In cooperation with the New Mexico Department of Transportation

Analysis of the Magnitude and Frequency of Peak Discharge and Maximum Observed Peak Discharge in New Mexico and Surrounding Areas

Scientific Investigations Report 2008–5119

U.S. Department of the Interior
U.S. Geological Survey

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Conversion Factors and Datum

Multiply	By	To obtain
	Length	
inch (in.)	25.40	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
square mile (mi^2)	2.590	square kilometer (km^2)
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83).

Vertical coordinate information is referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29) or the North American Vertical Datum of 1988 (NAVD 88).

Elevation, as used in this report, refers to distance above the vertical datum.

Analysis of the Magnitude and Frequency of Peak Discharge and Maximum Observed Peak Discharge in New Mexico and Surrounding Areas

By Scott D. Waltemeyer

Abstract

Estimates of the magnitude and frequency of peak discharges are necessary for the reliable design of bridges, culverts, and open-channel hydraulic analysis, and for flood-hazard mapping in New Mexico and surrounding areas. The U.S. Geological Survey, in cooperation with the New Mexico Department of Transportation, updated estimates of peak-discharge magnitude for gaging stations in the region and updated regional equations for estimation of peak discharge and frequency at ungaged sites.

Equations were developed for estimating the magnitude of peak discharges for recurrence intervals of 2, 5, 10, 25, 50, 100, and 500 years at ungaged sites by use of data collected through 2004 for 293 gaging stations on unregulated streams that have 10 or more years of record.

Peak discharges for selected recurrence intervals were determined at gaging stations by fitting observed data to a log-Pearson Type III distribution with adjustments for a low-discharge threshold and a zero skew coefficient. A low-discharge threshold was applied to frequency analysis of 140 of the 293 gaging stations. This application provides an improved fit of the log-Pearson Type III frequency distribution. Use of the low-discharge threshold generally eliminated the peak discharge by having a recurrence interval of less than 1.4 years in the probability-density function.

Within each of the nine regions, logarithms of the maximum peak discharges for selected recurrence intervals were related to logarithms of basin and climatic characteristics by using stepwise ordinary least-squares regression techniques for exploratory data analysis. Generalized least-squares regression techniques, an improved regression procedure that accounts for time and spatial sampling errors, then were applied to the same data used in the ordinary least-squares regression analyses. The average standard error of prediction, which includes average sampling error and average standard error of regression, ranged from 38 to 93 percent (mean value is 62, and median value is 59) for the 100-year flood. The 1996 investigation standard error of prediction for the flood regions ranged from 41 to 96 percent (mean value is 67, and median value is 68) for the 100-year flood that was analyzed by using generalized least-squares regression analysis. Overall, the equations based on generalized least-squares regression techniques are more reliable than those in the 1996 report because of the increased length of record and improved geographic information system (GIS) method to determine basin and climatic characteristics.

Flood-frequency estimates can be made for ungaged sites upstream or downstream from gaging stations by using a method that transfers flood-frequency data at the gaging station to the ungaged site by using a drainage-area ratio adjustment equation. The peak discharge for a given recurrence interval at the gaging station, drainage-area ratio, and the drainage-area exponent from the regional regression equation of the respective region is used to transfer the peak discharge for the recurrence interval to the ungaged site.

Maximum observed peak discharge as related to drainage area was determined for New Mexico. Extreme events are commonly used in the design and appraisal of bridge crossings and other structures. Bridge-scour evaluations are commonly made by using the 500-year peak discharge for these appraisals. Peak-discharge data collected at 293 gaging stations and 367 miscellaneous sites were used to develop a maximum peak-discharge relation as an alternative method of estimating peak discharge of an extreme event such as a maximum probable flood.

Introduction

Estimates of the magnitude and frequency of peak discharges in unregulated streams at gaging stations or at ungaged stream sites in New Mexico and surrounding areas (fig. 1) are necessary for reliable design of bridges, culverts, drainage structures, and open-channel hydraulic analysis and for flood-hazard mapping. Construction to accommodate discharge equal to the 50-year recurrence interval is required by the New Mexico Department of Transportation (NMDOT) for bridge and culvert design (New Mexico Department of Transportation, 1995). Use of a peak discharge with a 100-year recurrence interval is mandated by the Federal Emergency Management Agency (FEMA) for mapping flood-hazard areas

