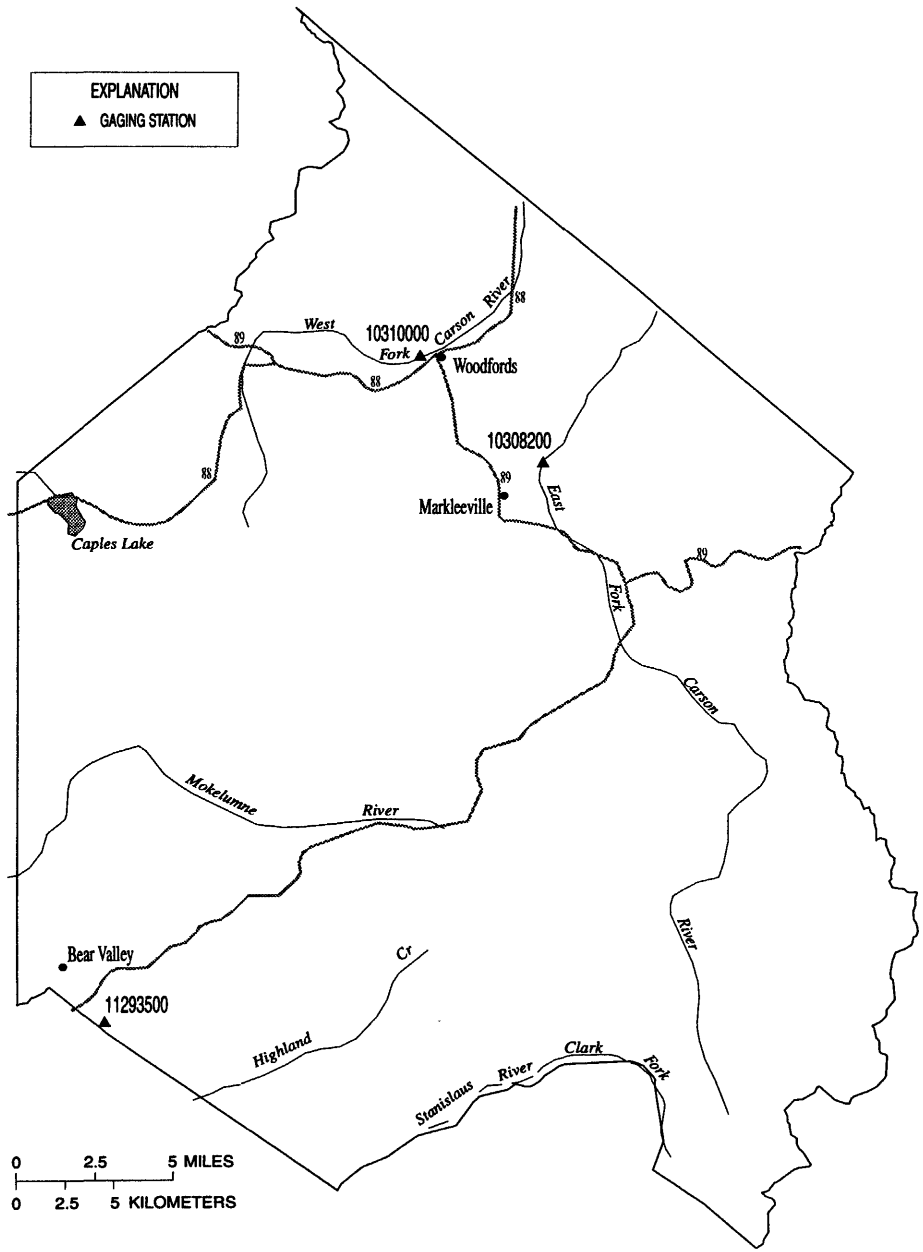

Figure 11. Location of streamflow gaging stations in Alpine County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent) 1996	Exceedance probability, (percent) 1997	Recurrence interval, (years) 1996	Recurrence interval, (years) 1997
				ALPINE									
10308200	East Fork Carson River below Markleeville Creek near Markleeville	276.	Minor	37	97	1/ 2/97	11.78	18,900	68.5	1.28	1.58	78	63
10310000	West Fork Carson River at Woodfords	65.4	Minor	82	97	1/ 1/97	7.32	8,100	124	0.24	0.90	417	111
11293500	North Fork Stanislaus River below Silver Creek	27.8	Partial	38	--	1/ 1/97	--	1,980	71.2	10.8	10.8	9	9

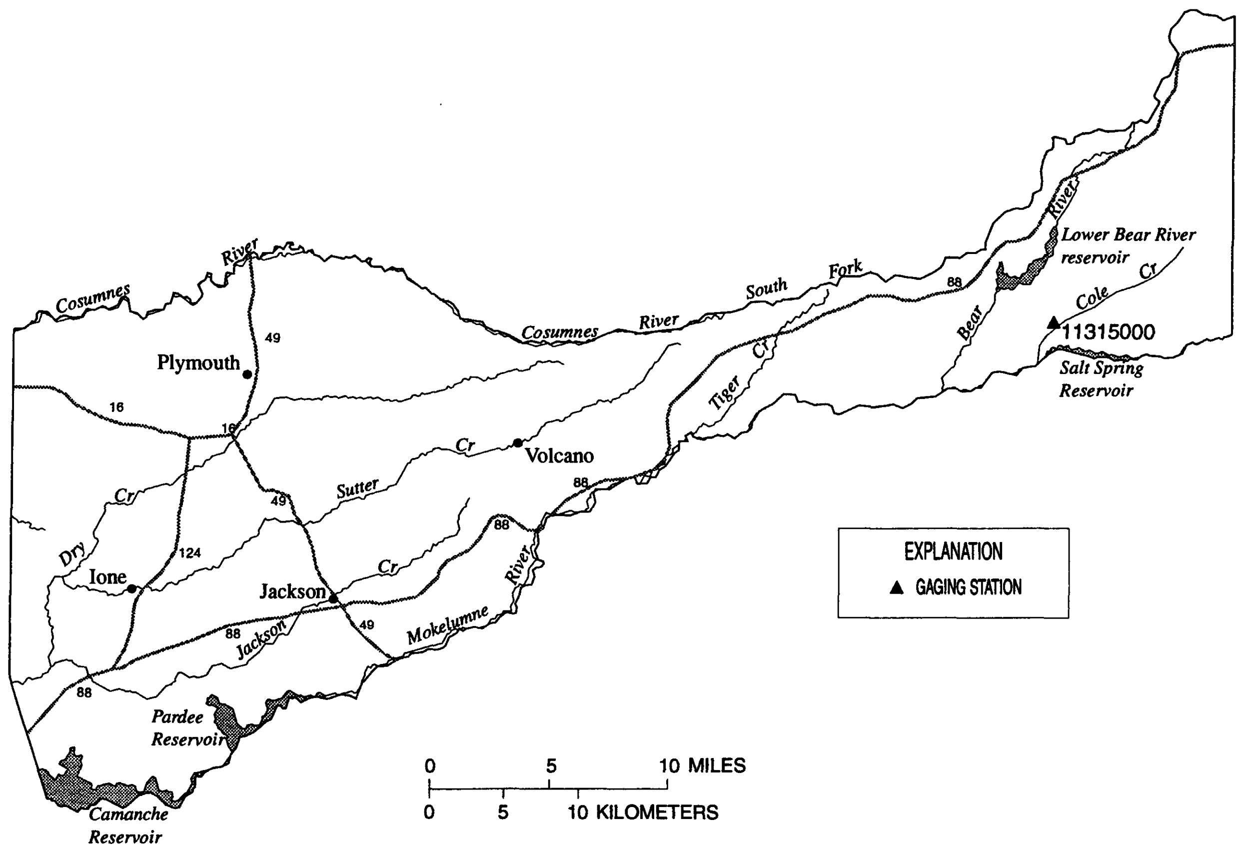

Figure 12. Location of streamflow gaging stations in Amador County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak							
						Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent)		Recurrence interval, (years)	
										1996	1997	1996	1997
AMADOR													
11315000	Cole Creek near Salt Springs Dam	21.0	None	68	90	1/ 2/97	7.01	5,040	240	2.3	2.7	43	37

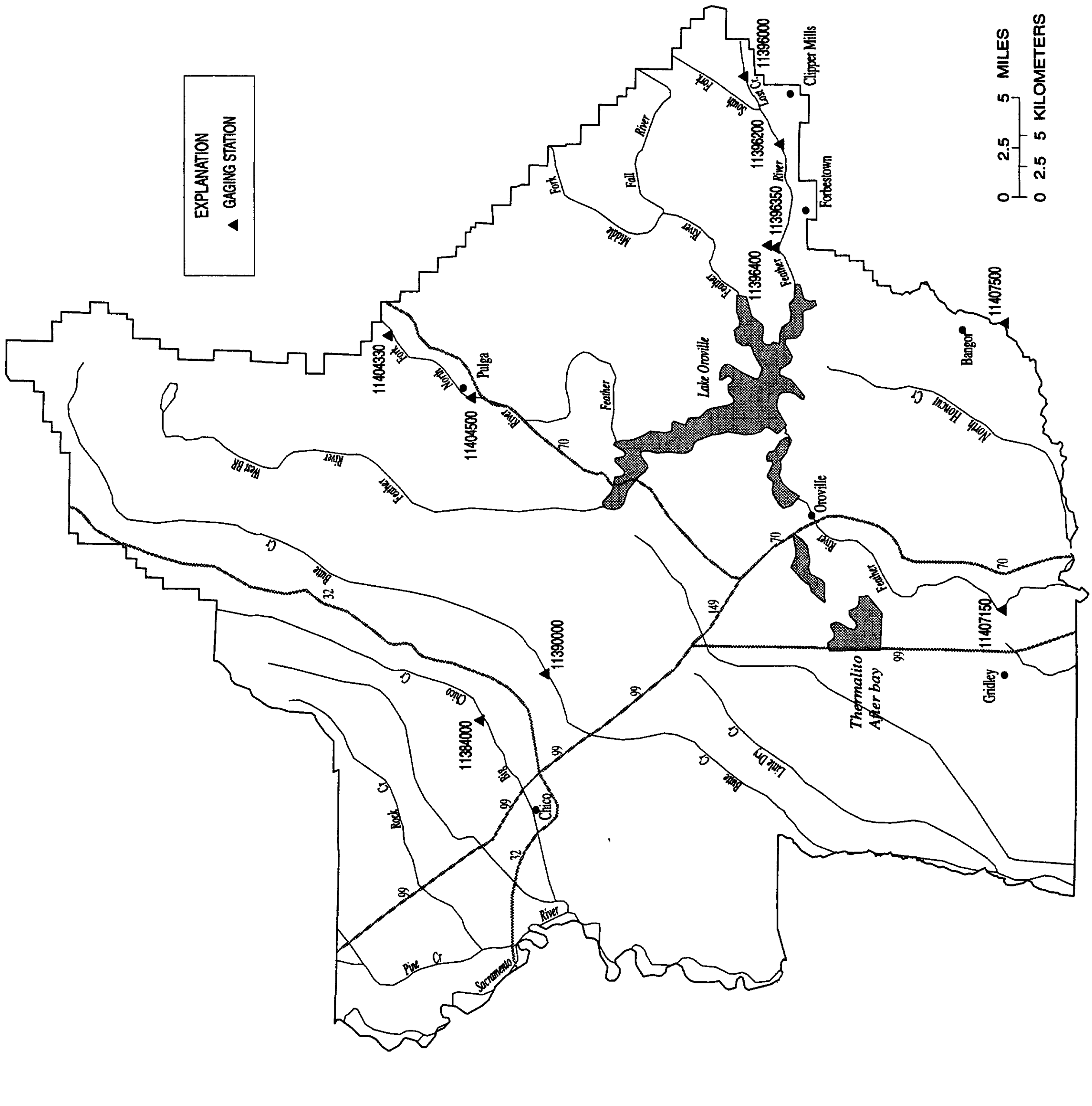

Figure 13. Location of streamflow gaging stations in Butte County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent): 1996	1997	Recurrence interval, (years): 1996	1997
				BUTTE									
11384000	Big Chico Creek near Chico	72.4	None	57	90	1/ 1/97	15.67	13,100	181	0.53	0.85	189	118
11390000	Butte Creek near Chico	147.	None	67	90	1/ 1/97	15.05	23,600	161	1.28	1.65	78	61
11396000	Lost Creek near Clipper Mills	30.0	Regulated	35	90	1/ 1/97	13.50	5,770	192	0.51	0.89	196	112
11396200	South Fork Feather River below Forbestown Dam	87.5	Regulated	35	90	1/ 1/97	17.64	21,800	249	--	<1.10	--	>91
11396350	South Fork Feather River at Ponderosa Dam	108.	Regulated	25	90	1/ 1/97	69.78	27,800	257	0.68	0.83	147	120
11396400	Sucker Run near Forbestown	18.7	None	24	37	1/ 1/97	8.84	2,210	118	5.7	6.6	18	15
11404330	North Fork Feather River below Grizzly Creek	1,914.	Partial	12	90	1/ 2/97	--	116,000	60.6	0.27	0.87	370	115
11404500	North Fork Feather River at Pulga	1,953.	Partial	86	90	1/ 2/97	41.65	101,000	51.7	0.86	1.30	116	77
11407150	Feather River near Gridley	3,676.	Regulated	29	34	1/ 2/97	100.42	163,000	44.3	1.81	3.1	55	32
11407500	South Honcut Creek near Bangor	30.6	None	37	90	1/ 1/97	15.40	12,500	408	0.69	1.11	145	90

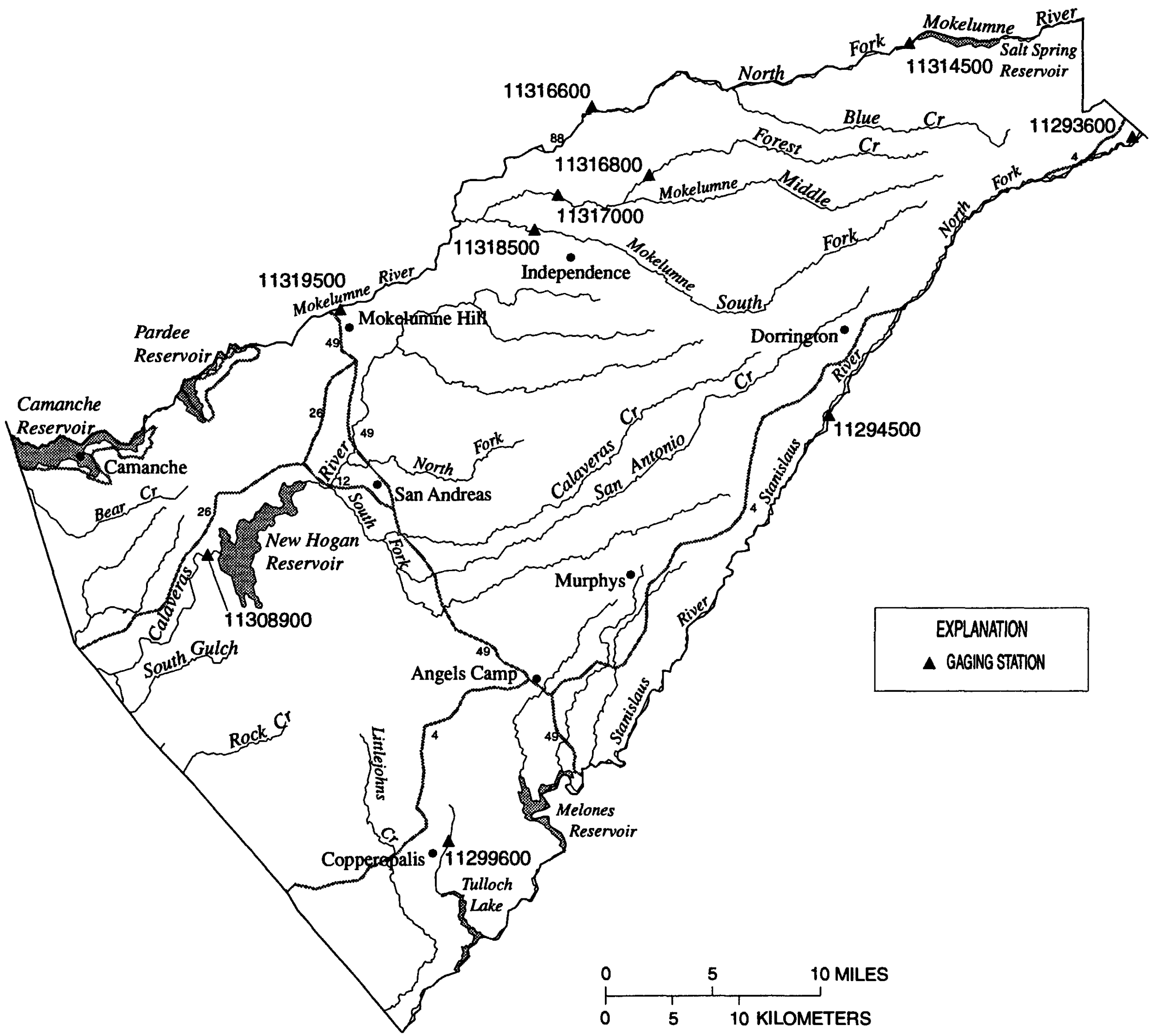

Figure 14. Location of streamflow gaging stations in Calaveras County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent) 1996	1997	Recurrence interval, (years) 1996	1997
			CALAVERAS										
11293600	North Fork Stanislaus River below Diversion Dam near Big Meadow	28.8	Partial	10	32	1/ 1/97	5.73	981	34.1	13.0	16.0	8	6
11294500	North Fork Stanislaus River near Avery	163.	Regulated	9	34	1/ 2/97	14.90	35,300	217	1.66	2.1	60	48
11299600	Black Creek near Copperopolis	14.4	None	14	15	1/ 2/97	5.51	1,950	135	24.0	25.8	4	4
11308900	Calaveras River below New Hogan Dam near Valley Springs	363.	Regulated	28	41	1/ 1/97	8.59	7,000	19.3	12.2	12.2	8	8
11314500	North Fork Mokelumne River below Salt Springs Dam	170.	Regulated	65	90	1/ 3/97	13.04	8,650	50.9	4.0	4.6	25	22
11316600	North Fork Mokelumne River above Tiger Creek	333.	Partial	12	46	1/ 2/97	12.49	36,900	111	2.2	2.8	45	36
11316800	Forest Creek near Wilseyville	20.8	None	37	90	1/ 2/97	7.59	1,930	92.8	2.2	2.6	45	38
11317000	Middle Fork Mokelumne River at West Point	68.4	None	86	90	1/ 2/97	9.30	5,070	74.1	2.5	2.8	40	36
11318500	South Fork Mokelumne River near West Point	75.1	None	64	90	1/ 2/97	12.72	7,650	102	2.7	3.0	37	33
11319500	Mokelumne River near Mokelumne Hill	544.	Partial	66	90	1/ 2/97	25.60	41,300	75.9	0.27	0.83	370	120

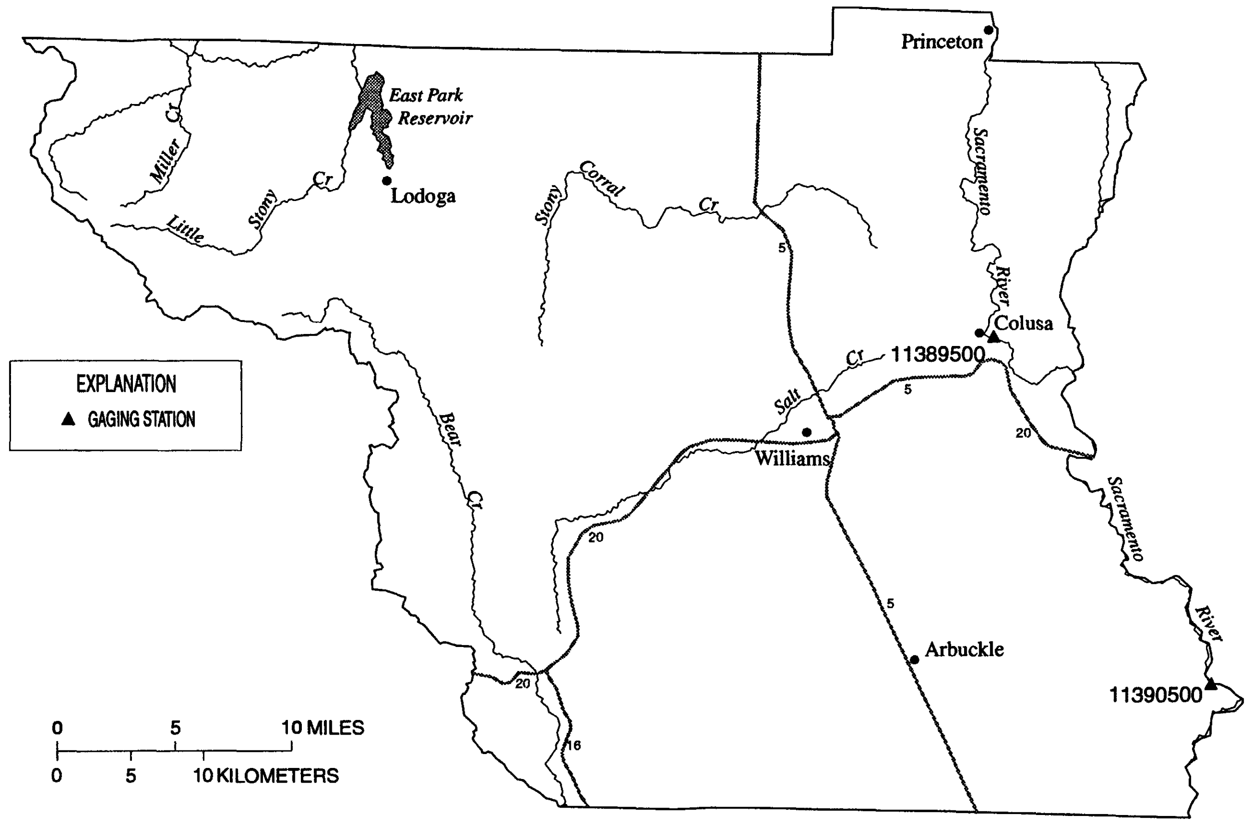

Figure 15. Location of streamflow gaging stations in Colusa County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak							
						Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent)		Recurrence interval, (years)	
										1996	1997	1996	1997
				COLUSA									
11389500	Sacramento River at Colusa	12,090.	Regulated	52	--	1/ 2/97	68.00	50,100	4.14	3.9	4.5	26	22
11390500	Sacramento River below Wilkins Slough near Grimes	12,920.	Regulated	52	--	1/ 4/97	52.68	31,600	2.45	3.5	4.2	29	24

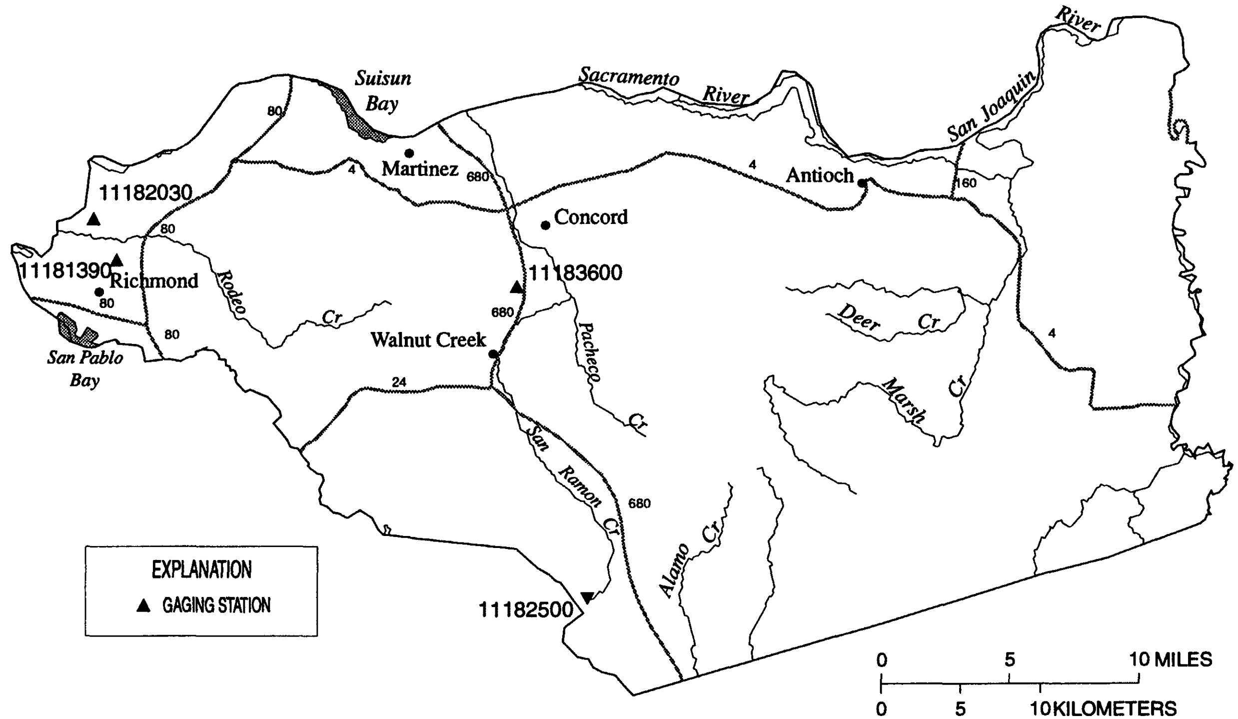

Figure 16. Location of streamflow gaging stations in Contra Costa County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak							
						Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent)		Recurrence interval, (years)	
										1996	1997	1996	1997
				CONTRA COSTA									
11181390	Wildcat Creek at Vale Road at Richmond	7.79	None	22	34	1/ 2/97	8.85	1,430	184	7.7	7.7	13	13
11182030	Rheem Creek at San Pablo	1.49	None	31	--	1/ 1/97	5.88	283	190	54.0	54.0	2	2
11182500	San Ramon Creek at San Ramon	5.89	None	45	--	1/ 2/97	6.87	652	111	20.0	20.2	5	5
11183600	Walnut Creek at Concord	85.2	Minor	25	--	1/22/97	15.20	9,970	117	10.8	10.8	9	9

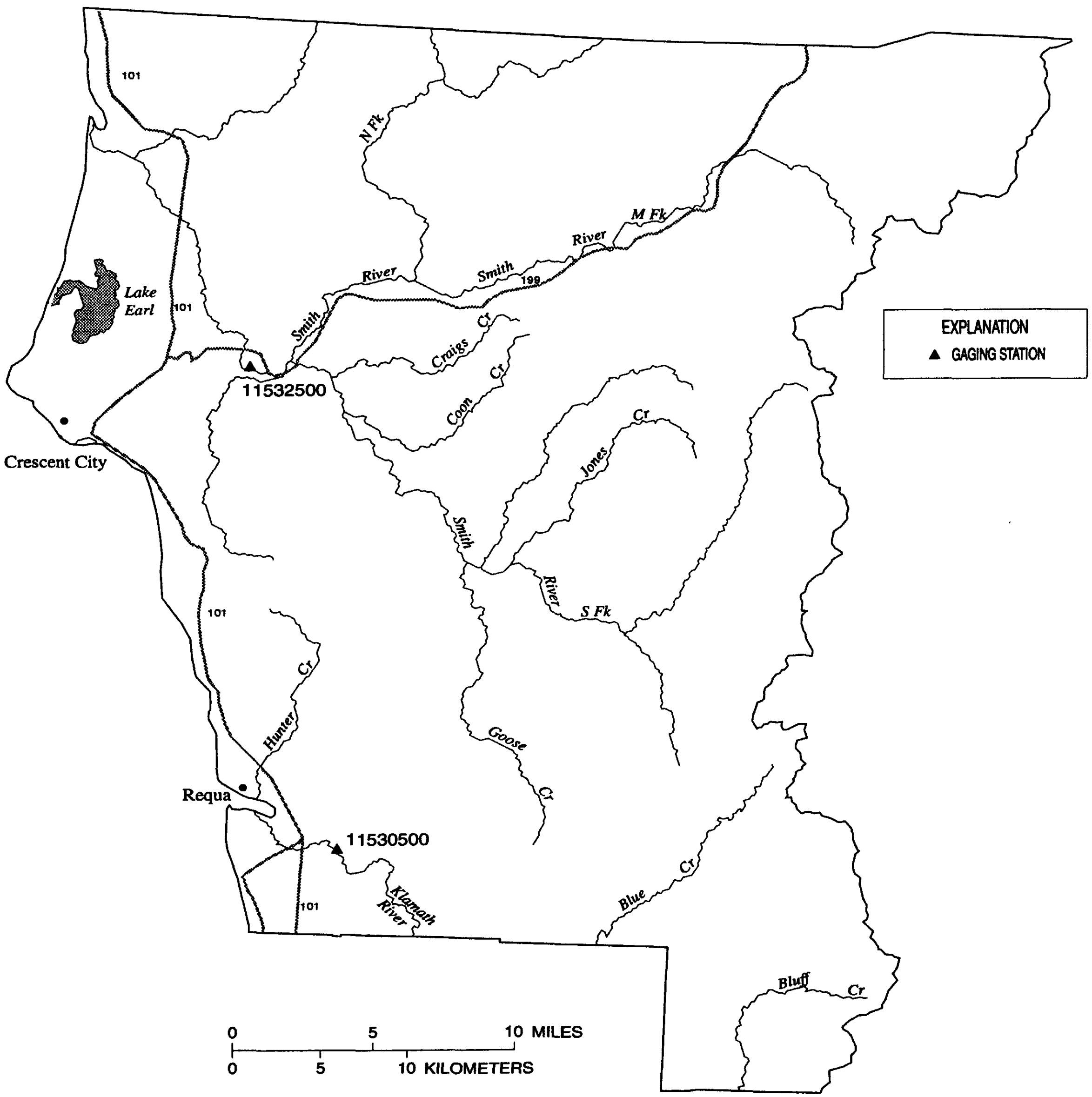

Figure 17. Location of streamflow gaging stations in Del Norte County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak							
						Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent)		Recurrence interval, (years)	
										1996	1997	1996	1997
	DEL NORTE												
11530500	Klamath River near Klamath	12,100.	Partial	83	136	1/ 1/97	45.25	500,000	41.3	1.63	1.87	61	53
11532500	Smith River near Crescent City	614	None	66	136	11/18/96	29.65	126,000	205	11.2	11.4	9	9
						1/ 1/97	28.61	113,000	184	16.8	17.2	6	6

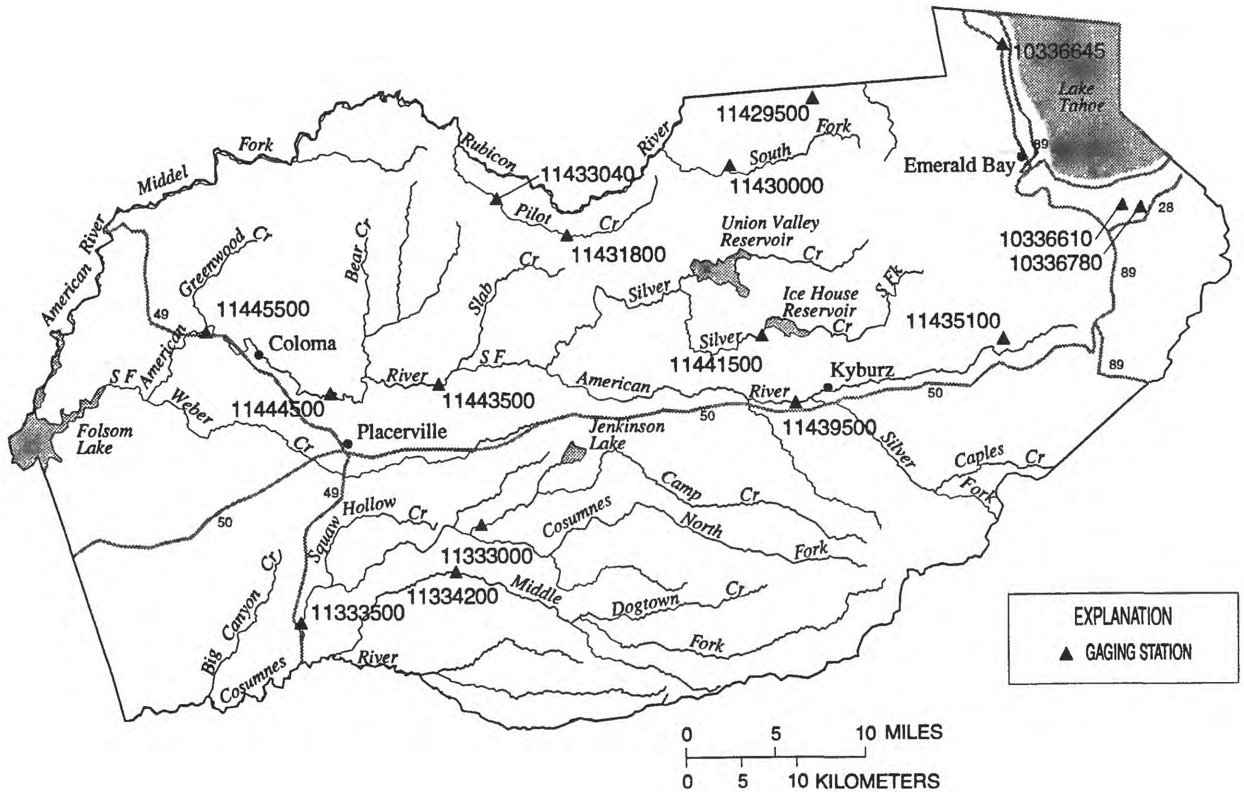

Figure 18. Location of streamflow gaging stations in El Dorado County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [$(ft^3/s)/mi^2$]	Exceedance probability, (percent) 1996	Exceedance probability, (percent) 1997	Recurrence interval, (years) 1996	Recurrence interval, (years) 1997
	EL DORADO												
10336610	Upper Truckee River at South Lake Tahoe	54.9	None	22	97	1/ 2/97	9.95	5,480	99.8	0.52	0.73	192	137
10336645	General Creek near Meeks Bay	7.44	None	17	27	1/ 1/97	7.86	797	107	3.4	4.6	29	22
10336780	Trout Creek near Tahoe Valley	36.7	None	37	41	1/ 2/97	9.33	535	14.6	3.7	4.5	27	22
11333000	Camp Creek near Somerset	62.6	Regulated	42	90	1/ 2/97	20.30	22,400	358	--	<1.10	--	>91
11333500	North Fork Cosumnes River near El Dorado	205.	Partial	33	90	1/ 2/97	21.40	42,000	205	<0.20	0.37	>500	270
11334200	Middle Fork Cosumnes River near Somerset	107.	None	21	90	1/ 2/97	22.00	29,800	278	0.85	0.70	118	143
11429500	Gerle Creek below Loon Lake near Meeks Bay	8.01	Regulated	26	--	1/ 1/97	--	51	6.37	36.1	36.7	3	3
11430000	South Fork Rubicon River below Gerle Creek near Georgetown	47.6	Regulated	34	96	1/ 1/97	--	12,500	263	0.84	1.02	119	98
11431800	Pilot Creek above Stumpy Meadows Reservoir	11.7	None	37	96	1/ 2/97	6.53	2,720	232	3.0	3.8	33	26
11433040	Pilot Creek below Mutton Canyon near Georgetown	21.1	Regulated	34	96	1/ 2/97	10.95	7,830	371	0.54	1.12	185	89
11435100	Pyramid Creek at Twin Bridges	8.76	Partial	27	135	1/ 1/97	7.22	2,190	250	0.75	0.66	133	152
11439500	South Fork American River near Kyburz (river only)	193.	Partial	75	135	1/ 1/97	14.26	25,000	130	0.29	0.60	345	167
11441500	South Fork Silver Creek near Ice House	27.5	Regulated	37	135	1/ 1/97	--	4,420	161	1.31	1.50	76	67
11443500	South Fork American River near Camino	493.	Partial	30	135	1/ 1/97	62.32	62,300	126	1.24	0.90	80	111
11444500	South Fork American River near Placerville	598.	Partial	33	135	1/ 1/97	--	71,700	120	0.66	0.66	152	152
11445500	South Fork American River near Lotus	673.	Partial	34	135	1/ 1/97	26.90	90,000	134	1.15	0.84	87	119

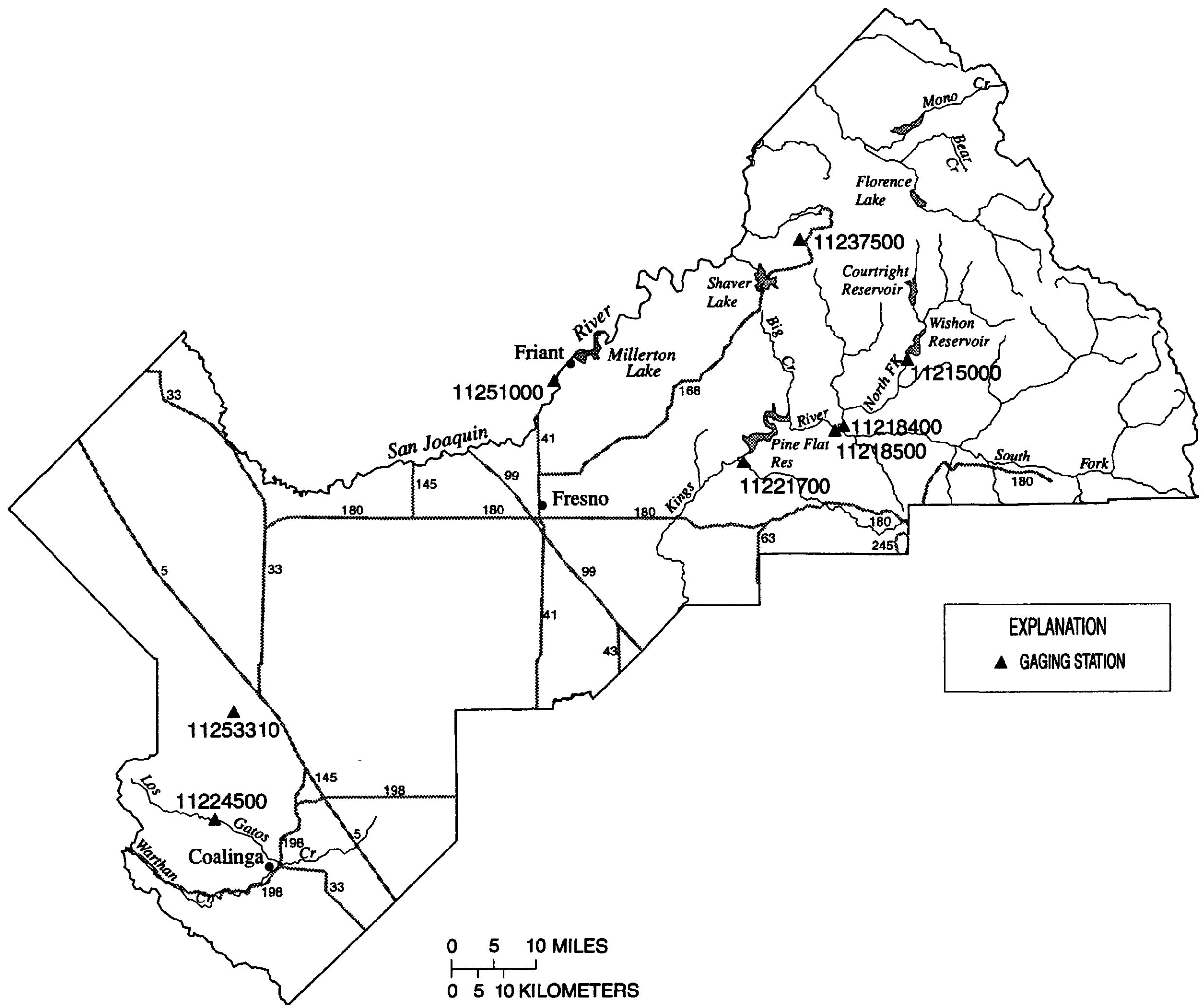

Figure 19. Location of streamflow gaging stations in Fresno County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent) 1996	Exceedance probability, (percent) 1997	Recurrence interval, (years) 1996	Recurrence interval, (years) 1997
	FRESNO												
11215000	North Fork Kings River near Cliff Camp	181.	Regulated	31	--	1/ 2/97	6.94	1,030	5.69	31.9	33.3	3	3
11218400	North Fork Kings River below Dinkey Creek near Balch Camp	387.	Partial	38	41	1/ 2/97	18.43	24,900	64.3	3.7	4.6	27	22
11218500	Kings River below North Fork near Trimmer	1,342.	Partial	35	41	1/ 2/97	21.58	73,900	55.1	1.50	2.3	67	43
11221700	Mill Creek near Piedra	127.	None	38	41	1/ 2/97	8.70	12,000	94.5	6.4	7.3	16	14
11224500	Los Gatos Creek above Nunez Canyon near Coalinga	95.8	None	47	70	1/ 2/97	7.50	1,490	15.6	21.8	22.0	5	5
11237500	Pitman Creek below Tamarack Creek	22.9	None	70	90	1/ 2/97	--	4,500	197	0.22	1.05	455	95
11251000	San Joaquin River below Friant	1,676.	Regulated	39	59	1/ 2/97	22.97	59,800	35.7	--	<1.67	--	>60
11253310	Cantua Creek near Cantua Creek	46.4	None	40	70	1/27/97	2.54	219	4.72	54.0	54.0	2	2
						1/ 2/97	2.47	190	4.09	58.4	58.4	2	2

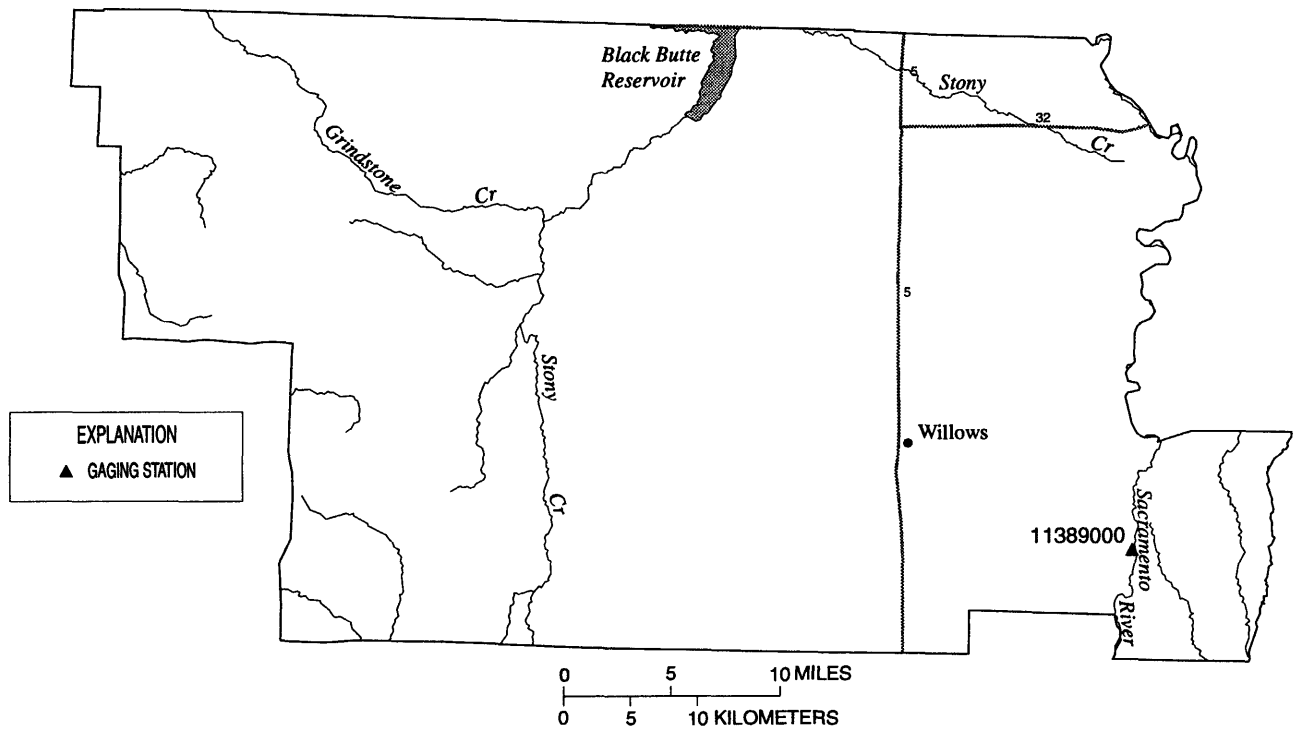

Figure 20. Location of streamflow gaging stations in Glenn County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak							
						Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/ mi^2]	Exceedance probability, (percent)		Recurrence interval, (years)	
										1996	1997	1996	1997
				GLENN									
11389000	Sacramento River at Butte City	12,075.	Regulated	51	--	1/ 2/97	95.02	146,000	12.1	9.0	9.0	11	11

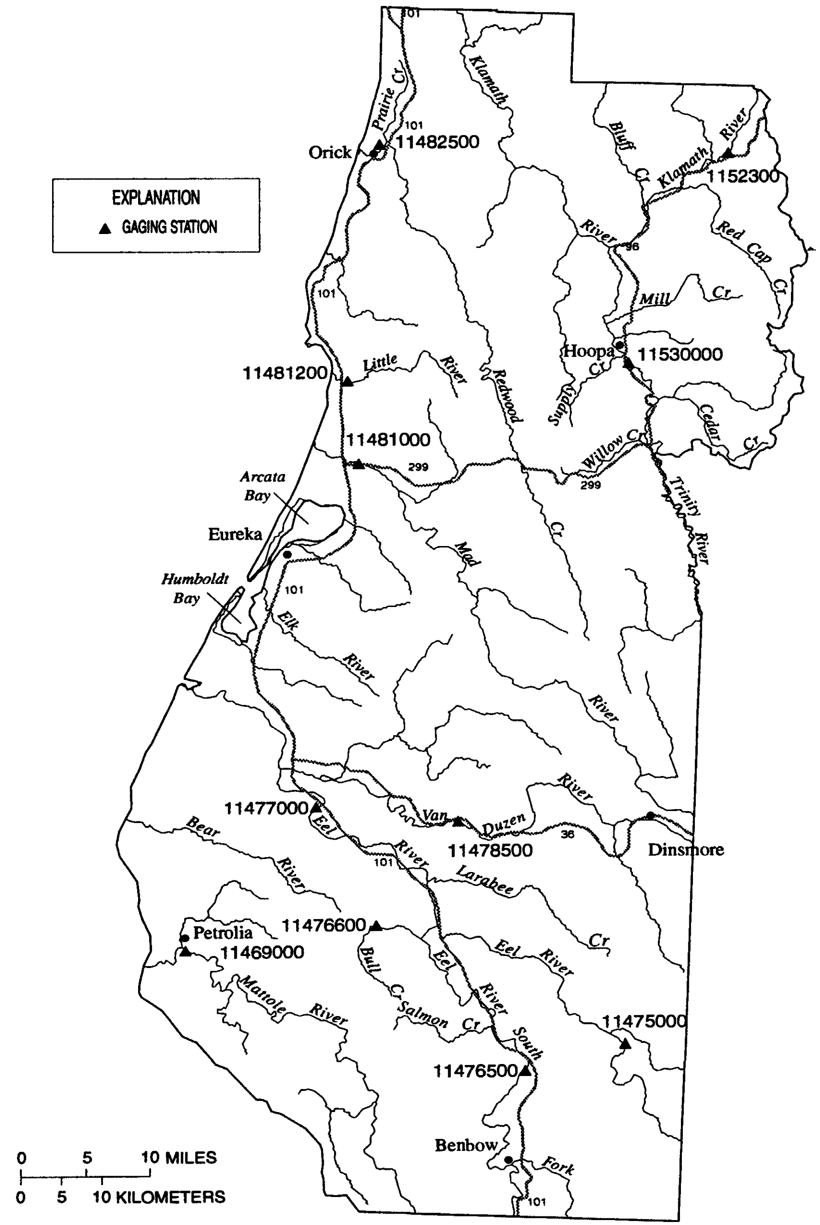

Figure 21. Location of streamflow gaging stations in Humboldt County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [$(ft^3/s)/mi^2$]	Exceedance probability, (percent) 1996	Exceedance probability, (percent) 1997	Recurrence interval, (years) 1996	Recurrence interval, (years) 1997
			HUMBOLDT										
11469000	Mattole River near Petrolia	245.	None	49	87	1/ 1/97	27.79	44,400	181	31.2	31.2	3	3
11475000	Eel River at Fort Seward	2,107.	Minor	42	87	1/ 1/97	52.36	240,000	114	10.4	11.1	10	9
11476500	South Fork Eel River near Miranda	537.	None	57	87	1/ 1/97	33.64	93,600	174	13.4	13.4	7	7
11476600	Bull Creek near Weott	28.1	None	37	41	1/ 1/97	12.84	7,830	279	2.6	3.5	38	29
11477000	Eel River at Scotia	3,113.	Minor	86	87	1/ 1/97	54.97	360,000	116	7.7	7.8	13	13
11478500	Van Duzen River near Bridgeville	222.	None	58	87	12/30/96	18.99	38,600	174	5.8	6.6	17	15
11481000	Mad River near Arcata	485.	Minor	50	87	1/ 1/97	25.46	61,800	127	4.7	5.3	21	19
11481200	Little River near Trinidad	40.5	None	42	--	1/ 1/97	13.62	9,140	226	8.3	9.2	12	11
11482500	Redwood Creek at Orick	277.	None	47	--	1/ 1/97	28.22	42,800	155	8.5	9.1	12	11
11523000	Klamath River at Orleans	8,475.	Minor	70	87	1/ 1/97	37.79	272,000	32.1	2.0	2.4	50	42
11530000	Trinity River at Hoopa	2,853.	Partial	36	136	1/ 1/97	42.97	120,000	42.1	6.6	7.5	15	13

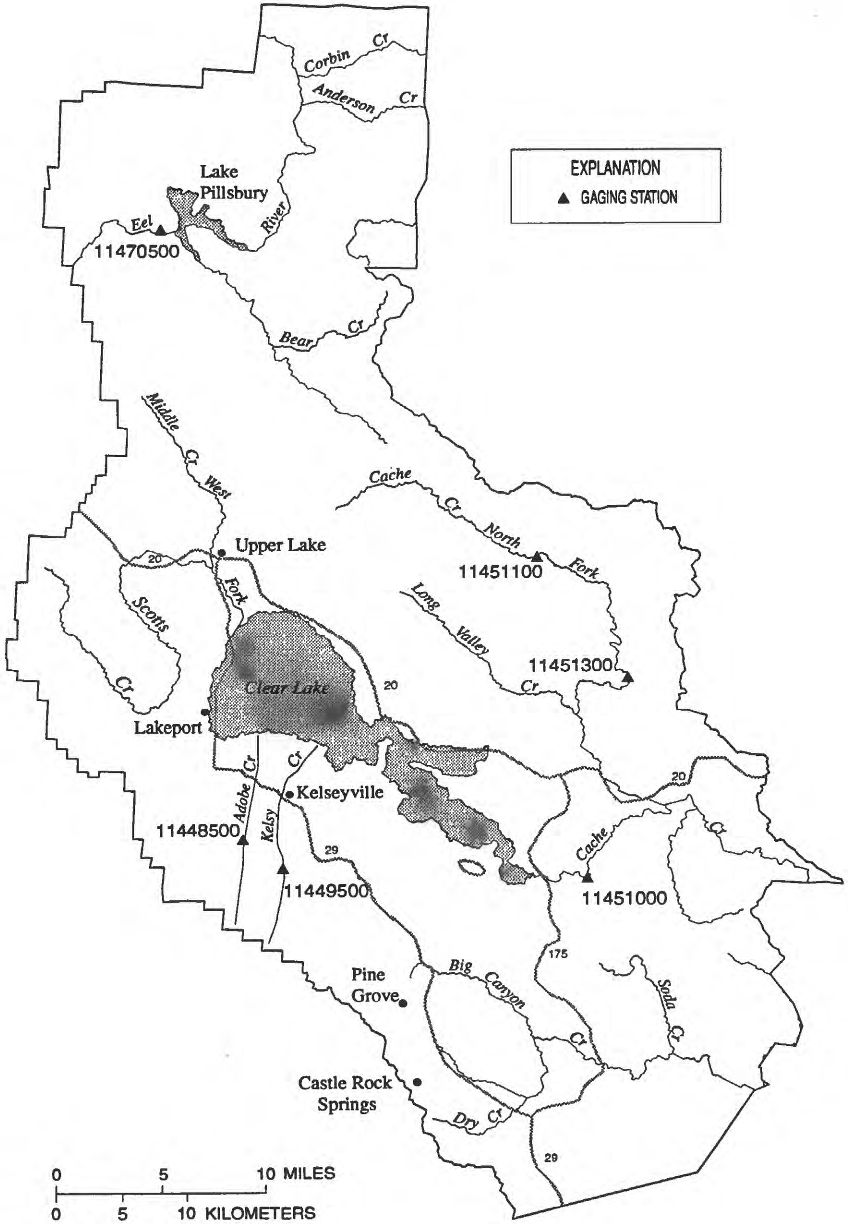

Figure 22. Location of streamflow gaging stations in Lake County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent) 1996	Exceedance probability, (percent) 1997	Recurrence interval, (years) 1996	Recurrence interval, (years) 1997
				LAKE									
11448500	Adobe Creek near Kelseyville	6.36	None	25	57	1/ 1/97	10.23	2,320	365	<0.20	0.45	>500	222
11449500	Kelsey Creek near Kelseyville	36.6	None	51	57	1/ 1/97	13.72	9,000	246	2.7	3.3	37	30
11451000	Cache Creek near Lower Lake	528.	Regulated	53	55	1/ 1/97	10.48	7,450	14.1	2.6	3.4	38	29
11451100	North Fork Cache Creek at Hough Spring near Clearlake Oaks	60.2	None	26	32	1/ 1/97	14.14	11,100	184	3.8	4.9	26	20
11451300	North Fork Cache Creek near Clearlake Oaks	121.	Regulated	12	23	1/ 2/97	10.41	5,720	47.3	3.9	5.6	26	18
11470500	Eel River below Scott Dam near Potter Valley	290.	Partial	75	88	1/ 2/97	18.65	32,200	111	10.6	10.6	9	9

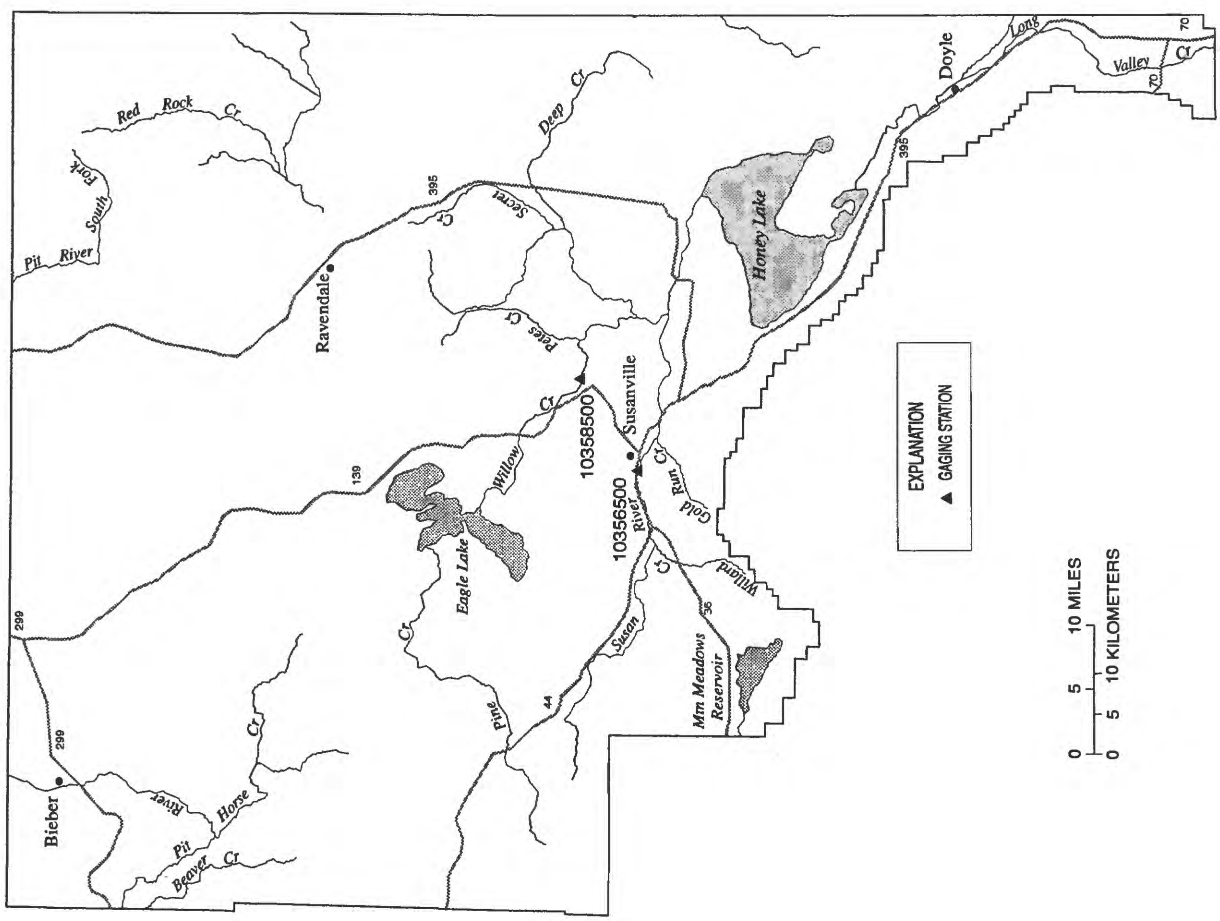

Figure 23. Location of streamflow gaging stations in Lassen County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak							
						Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent)		Recurrence interval, (years)	
										1996	1997	1996	1997
				LASSEN									
10356500	Susan River at Susanville	184.	Partial	54	65	1/ 2/97	11.75	5,150	28.0	3.3	3.8	30	26
10358500	Willow Creek near Susanville	90.0	None	44	57	1/ 2/97	5.44	745	8.28	12.0	12.0	8	8