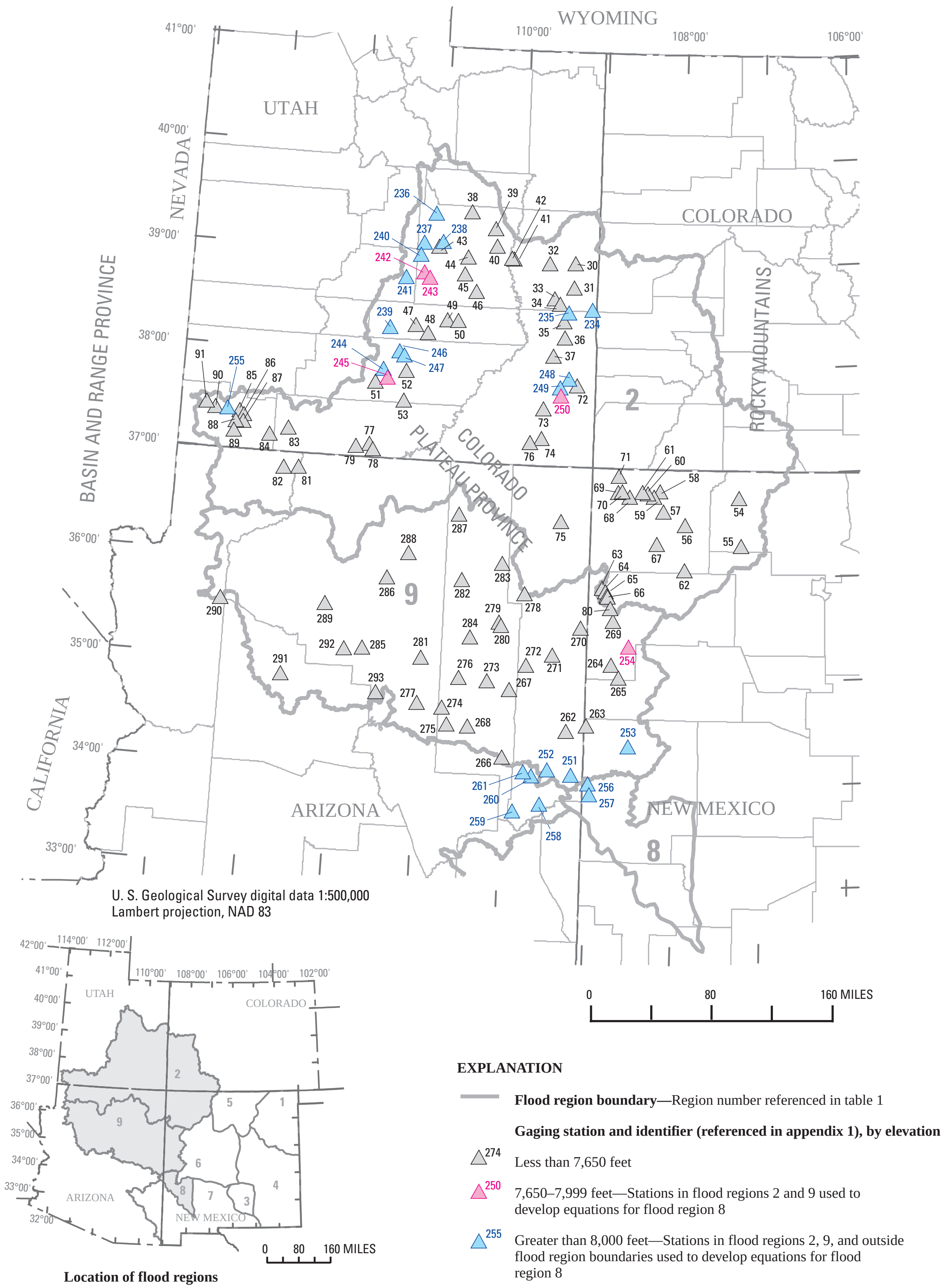
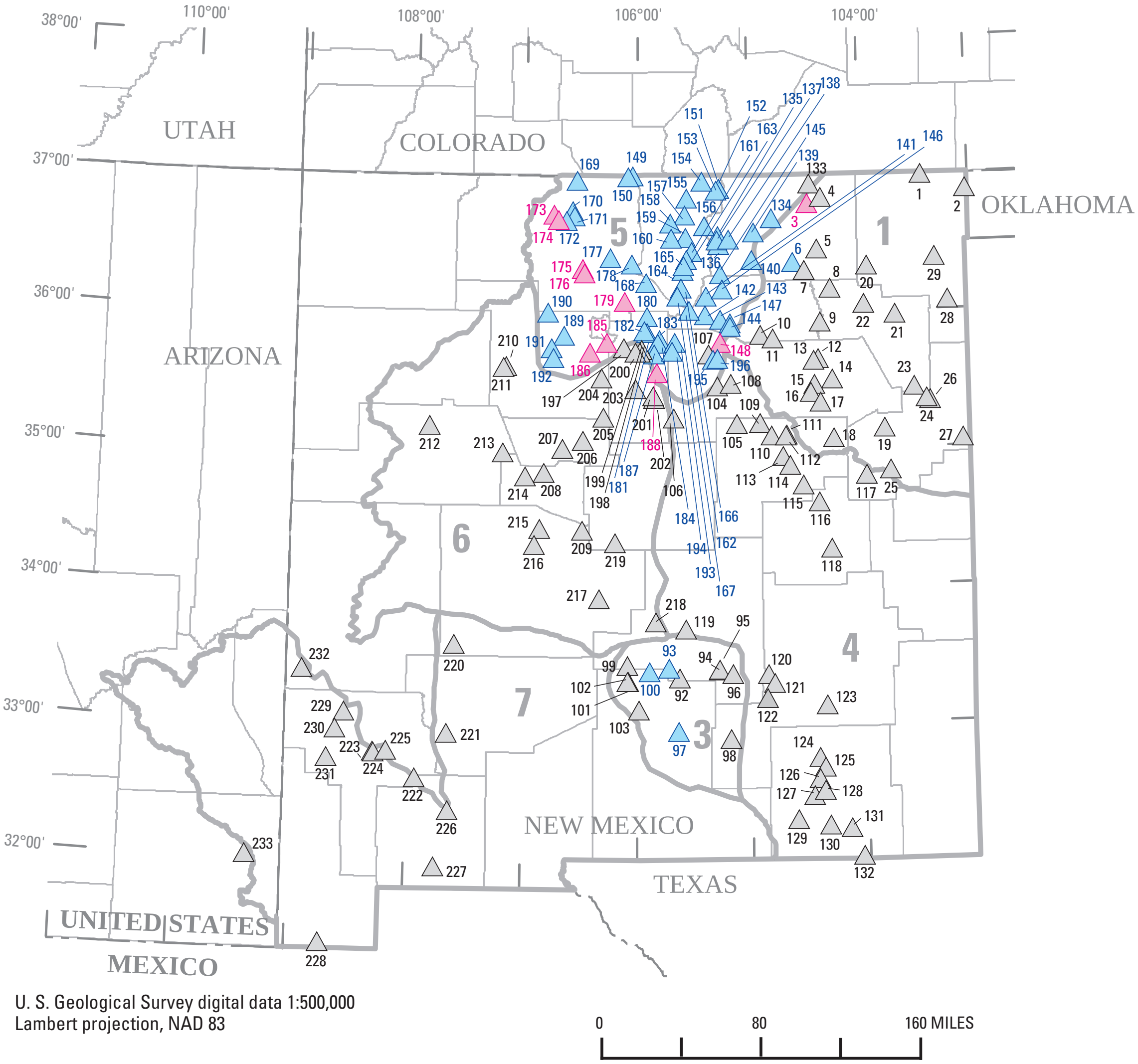
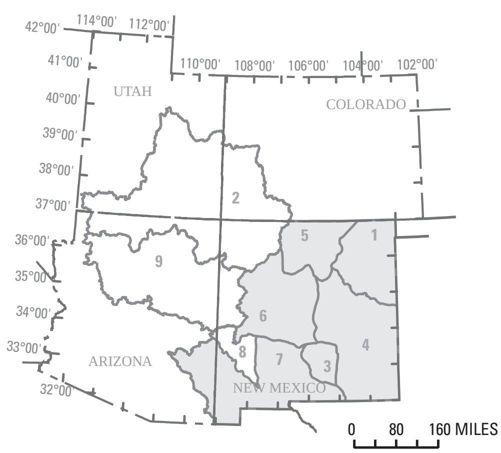