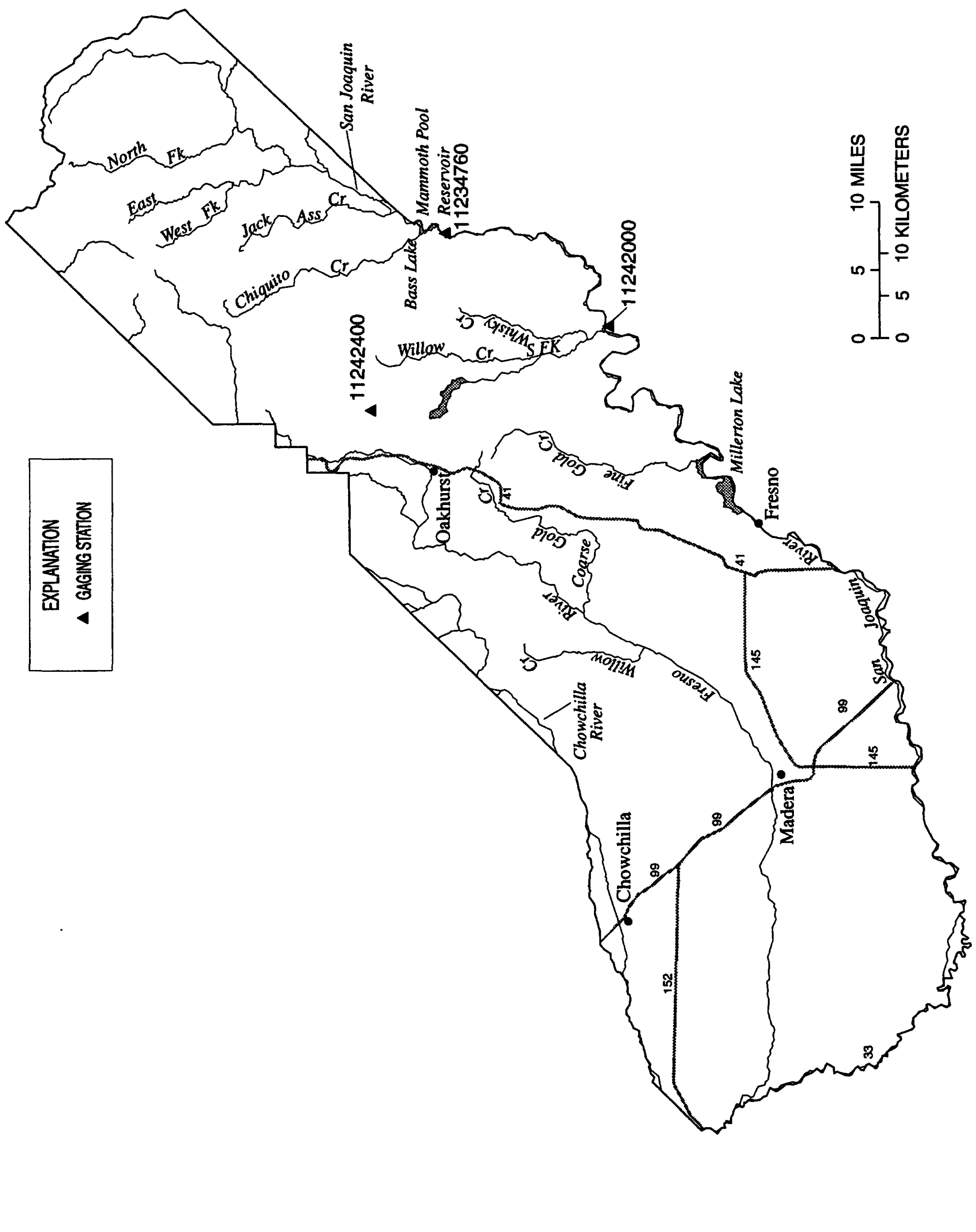

Figure 24. Location of streamflow gaging stations in Madera County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent) 1996	1997	Recurrence interval, (years) 1996	1997
					MADERA								
11234760	San Joaquin River above Shakeflat Creek near Big Creek	1,003.	Regulated	38	90	1/ 2/97	--	79,000	78.8	--	<1.10	--	>91
11242000	San Joaquin River above Willow Creek near Auberry	1,295.	Regulated	38	90	1/ 2/97	--	99,000	76.4	--	<1.10	--	>91
11242400	North Fork Willow Creek near Sugar Pine	16.9	None	32	41	1/ 2/97	7.06	2,570	152	3.1	3.8	32	26

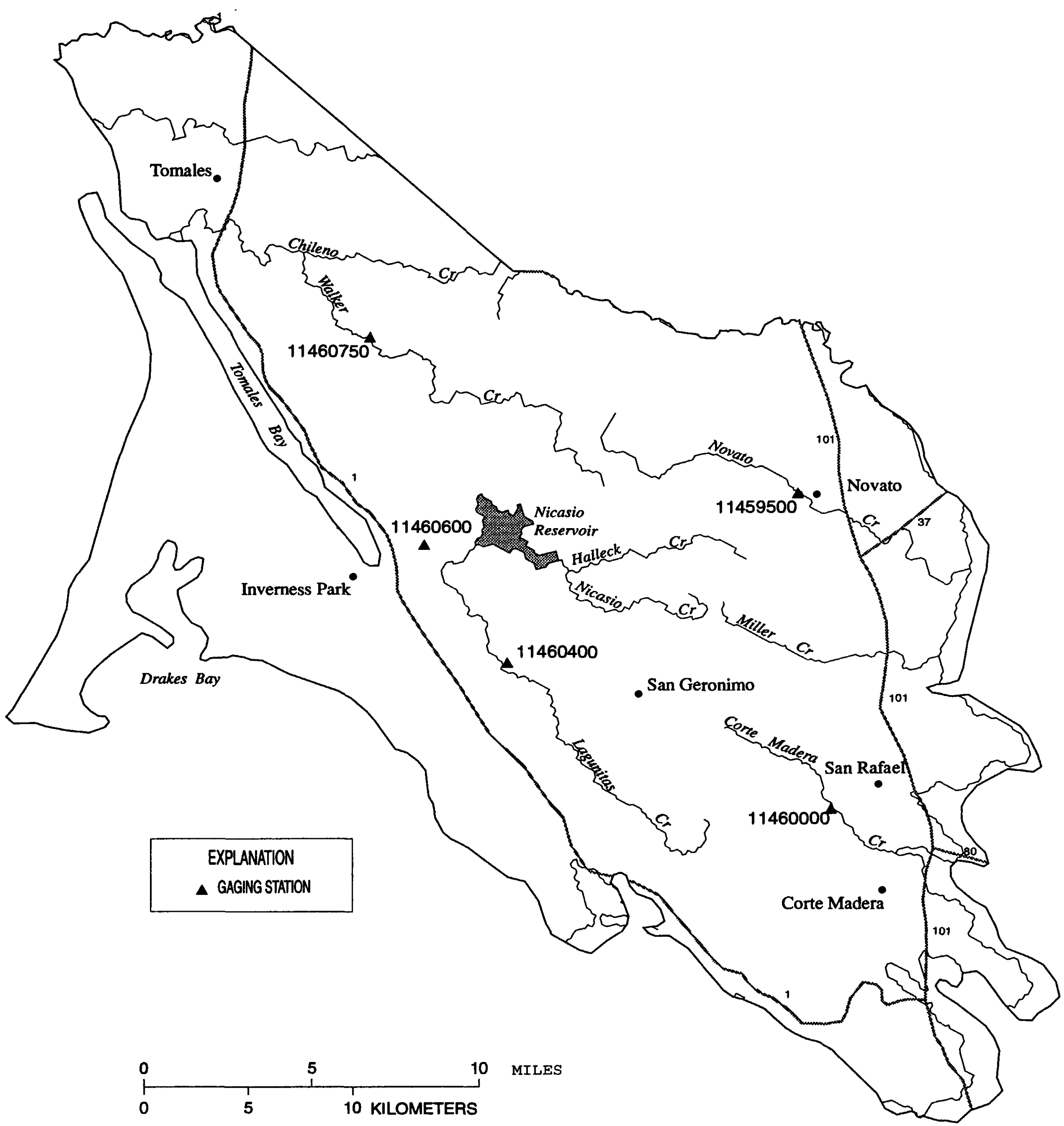

Figure 25. Location of streamflow gaging stations in Marin County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [$(ft^3/s)/mi^2$]	Exceedance probability, (percent) 1996	Exceedance probability, (percent) 1997	Recurrence interval, (years) 1996	Recurrence interval, (years) 1997
					MARIN								
11459500	Novato Creek at Novato	17.6	Partial	43	51	1/26/97	11.52	2,030	115	9.5	10.0	11	10
						1/ 1/97	8.21	850	48.3	39.0	41.2	3	2
11460000	Corte Madera Creek at Ross	18.1	Minor	43	68	1/ 1/97	14.83	2,270	125	40.5	40.5	2	2
11460400	Lagunitas Creek at SP Taylor State Park	34.3	Partial	15	--	1/ 1/97	8.21	3,195	93.2	10.7	13.0	9	8
11460600	Lagunitas Creek near Point Reyes Station	81.7	Partial	23	68	1/ 1/97	19.49	7,710	94.4	14.8	16.1	7	6
11460750	Walker Creek near Marshall	31.1	Partial	15	68	1/ 1/97	9.60	5,310	171	18.0	19.9	6	5

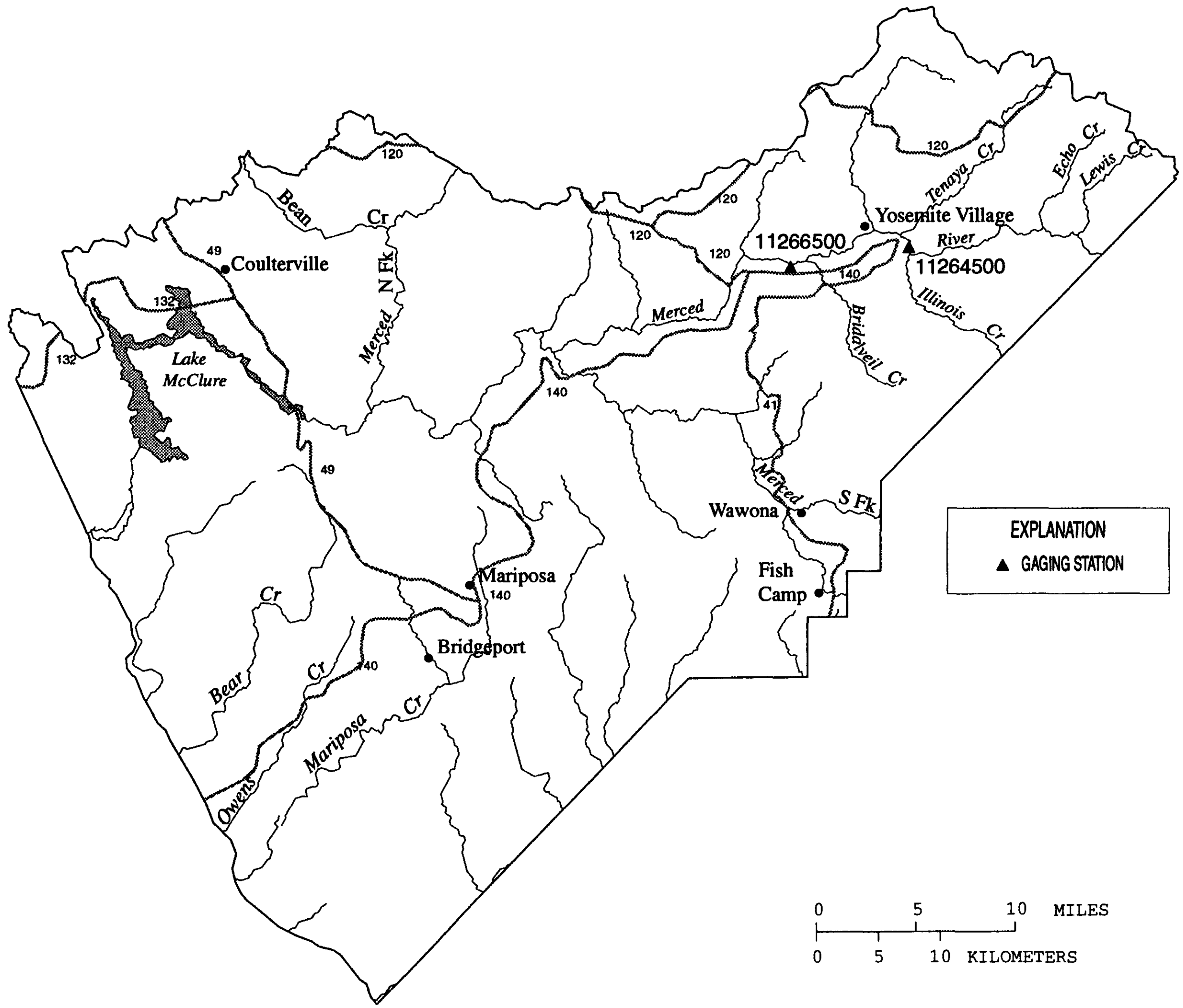

Figure 26. Location of streamflow gaging stations in Mariposa County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	1997 Peak: Stage (ft)	1997 Peak: Flow (ft^3/s)	1997 Peak: Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent): 1996	Exceedance probability, (percent): 1997	Recurrence interval, (years): 1996	Recurrence interval, (years): 1997
					MARIPOSA								
11264500	Merced River at Happy Isles Bridge near Yosemite	181.	None	82	86	1/ 2/97	13.27	10,000	55.2	1.09	1.54	92	65
11266500	Merced River at Pohono Bridge near Yosemite	321.	None	81	86	1/ 2/97	23.45	25,000	77.9	0.30	1.15	333	87

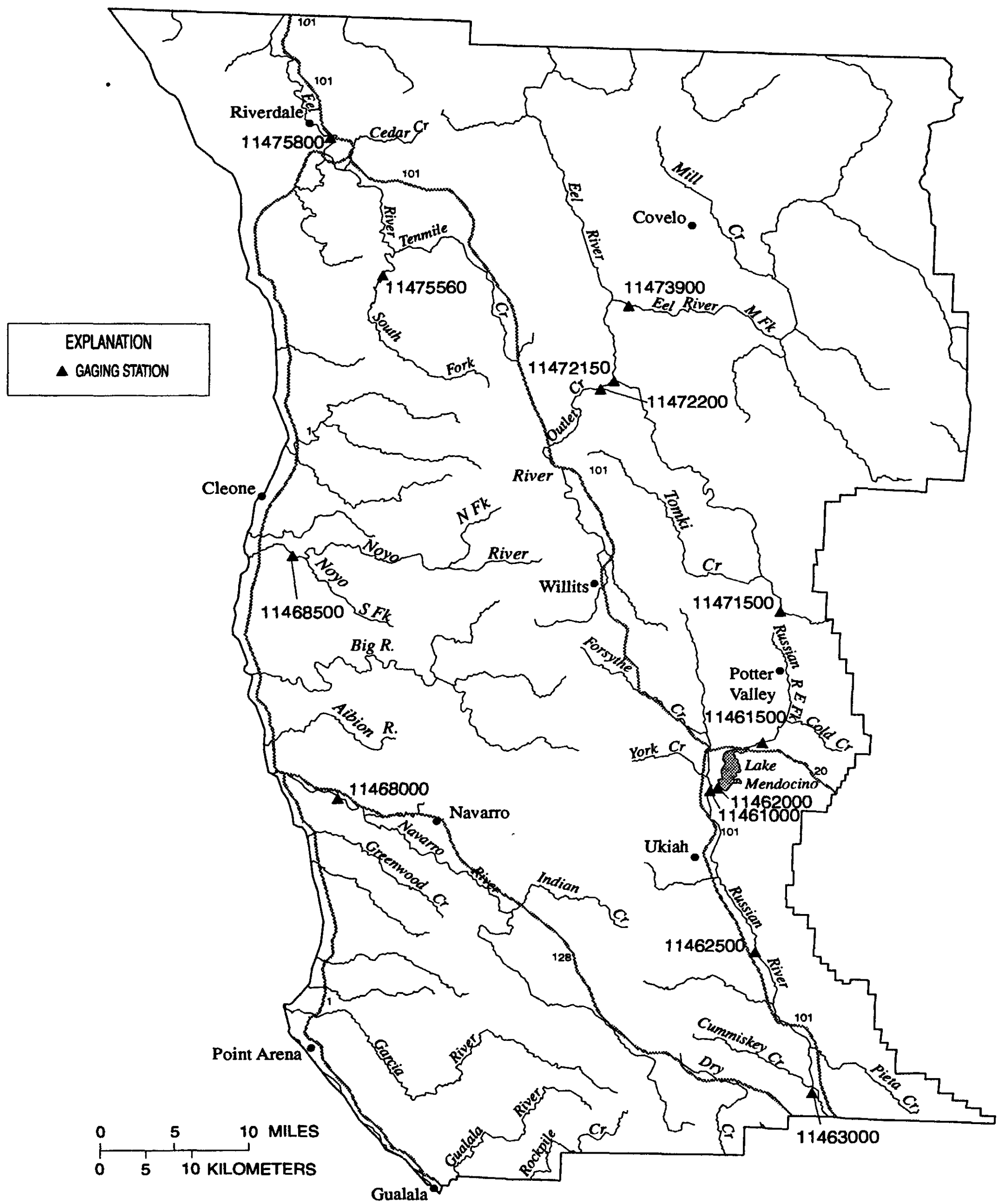

Figure 27. Location of streamflow gaging stations in Mendocino County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak							
						Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent)		Recurrence interval, (years)	
										1996	1997	1996	1997
				MENDOCINO									
11461000	Russian River near Ukiah	100.	None	47	61	1/ 1/97	16.06	11,600	116	22.6	22.6	4	4
11461500	East Fork Russian River near Calpella	92.2	None	56	87	1/ 1/97	20.61	8,270	89.7	35.0	35.0	3	3
11462000	East Fork Russian River near Ukiah	105.	Regulated	38	41	1/ 3/97	6.67	3,850	36.7	35.0	35.0	3	3
11462500	Russian River near Hopland	362.	Partial	38	41	12/31/96	18.84	22,400	61.9	24.8	24.8	4	4
11463000	Russian River near Cloverdale	503.	Partial	38	41	1/ 1/97	19.92	29,830	59.3	21.0	21.5	5	5
11468000	Navarro River near Navarro	303.	None	47	87	12/31/96	35.09	40,600	134	11.6	12.1	9	8
11468500	Noyo River near Fort Bragg	106.	None	46	58	1/ 1/97	23.30	11,000	104	21.8	22.0	5	5
11471500	Eel River at Van Arsdale Dam near Potter Valley	349.	Partial	75	88	1/ 1/97	26.18	32,500	93.1	13.4	13.6	7	7
11472150	Eel River near Dos Rios	528.	Partial	30	87	1/ 1/97	32.70	63,000	119	7.1	7.1	14	14
11472200	Outlet Creek near Longvale	161.	None	39	87	1/ 1/97	23.20	36,700	228	3.0	3.0	33	33
11473900	Middle Fork Eel River near Dos Rios	745.	None	32	--	1/ 1/97	28.70	105,000	141	3.0	4.1	33	24
11475560	Elder Creek near Branscomb	6.50	None	31	87	1/ 1/97	9.88	2,480	382	3.0	4.1	33	24
11475800	South Fork Eel River at Leggett	248.	None	33	87	12/31/96	19.74	36,900	149	22.0	22.0	5	5

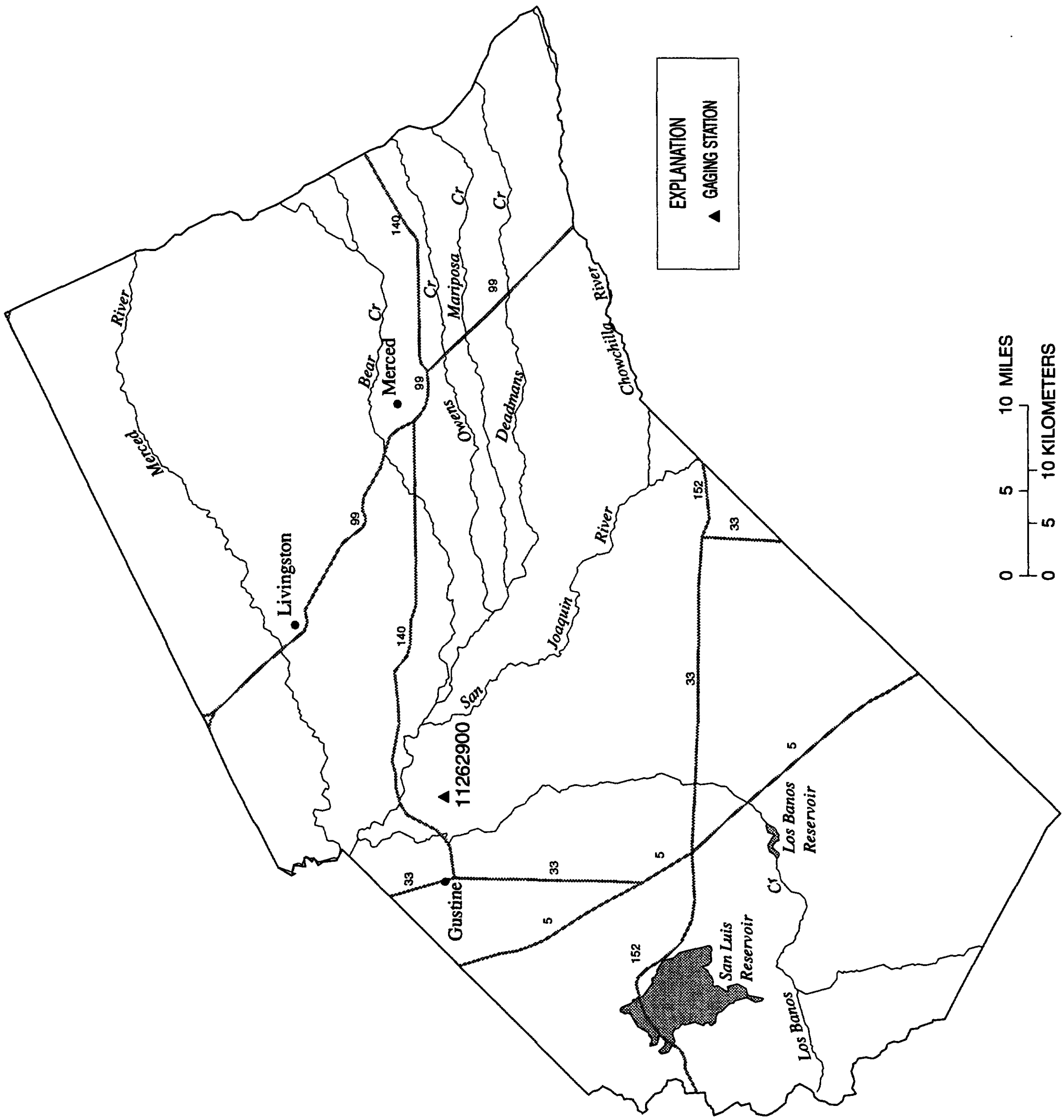

Figure 28. Location of streamflow gaging stations in Merced County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent) 1996	Exceedance probability, (percent) 1997	Recurrence interval, (years) 1996	Recurrence interval, (years) 1997
					MERCED								
11262900	Mud Slough near Gustine	--	Partial	12	14	1/28/97	12.02	735	--	5.6	7.7	18	13
						1/ 6/97	11.32	632	--	8.4	11.4	12	9

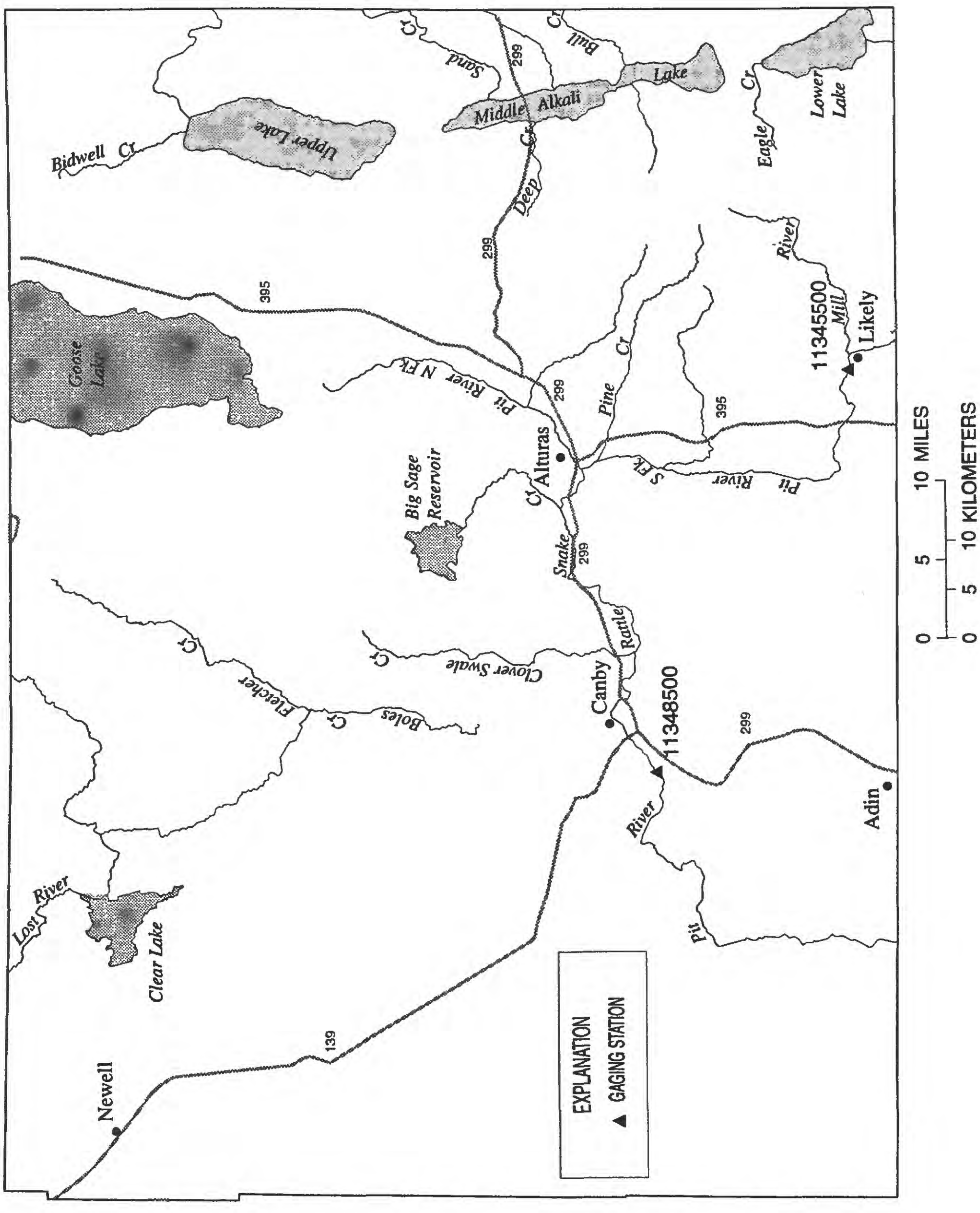

Figure 29. Location of streamflow gaging stations in Modoc County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak Date	1997 Peak Stage (ft)	1997 Peak Flow (ft^3/s)	1997 Peak Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent) 1996	Exceedance probability, (percent) 1997	Recurrence interval, (years) 1996	Recurrence interval, (years) 1997
					MODOC								
11345500	South Fork Pit River near Likely	247.	Minor	66	--	1/ 3/97	4.08	426	1.72	45.3	45.3	2	2
11348500	Pit River near Canby	1,431.	Minor	68	90	1/ 3/97	11.82	7,280	5.09	5.4	5.9	19	17

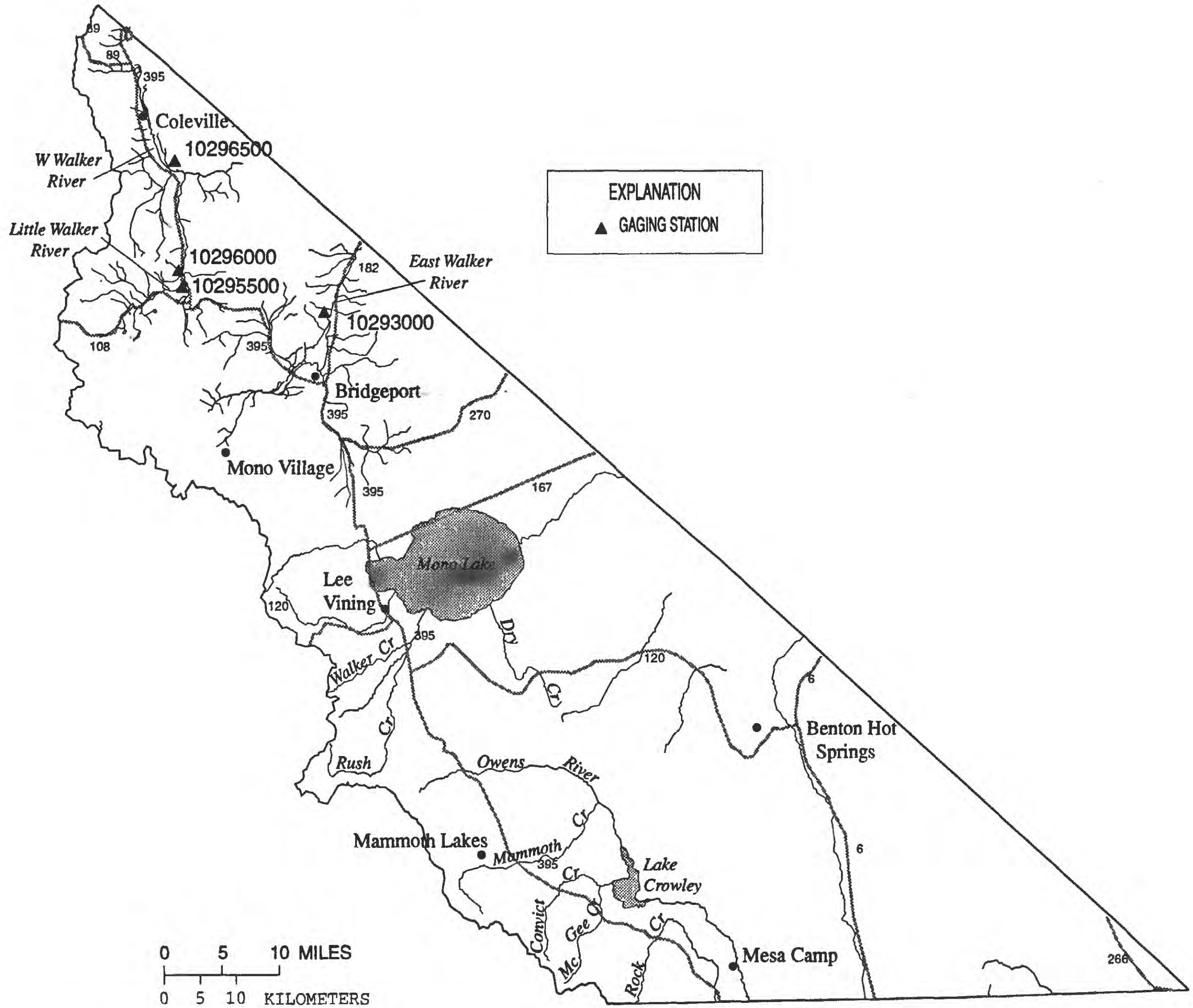

Figure 30. Location of streamflow gaging stations in Mono County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent) 1996	Exceedance probability, (percent) 1997	Recurrence interval, (years) 1996	Recurrence interval, (years) 1997
	MONO												
10293000	East Walker River near Bridgeport	359.	Partial	74	97	1/ 4/97	6.74	1,810	5.04	0.32	0.81	312	123
10295500	Little Walker River near Bridgeport	63.1	None	44	97	1/ 2/97	5.70	2,540	40.2	0.22	0.45	455	222
10296000	West Walker River below Little Walker River near Coleville	181.	Minor	60	97	1/ 2/97	10.11	12,300	60.0	<0.20	<0.20	>500	>500
10296500	West Walker River near Coleville	250.	Minor	72	97	1/ 2/97	10.23	12,500	44.0	<0.20	<0.20	>500	>500