Figure 1. Flood regions and locations of gaging stations in New Mexico and surrounding areas.





Location of flood regions

EXPLANATION

Flood region boundary—Region number referenced in table 1

Gaging station and identifier (referenced in appendix 1), by elevation

117 Less than 7,650 feet

148 7,650–7,999 feet

155 Greater than 8,000 feet

Figure 1.—Continued.

for housing development (Federal Emergency Management Agency, 2002). The magnitude of a peak discharge with a 100-year recurrence interval has an annual exceedance frequency of 1 percent and occurs, on average, at least once in a 100-year period. The U.S. Geological Survey (USGS), in cooperation with the NMDOT, updated estimates of peak-discharge magnitude for gaging stations in the region and updated regional equations for estimation of peak-discharge magnitude and frequency at ungaged sites.

The most recent publication for estimating magnitude and frequency of peak discharge for New Mexico and surrounding areas was completed in 1996 (Waltemeyer, 1996). Waltemeyer (1996) included analysis of flood data collected for 201 gaging stations from the beginning of record through 1993 and presented equations for estimation of peak discharges for various frequencies at ungaged sites based on basin and climatic characteristics for eight physiographic regions. Region boundaries in this report now extend into Arizona and Utah and to basin divides; the extension has expanded the number of gaging stations from 201 to 293. The flood regions were delineated on the basis of the hydrologic unit codes from the 1996 investigation (Waltemeyer, 1996) and were expanded into the four corners area (Arizona, Utah, Colorado, and New Mexico). Waltemeyer (1996) and Thomas and others (1997) determined that the use of zero for the generalized skew coefficient and a low-discharge threshold improved the fit of the log-Pearson Type III distribution to recorded peak-discharge data first for New Mexico and then for the Southwestern United States. In addition to the investigation by Waltemeyer (1996), another statistical regression analysis approach—generalized least-squares (Stedinger and Tasker, 1985)—also has statistically improved estimation of regional flood-frequency relations and is used in this report.

Purpose and Scope

This report presents updated estimates of the magnitude and frequency of peak discharges at gaging stations based on 11 additional years of data collected since Waltemeyer (1996) developed equations for estimates of magnitude and frequency of peak discharges at ungaged sites. The report presents new and updated basin and climatic characteristics and uses a geographic information system (GIS) (raster modeling) and the National Elevation Dataset. The magnitudes of peak discharges were determined for recurrence intervals of 2, 5, 10, 25, 50, 100, and 500 years for 293 gaging stations on unregulated streams that generally have 10 or more years of record (data collected through 2004). The report also includes equations for nine flood regions for estimation of peak discharges at ungaged sites and a discussion of substantial improvements in the prediction error of the regression models. Maximum observed peak discharges collected by USGS through 2004 are presented in relation to drainage area to develop envelope curves.

Description of Study Area

The physiography of New Mexico is varied and complex and includes mountains, plains, plateaus, valleys, and deserts. The Rocky Mountains end in northern New Mexico, creating a marked climatological division in the north-central part of the State. Several flat desert areas are interspersed between the mountains, and some of these areas are lake deposits that have not been covered with water for hundreds of years. Many of the plains contain distributary-flow areas that consist of material deposited by mountain-front runoff (Thomas and others, 1997). Mainstem streams such as the Rio Grande and Canadian, Pecos, and San Juan Rivers originate in Colorado.

Storms that originate in the Pacific Ocean travel over the mountains and progressively intensify in the plains of New Mexico. For example, isopluvials of annual maximum precipitation indicate a pattern of increasing intensity in the eastern plains (Miller and others, 1973). Also, storms that originate in the Pacific Ocean travel over the mountains and locally intensify in the plains region of the four corners area. Regional thunderstorms develop over the mountains during early and late summer. The greatest monthly precipitation and localized areas of rainfall typically occur in July and August. Intense, convective midsummer storms that commonly are preceded by mild rainfall can produce severe flooding.

Storms that originate in the Gulf of Mexico during the summer period affect the eastern half of New Mexico. Intense rainfall during the summer is usually due to moisture from the Gulf of Mexico. Regional thunderstorms develop over the mountains during early and late summer, which can cause rare or unusual flooding, whereas annual peak discharge is a result of snowmelt runoff. Substantial floods, such as the early summer flood of 1965 and the early fall flood of 1904 (U.S. Geological Survey, 1991), have occurred during those seasons, but the greatest monthly precipitation, although mostly of irregular regional extent, typically occurs in July and August.

Floods in the northern, southeastern, and southwestern mountain regions are produced generally by snowmelt, sometimes by rainfall, and rarely by rainfall on snowpack. Floods in the plains, plateaus, valleys, and deserts almost always are produced by rainfall.

Analysis of Magnitude and Frequency of Peak Discharges

Peak-discharge data collected at crest-stage gages and continuously recording gaging stations were used to estimate the magnitude and frequency of peak discharges by using a log-Pearson Type III probability distribution (Interagency Advisory Committee on Water Data, 1982). The peak-discharge characteristics at the gaging stations were related to basin and climatic characteristics by using generalized least-squares (GLS) regression analyses.

Station Flood-Frequency Analysis

Peak-discharge data at gaging stations consist of a period of gaged record through 2004 of annual peak discharges, referred to as the systematic record, and stations with one or more historic, extreme discharges outside the systematic record (Interagency Advisory Committee on Water Data, 1982). Relating the magnitudes of annual peak discharges, generally referred to as flood-frequency data or characteristics, to their expected frequency of exceedance, is termed a flood-frequency analysis. The frequency of peak discharges generally is expressed in terms of exceedance probability or recurrence intervals. Exceedance probability is the probability that a flood will exceed a given magnitude in any year. Recurrence interval, in years, is the reciprocal of the exceedance probability. For example, a flood with an exceedance probability of 0.01 has a recurrence interval of 100 years. The term “recurrence interval” is used in this report for simplicity.

Peak discharges for selected recurrence intervals were determined for each of 293 gaging stations by using the log-Pearson Type III probability distribution as recommended by the Interagency Advisory Committee on Water Data (1982). Various adjustments for low outliers, zero-flow years, historic peak discharges, user-defined low-discharge threshold, and a user-defined generalized coefficient of skewness were applied to station data where applicable.

Floods in the United States are derived mainly from four different populations: rainfall, snowmelt runoff, rain on snowpack, and remnants of hurricanes or tropical storms. For New Mexico, some outliers existed in the annual peak-discharge series, a condition that most likely was caused by a population other than the normal population; however, an adequate number of annual peak-discharge data to define these rare populations was not recorded to date (2004) for any of the gaging stations in the study area. In New Mexico, annual peak discharges caused by annual snowmelt runoff from mountainous regions and annual peak discharges caused by annual rainfall runoff from convective thunderstorms are the most common. Annual peak discharges caused by annual rainfall runoff from infrequent remnants of hurricanes or tropical storms are the rare populations. Composite frequency analysis is required for some sites that have mixed populations. Crippen (1978) described techniques for making a composite analysis primarily from two populations of annual peak discharges, those caused by snowmelt runoff and by rainfall runoff. The populations that cause floods were described in “National Water Summary 1988–89” (U.S. Geological Survey, 1991). In New Mexico, only a few gaging stations have recorded extreme peak discharges that plot as high outliers from the main distribution. Data on the separate sample populations for these rare storms are inadequate; thus, a composite frequency analysis could not be performed.