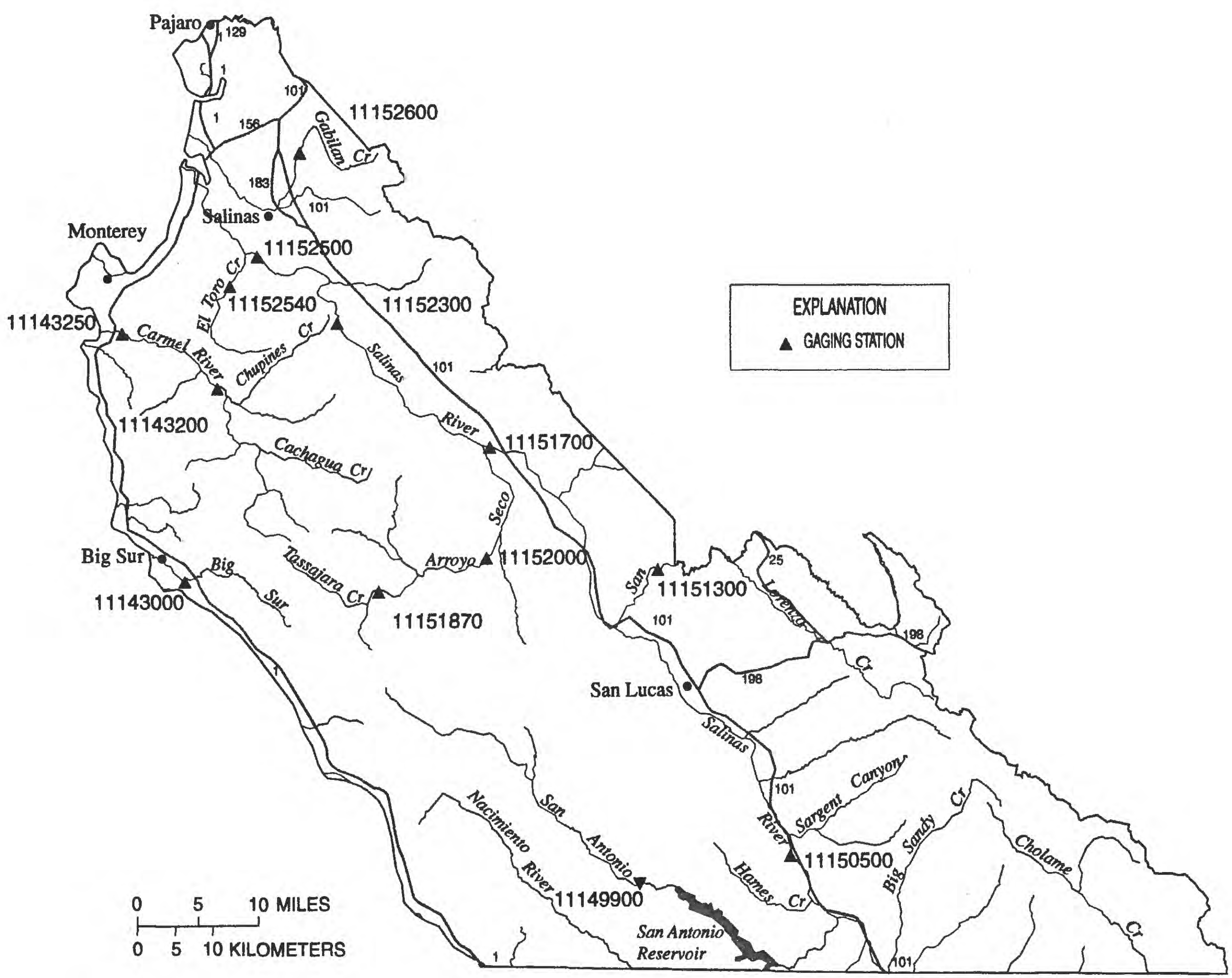

Figure 31. Location of streamflow gaging stations in Monterey County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent) 1996	Exceedance probability, (percent) 1997	Recurrence interval, (years) 1996	Recurrence interval, (years) 1997
				MONTEREY									
11143000	Big Sur River near Big Sur	46.5	None	47	92	1/ 1/97	10.58	5,000	108	10.6	11.2	9	9
11143200	Carmel River at Robles Del Rio	193.	Minor	41	92	1/ 1/97	6.95	3,270	16.9	33.0	33.0	3	3
11143250	Carmel River near Carmel	246.	Minor	35	92	1/ 1/97	10.54	3,270	13.3	35.5	35.5	3	3
11149900	San Antonio River near Lockwood	217.	None	32	92	1/ 1/97	11.68	9,280	42.8	18.8	19.7	5	5
11150500	Salinas River near Bradley	2,535.	Partial	41	92	1/ 3/97	11.98	17,000	6.71	17.1	17.7	6	6
11151300	San Lorenzo Creek below Bitterwater Creek near King City	233.	None	39	--	1/ 2/97	9.96	4,050	17.4	16.2	16.8	6	6
11151700	Salinas River at Soledad	3,563.	Partial	24	92	1/27/97	16.78	20,800	5.84	10.2	11.4	10	9
						1/ 3/97	17.63	16,100	4.52	12.7	14.2	8	7
11151870	Arroyo Seco near Greenfield	113.	None	36	39	1/ 1/97	12.76	8,480	75.0	37.5	37.5	3	3
11152000	Arroyo Seco near Soledad	244.	None	92	--	1/ 1/97	8.76	8,260	33.8	44.0	44.0	2	2
11152300	Salinas River near Chualar	4,042.	Partial	21	92	1/ 4/97	13.01	17,800	4.40	18.2	19.5	5	5
11152500	Salinas River near Spreckels	4,156.	Partial	39	92	1/ 4/97	20.74	16,800	4.04	21.3	22.0	5	5
11152540	El Toro Creek near Spreckels	31.9	None	36	--	1/ 2/97	4.13	259	8.12	18.4	19.2	5	5
11152600	Gabilan Creek near Salinas	36.7	None	26	28	1/ 2/97	5.04	860	23.4	4.7	5.8	21	17

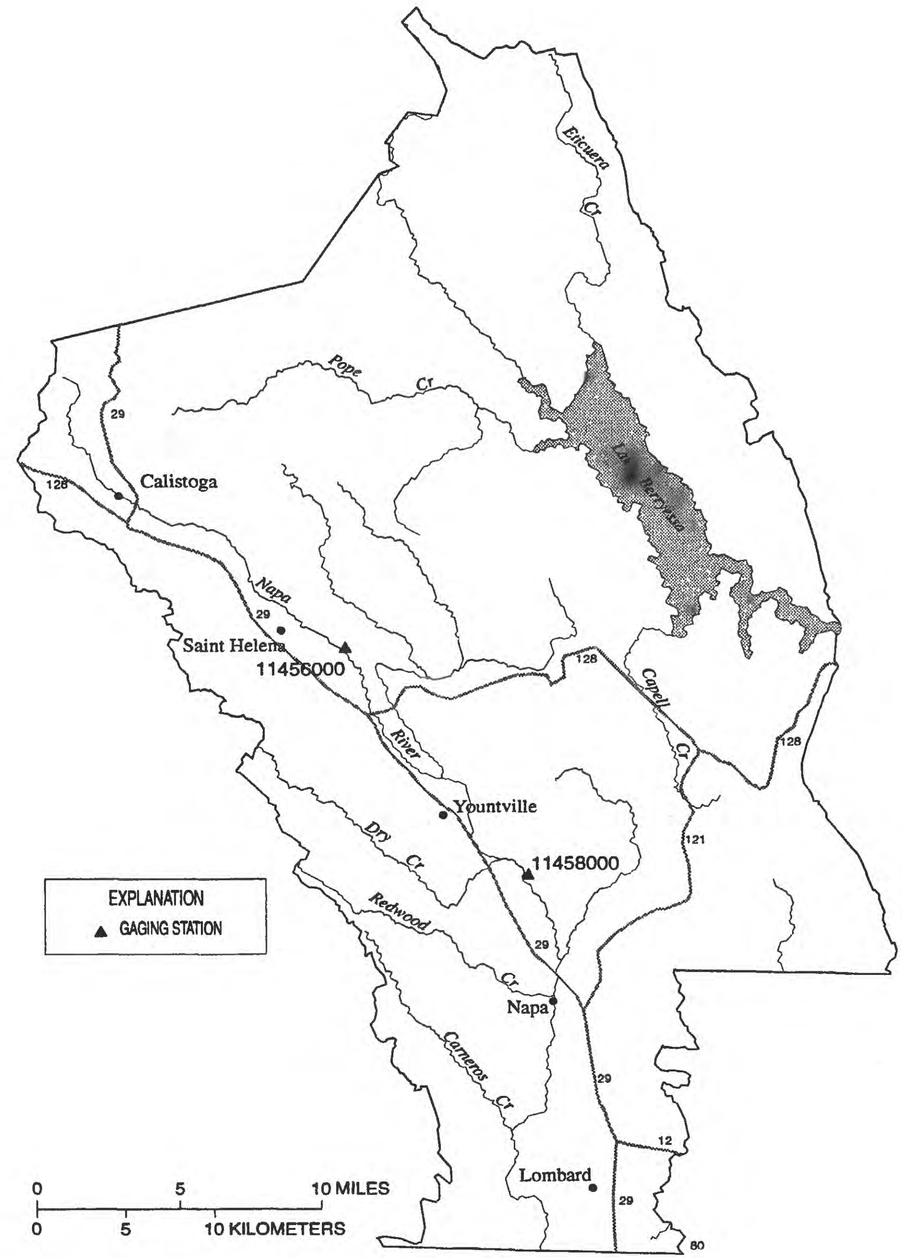

Figure 32. Location of streamflow gaging stations in Napa County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent) 1996	Exceedance probability, (percent) 1997	Recurrence interval, (years) 1996	Recurrence interval, (years) 1997
				NAPA									
11456000	Napa River near St. Helena	81.4	Minor	61	68	1/ 1/97	18.48	15,000	184	3.7	4.3	27	23
11458000	Napa River near Napa	218.	Partial	38	68	1/ 1/97	28.07	24,000	110	6.4	7.6	16	13

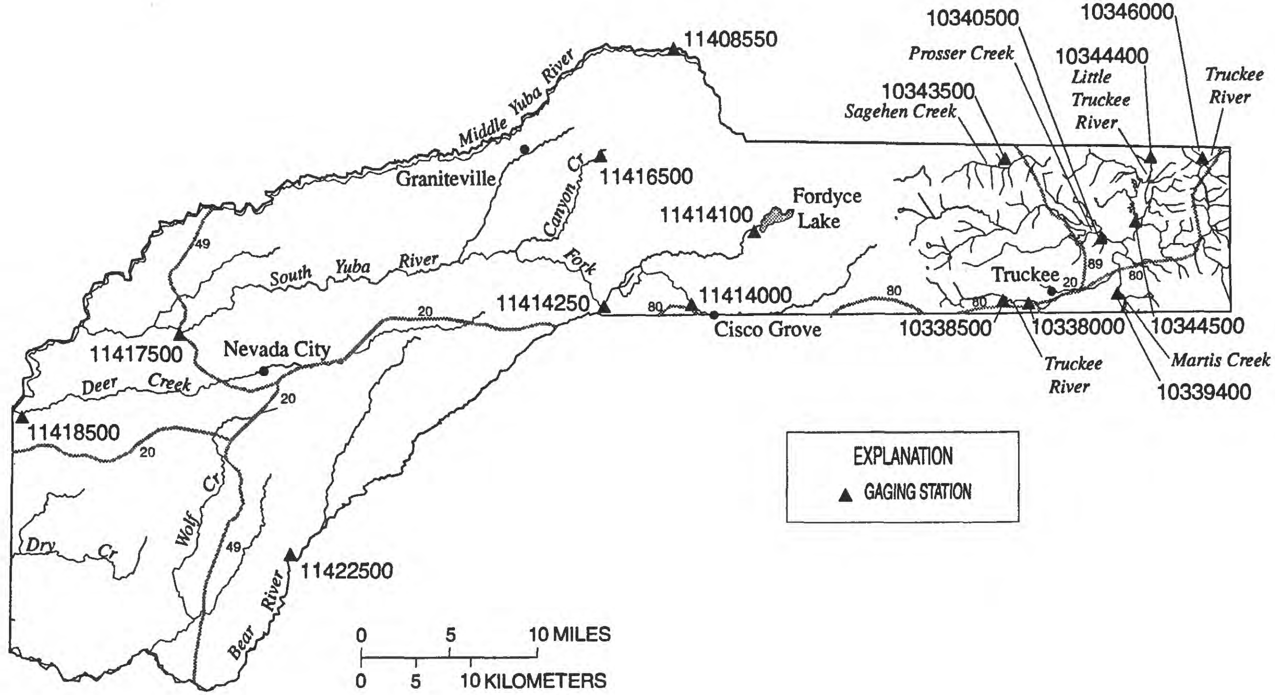

Figure 33. Location of streamflow gaging stations in Nevada County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent) 1996	Exceedance probability, (percent) 1997	Recurrence interval, (years) 1996	Recurrence interval, (years) 1997
				NEVADA									
10338000	Truckee River near Truckee	552.	Regulated	28	59	1/ 2/97	9.97	11,900	21.6	1.29	2.1	78	48
10338500	Donner Creek at Donner Lake near Truckee	14.3	Partial	64	90	1/ 2/97	6.69	863	60.4	0.99	1.3	101	77
10339400	Martis Creek near Truckee	39.9	Regulated	24	--	1/ 2/97	4.56	372	9.32	36.0	37.3	3	3
10340500	Prosser Creek below Prosser Creek Dam near Truckee	52.9	Regulated	34	41	1/ 3/97	6.72	2,140	40.4	0.95	2.3	105	43
10343500	Sagehen Creek near Truckee	10.5	None	44	90	1/ 2/97	5.20	1,230	117	0.90	1.15	111	87
10344400	Little Truckee River above Boca Reservoir near Truckee	146.	Regulated	28	32	1/ 3/97	5.26	6,470	44.3	--	<3.0	--	>33
10344500	Little Truckee River below Boca Dam near Truckee	173.	Regulated	27	46	1/ 8/97	6.14	2,680	15.5	2.7	3.3	37	30
10346000	Truckee River at Farad	932.	Regulated	28	46	1/ 2/97	13.13	14,900	16.0	0.94	1.6	106	62
11408550	Middle Yuba River below Milton Dam	39.9	Regulated	10	34	1/ 1/97	8.09	8,590	215	3.2	2.9	31	34
11414000	South Yuba River near Cisco	51.8	None	53	94	1/ 1/97	18.26	15,000	290	1.68	2.0	60	50
11414100	Fordyce Creek below Fordyce Dam near Cisco	31.7	Regulated	31	--	1/ 2/97	6.18	2,480	78.2	7.8	8.7	13	11
11414250	South Yuba River at Langs Crossing near Emigrant Gap	120.	Regulated	32	--	1/ 1/97	23.60	33,700	281	3.5	4.8	29	21
11416500	Canyon Creek below Bowman Lake	28.3	Regulated	71	--	1/ 1/97	13.01	5,550	196	0.74	1.50	135	67
11417500	South Yuba River at Jones Bar near Grass Valley	308.	Partial	46	94	1/ 2/97	22.22	40,000	130	1.35	2.2	74	45
11418500	Deer Creek near Smartville	84.6	Partial	33	69	1/ 1/97	13.68	11,400	135	1.06	2.3	94	43
11422500	Bear River below Rollins Dam near Colfax	105.	Regulated	31	90	1/ 2/97	--	17,700	169	2.8	3.9	36	26

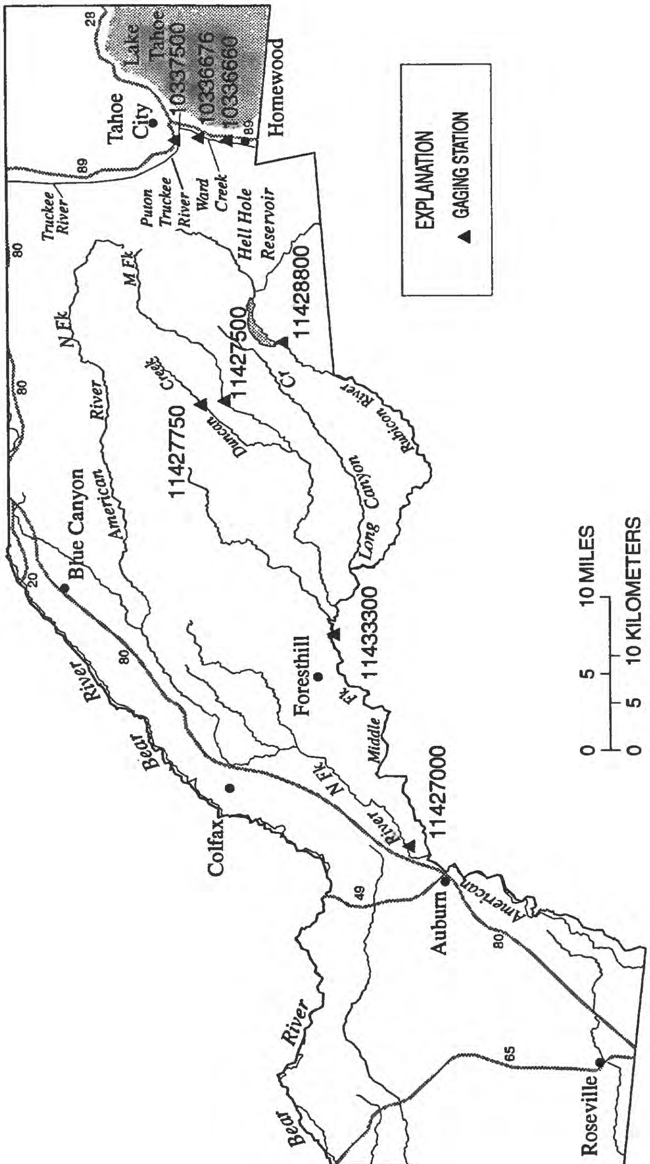

Figure 34. Location of streamflow gaging stations in Placer County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak							
						Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [$(ft^3/s)/mi^2$]	Exceedance probability, (percent)		Recurrence interval, (years)	
										1996	1997	1996	1997
			PLACER										
10336660	Blackwood Creek near Tahoe City	11.2	None	37	97	1/ 1/97	9.82	2,940	262	<0.20	0.63	>500	159
10336676	Ward Creek at Highway 89 near Tahoe Pines	9.70	None	25	97	1/ 1/97	9.36	2,530	261	1.66	1.86	60	54
10337500	Truckee River at Tahoe City	507.	Regulated	60	--	1/ 2/97	9.59	2,690	5.31	1.84	2.6	54	38
11427000	North Fork American River at North Fork Dam	342.	None	56	96	1/ 1/97	11.82	64,800	189	2.7	3.1	37	32
11427500	Middle Fork American River at French Meadows	47.9	Regulated	33	--	1/ 1/97	11.17	4,140	86.4	3.8	5.1	26	20
11427750	Duncan Creek below Diversion Dam near French Meadows	10.5	None	33	--	1/ 1/97	8.59	3,530	336	3.7	4.7	27	21
11428800	Rubicon River below Hell Hole Dam	114.	Regulated	31	32	1/ 2/97	--	28,800	253	2.4	3.9	42	26
11433300	Middle Fork American River near Foresthill	524.	Partial	32	96	1/ 2/97	29.56	123,000	235	0.57	0.87	175	115

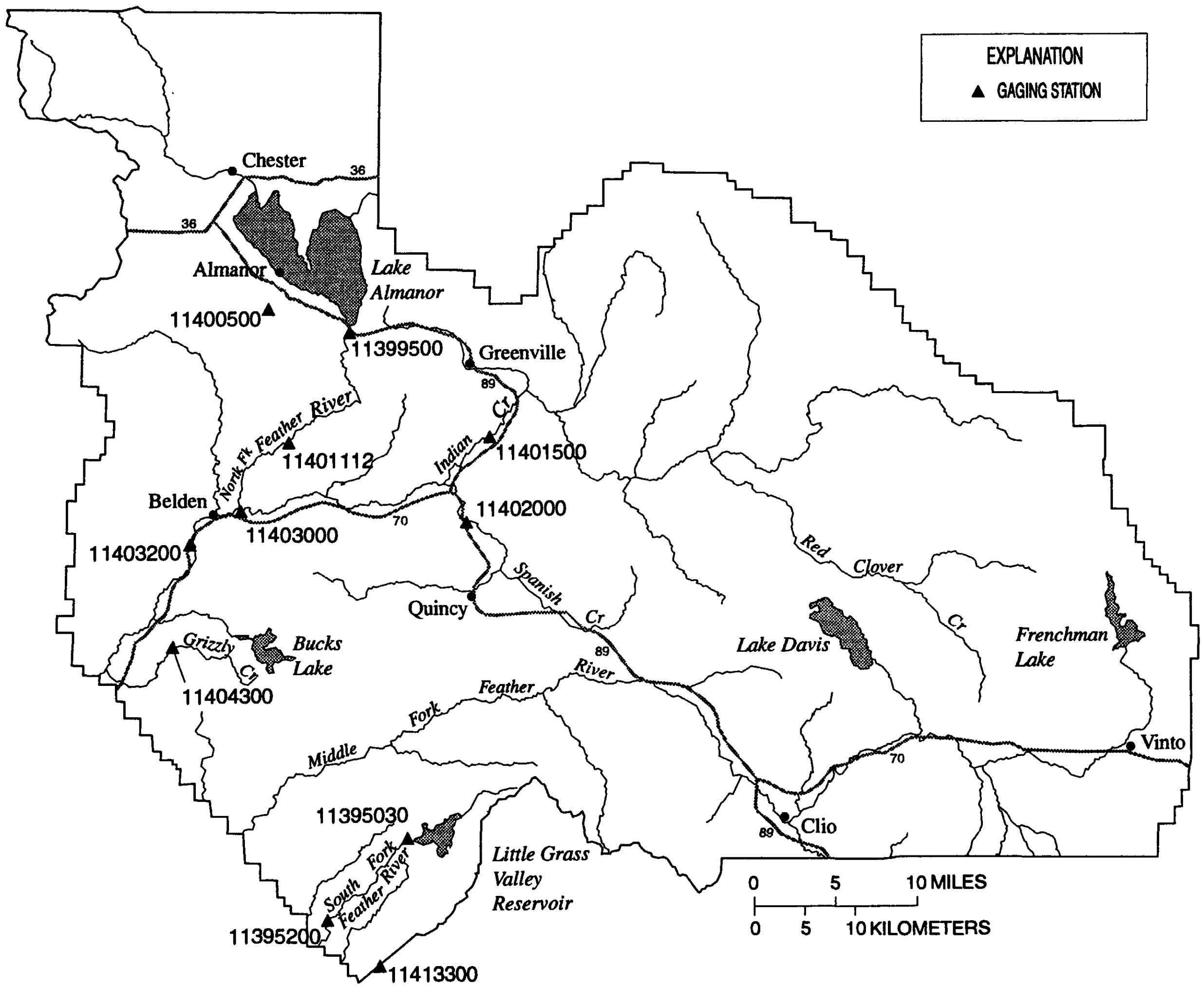

Figure 35. Location of streamflow gaging stations in Plumas County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak							
						Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent) 1996	Exceedance probability, (percent) 1997	Recurrence interval, (years) 1996	Recurrence interval, (years) 1997
			PLUMAS										
11395030	South Fork Feather River below Little Grass Valley Dam	25.9	Regulated	35	90	1/ 1/97	14.80	7,360	284	1.08	1.15	93	87
11395200	South Fork Feather River below Diversion Dam near Strawberry Valley	37.7	Regulated	35	90	1/ 1/97	--	11,300	300	1.43	1.35	70	74
11399500	North Fork Feather River near Prattville	493.	Regulated	38	39	1/ 5/97	6.67	2,160	4.38	--	<2.5	--	>40
11400500	Butt Creek below Almanor-Butt Creek Tunnel near Prattville	69.3	None	56	92	1/ 1/97	6.22	4,280	61.8	1.50	1.66	67	60
11401112	North Fork Feather River below Belden Dam	612.	Regulated	28	--	1/ 1/97	9.61	3,990	6.52	2.2	3.9	45	26
11401500	Indian Creek near Crescent Mills	739.	Minor	73	96	1/ 1/97	21.60	40,000	54.1	1.09	1.4	92	71
11402000	Spanish Creek above Blackhawk Creek at Keddie	184.	None	64	90	1/ 2/97	15.68	22,100	120	0.33	0.85	303	118
11403000	East Branch of North Fork Feather River near Rich Bar	1,025.	Minor	30	90	1/ 2/97	--	88,800	86.6	0.46	0.56	217	179
11403200	North Fork Feather River below Rock Creek Diversion Dam	1,773.	Partial	12	90	1/ 2/97	31.85	91,600	51.7	0.86	1.36	116	74
11404300	Grizzly Creek below Diversion Dam	14.4	None	12	90	1/ 1/97	7.39	7,530	523	0.26	0.54	385	185
11413300	Slate Creek below Diversion Dam near Strawberry	49.4	None	37	90	1/ 1/97	17.20	17,300	350	1.56	1.79	64	56

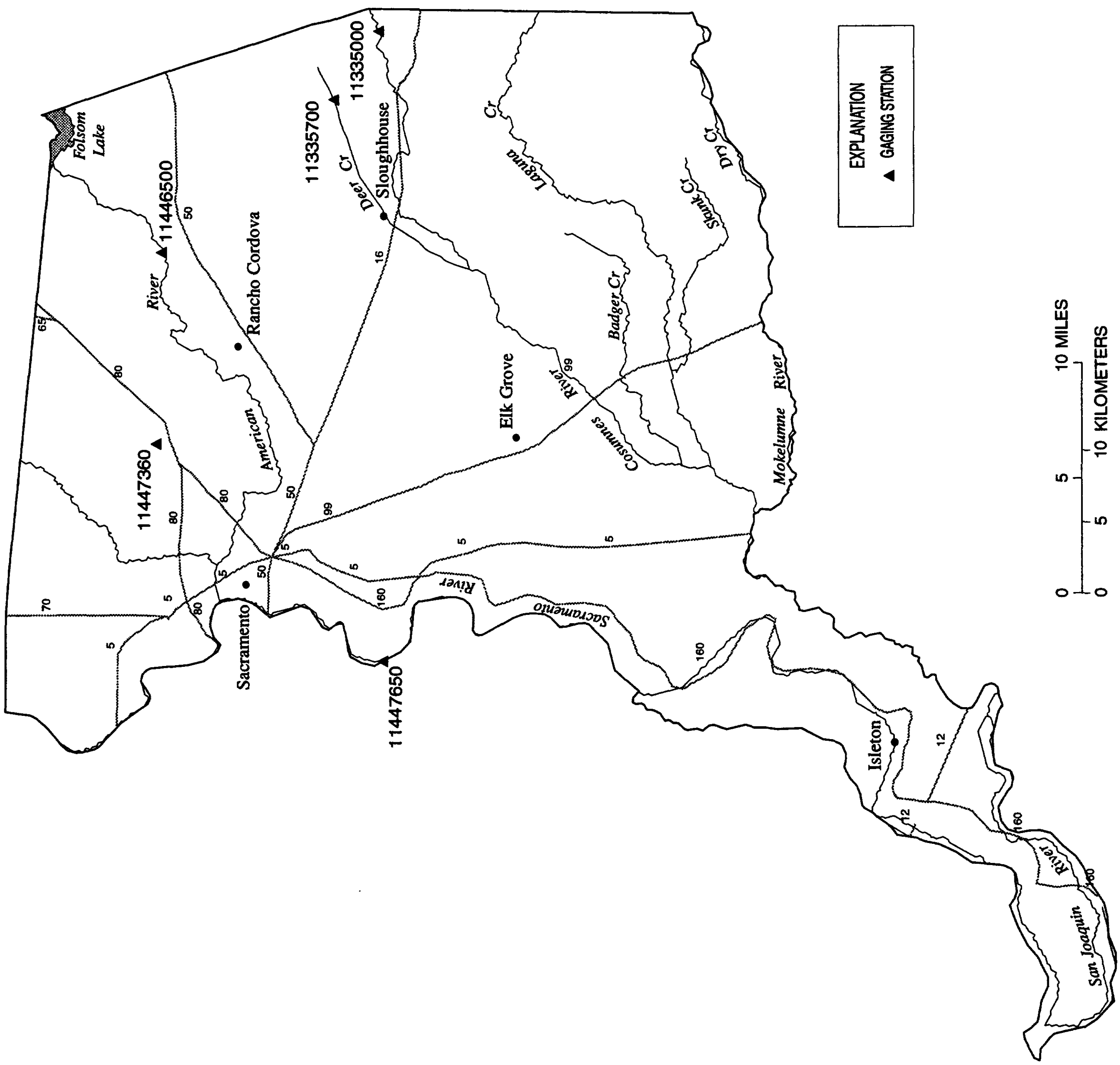

Figure 36. Location of streamflow gaging stations in Sacramento County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak							
						Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent)		Recurrence interval, (years)	
										1996	1997	1996	1997
SACRAMENTO													
11335000	Cosumnes River at Michigan Bar	536.	Minor	90	91	1/ 2/97	18.20	93,000	174	0.38	0.66	263	152
11335700	Deer Creek near Sloughhouse	46.0	None	18	41	1/ 2/97	13.00	7,200	157	4.2	5.0	24	20
11446500	American River at Fair Oaks	1,888.	Regulated	42	--	1/ 2/97	26.40	117,000	62.0	4.4	5.0	23	20
11447360	Arcade Creek near Del Paso Heights	31.4	None	17	--	1/ 1/97	13.41	1,510	48.0	47.3	47.3	2	2
11447650	Sacramento River at Freeport	--	Regulated	49	89	1/3/97	123.83	114,300	--	0.60	1.15	167	87