The low-discharge threshold was used in investigations of flood frequency in the Southwestern United States by Waltemeyer (1996) and Thomas and others (1997). The user-defined low-discharge threshold is based on the rationale that, in some instances, discharges less than some threshold value are not from the same population of peak discharges as are the larger peak discharges. A probability-density-function plot of annual-series data indicates that these low discharges have a different slope than do the larger peak discharges. As a result, the overall fit of the probability distribution is affected, and peak discharges for large recurrence intervals tend to be underestimated when the low discharges are included. The low-discharge threshold was determined graphically from the probability-density-function plots and applied to the frequency analysis of 140 of the 293 gaging stations (fig. 1; app. 1). Use of the low-discharge threshold generally eliminated the peak discharges that had recurrence intervals of less than 1.4 years.

The skew coefficient used in the log-Pearson Type III analysis is a weighted value determined by weighting the station skew with a generalized skew in inverse proportion to their individual mean-square errors (Interagency Advisory Committee on Water Data, 1982). In this report, a generalized skew based on research in prior investigations is used. The station skew used in an investigation in New Mexico (Waltemeyer, 1986) ranged from -0.22 to 0.29 log units for the physiographic regions; previous investigations have reported the median for most of the regions to be close to zero (Waltemeyer, 1986). An investigation of flood frequency for the Southwestern United States (Thomas and others, 1997) also used zero for the generalized skew. Results from the investigation indicated that the mean-square error of generalized skew was 0.31; the same mean-square error was considered to be applicable for the investigation described in this report. Accordingly, the generalized skew for the nine flood regions was considered to be zero for this investigation.

The USGS computer program PEAKFQ (Kirby, 1981) was used to perform the flood-frequency analyses. Peak-discharge data and basin and climatic characteristics were determined from the NWISWeb (U.S. Geological Survey, 2001) and GIS Weasel computerized systems (U.S. Geological Survey, 2000) and entered into the ANNIE data-management program (Lumb and others, 1990) for analysis. Selected basin, climatic, and flood characteristics for each station are listed in appendixes 1 and 2.

Regional Flood-Frequency Analysis

Regionalization of flood-frequency characteristics with basin and climatic characteristics is necessary to estimate peak discharge at ungaged sites (New Mexico Department of Transportation, 1995). The magnitude of peak discharge is influenced by the basin and climatic characteristics of a physiographic region. In Waltemeyer (1996), different flood characteristics are identified in eight flood regions. The current investigation identifies nine flood regions, which include expanded areas in the four corners area.

Peak flows in regions 3, 5, and 8 (elevations generally greater than 7,500 ft) are predominately in response to snowmelt runoff (Jarrett and Costa, 1982). Most of the gaging stations used to develop the equations for flood region 8 have an average basin elevation generally above 7,500 feet and are in flood region 9 (with four gaging-station locations south of the flood region 9 boundary) and in flood region 2. The general lack of gaging stations in flood region 8 required the investigation of gaging stations in the intermountain region of Utah and Arizona that would be used to statistically represent flood response from flood region 8. The few gaging stations in flood region 8 reflect the same sample population of the gaging stations in flood regions 2 and 9 generally above 7,500 feet. In this report, generally grouping above 7,500 feet was shown to depict the elevation distribution of stations available for use in the model equations. A range from 7,650 to about 8,000 feet and above 8,000 feet was selected to indicate the number of gaging stations in those strata. In addition, the gaging stations below 7,650 feet also are shown (fig. 1).

Peak flows in regions 1, 2, 4, 6, 7, and 9 are predominately in response to rainfall runoff. The boundary of the regions generally corresponds to the hydrologic unit code defined by the USGS (Seaber and others, 1987). The regional equations for the nine flood regions were developed with the intent to explain flood response by using selected basin and climatic characteristics. Within each region, a certain proportion of flood response is unexplained variation, largely due to basin and climatic characteristics that are not measured or used in the regional equations.

Ordinary least-squares (OLS) regression techniques (Minitab, Inc., 2003) were used to determine the most appropriate basin and climatic characteristics. GLS regression analysis (Stedinger and Tasker, 1985) was used to determine the values of the regression constant and regression coefficients and the error terms of the regression equations.

Determination of Basin and Climatic Characteristics

Regional equations commonly are used for estimating the magnitude and frequency of peak discharges at locations that have no streamflow data. Equations have been developed from a regression analysis, in which peak discharges for recurrence intervals determined at gaging stations are related to basin and climatic characteristics.

Geographic Information System

Basin and climatic characteristics were computed by use of an ARC/INFO GIS (ESRI, 1999) and algorithms in the GIS Weasel developed by the USGS (U.S. Geological Survey, 2000 and Viger and Leavesley, 2007). A graphical user interface based on ARC/INFO, arc macro language (AML) scripts, and C++ programming language is used in GIS Weasel. The operation of the GIS Weasel does not require GIS expertise, but knowledge of ARC/INFO is helpful in changing the geographical projections from decimal degrees to other projections and in merging grids. The GIS Weasel online computer program (U.S. Geological Survey, 2000) was used to derive basin and climatic characteristics from raster data. A GRID subsystem of ARC/INFO is used by the GIS Weasel to discretize coverages (vector data) into grids of cells with specific dimensions (for example, 85 ft by 85 ft) and to assign a data value to each grid cell. The grid of data values represents some aspect of the discretized coverage, such as elevation or precipitation. The data values can be manipulated by applying mathematical operations to individual cells to the whole grid, or by combining two or more grids. The GIS Weasel operates on a Unix or Windows NT platform and is available for downloading at *http://wwwbrr.cr.usgs.gov/projects/SW_precip_runoff/software/weasel_s/weasel.shtml*, accessed June 19, 2007. Coverages of vector data were converted to raster data by discretizing coverages into a regularly spaced grid. The rasterization of the vector data or the use of raster data herein is referred to as “raster modeling.” Grid cells were assigned data values that represent geospatial characteristics.

Basin and Climatic Characteristics

The following basin and climatic characteristics were determined with raster modeling by using GIS Weasel (app. 1 and app. 2): average basin mean annual precipitation (1961–90); average basin mean winter precipitation (1961–90); average basin maximum 24-hour and 6-hour precipitation for 100-year recurrence interval by using National Oceanic and Atmospheric Administration (NOAA) Atlas 2 (Miller and others, 1973) and Atlas 14 (Bonnin and others, 2004); average basin slope; drainage area; average basin elevation; and average basin aspect. Existing basin and climatic characteristics also were available from the USGS Water-Data Storage and Retrieval System (WATSTORE) computerized data system (Dempster, 1981, 1983). Existing data values for the basin and climatic characteristics were not used in the analysis because the only other significant characteristics in previous reports were average channel elevation and mean minimum January temperature. The average basin slope determined in this investigation reduces the unexplained variation more than the average channel elevations. Only two points are used for average channel elevations (10 and 85 percent of stream length), whereas many grid cell points are used for basin slope (roughly every 30 m) for an average. January temperature characteristic was considered to be an inherent characteristic in average basin elevation.

The National Elevation Dataset (NED) is a USGS raster product (U.S. Geological Survey, 1999) designed to provide national elevation data in a seamless form with a consistent datum, elevation unit, and cartographic projection. “Seamless” means that all 7.5-minute quadrangles for each State can be compiled into a single coverage or layer. Data corrections were made in the NED assembly process to minimize artifacts, permit edge matching, and fill sliver areas of missing data. The NED has a resolution of 1 arc-second (approximately 30 m or 91 ft) for the conterminous United States. For example, the New Mexico 7.5-minute, 30-m NED actual cell size is 28 m (85 ft). In the NED assembly process, the elevation values were converted to decimal meters as a consistent unit of measure, the North American Datum of 1983 consistently was used as a horizontal datum, and all data were recast in a geographic projection of decimal degrees. The Web page describing the NED is available at *http://ned.usgs.gov*, accessed June 19, 2007.

The GIS Weasel (U.S. Geological Survey, 2000) is used for the preparation of spatial information for input to merged and distributed parameter physical-process models. Tools within GIS Weasel are provided to delineate, characterize, modify, and parameterize “model response units” (MRUs) within a geographical area; in this report, the area is the watershed or drainage area. An MRU in a watershed typically is used to represent an area that is characterized or attributed to estimate a uniform physical hydrologic process. Selected basin and climatic characteristics were computed for each watershed (average basin mean annual precipitation, average basin mean winter precipitation, average basin maximum 24-hour and 6-hour precipitation for 100-year recurrence interval determined by using NOAA Atlas 2 (Miller and others, 1973) and 14 (Bonnin and others, 2004), average basin slope, drainage area, average basin elevation, and average basin aspect) using a single MRU for each watershed. The 7.5-minute digital elevation models (DEMs) of the NED were used for Arizona, Utah, Colorado, and New Mexico. The mean annual and winter precipitation grids were composed for the four corner States by using data developed by Daly and others (1994). A point coverage (latitude and longitude) was developed for the gaging-station locations listed in appendix 1.

Drainage area (DA), in square miles, typically is determined by planimetering the delineated area on the largest scale topographic maps available (generally the 7.5-minute quadrangles, 1:24,000 scale). In this investigation, DA was determined by raster modeling that used 7.5-minute, 30-m DEMs. Average basin mean winter precipitation (Pw) and average basin mean annual precipitation (Pa) (1961–90, in inches) were averaged for each basin by raster modeling that used a 4-km (2.5-mi) grid developed by Daly (1998 a, b, c, and d) for Arizona, Utah, Colorado, and New Mexico. Average basin slope (S), in percent, was averaged for each basin by raster modeling that used the grid cells of the 7.5-minute, 30-m DEMs. Average basin aspect (A), in degrees from north, was averaged for each basin by raster modeling that used the grid cells of the 7.5-minute, 30-m DEMs. Average basin elevation (E), in feet, was averaged for each basin by raster modeling that used the grid cells of the 7.5-minute, 30-m DEMs.