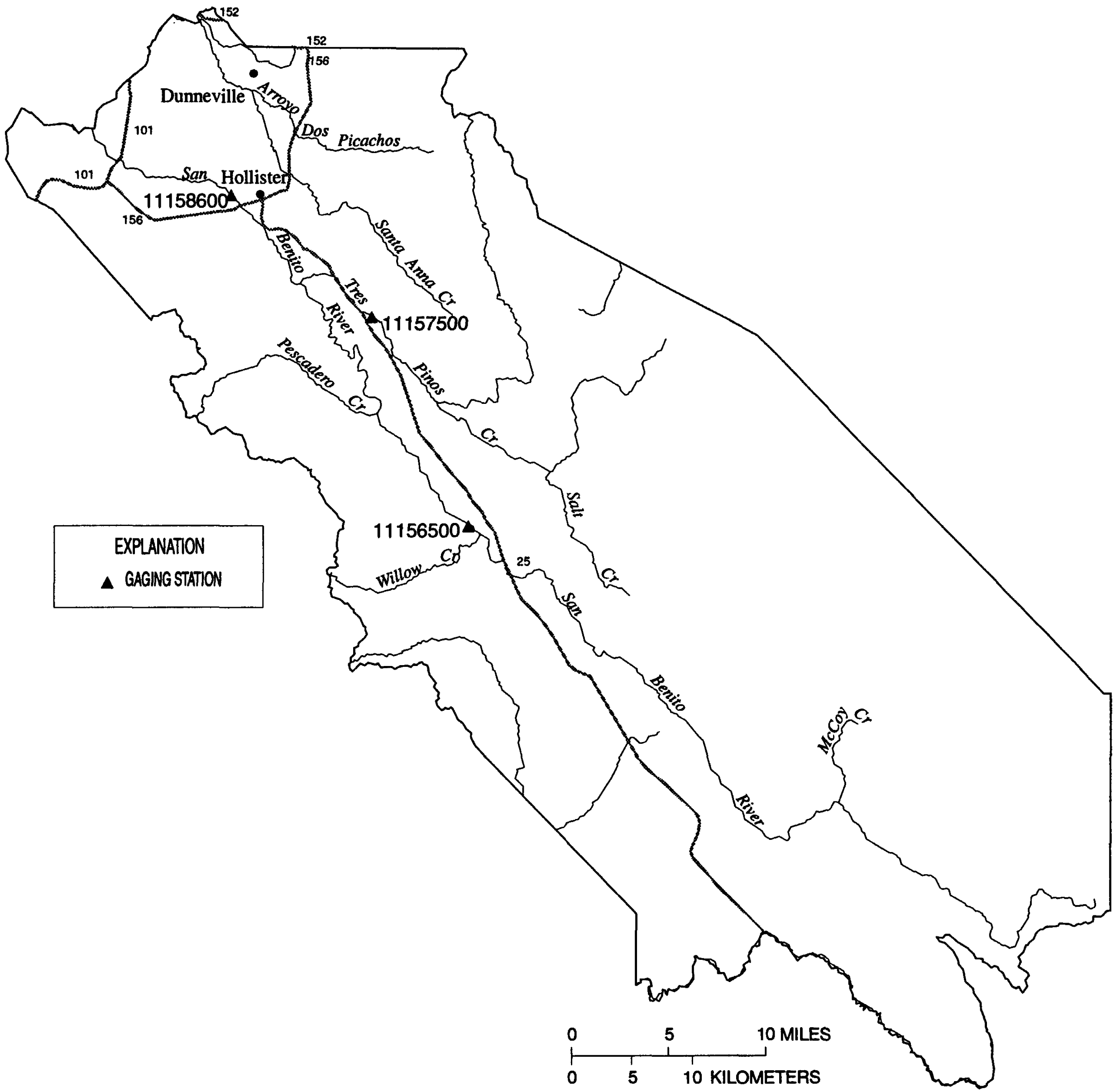

Figure 37. Location of streamflow gaging stations in San Benito County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent): 1996	Exceedance probability, (percent): 1997	Recurrence interval, (years): 1996	Recurrence interval, (years): 1997
					SAN BENITO								
11156500	San Benito River near Willow Creek School	249.	Minor	59	70	1/26/97	8.12	1,300	5.22	28.0	28.0	4	4
						1/ 2/97	6.64	410	1.65	55.5	56.2	2	2
11157500	Tres Pinos Creek near Tres Pinos	208	None	45	--	1/ 2/97	8.61	6,340	30.5	9.0	9.0	11	11
11158600	San Benito River at Highway 156 near Hollister	607.	Minor	27	39	1/26/97	9.62	7,350	12.1	9.3	10.6	11	9
						1/ 2/97	8.58	5,520	9.09	12.8	14.1	8	7

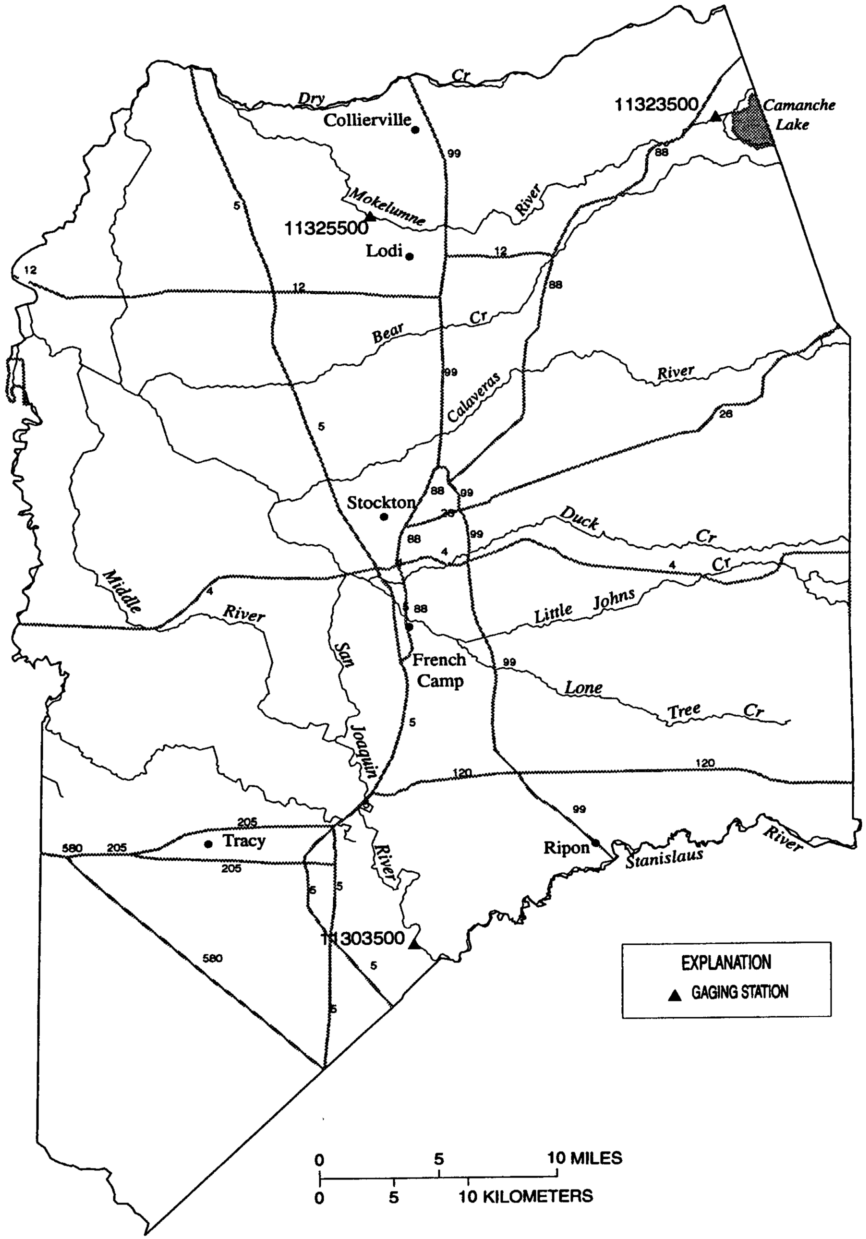

Figure 38. Location of streamflow gaging stations in San Joaquin County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent) 1996	1997	Recurrence interval, (years) 1996	1997
						SAN JOAQUIN							
11303500	San Joaquin River near Vernalis	13,536.	Regulated	19	46	1/ 5/97	34.88	75,600	5.59	--	<2.1	--	>48
11323500	Mokelumne River below Camanche Dam	627.	Regulated	33	--	1/ 2/97	10.51	5,440	8.68	5.3	6.3	19	16
11325500	Mokelumne River at Woodbridge	661.	Regulated	33	34	1/23/97	38.01	5,070	7.67	4.9	5.3	20	19

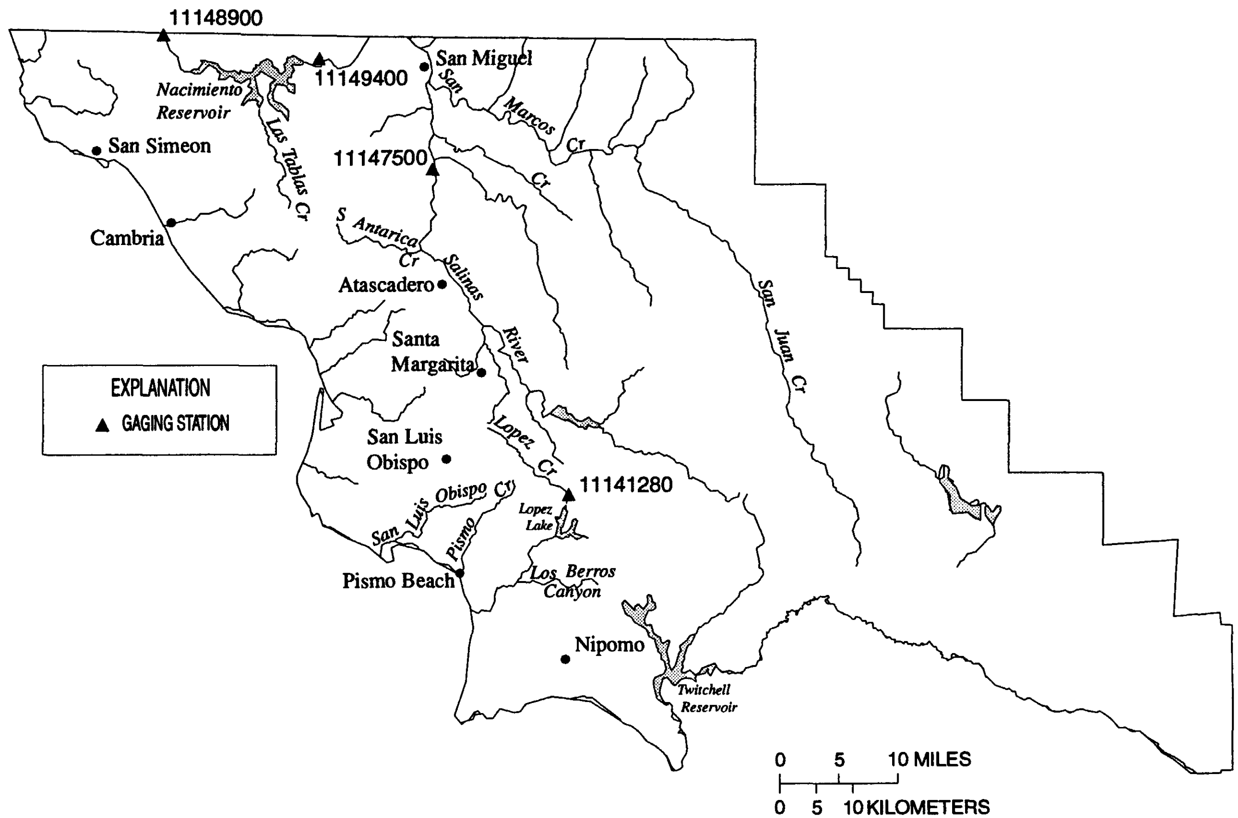

Figure 39. Location of streamflow gaging stations in San Luis Obispo County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	1997 Peak: Stage (ft)	1997 Peak: Flow (ft^3/s)	1997 Peak: Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent): 1996	Exceedance probability, (percent): 1997	Recurrence interval, (years): 1996	Recurrence interval, (years): 1997
	SAN LUIS OBISPO												
11141280	Lopez Creek near Arroyo Grande	20.9	None	30	68	1/ 2/97	7.30	741	35.4	29.0	29.0	3	3
11147500	Salinas River at Paso Robles	390.	Minor	55	92	1/ 2/97	13.63	9,760	25.0	18.0	18.3	6	5
11148900	Nacimiento River below Sapaque Creek near Bryson	162.	None	26	92	12/10/96	21.40	14,300	88.3	44.6	44.6	2	2
						1/ 1/97	19.55	10,600	65.4	58.7	59.3	2	2
11149400	Nacimiento River below Nacimiento Dam near Bradley	329.	Regulated	40	--	1/ 3/97	9.37	4,720	14.4	20.5	21.2	5	5

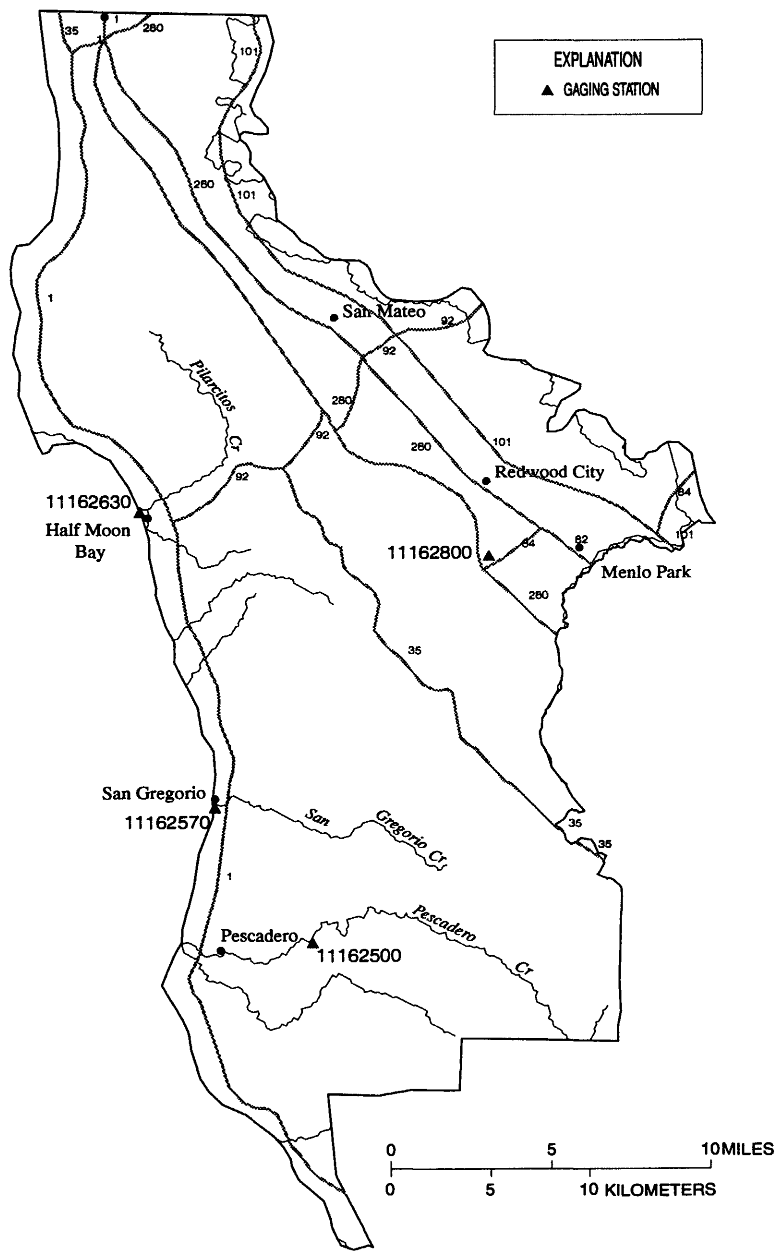

Figure 40. Location of streamflow gaging stations in San Mateo County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent) 1996	Exceedance probability, (percent) 1997	Recurrence interval, (years) 1996	Recurrence interval, (years) 1997
				SAN MATEO									
11162500	Pescadero Creek near Pescadero	45.9	None	46	68	1/ 1/97	12.91	3,340	72.8	27.0	27.0	4	4
11162570	San Gregorio Creek at San Gregorio	50.9	None	26	41	1/ 1/97	18.74	6,100	120	4.6	5.3	22	19
11162630	Pilarcitos Creek at Half Moon Bay	27.1	None	31	41	1/ 2/97	11.29	1,700	62.7	10.2	11.2	10	9
11162800	Redwood Creek at Redwood City	1.82	None	38	39	1/ 2/97	5.63	245	135	42.0	42.0	2	2

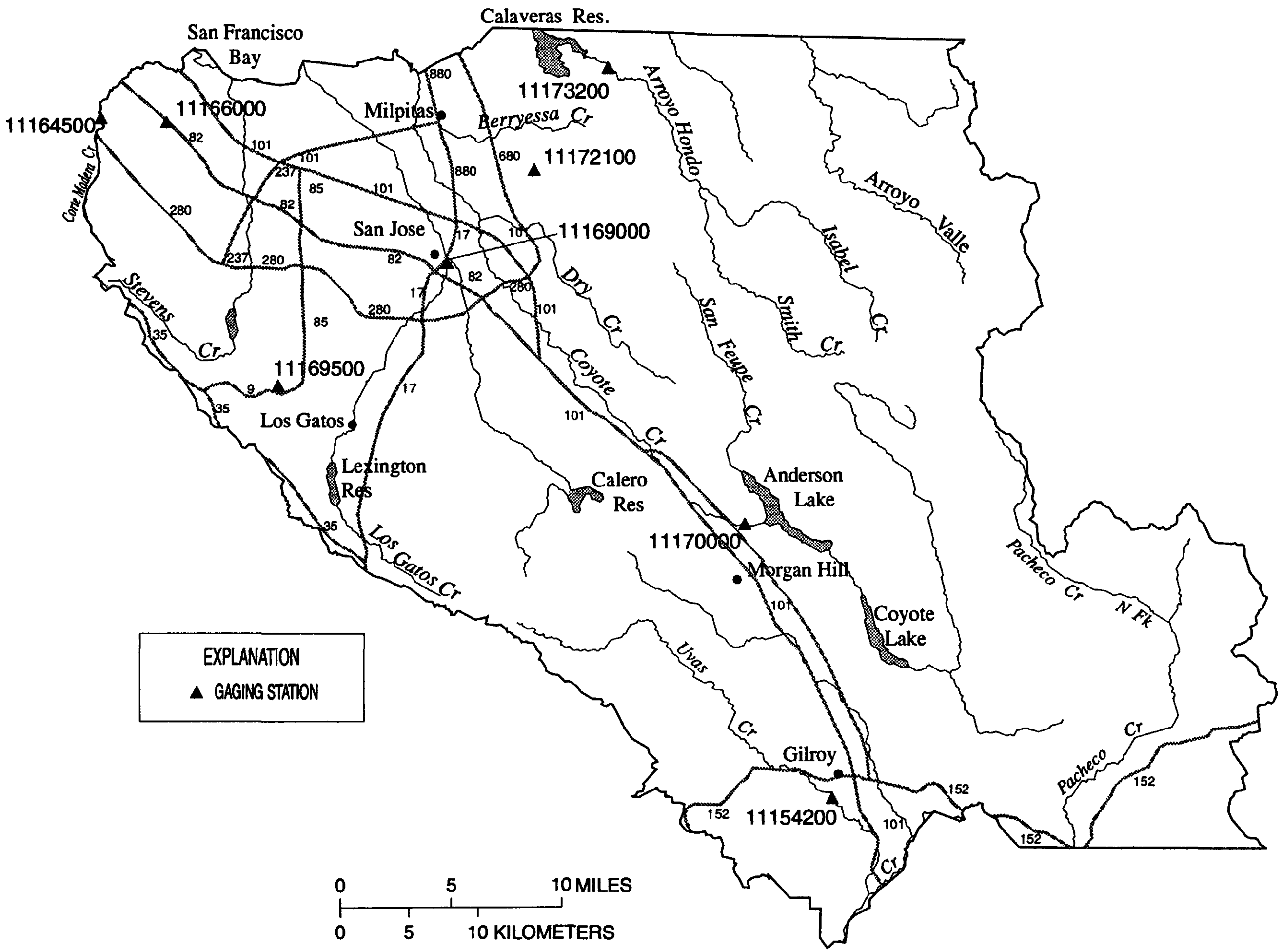

Figure 41. Location of streamflow gaging stations in Santa Clara County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent): 1996	Exceedance probability, (percent): 1997	Recurrence interval, (years): 1996	Recurrence interval, (years): 1997
			SANTA CLARA										
11154200	Uvas Creek near Gilroy	71.2	Partial	35	--	1/ 2/97	24.55	8,850	124	5.7	5.7	18	18
11164500	San Francisquito Creek at Stanford University	37.4	Minor	58	68	1/ 2/97	7.95	2,690	71.9	21.5	21.5	5	5
11166000	Matadero Creek at Palo Alto	7.26	None	44	68	1/ 2/97	5.36	503	69.3	32.0	32.0	3	3
11169000	Guadalupe River at San Jose	146.	Partial	43	68	1/26/97	9.42	5,460	37.4	19.7	20.0	5	5
						1/ 1/97	7.50	4,090	28.0	31.0	31.5	3	3
11169500	Saratoga Creek at Saratoga	9.22	Minor	64	68	1/ 1/97	5.82	820	88.9	23.0	23.0	4	4
11170000	Coyote Creek near Madrone	196.	Partial	38	52	1/26/97	10.84	6,280	32.0	1.5	2.3	67	43
11172100	Upper Penitencia Creek at San Jose	21.5	Minor	28	65	1/22/97	5.59	754	35.1	25.0	25.0	4	4
11173200	Arroyo Hondo near San Jose	77.1	None	16	--	1/ 2/97	12.42	4,040	52.4	35.3	35.3	3	3

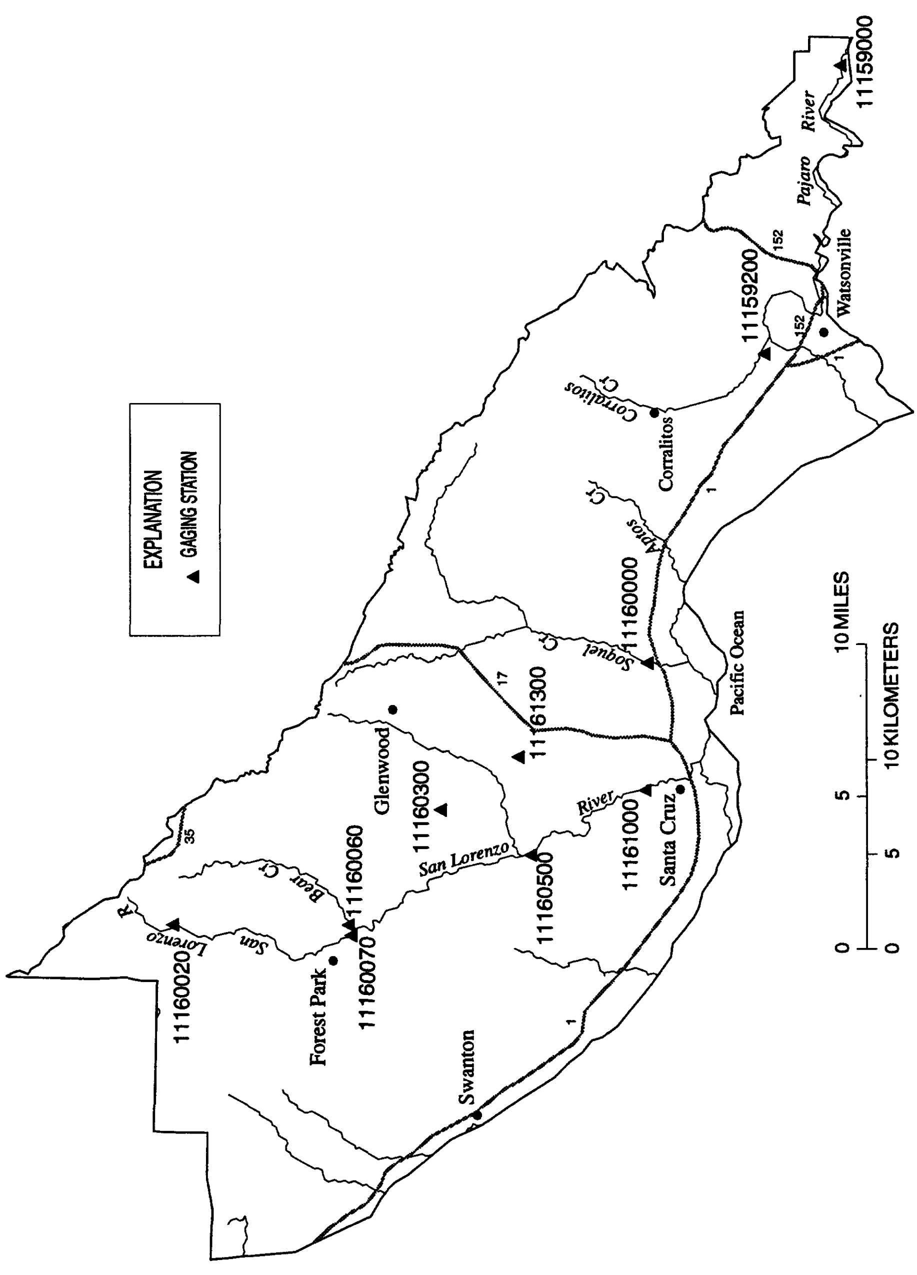

Figure 42. Location of streamflow gaging stations in Santa Cruz County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent): 1996	1997	Recurrence interval, (years): 1996	1997
				SANTA CRUZ									
11159000	Pajaro River at Chittenden	1,186.	Minor	58	70	1/ 3/97	29.53	15,800	13.3	7.1	7.4	14	14
11159200	Corralitos Creek at Freedom	27.8	None	42	68	12/10/96	13.63	3,470	125	6.2	7.3	16	14
						1/ 2/97	11.80	2,900	104	10.0	11.1	10	9
11160000	Soquel Creek at Soquel	40.2	None	48	68	12/10/96	15.23	6,860	171	10.0	10.7	10	9
						1/ 1/97	12.53	4,360	108	23.7	25.1	4	4
11160020	San Lorenzo River near Boulder Creek	6.17	None	25	41	12/10/96	8.25	610	98.9	16.2	16.2	6	6
11160060	Bear Creek at Boulder Creek	16.0	None	16	41	12/10/96	9.42	2,360	148	12.0	12.0	8	8
11160070	Boulder Creek at Boulder Creek	11.3	None	17	41	12/10/96	7.19	2,300	204	5.0	5.0	20	20
11160300	Zayante Creek at Zayante	11.1	None	36	41	12/10/96	5.95	1,760	159	26.4	26.4	4	4
11160500	San Lorenzo River at Big Trees	106.	Minor	61	68	12/10/96	18.65	12,500	118	19.8	19.8	5	5
						1/ 1/97	17.02	9,960	94.0	26.8	27.2	4	4
11161000	San Lorenzo River at Santa Cruz	115.	Minor	18	--	12/10/96	16.41	14,800	129	12.2	13.7	8	7
						1/ 1/97	15.11	11,400	99.1	19.0	21.0	5	5
11161300	Carbonera Creek at Scotts Valley	3.60	None	13	15	12/10/96	11.84	1,610	447	<0.20	1.46	>500	68
						1/ 1/97	8.08	367	102	90.7	90.0	1	1

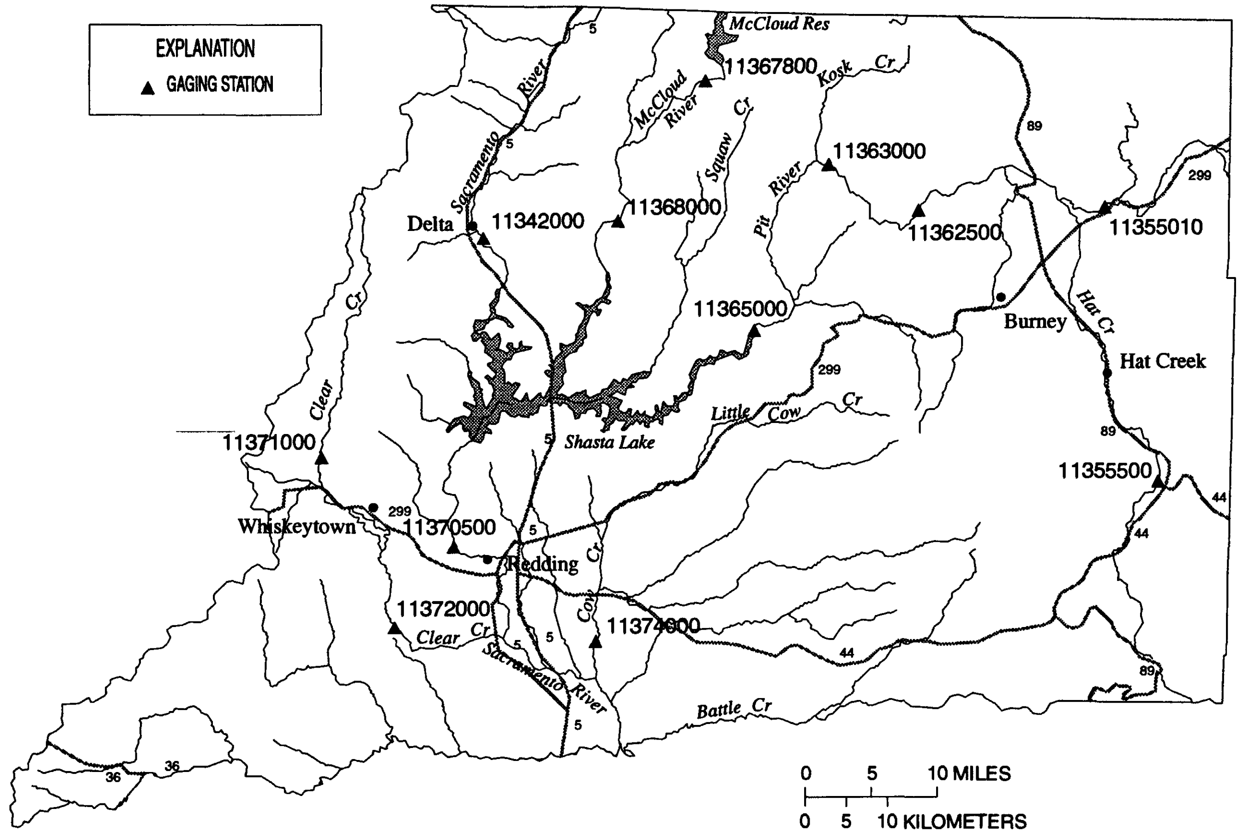

Figure 43. Location of streamflow gaging stations in Shasta County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent) 1996	Exceedance probability, (percent) 1997	Recurrence interval, (years) 1996	Recurrence interval, (years) 1997
				SHASTA									
11342000	Sacramento River at Delta	425.	Minor	53	88	1/ 1/97	25.22	62,300	147	1.08	1.44	93	69
11355010	Pit River below Pit No. 1 Powerhouse near Fall River Mills	3,761.	Minor	23	88	1/ 4/97	15.05	21,600	5.74	3.9	5.1	26	20
11355500	Hat Creek near Hat Creek	162.	None	70	90	1/ 3/97	7.41	1,460	9.01	4.8	4.8	21	21
11362500	Pit River below Pit No. 4 Dam	4,648.	Minor	75	88	1/ 4/97	16.65	25,500	5.49	5.2	5.7	19	18
11363000	Pit River at Big Bend	4,710.	Minor	87	88	1/ 4/97	18.36	41,000	8.70	2.8	3.3	36	30
11365000	Pit River near Montgomery Creek	4,952.	Minor	52	88	1/ 3/97	75.30	59,400	12.0	2.9	3.7	34	27
11367800	McCloud River at Ah-Di-Na near McCloud	427.	None	34	88	1/ 1/97	14.77	31,700	74.2	1.57	1.73	64	58
11368000	McCloud River above Shasta Lake	604.	Minor	52	88	1/ 1/97	29.00	51,300	84.9	1.40	1.63	71	61
11370500	Sacramento River at Keswick	6,468.	Regulated	52	--	1/ 4/97	32.67	78,900	12.2	4.4	4.8	23	21
11371000	Clear Creek at French Gulch	115.	None	44	57	1/ 2/97	14.67	11,500	100	1.67	2.2	60	45
11372000	Clear Creek near Igo	228.	Regulated	33	39	1/ 2/97	12.11	16,400	71.9	1.57	2.5	64	40
11374000	Cow Creek near Millville	425.	None	48	57	1/ 1/97	17.19	22,300	52.5	46.7	46.7	2	2

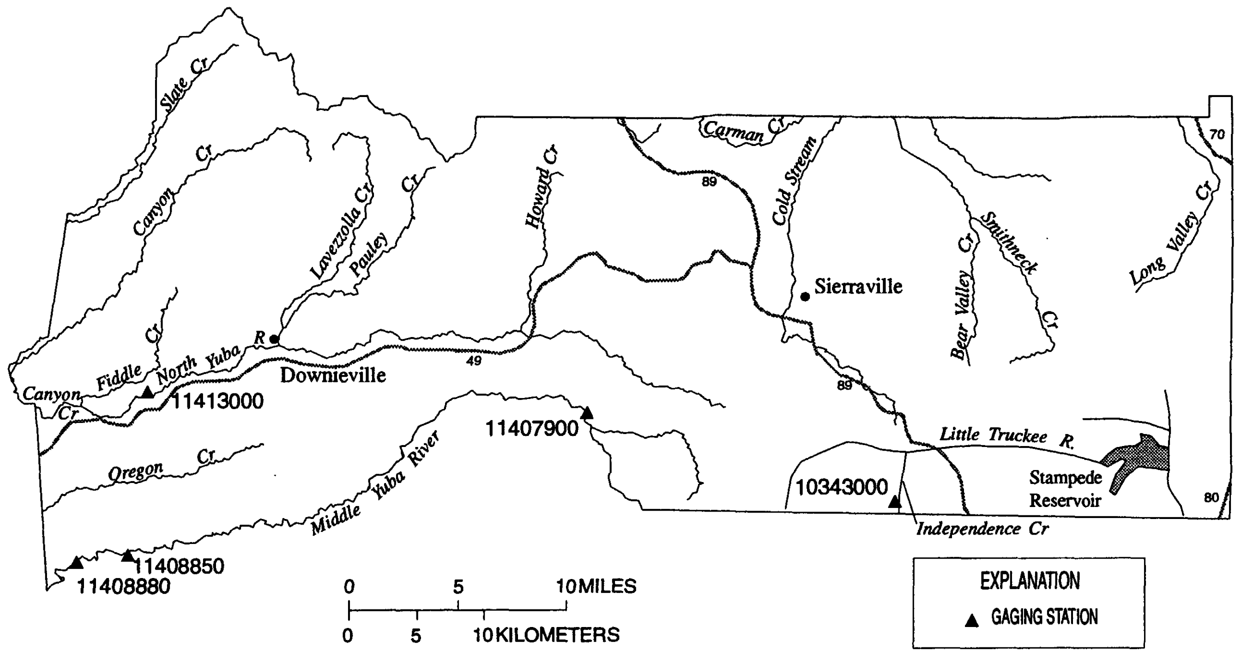

Figure 44. Location of streamflow gaging stations in Sierra County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent): 1996	1997	Recurrence interval, (years): 1996	1997
	SIERRA												
10343000	Independence Creek near Truckee	8.10	Regulated	30	--	1/ 3/97	6.20	329	40.6	2.6	3.9	38	26
11407900	Middle Yuba River below Jackson Meadows Dam near Sierra City	38.3	Regulated	24	34	1/ 1/97	--	9,900	258	--	<2.9	--	>34
11408850	Middle Yuba River near Camptonville	136.	Partial	24	34	1/ 1/97	23.70	47,000	346	0.49	1.45	204	69
11408880	Middle Yuba River below Our House Dam	145.	Partial	29	32	1/ 2/97	34.00	27,100	187	1.12	2.3	89	43
11413000	North Yuba River below Goodyears Bar	250.	None	67	90	1/ 2/97	25.65	45,500	182	1.22	1.57	82	64

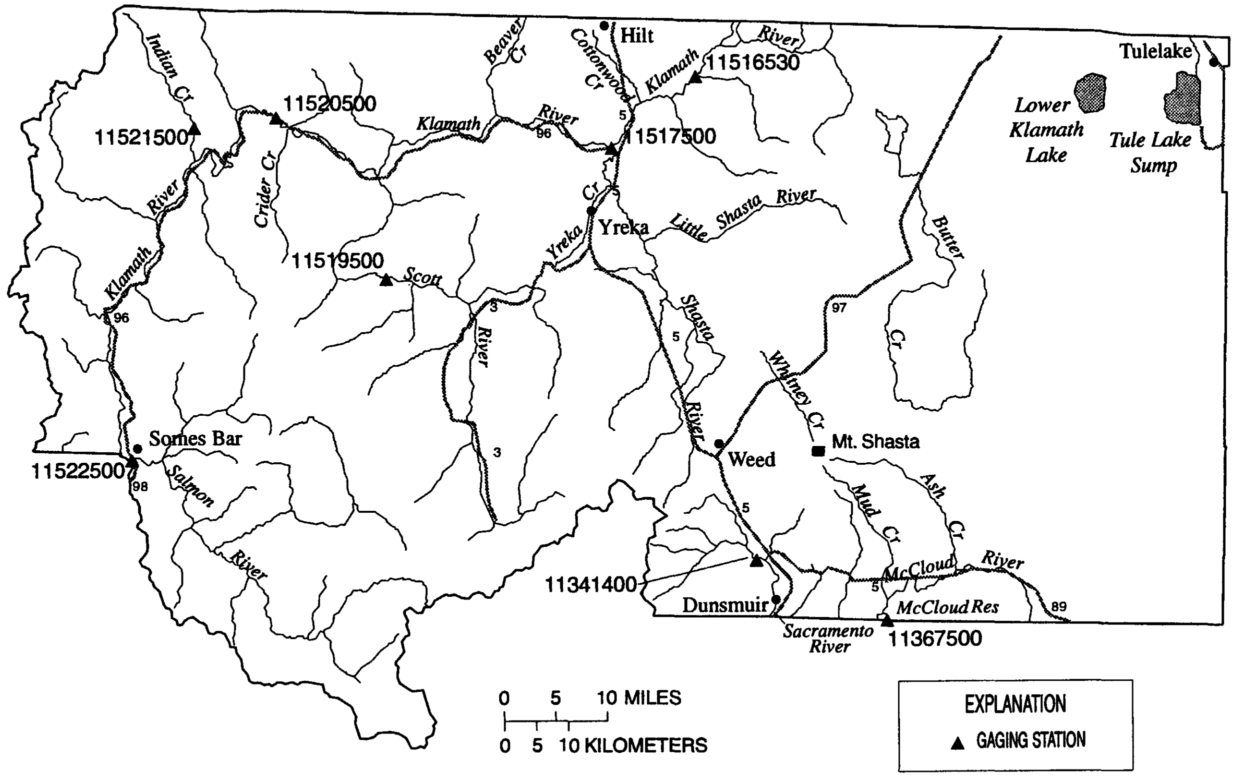

Figure 45. Location of streamflow gaging stations in Siskiyou County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent) 1996	1997	Recurrence interval, (years) 1996	1997
				SISKIYOU									
11341400	Sacramento River near Mt. Shasta	135.	Partial	20	57	1/ 1/97	16.72	16,400	121	1.25	1.61	80	62
11367500	McCloud River near McCloud	358.	None	66	88	1/ 1/97	11.22	15,500	43.3	1.08	1.40	93	71
11516530	Klamath River below Iron Gate Dam	4,630.	Partial	37	87	1/ 1/97	13.08	20,500	4.43	4.1	5.0	24	20
11517500	Shasta River near Yreka	793.	Minor	62	136	1/ 1/97	12.27	11,400	14.4	0.95	1.17	105	85
11519500	Scott River near Fort Jones	653.	None	56	136	1/ 1/97	23.47	34,000	52.1	2.3	2.9	43	34
11520500	Klamath River near Seiad Valley	6,940.	Minor	59	87	1/ 1/97	28.72	117,000	16.9	3.6	4.0	28	25
11521500	Indian Creek near Happy Camp	120.	None	46	87	1/ 1/97	17.68	21,200	177	2.4	2.8	42	36
11522500	Salmon River at Somes Bar	751.	None	73	135	1/ 1/97	27.66	90,000	120	1.4	1.72	71	58

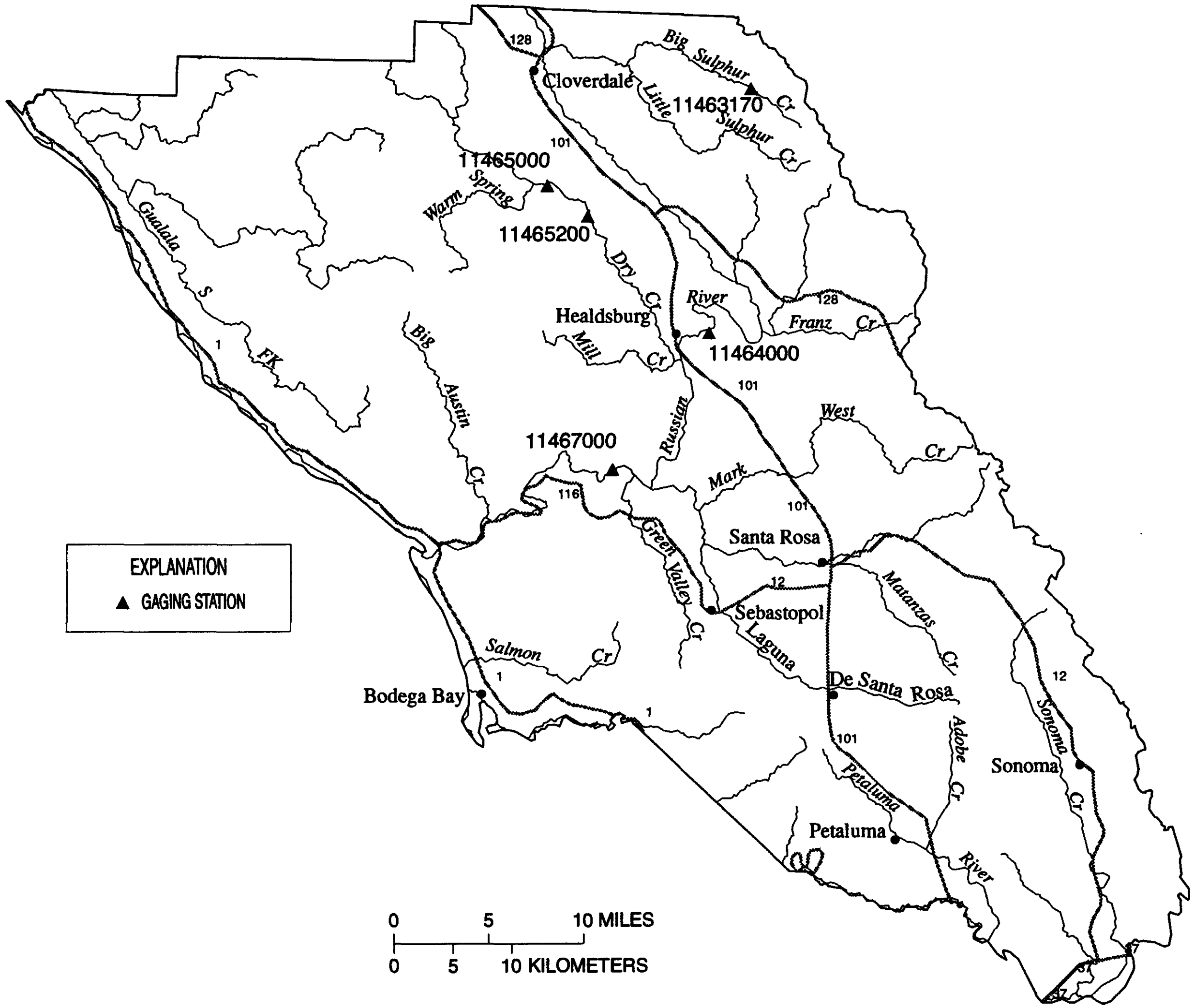

Figure 46. Location of streamflow gaging stations in Sonoma County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [$(ft^3/s)/mi^2$]	Exceedance probability, (percent) 1996	1997	Recurrence interval, (years) 1996	1997
	SONOMA												
11463170	Big Sulphur Creek at G Resort near Cloverdale	13.1	None	17	57	1/ 1/97	10.79	8,960	684	0.27	0.66	370	152
11464000	Russian River near Healdsburg	793.	Partial	58	--	1/ 1/97	24.61	65,700	82.8	5.9	6.6	17	15
11465000	Dry Creek below Warm Springs Dam near Geyserville	131.	Regulated	15	--	1/ 6/97	9.70	4,160	31.8	15.0	16.6	7	6
11465200	Dry Creek near Geyserville	162.	Regulated	15	17	1/19/97	13.90	6,500	40.1	16.7	19.3	6	5
						1/ 1/97	12.94	5,270	32.5	25.2	27.7	4	4
11467000	Russian River near Guerneville	1,338.	Partial	58	--	1/ 1/97	44.99	82,100	61.4	10.8	11.0	9	9

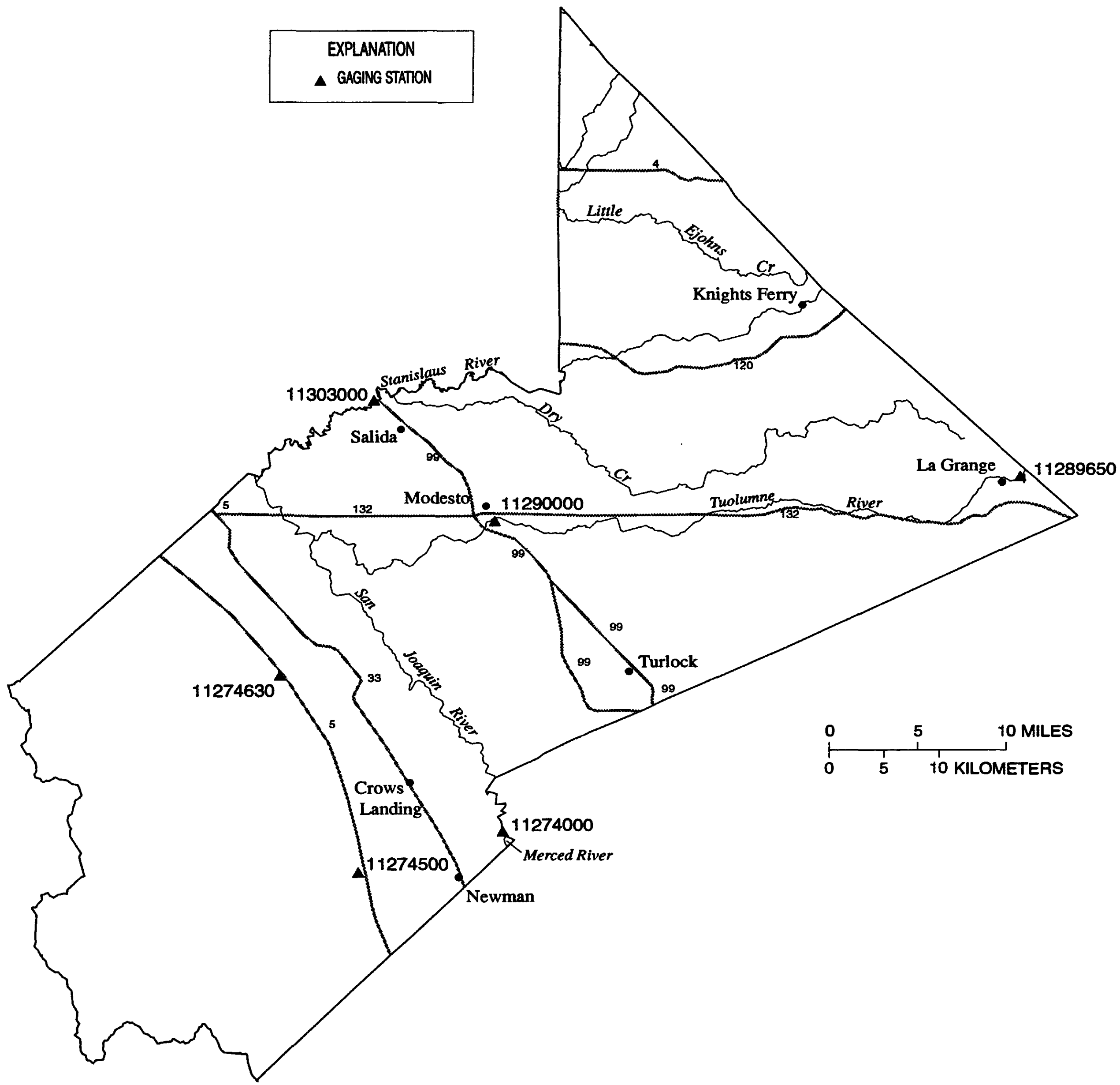

Figure 47. Location of streamflow gaging stations in Stanislaus County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent) 1996	Exceedance probability, (percent) 1997	Recurrence interval, (years) 1996	Recurrence interval, (years) 1997
				STANISLAUS									
11274000	San Joaquin River near Newman	9,520.	Regulated	30	59	1/28/97	66.14	31,000	3.26	1.52	2.3	66	43
						1/ 7/97	65.79	27,700	2.91	3.3	4.6	30	22
11274500	Orestimba Creek near Newman	134.	None	66	86	1/ 2/97	6.75	3,350	25.0	22.0	22.0	5	5
11274630	Del Puerto Creek near Patterson	72.6	None	39	--	1/23/97	8.51	1,860	25.6	9.0	10.0	11	10
						1/ 1/97	5.27	712	9.81	24.4	26.0	4	4
11289650	Tuolumne River below Lagrange Dam near Lagrange	1,538.	Regulated	27	46	1/ 3/97	28.43	59,000	38.4	--	<2.1	--	>48
11290000	Tuolumne River at Modesto	1,884.	Regulated	27	46	1/ 4/97	71.21	55,800	29.6	--	<2.1	--	>48
11303000	Stanislaus River at Ripon	1,075.	Regulated	19	--	1/12/97	55.95	6,630	6.17	6.2	7.9	16	13

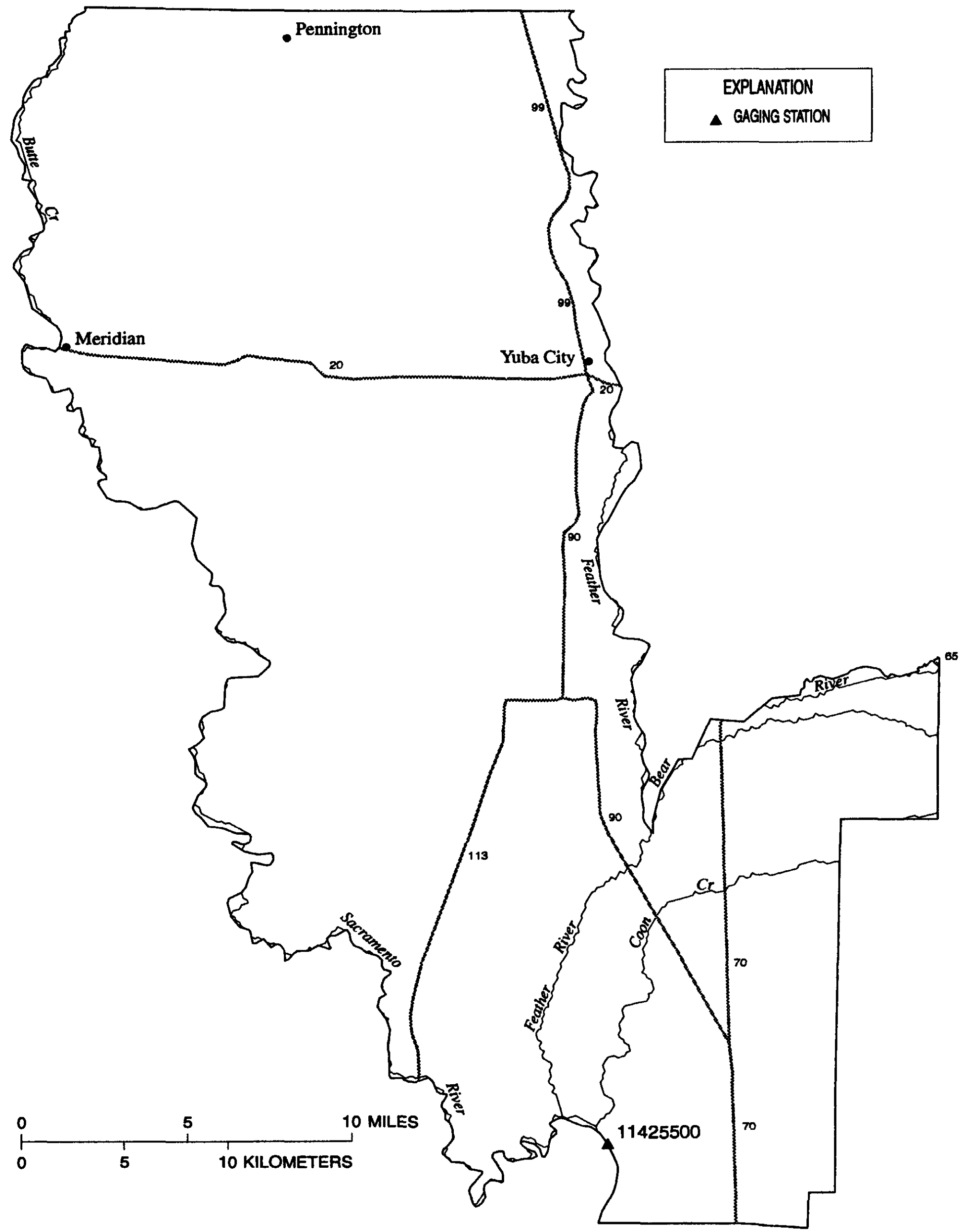

Figure 48. Location of streamflow gaging stations in Sutter County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak							
						Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent)		Recurrence interval, (years)	
										1996	1997	1996	1997
SUTTER													
11425500	Sacramento River at Verona	21,251.	Regulated	52	68	1/ 2/97	40.40	86,500	4.07	2.3	2.8	43	36

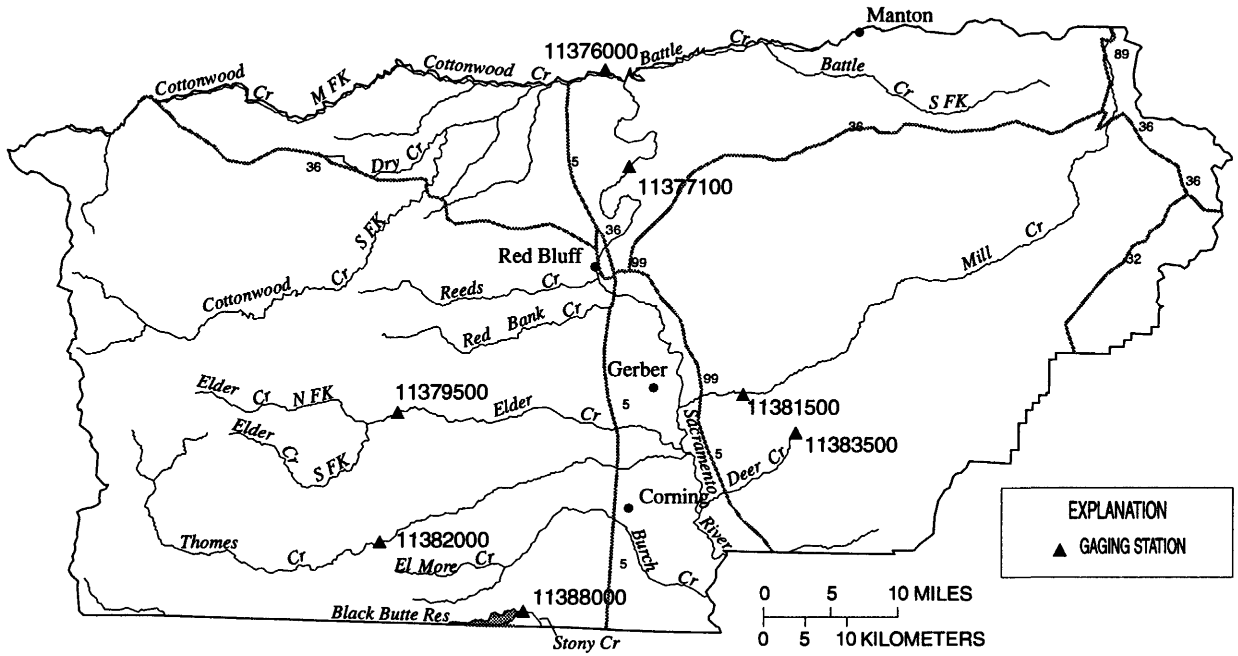

Figure 49. Location of streamflow gaging stations in Tehama County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent) 1996	Exceedance probability, (percent) 1997	Recurrence interval, (years) 1996	Recurrence interval, (years) 1997
				TEHAMA									
11376000	Cottonwood Creek near Cottonwood	927.	None	57	--	1/ 1/97	15.90	36,000	38.8	23.5	23.5	4	4
11377100	Sacramento River above Bend Bridge near Red Bluff	8,900.	Regulated	52	--	1/ 1/97	29.78	116,200	13.1	17.0	17.0	6	6
11379500	Elder Creek near Paskenta	92.4	None	49	--	12/31/96	10.67	11,500	124	9.0	9.7	11	10
11381500	Mill Creek near Los Molinos	131.	None	69	90	1/ 1/97	17.10	20,600	157	1.73	2.2	58	45
11382000	Thomes Creek at Paskenta	203.	None	77	--	1/ 1/97	11.33	25,800	127	4.7	5.1	21	20
11383500	Deer Creek near Vina	208.	None	81	90	1/ 1/97	15.50	20,750	99.8	2.4	2.7	42	37
11388000	Stony Creek below Black Butte Dam near Orland	738.	Partial	28	39	1/ 1/97	10.12	15,500	21.0	11.6	12.1	9	8