Estimates of mean monthly and mean annual precipitation for 1961–90 have been developed for 4-km (2.5-mi) grid cells by Daly (1998 a, b, c, and d) for Arizona, Utah, Colorado, and New Mexico by using the Parameter-Elevation Regressions on Independent Slopes Model (PRISM) presented by Daly and others (1994). PRISM estimates are based on all available point data, including the high-elevation precipitation data from the Natural Resources Conservation Service data collection at *http://www.nm.nrcs.usda.gov*, accessed January 31, 2008, and a DEM to account for the effects of topography through station weighting and simple linear regression of precipitation and elevation. The mean monthly precipitation raster datasets are available at *http://www.ocs.orst.edu/prism/prism_new.html*, accessed June 19, 2007. The raster precipitation data units are in millimeters multiplied by 100, and the geographical coordinates of the grid cells are in decimal degrees.

The mean monthly precipitation (1961–90) raster data were available only by month. By using the 12 monthly values of 30-year mean precipitation for each grid cell, the GRID subsystem of ARC/INFO was used to compute mean values for the annual 12-month period and for the 7-month winter period (October–April). GIS Weasel was used to compute an average, spatially weighted value for each basin from the values for the 4-km (2.5-mi) grid cells within each basin. Finally, total values of precipitation for each period were computed and converted from millimeters to inches by multiplying by the number of months in the period (7 for the winter and 12 for the annual) and dividing by 2,540.

Basin and climatic characteristics determined by using GIS Weasel for the 293 gaging stations in the nine flood regions are listed in appendix 2. The basin and climatic characteristics determined to be statistically significant for the regression models are listed in appendix 1, and the range is listed in table 1.

A stepwise OLS multiple-regression procedure (Minitab, Inc., 2003) was used to determine which independent variables were significant in the equations for peak discharge. In the stepwise procedure, variables were added one at a time until all that were significant at the 5-percent level were included. Because the logarithms of peak discharge commonly are determined to be linearly related to logarithms of basin and climatic variables, all variables were transformed to base 10 logarithms for the regression analysis. The general form of the mathematical model is as follows:

$$\log Q_t = \log k + a \log x_1 + b \log x_2 + \ldots + n \log x_n, \quad (1)$$

or

$$Q_t = K\, x_1^{a}\, x_2^{b} \ldots x_n^{n},$$

where

Q_t = peak discharge (instantaneous peak discharge), in cubic feet per second, for recurrence interval *t*;
k = regression constant;
a, b, ... n = regression coefficients;
$x_1, x_2, \ldots x_n$ = basin and climatic variables; and
K = the antilog of the regression constant.

One or more of the following basin and climatic characteristics was determined to be statistically significant for inclusion as independent variables in the regression equations:

A = drainage area, in square miles;
S = average basin slope upstream from the gaging station, in percent (feet/foot*100);
E = average basin elevation, in feet above NAVD 88. Elevation was transformed by division by 1,000 to reduce the size of the intercept coefficient of the equation;

Table 1. Range of statistically significant basin and climatic characteristics selected for use in the regression analysis.

[--, data not statistically significant]

Flood region and number (fig. 1)	Drainage area (square miles)	Average basin slope (percent [feet/foot*100])	Average basin elevation (feet)	Maximum 24-hour precipitation intensity for indicated recurrence interval 100 years (inches)	Average basin annual precipitation 1961–90 (inches)
Northeast plains	0.536 to 10,800	0.0205 to 0.2023	--	--	14.50 to 20.15
flood region (1)			--	--	
Northwest plateau	0.059 to 12,7000	0.0231 to 0.4447	4,320 to 7,520	--	--
flood region (2)				--	--
Southeast mountain	3.35 to 716	--	4,890 to 8,820	--	--
flood region (3)		--		--	--
Southeast plains	0.140 to 4,460	0.0194 to 0.1966	3,970 to 7,620	--	--
flood region (4)				--	--
Northern mountain	0.606 to 3,120	--	7,570 to 11,500	[1]3.08 to 5.51	--
flood region (5)		--			--
Central mountain valley	0.18 to 7,220	--	--	--	--
flood region (6)		--	--	--	--
Southwest desert	0.20 to 2,820	--	--	--	--
flood region (7)		--	--	--	--
Southwest mountain	1.70 to1,200	--	--	--	--
flood region (8)		--	--	--	--
Northern Arizona	0.107 to 2,150	0.0177 to 0.1545	--	--	--
flood region (9)			--	--	--

[1] Data from National Oceanic and Atmospheric Administration Atlas 14, Bonnin and others (2004).

$I_{24,100}$ = maximum precipitation intensity of a storm of 24-hour duration with a recurrence interval of 100 years; and,

Pa = mean annual precipitation (1961–90).