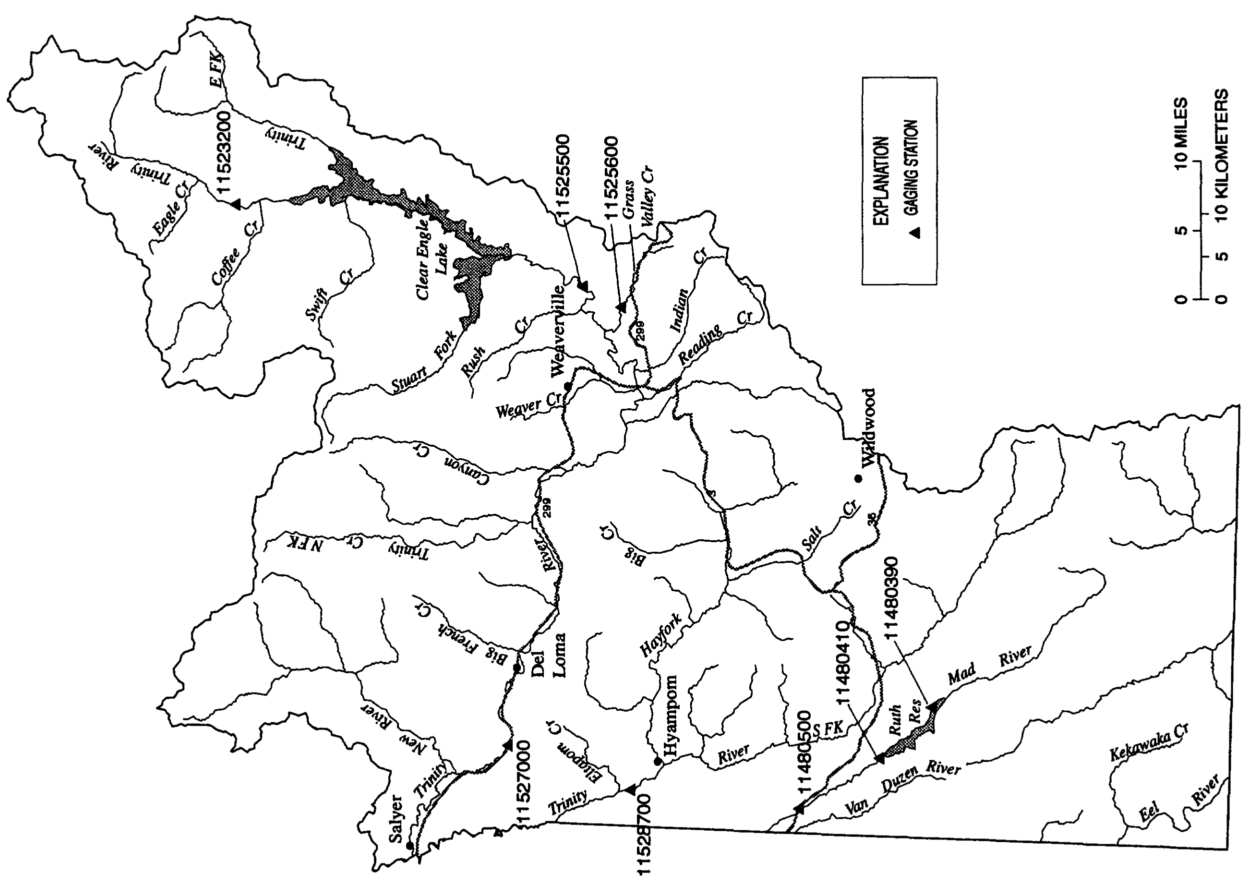

Figure 50. Location of streamflow gaging stations in Trinity County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak							
						Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent)		Recurrence interval, (years)	
										1996	1997	1996	1997
				TRINITY									
11480390	Mad River above Ruth Reservoir near Forest Glen	93.8	None	17	32	12/30/96	12.85	11,400	122	10.6	12.4	9	8
11480410	Mad River below Ruth Reservoir near Forest Glen	121.	Partial	17	32	1/ 1/97	15.76	15,500	128	6.3	7.8	16	13
11480500	Mad River near Forest Glen	143.	Partial	33	41	1/ 1/97	15.55	18,100	127	6.5	6.5	15	15
11523200	Trinity River above Coffee Creek near Trinity Center	149.	None	41	87	1/ 1/97	16.88	20,400	137	1.70	2.2	59	45
11525500	Trinity River at Lewiston	719.	Regulated	36	--	1/26/97	7.85	6,660	9.26	12.3	13.0	8	8
						1/ 7/97	7.67	6,040	8.40	14.0	14.9	7	7
11525600	Grass Valley Creek at Fawn Lodge near Lewiston	30.8	Minor	22	35	1/ 1/97	7.10	1,800	58.4	12.4	13.9	8	7
11527000	Trinity River near Burnt Ranch	1,439.	Regulated	36	39	1/ 1/97	28.01	69,900	48.6	3.8	4.7	26	21
11528700	South Fork Trinity River below Hyampom	764.	None	33	87	12/31/96	16.25	30,000	39.3	39.0	39.0	3	3

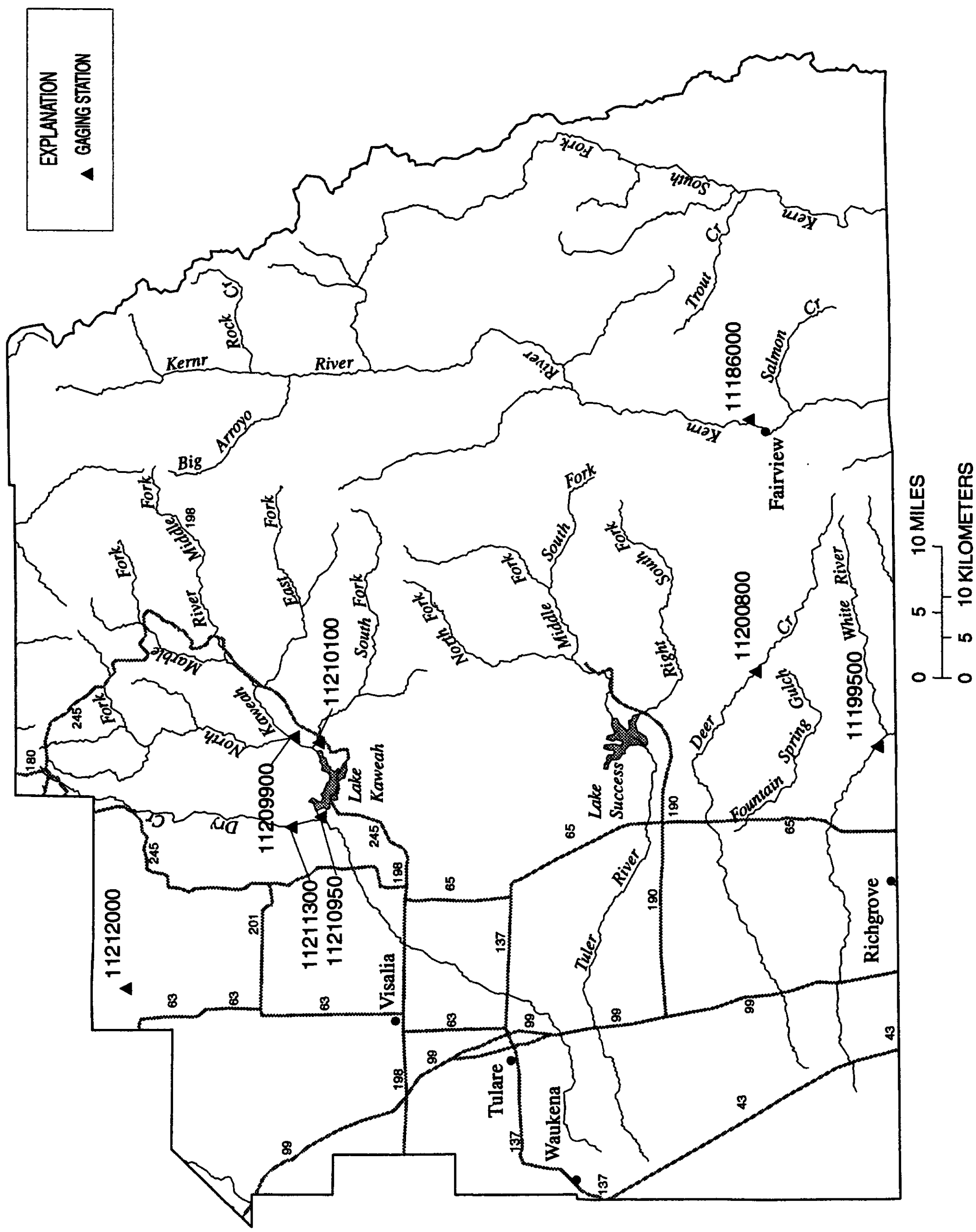

Figure 51. Location of streamflow gaging stations in Tulare County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	1997 Peak: Stage (ft)	1997 Peak: Flow (ft^3/s)	1997 Peak: Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent): 1996	Exceedance probability, (percent): 1997	Recurrence interval, (years): 1996	Recurrence interval, (years): 1997
	TULARE												
11186000	Kern River near Kernville	846.	None	86	104	1/2/97	--	43,100	51.0	1.35	1.73	74	58
11199500	White River near Ducor	90.6	None	36	--	1/3/97	4.54	696	7.68	15.3	16.1	7	6
11200800	Deer Creek near Fountain Springs	83.3	None	30	104	1/3/97	10.32	3,790	45.5	5.1	6.3	20	16
11209900	Kaweah River at Three Rivers	418.	None	34	101	1/2/97	15.73	54,900	131	1.96	2.3	51	43
11210100	South Fork Kaweah River at Three Rivers	86.7	None	34	101	1/2/97	7.76	8,520	98.3	2.7	3.1	37	32
11210950	Kaweah River below Terminus Dam	561.	Partial	28	39	1/19/97	--	3,150	5.61	25.0	25.0	4	4
11211300	Dry Creek near Lemoncove	75.6	None	37	101	1/2/97	8.75	4,380	57.9	7.8	7.8	13	13
11212000	Sand Creek near Orange Cove	31.6	None	37	53	1/2/97	4.74	411	13.0	17.4	17.4	6	6

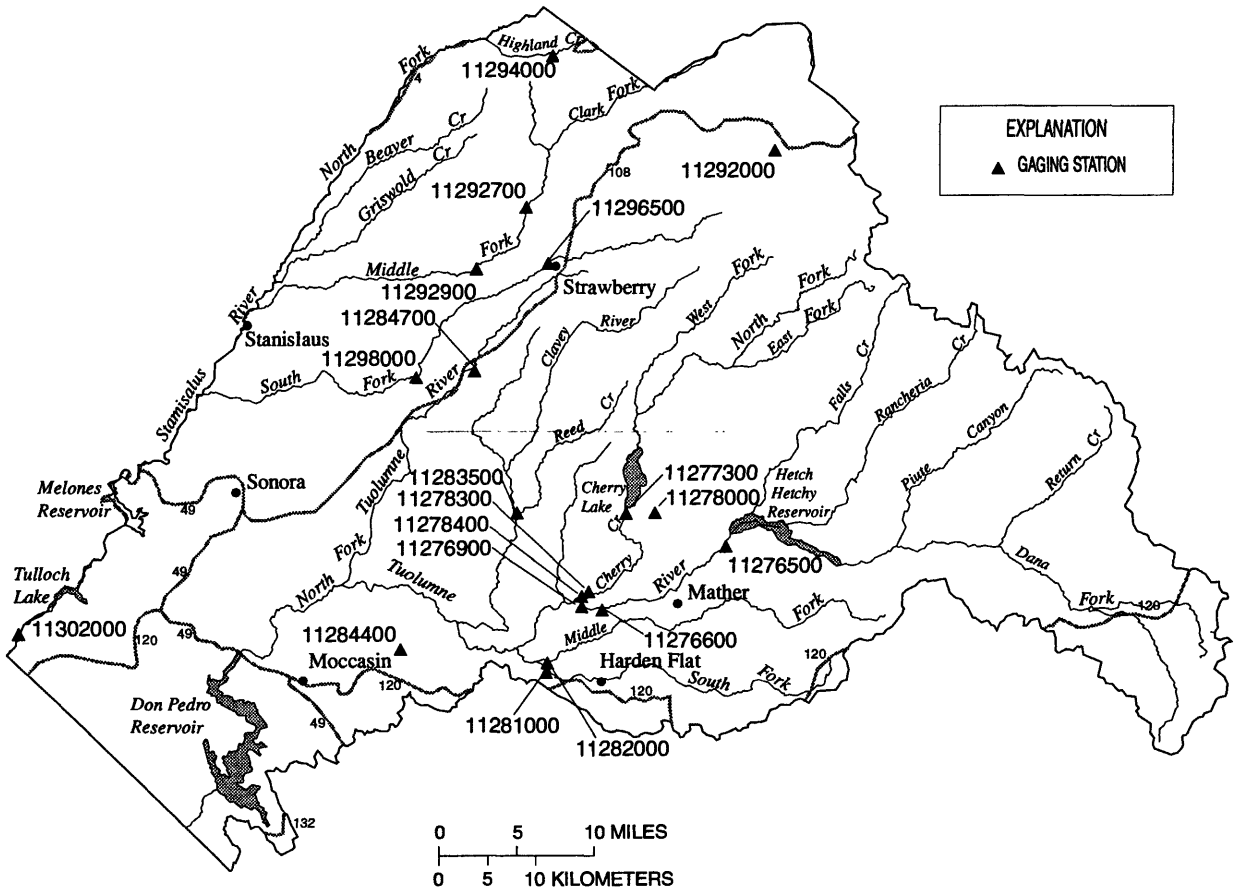

Figure 52. Location of streamflow gaging stations in Tuolumne County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [$(ft^3/s)/mi^2$]	Exceedance probability, (percent) 1996	Exceedance probability, (percent) 1997	Recurrence interval, (years) 1996	Recurrence interval, (years) 1997
	TUOLUMNE												
11276500	Tuolumne River near Hetch Hetchy	457.	Regulated	30	83	1/ 3/97	15.08	16,400	35.9	1.05	1.12	95	89
11276600	Tuolumne River above Early Intake near Mather	484.	Regulated	27	83	1/ 3/97	22.98	17,700	36.6	0.70	1.05	143	95
11276900	Tuolumne River below Early Intake near Mather	487.	Regulated	30	83	1/ 3/97	12.33	18,300	37.6	0.70	0.96	143	104
11277300	Cherry Creek below Valley Dam near Hetch Hetchy	118.	Regulated	37	--	1/ 2/97	9.20	2,650	22.5	10.8	11.4	9	9
11278000	Eleanor Creek near Hetch Hetchy	78.4	Partial	37	83	1/ 2/97	16.74	17,500	223	0.29	0.81	345	123
11278300	Cherry Creek near Early Intake	226.	Regulated	37	83	1/ 2/97	18.46	39,200	173	0.60	0.98	167	102
11278400	Cherry Creek below Dion R. Holm Powerhouse, near Mather	234.	Regulated	35	83	1/ 1/97	19.93	43,000	184	--	<1.19	--	>84
11281000	South Fork Tuolumne River near Oakland Recreation Camp	87.0	None	75	83	1/ 3/97	12.51	11,500	132	1.98	2.3	51	43
11282000	Middle Tuolumne River at Oakland Recreation Camp	73.5	None	81	83	1/ 3/97	13.02	6,300	85.7	0.55	0.86	182	116
11283500	Clavey River near Buck Meadows	144.	None	33	83	1/ 3/97	28.66	47,000	326	0.50	0.77	200	130
11284400	Big Creek above Whites Gulch near Groveland	16.4	None	29	33	1/ 1/97	6.94	2,500	152	7.4	8.3	14	12
11284700	North Fork Tuolumne River near Long Barn	23.1	None	27	46	1/ 3/97	9.16	2,400	104	6.1	6.8	16	15
11292000	Middle Fork Stanislaus River at Kennedy Meadows near Dardanelle	47.5	Partial	58	92	1/ 2/97	7.99	2,890	60.8	0.20	0.46	500	217
11292700	Middle Fork Stanislaus River at Hells Half Acre Bridge	287.	Partial	40	--	1/ 2/97	18.02	18,500	64.5	0.58	1.82	172	55
11292900	Middle Fork Stanislaus River below Beardsley Dam	316.	Regulated	40	92	1/ 2/97	19.31	43,000	136	--	<1.08	--	>93
11294000	Highland Creek below Spicer Meadows Reservoir	45.4	Regulated	9	--	12/19/96	4.90	699	15.4	61.3	61.3	2	2
						1/ 1/97	2.94	188	4.14	99.5	99.6	1	1
11296500	South Fork Stanislaus River at Strawberry	44.8	Partial	59	92	1/ 2/97	12.30	7,460	167	--	<1.08	--	>93
11298000	South Fork Stanislaus River near Long Barn	66.9	Partial	60	92	1/ 2/97	12.75	12,000	179	--	<1.08	--	>93
11302000	Stanislaus River below Goodwin Dam near Knights Ferry	986.	Regulated	19	--	1/ 3/97	15.59	7,190	7.29	1.95	5.0	51	20

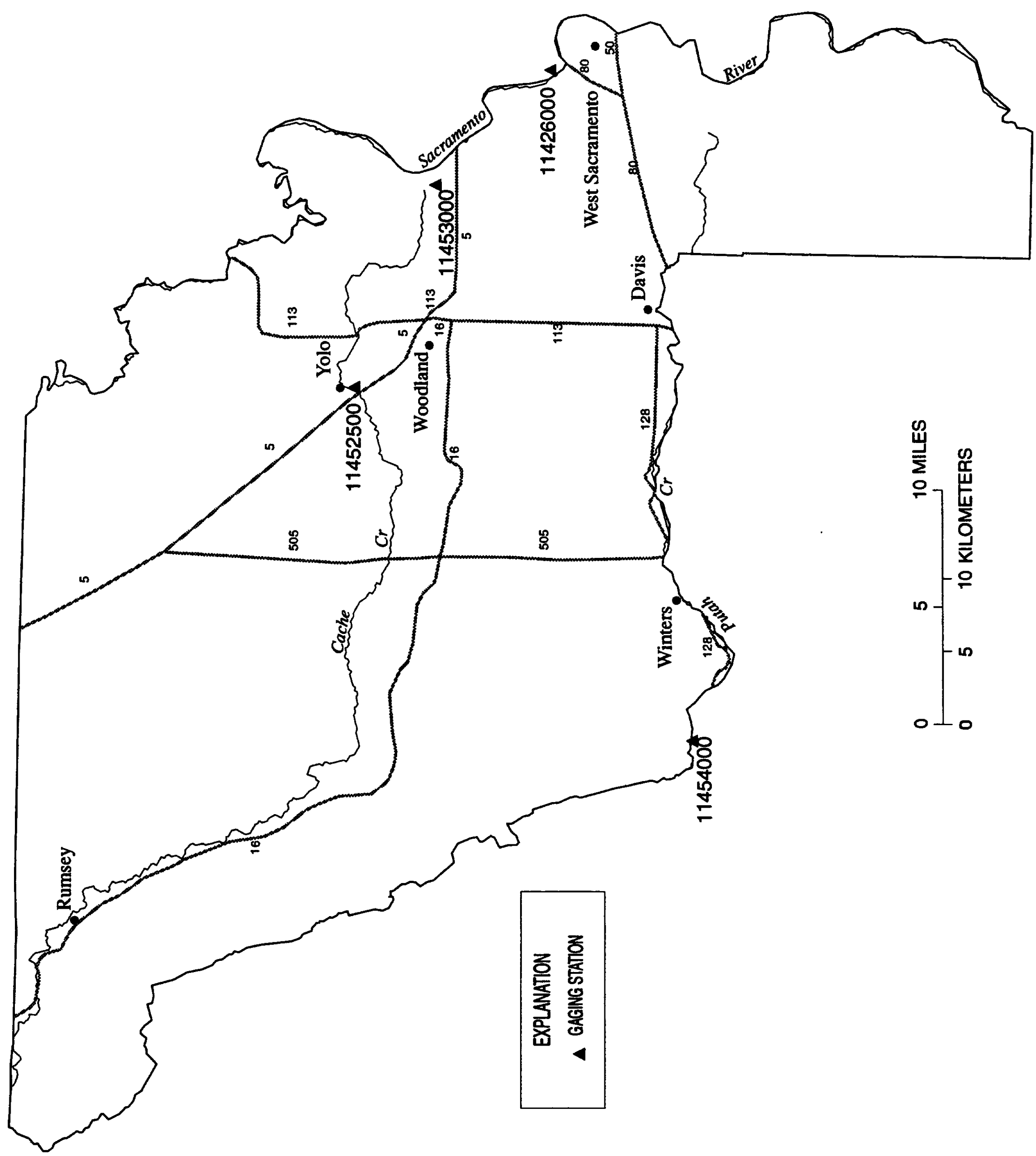

Figure 53. Location of streamflow gaging stations in Yolo County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak: Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [$(ft^3/s)/mi^2$]	Exceedance probability, (percent) 1996	Exceedance probability, (percent) 1997	Recurrence interval, (years) 1996	Recurrence interval, (years) 1997
				YOLO									
11426000	Sacramento Weir Spill to Yolo Bypass near Sacramento	--	Regulated	37	71	1/ 3/97	30.30	116,000	--	1.84	2.7	54	37
11452500	Cache Creek at Yolo	1,139.	Partial	23	32	1/ 1/97	80.91	28,700	25.2	8.3	9.4	12	11
11453000	Yolo Bypass near Woodland	--	Regulated	48	58	1/ 3/97	34.84	499,000	--	0.33	1.20	303	83
11454000	Putah Creek near Winters	574.	Regulated	41	--	1/26/97	18.39	14,800	25.8	4.0	4.9	25	20
						1/ 1/97	14.90	6,100	10.6	19.8	22.0	5	5

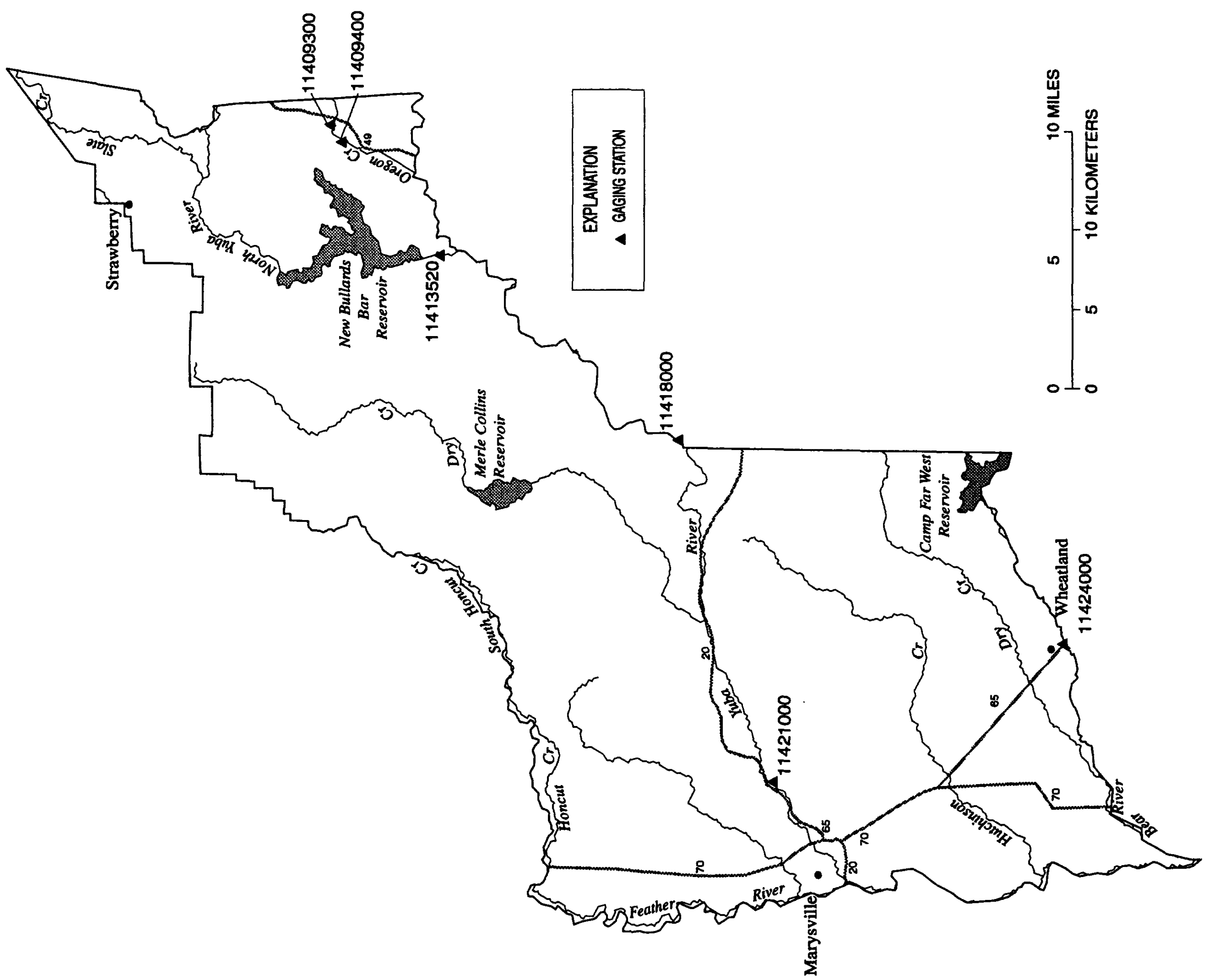

Figure 54. Location of streamflow gaging stations in Yuba County.

Table 2. Magnitude and frequency of 1997 annual peak flows at streamflow gaging stations, by county—Continued

Station number	Station name	Drainage area (mi^2)	Regulation	Period of record (years)	Historic period (years)	1997 Peak Date	Stage (ft)	Flow (ft^3/s)	Unit runoff [(ft^3/s)/mi^2]	Exceedance probability, (percent) 1996	1997	Recurrence interval, (years) 1996	1997
	YUBA												
11409300	Oregon Creek at Camptonville	23.0	None	30	32	1/ 1/97	11.32	5,300	230	2.1	3.2	48	31
11409400	Oregon Creek below Log Cabin Dam near Camptonville	29.1	None	29	32	1/ 2/97	15.56	5,940	204	2.8	4.2	36	24
11413520	North Yuba River below New Bullards Bar Dam near North San Juan	490.	Regulated	28	--	1/ 2/97	34.86	48,000	98.0	4.7	6.1	21	16
11418000	Yuba River below Englebright Dam near Smartville	1,108.	Partial	28	32	1/ 2/97	44.91	155,000	140	2.2	3.3	45	30
11421000	Yuba River near Marysville	1,339.	Regulated	28	32	1/ 2/97	91.64	150,000	112	2.2	3.2	45	31
11424000	Bear River near Wheatland	292.	Regulated	32	90	1/ 2/97	23.60	33,400	114	2.5	3.5	40	29

Table 3. Location and frequency analysis information for steamflow gaging stations, by station number

Station number	County	Latitude	Longitude	Period of record (water years)	Historic period (water years)	Thresholds (cubic feet per second)		Analysis method
						Low	High	
10293000	Mono	381940	1191250	1924-97	1901–97	900	1,600	Graphical
10295500	Mono	382139	1192638	1945–86,96–97	1901–97	50	2,000	WRC-Weighted
10296000	Mono	382247	1192657	1938–97	1901–97	339	10,000	WRC-Weighted
10296500	Mono	383055	1192715	1903–10,16–38,57–97	1901–97	369	10,000	WRC-Weighted
10308200	Alpine	384250	1194550	1961–97	1901–97	242	17,000	WRC-Weighted
10310000	Alpine	384610	1194955	1890–91,1901–20,38–97	1901–97	2,500	7,000	Graphical
10336610	El Dorado	385521	1195926	1972–74,78,80–97	1901–97	63	5,000	WRC-Weighted
10336645	El Dorado	390307	1200703	1981–97	1971–97	29	700	WRC-Weighted
10336660	Placer	390627	1200940	1961–97	1901–97	1,400	2,800	Graphical
10336676	Placer	390756	1200924	1973–97	1901–97	19	2,400	WRC-Weighted
10336780	El Dorado	385512	1195817	1961–97	1957–97	17	400	WRC-Weighted
10337500	Placer	390959	1200836	1938–97	—	1,700	—	Graphical
10338000	Nevada	391730	1201230	1945–61,63H,77–82,93–95,97H	1939–97	4,000	11,000	Graphical
10338500	Nevada	391925	1201400	1910,31–52,56–57,59–97	1908–97	50	800	WRC-Weighted
10339400	Nevada	391944	1200700	1972–90,93–97	—	550	—	Graphical
10340500	Nevada	392224	1200750	1964–97	1957–97	1,100	2,000	Graphical
10343000	Sierra	392724	1201710	1968–97	—	24	—	WRC-Station
10343500	Nevada	392554	1201413	1954–97	1908–97	5	1,200	WRC-Weighted
10344400	Nevada	392609	1200500	1970–97	1966–97	—	6,000	Indeterminate
10344500	Nevada	392313	1200540	1970–97	1952–97	206	2,650	WRC-Station
10346000	Nevada	392541	1200159	1970–97	1952–97	394	14,800	WRC-Station
10356500	Lassen	402503	1204015	1901H,3–5,17–21,51–94,97H	1941–97	3,000	5,000	Graphical
10358500	Lassen	402921	1203210	1951–93,97H	1941–97	550	1,100	Graphical
11141280	San Luis Obispo	351408	1202817	1968–97	1930–97	8	2,600	WRC-Weighted
11143000	Monterey	361445	1214620	1951–97	1906–97	296	10,000	WRC-Weighted
11143200	Monterey	362828	1214340	1956H,58–97	1906–97	100	15,000	WRC-Weighted
11143250	Monterey	363220	1215225	1963–97	1906–97	300	15,000	WRC-Weighted
11147500	San Luis Obispo	353743	1204100	1940–65,69H,70–97	1906–97	400	28,000	WRC-Weighted
11148900	San Luis Obispo	354719	1210534	1972–97	1906-97	900	55,000	WRC-Weighted
11149400	San Luis Obispo	354541	1205116	1958–97	—	4,100	—	Graphical
11149900	Monterey	355348	1210514	1966–97	1906–97	100	23,000	WRC-Weighted
11150500	Monterey	355549	1205204	1957–97	1906–97	39	110,000	WRC-Station

Table 3. Location and frequency analysis information for steamflow gaging stations, by station number—Continued

Station number	County	Latitude	Longitude	Period of record (water years)	Historic period (water years)	Thresholds (cubic feet per second)		Analysis method
						Low	High	
11151300	Monterey	361605	1210355	1959–97	—	20	—	WRC-Weighted
11151700	Monterey	362440	1211906	1969–78,84–97	1906–97	26	100,000	WRC-Station
11151870	Monterey	361415	1212850	1962–97	1959–97	1,200	20,000	WRC-Weighted
11152000	Monterey	361650	1211918	1906–97	—	431	—	WRC-Weighted
11152300	Monterey	363320	1213255	1977–97	1906–97	600	90,000	WRC-Station
11152500	Monterey	363752	1214017	1958–60,62–97	1906–97	18	90,000	WRC-Station
11152540	Monterey	363500	1214250	1962–97	—	1	—	WRC-Weighted
11152600	Monterey	364521	1213634	1971–81, 83–97	1970–97	40	800	WRC-Weighted
11154200	Santa Clara	365932	1213421	1959–92,97H	—	5	—	WRC-Station
11156500	San Benito	363634	1211207	1938H,40–97	1928–97	5	9,000	WRC-Weighted
11157500	San Benito	364553	1211745	1940–83,97	—	4,000	—	Graphical
11158600	San Benito	365107	1212544	1971–97	1959–97	1	16,000	WRC-Weighted
11159000	Santa Cruz	365401	1213548	1940–97	1928–97	7,000	20,000	Graphical
11159200	Santa Cruz	365622	1214610	1956H,57–97	1930–97	37	3,620	WRC-Weighted
11160000	Santa Cruz	365929	1215717	1937H,51–97	1930–97	150	15,000	WRC-Weighted
11160020	Santa Cruz	371224	1220838	1969–92,97H	1957–97	5	1,000	WRC-Weighted
11160060	Santa Cruz	370740	1220657	1978–92,97H	1957–97	73	4,000	WRC-Weighted
11160070	Santa Cruz	370736	1220718	1977–92,97H	1957–97	150	3,000	WRC-Weighted
11160300	Santa Cruz	370510	1220245	1958–92,97H	1957–97	14	3,500	WRC-Weighted
11160500	Santa Cruz	370240	1220417	1937–97	1930–97	232	29,000	WRC-Weighted
11161000	Santa Cruz	365927	1220151	1953–60, 88–97	—	492	—	WRC-Weighted
11161300	Santa Cruz	370302	1220045	1985–97	1983–97	300	1,500	WRC-Weighted
11162500	San Mateo	371539	1221940	1952–97	1930–97	250	9,000	WRC-Weighted
11162570	San Mateo	371933	1222308	1970–76,78–94,95H,97H	1957–97	500	6,100	WRC-Weighted
11162630	San Mateo	372800	1222559	1967–97	1957–97	140	4,000	WRC-Weighted
11162800	San Mateo	372658	1221357	1960–97	1959–97	26	560	WRC-Weighted
11164500	Santa Clara	372524	1221118	1931–41,51–97	1930–97	150	5,000	WRC-Weighted
11166000	Santa Clara	372518	1220804	1953–89,91–97	1930–97	50	1,400	WRC-Weighted
11169000	Santa Clara	372004	1215354	1955–97	1930–97	184	10,000	WRC-Station
11169500	Santa Clara	371516	1220218	1934–97	1930–97	60	2,500	WRC-Weighted
11170000	Santa Clara	371006	1213855	1951–87,97H	1946–97	3,000	3,000	Graphical
11172100	Santa Clara	372343	1214938	1958H,62–87,97H	1930–94	15	2,000	WRC-Weighted
11173200	Santa Clara	372742	1214606	1969–81,95–97	—	700	—	WRC-Weighted
11176000	Alameda	373735	1214213	1913–30,56H,64–97	1913–97	2	1,880	WRC-Weighted

Table 3. Location and frequency analysis information for steamflow gaging stations, by station number—Continued

Station number	County	Latitude	Longitude	Period of record (water years)	Historic period (water years)	Thresholds (cubic feet per second)		Analysis method
						Low	High	
11176400	Alameda	373341	1214058	1964–97	1957–97	20	8,000	WRC-Weighted
11176500	Alameda	373724	1214528	1970–97	1968–97	600	2,500	Graphical
11177000	Alameda	373655	1215250	1970–83,88–97	—	211	—	WRC-Station
11179000	Alameda	373514	1215735	1970–97	1959–97	196	14,000	WRC-Station
11180500	Alameda	373622	1220122	1917–19,59–97	—	1	—	WRC-Weighted
11180700	Alameda	373509	1220250	1959–97	1959–97	267	13,000	WRC-Station
11180960	Alameda	374304	1220312	1979–97	1964–97	8	1,500	WRC-Weighted
11181008	Alameda	374048	1220446	1972–97	1964–97	300	1,300	WRC-Weighted
11181040	Alameda	374103	1220820	1968–78,88–97	—	350	—	WRC-Weighted
11181390	Contra Costa	375712	1222014	1976–96,97H	1964–97	80	2,000	WRC-Weighted
11182030	Contra Costa	375838	1222110	1961–90,97H	—	119	—	WRC-Weighted
11182500	Contra Costa	374623	1215937	1953–97	—	9	—	WRC-Weighted
11183600	Contra Costa	375643	1220255	1969–92,97H	—	375	—	WRC-Weighted
11186000	Tulare	355643	1182836	1912–97	1894–1997	20,000	20,000	Graphical
11189500	Kern	354415	1181022	1930–42,47–94,96–97	1894–1997	21	8,000	WRC-Weighted
11199500	Tulare	354853	1185542	1943,45–53,72–97	—	3	—	WRC-Weighted
11200800	Tulare	355630	1184919	1967H,69–97	1894–1997	16	5,330	WRC-Weighted
11209900	Tulare	362638	1185409	1956H,59–90,97H	1897–1997	170	54,900	WRC-Weighted
11210100	Tulare	362500	1185448	1956H,59–90,97H	1897–1997	19	8,520	WRC-Weighted
11210950	Tulare	362451	1190042	1962–88,97H	1959–97	469	4,400	WRC-Station
11211300	Tulare	362651	1190138	1956H,60–94,97H	1897–1997	15	14,000	WRC-Weighted
11212000	Tulare	363736	1191448	1945–54, 56H,67H, 69H,72–94,97H	1945–97	1	3,000	WRC-Weighted
11215000	Fresno	365938	1185849	1959–88,97H	—	1,000	—	Graphical
11218400	Fresno	365247	1190740	1960–97	1957–97	183	20,000	WRC-Station
11218500	Fresno	365229	1190827	1959–92,97H	1957–97	1,231	60,000	WRC-Station
11221700	Fresno	364907	1192027	1958–95,97H	1957–97	10	12,000	WRC-Weighted
11224500	Fresno	361253	1202811	1950–83,85–97	1928–97	5	5,000	WRC-Weighted
11234760	Madera	371900	1191943	1960–97	1908–97	—	70,000	Indeterminate
11237500	Fresno	371155	1191246	1928–97	1908–97	2,500	2,800	Graphical
11242000	Madera	370840	1192713	1960–97	1908–97	—	70,000	Indeterminate
11242400	Madera	372352	1193355	1966–97	1957–97	30	2,400	WRC-Weighted
11251000	Fresno	365904	1194324	1959–97	1939–97	—	50,000	Indeterminate

Table 3. Location and frequency analysis information for steamflow gaging stations, by station number—Continued

Station number	County	Latitude	Longitude	Period of record (water years)	Historic period (water years)	Thresholds (cubic feet per second)		Analysis method
						Low	High	
11253310	Fresno	362408	1202557	1958-97	1928-97	25	2,800	WRC-Weighted
11262900	Merced	371545	1205420	1986-97	1984-97	61	700	WRC-Station
11264500	Mariposa	374354	1193328	1916-97	1912-97	8,000	8,000	Graphical
11266500	Mariposa	374301	1193955	1917-97	1912-97	20,000	15,000	Graphical
11274000	Stanislaus	372102	1205834	1968-97	1939-97	18,000	27,000	Graphical
11274500	Stanislaus	371856	1210727	1932-97	1912-97	60	10,000	WRC-Weighted
11274630	Stanislaus	372912	1211229	1959-97	--	1	--	WRC-Weighted
11276500	Tuolumne	375615	1194750	1968-97	1915-97	7,000	15,000	Graphical
11276600	Tuolumne	375246	1195646	1971-97	1915-97	7,000	15,000	Graphical
11276900	Tuolumne	375254	1195809	1968-97	1915-97	7,000	15,000	Graphical
11277300	Tuolumne	375804	1195459	1961-97	--	600	--	Graphical
11278000	Tuolumne	375809	1195252	1961-97	1915-97	4,500	17,000	Graphical
11278300	Tuolumne	375340	1195742	1961-97	1915-97	4,000	38,000	Graphical
11278400	Tuolumne	375325	1195808	1963-97	1915-97	--	40,000	Indeterminate
11281000	Tuolumne	374918	1200043	1923-96,97H	1915-97	53	11,000	WRC-Weighted
11282000	Tuolumne	374942	1200038	1917-96,97H	1915-97	69	4,500	WRC-Weighted
11283500	Tuolumne	375402	1204015	1960-83,87-94,97H	1915-97	140	40,000	WRC-Weighted
11284400	Tuolumne	375031	1201102	1965H,70-97	1965-97	25	1,850	WRC-Weighted
11284700	Tuolumne	380556	1200555	1956H,62-86,97H	1952-97	20	2,400	WRC-Weighted
11289650	Stanislaus	373959	1202628	1971-97	1952-97	--	55,000	Indeterminate
11290000	Stanislaus	373738	1205911	1971-97	1952-97	--	55,000	Indeterminate
11292000	Tuolumne	381751	1194425	1939-45,47-97	1906-97	195	2,800	WRC-Station
11292700	Tuolumne	381449	1200151	1958-97	--	4,500	--	Graphical
11292900	Tuolumne	381136	1200553	1958-97	1906-97	--	42,000	Indeterminate
11293500	Alpine	382622	1200053	1950-51,53-87,97H	--	122	--	WRC-Station
11293600	Calaveras	382604	1200104	1988-97	1966-97	8	3,000	WRC-Station
11294000	Tuolumne	382324	1200022	1989-97	--	349	--	WRC-Station
11294500	Calaveras	381445	1201720	1989-97	1964-97	194	35,000	WRC-Station
11296500	Tuolumne	381151	1200027	1939-97	1906-97	--	7,400	Indeterminate
11298000	Tuolumne	380533	1201002	1938-97	1906-97	--	11,500	Indeterminate
11299600	Calaveras	375740	1203651	1984-97	1983-97	150	5,000	WRC-Weighted
11302000	Tuolumne	375106	1203813	1979-97	--	4,500	--	Graphical
11303000	Stanislaus	374347	1210634	1979-97	--	3,500	--	Graphical
11303500	San Joaquin	374034	1211551	1979-97	1952-97	--	70,000	Indeterminate

Table 3. Location and frequency analysis information for steamflow gaging stations, by station number—Continued

Station number	County	Latitude	Longitude	Period of record (water years)	Historic period (water years)	Thresholds (cubic feet per second) Low	Thresholds (cubic feet per second) High	Analysis method
11308900	Calaveras	380853	1204926	1964–90,97H	1957–97	3,500	9,000	Graphical
11314500	Calaveras	382937	1201312	1932–33,35–97	1908–97	2,700	15,000	Graphical
11315000	Amador	383109	1201242	1928–42,44–75,77–97	1908–97	133	4,500	WRC-Weighted
11316600	Calaveras	382648	1202921	1986–97	1952–97	39	30,000	WRC-Station
11316800	Calaveras	382412	1202645	1961–97	1908–97	800	1,800	Graphical
11317000	Calaveras	382323	1203132	1912–97	1908–97	24	4,000	WRC-Weighted
11318500	Calaveras	382206	1203240	1934–97	1908–97	45	5,500	WRC-Weighted
11319500	Calaveras	381846	1204309	1932–97	1908–97	22,000	40,000	Graphical
11323500	San Joaquin	381314	1200219	1965–97	—	3,500	—	Graphical
11325500	San Joaquin	380931	1211809	1965–96,97H	1964–97	2,800	5,070	Graphical
11333000	El Dorado	383926	1203946	1956–97	1908–97	—	22,000	Indeterminate
11333500	El Dorado	383520	1205038	1956–87,97H	1908–97	100	42,000	WRC-Station
11334200	El Dorado	383729	1204202	1958–71,73–78,97H	1908–97	60	29,800	WRC-Weighted
11335000	Sacramento	383001	1210239	1907H,1908–97	1907–97	257	71,000	WRC-Weighted
11335700	Sacramento	383306	1210630	1961–66,68–77,86H,97H	1956–97	400	7,000	WRC-Weighted
11341400	Siskiyou	411600	1221838	1969–87,97H	1941–97	254	15,000	WRC-Station
11342000	Shasta	405623	1222458	1945–97	1910–97	2,729	60,000	WRC-Weighted
11345500	Modoc	411351	1202610	1932–97	—	82	—	WRC-Weighted
11348500	Modoc	412422	1205536	1904–5,32–97	1910–97	300	12,000	WRC-Weighted
11355010	Shasta	405900	1213039	1974H,76–97	1910–97	10,000	29,000	Graphical
11355500	Shasta	404112	1212525	1926–94,97H	1908–97	600	2,000	Graphical
11362500	Shasta	405825	1214642	1923–97	1910–97	700	28,000	WRC-Weighted
11363000	Shasta	410110	1215436	1911–97	1910–97	1,000	39,000	WRC-Weighted
11365000	Shasta	405036	1220058	1945–64,66–97	1910–97	9,000	70,000	WRC-Weighted
11367500	Siskiyou	411118	1220352	1932–97	1910–97	281	15,000	WRC-Weighted
11367800	Shasta	410639	1220542	1956H, 65–97	1910–97	104	30,000	WRC-Weighted
11368000	Shasta	405730	1221307	1946–97	1910–97	1,078	50,000	WRC-Weighted
11370500	Shasta	403604	1222636	1946–97	—	70,000	—	Graphical
11371000	Shasta	404142	1223808	1951–93,97H	1941–97	1,200	11,500	WRC-Weighted
11372000	Shasta	403048	1223123	1965–97	1959–97	300	16,000	WRC-Station
11374000	Shasta	403019	1221356	1950–97	1941–97	3,849	44,000	WRC-Weighted
11376000	Tehama	402314	1221415	1941–97	—	1,921	—	WRC-Weighted
11377100	Tehama	401719	1221108	1946–97	—	14,757	—	WRC-Station
11379500	Tehama	400129	1223031	1949–97	—	364	—	WRC-Weighted

Table 3. Location and frequency analysis information for steamflow gaging stations, by station number—Continued

Station number	County	Latitude	Longitude	Period of record (water years)	Historic period (water years)	Thresholds (cubic feet per second)		Analysis method
						Low	High	
11381500	Tehama	400317	1220123	1929–97	1908–97	567	20,000	WRC-Weighted
11382000	Tehama	395316	1223141	1921–97	—	422	—	WRC-Weighted
11383500	Tehama	400051	1215650	1912–15, 21–97	1908–97	484	18,000	WRC-Weighted
11384000	Butte	394635	1214510	1931–86,97H	1908–97	1,400	10,000	WRC-Weighted
11388000	Tehama	394907	1221926	1964–90,97H	1959–97	8,000	18,000	Graphical
11389000	Glenn	392728	1215935	1946–95,97	—	140,000	—	Graphical
11389500	Colusa	391251	1215957	1946–97	—	28,000	—	WRC-Station
11390000	Butte	394334	1214228	1931–97	1908–97	507	20,000	WRC-Weighted
11390500	Colusa	390036	1214925	1946–97	—	16,426	—	WRC-Station
11395030	Plumas	394626	1210116	1963–97	1908–97	4,000	7,000	Graphical
11395200	Plumas	393851	1210704	1963–97	1908–97	2,000	11,000	Graphical
11396000	Butte	393425	1210826	1963–97	1908–97	2,200	5,500	Graphical
11396200	Butte	393305	1211230	1963–97	1908–97	—	20,000	Indeterminate
11396350	Butte	393252	1211811	1963–80,82–87,97H	1908–97	6,000	26,000	Graphical
11396400	Butte	393312	1211804	1965–87,97H	1961–97	54	2,000	WRC-Weighted
11399500	Plumas	401006	1210531	1960–97	1959–97	—	2,000	Indeterminate
11400500	Plumas	401112	1211111	1937–59,65–97	1906–97	96	4,200	WRC-Weighted
11401112	Plumas	400417	1210949	1970–97	—	1,600	—	Graphical
11401500	Plumas	400441	1205537	1906–08,12–17,31–93,97H	1902–97	194	34,000	WRC-Weighted
11402000	Plumas	400011	1205712	1934–97	1908–97	10,000	19,000	Graphical
11403000	Plumas	400038	1211303	1951–61,65–82,97H	1908–97	797	88,800	WRC-Weighted
11403200	Plumas	395849	1211633	1986–97	1908–97	14,000	75,000	Graphical
11404300	Plumas	395329	1211735	1986–97	1908–97	21	5,000	WRC-Weighted
11404330	Butte	395109	1212329	1986–97	1908–97	25,000	80,000	Graphical
11404500	Butte	394739	1212703	1912–97	1908–97	30,000	80,000	Graphical
11407150	Butte	392200	1213846	1969–97	1964–97	30,000	160,000	Graphical
11407500	Butte	392204	1212216	1951–86,97H	1908–97	1,400	12,000	WRC-Weighted
11407900	Sierra	393058	1203340	1965–87,97H	1964–97	—	9,000	Indeterminate
11408550	Nevada	393119	1203457	1988–97	1964–97	200	8,000	Graphical
11408850	Sierra	392501	1205706	1967–89,97H	1964–97	300	46,000	WRC-Station
11408880	Sierra	392442	1205949	1969–97	1966–97	60	20,000	WRC-Station
11409300	Yuba	392646	1210243	1968–97	1966–97	125	4,400	WRC-Weighted
11409400	Yuba	392622	1210329	1969–97	1966–97	25	5,500	WRC-Station
11413000	Sierra	393130	1205613	1931–97	1908–97	700	36,000	WRC-Weighted

Table 3. Location and frequency analysis information for steamflow gaging stations, by station number—Continued

Station number	County	Latitude	Longitude	Period of record (water years)	Historic period (water years)	Thresholds (cubic feet per second) Low	Thresholds (cubic feet per second) High	Analysis method
11413300	Plumas	393652	1210304	1961–97	1908–97	5,000	16,000	Graphical
11413520	Yuba	392248	1210819	1970–97	—	10,000	—	Graphical
11414000	Nevada	391917	1203348	1943–94,97H	1904–97	700	14,000	WRC-Weighted
11414100	Nevada	392248	1202954	1967–97	—	128	—	WRC-Station
11414250	Nevada	391907	1203924	1966–97	—	1,000	—	Graphical
11416500	Nevada	392623	1203939	1927–97	—	1,000	—	Graphical
11417500	Nevada	391732	1210613	1941–48,60–97	1904–97	403	52,000	WRC-Station
11418000	Yuba	391407	1211623	1970–97	1966–97	353	150,000	WRC-Station
11418500	Nevada	391328	1211603	1965–97	1929–97	600	12,000	WRC-Station
11421000	Yuba	391033	1213126	1970–97	1966–97	700	140,000	WRC-Station
11422500	Nevada	390753	1205729	1966–94,95–96	1908–97	4,000	22,000	Graphical
11424000	Yuba	390001	1212421	1966–97	1908–97	16,000	46,000	Graphical
11425500	Sutter	384628	1213550	1946–97	1930–97	60,000	85,000	Graphical
11426000	Yolo	383625	1213315	1961–97	1927–97	20,000	120,000	Graphical
11427000	Placer	385610	1210122	1942–97	1902–97	632	58,000	WRC-Weighted
11427500	Placer	390635	1202849	1965–97	—	400	—	Graphical
11427750	Placer	390759	1202858	1965–97	—	160	—	WRC-Weighted
11428800	Placer	390324	1202425	1967–97	1966–97	400	28,000	Graphical
11429500	El Dorado	390020	1201852	1972–97	—	150	—	Graphical
11430000	El Dorado	385717	1202402	1964–97	1902–97	5,000	12,000	Graphical
11431800	El Dorado	385341	1203402	1961–97	1902–97	1,800	3,300	Graphical
11433040	El Dorado	385525	1203827	1964–97	1902–97	2,500	5,000	Graphical
11433300	Placer	390023	1204540	1966–97	1902–97	4,000	120,000	WRC-Station
11435100	El Dorado	384857	1200658	1971–97	1863–1997	400	2,000	Graphical
11439500	El Dorado	384549	1201939	1923–97	1863–1997	9,000	24,000	Graphical
11441500	El Dorado	384908	1202151	1961–97	1863–1997	850	4,000	Graphical
11443500	El Dorado	384623	1204202	1968–97	1863–1997	10,000	60,000	Graphical
11444500	El Dorado	384616	1204855	1965–97	1863–1997	20,000	70,000	Graphical
11445500	El Dorado	384907	1205645	1963–95,97H	1863–1997	30,000	90,000	Graphical
11446500	Sacramento	383808	1211336	1956–97	—	70,000	—	Graphical
11447360	Sacramento	383831	1212254	1964–78,96–97	—	1,400	—	Graphical
11447650	Sacramento	382720	1213007	1949–97	1909–97	90,000	110,000	Graphical
11448500	Lake	385537	1225247	1955–78,97H	1941–97	700	2,320	WRC-Weighted

Table 3. Location and frequency analysis information for steamflow gaging stations, by station number—Continued

Station number	County	Latitude	Longitude	Period of record (water years)	Historic period (water years)	Thresholds (cubic feet per second)		Analysis method
						Low	High	
11449500	Lake	385539	1225033	1947–97	1941–97	1,000	8,500	WRC-Weighted
11451000	Lake	385527	1223353	1945–97	1943–97	4,000	7,000	Graphical
11451100	Lake	390956	1223708	1972–97	1966–97	240	10,000	WRC-Weighted
11451300	Lake	390450	1223207	1986–97	1975–97	700	5,000	Graphical
11452500	Yolo	384331	1214822	1975–97	1966–97	14,000	36,000	Graphical
11453000	Yolo	384040	1213835	1942H,51–97	1940–97	150,000	272,000	Graphical
11454000	Yolo	383055	1220451	1957–97	—	5,000	—	Graphical
11456000	Napa	382952	1222537	1930–32,40–97	1930–97	305	14,000	WRC-Station
11458000	Napa	382206	1221808	1960–97	1930–97	400	30,000	WRC-Station
11459500	Marin	380628	1223444	1955–97	1947–97	69	4,000	WRC-Station
11460000	Marin	375745	1223320	1952–93,97H	1930–97	350	5,000	WRC-Weighted
11460400	Marin	380137	1224407	1983–97	—	386	—	WRC-Station
11460600	Marin	380449	1224700	1975–97	1930–97	300	20,000	WRC-Station
11460750	Marin	381033	1224902	1982H,84–97	1930–97	3,000	14,600	Graphical
11461000	Mendocino	391144	1231138	1912–13, 53–97	1939–97	1,137	16,000	WRC-Weighted
11461500	Mendocino	391448	1230745	1942–97	1911–97	1,188	18,000	WRC-Weighted
11462000	Mendocino	391151	1231111	1960–97	1957–97	1,200	5,500	WRC-Station
11462500	Mendocino	390136	1230746	1960–97	1957–97	1,249	38,000	WRC-Station
11463000	Mendocino	385246	1230309	1960–97	1957–97	1,756	50,000	WRC-Station
11463170	Sonoma	384752	1224805	1981–97	1941–97	791	7,000	WRC-Weighted
11464000	Sonoma	383648	1225007	1940–97	—	2,828	—	WRC-Station
11465000	Sonoma	384311	1225958	1983–97	—	1,600	—	Graphical
11465200	Sonoma	384155	1225725	1983–97	1981–97	700	10,000	WRC-Station
11467000	Sonoma	383031	1225536	1940–97	—	5,139	—	WRC-Station
11468000	Mendocino	391020	1234006	1951–97	1911–97	1,479	60,000	WRC-Weighted
11468500	Mendocino	392542	1234412	1952–97	1939–97	512	21,000	WRC-Weighted
11469000	Humboldt	401848	1241657	1912–12,51–97	1911–97	6,457	75,000	WRC-Weighted
11470500	Lake	392429	1225813	1923–97	1911–97	23,000	50,000	Graphical
11471500	Mendocino	392319	1230654	1922–23,25–97	1910–97	300	60,000	WRC-Station
11472150	Mendocino	393730	1232025	1965H,67–94,97H	1911–97	1,233	90,000	WRC-Station
11472200	Mendocino	393705	1232120	1957–94,97H	1911–97	6,000	70,000	WRC-Weighted
11473900	Mendocino	394223	1231927	1966–97	—	3,786	—	WRC-Weighted
11475000	Humboldt	401306	1233753	1956–97	1911–97	9,669	540,000	WRC-Weighted

Table 3. Location and frequency analysis information for steamflow gaging stations, by station number—Continued

Station number	County	Latitude	Longitude	Period of record (water years)	Historic period (water years)	Thresholds (cubic feet per second)		Analysis method
						Low	High	
11475560	Mendocino	394347	1233834	1965H,68–97	1911–97	41	3,660	WRC-Weighted
11475800	Mendocino	395229	1234310	1965H,66–97	1911–97	3,383	78,700	WRC-Weighted
11476500	Humboldt	401055	1234630	1941–97	1911–97	5,856	170,000	WRC-Weighted
11476600	Humboldt	402105	1240010	1961–97	1957–97	322	7,500	WRC-Weighted
11477000	Humboldt	402930	1240555	1911–15, 17–97	1911–97	19,495	500,000	WRC-Weighted
11478500	Humboldt	402850	1235323	1940–97	1911–97	4,523	48,000	WRC-Weighted
11480390	Trinity	401851	1232144	1981–97	1966–97	1,124	14,000	WRC-Weighted
11480410	Trinity	402216	1232606	1981–97	1966–97	10,000	17,000	Graphical
11480500	Trinity	402730	1233035	1963–94,97H	1957–97	361	18,100	WRC-Station
11481000	Humboldt	405435	1240335	1911–13,51–97	1911–97	4,447	70,000	WRC-Weighted
11481200	Humboldt	410040	1240450	1956–97	—	891	—	WRC-Weighted
11482500	Humboldt	411758	1240300	1912–13, 53–97	—	3,360	—	WRC-Weighted
11516530	Siskiyou	415541	1222635	1961–97	1911–97	1,400	29,000	WRC-Station
11517500	Siskiyou	414923	1223540	1934–42,45–97	1862–97	61	10,000	WRC-Weighted
11519500	Siskiyou	413827	1230050	1942–97	1862–97	1,000	30,000	WRC-Weighted
11520500	Siskiyou	415114	1231352	1913–25, 52–97	1911–97	100,000	110,000	Graphical
11521500	Siskiyou	415007	1232255	1912–15,56H,57–97	1911–97	885	20,000	WRC-Weighted
11522500	Siskiyou	412240	1232835	1912H,14–15,27–29,31–97	1863–97	35,000	80,000	Graphical
11523000	Humboldt	411813	1233200	1925–29, 31–97	1911–97	8,000	250,000	WRC-Weighted
11523200	Trinity	410641	1224216	1956H,58–97	1911–97	618	20,000	WRC-Weighted
11525500	Trinity	404310	1224809	1962–97	—	89	—	WRC-Station
11525600	Trinity	404035	1224946	1975–97	1975–97	30	4,000	WRC-Weighted
11527000	Trinity	404720	1232620	1962–97	1959–97	20,000	60,000	Graphical
11528700	Trinity	403900	1232935	1965H,66–97	1911–97	1,907	88,000	WRC-Weighted
11530000	Humboldt	410300	1234015	1962–97	1862–97	18,000	220,000	WRC-Station
11530500	Del Norte	413052	1235957	1862H,1881H,1890H,1911–27,32–97	1862–97	35,000	480,000	WRC-Station
11532500	Del Norte	414730	1240430	1932–97	1862–97	19,334	220,000	WRC-Weighted