Additional variables listed in appendix 2 also were determined by using GIS; these variables include average basin mean annual winter precipitation (1961–90); maximum 6-hour precipitation for 100-year recurrence intervals for NOAA Atlas 2 (Miller and others, 1973) and Atlas 14 (Bonnin and others, 2004); and average basin aspect. The maximum precipitation frequency from NOAA Atlas 2 was statistically significant in some flood regions in previous reports (Waltemeyer, 1986, 1996). Maximum precipitation characteristics from NOAA Atlas 2 and Atlas 14 were not statistically significant (p-value less than 5 percent). Annual peak discharge in mountain regions are generally produced from snowmelt runoff where basins are greater than 7,500 feet in elevation. Gaging stations shown in figure 1 are grouped into three intervals to show the spatial distribution.

Development of Generalized Least-Squares Regression Equations

After the appropriate independent variables were determined using the OLS regression, GLS regression was used to determine the best values of the regression coefficients. Regression coefficients determined from a GLS regression procedure (Stedinger and Tasker, 1985; Tasker and others, 1986) are considered to be better by Tasker and others (1986) than those determined from OLS regression because GLS regression considers the time-sampling error of the dependent variable, whereas OLS regression does not. GLS regression also considers cross correlation among concurrent peak discharges at gaging stations, whereas OLS regression does not. The basic regression model that uses GLS is shown as equation 1. The equations determined by using GLS regression analysis are listed in table 2; included in these are equations for estimating peak-discharge magnitudes that have recurrence intervals of 2, 5, 10, 25, 50, 100, and 500 years for each of the nine regions in New Mexico and the surrounding area.

Residual plots of the regression analysis were examined for bias of model equations. The plots of the nine regions indicate no change in variance or any pattern showing nonhomogeneities. No significant outliers that would indicate a strong influence in the equation exist because of drainage area size. In addition, plots of the observed in comparison to predicted discharge indicate good dispersion about the 1:1 line of the equation that indicates equivalent observed and predicted values and that an adequate model was developed.

Table 2. Regional flood-frequency equations using generalized least-squares regression.

[Q, peak discharge, in cubic feet per second, for indicated recurrence interval; A, drainage area, in square miles; S, average basin slope upstream from gaging station, in percent (ft/ft*100); I24,100, maximum precipitation intensity of a storm of 24 hours duration with a recurrence interval of 100 years, in inches; Pa, mean annual precipitation (1961–90), in inches; E, average basin elevation, in feet]

Equations	Recurrence interval (years)	Average standard error of estimates: Regresion		Average standard error of estimates: Prediction	
		Log units	Percent	Log units	Percent
Northeast plains flood region (1)					
$Q_2 = 8.260 \times 10^6 A^{0.562} S^{0.351} Pa^{-3.81}$	2	0.298	74	0.320	85
$Q_5 = 3.939 \times 10^8 A^{0.540} S^{0.520} Pa^{-4.69}$	5	0.250	61	0.270	69
$Q_{10} = 2.630 \times 10^9 A^{0.533} S^{0.615} Pa^{-5.10}$	10	0.229	55	0.249	63
$Q_{25} = 1.764 \times 10^{10} A^{0.530} S^{0.721} Pa^{-5.50}$	25	0.210	50	0.231	57
$Q_{50} = 5.480 \times 10^{10} A^{0.530} S^{0.789} Pa^{-5.73}$	50	0.200	48	0.223	55
$Q_{100} = 1.400 \times 10^{11} A^{0.531} S^{0.850} Pa^{-5.90}$	100	0.195	46	0.218	53
$Q_{500} = 6.774 \times 10^{11} A^{0.537} S^{0.966} Pa^{-6.15}$	500	0.191	46	0.219	54
Northwest plateau flood region (2)					
$Q_2 = 9.656 \times 10^1 A^{0.428}$	2	0.419	112	0.427	127
$Q_5 = 1.256 \times 10^4 A^{0.365} S^{0.365} E/1{,}000^{-1.69}$	5	0.318	80	0.332	89
$Q_{10} = 2.927 \times 10^4 A^{0.344} S^{0.395} E/1{,}000^{-1.84}$	10	0.274	68	0.287	72
$Q_{25} = 6.685 \times 10^4 A^{0.323} S^{0.424} E/1{,}000^{-1.95}$	25	0.238	58	0.252	63
$Q_{50} = 1.061 \times 10^5 A^{0.308} S^{0.442} E/1{,}000^{-1.99}$	50	0.226	54	0.240	60
$Q_{100} = 1.531 \times 10^5 A^{0.295} S^{0.457} E/1{,}000^{-1.99}$	100	0.223	54	0.238	59
$Q_{500} = 2.955 \times 10^5 A^{0.267} S^{0.482} E/1{,}000^{-1.97}$	500	0.242	59	0.260	66
Southeast mountain flood region (3)					
$Q_2 = 2.118 \times 10^4 A^{0.611} E/1{,}000^{-3.16}$	2	0.337	86	0.381	108
$Q_5 = 1.506 \times 10^5 A^{0.662} E/1{,}000^{-3.81}$	5	0.316	80	0.359	99
$Q_{10} = 3.630 \times 10^5 A^{0.698} E/1{,}000^{-4.09}$	10	0.307	77	0.351	96
$Q_{25} = 8.179 \times 10^5 A^{0.744} E/1{,}000^{-4.34}$	25	0.299	75	0.345	94
$Q_{50} = 1.289 \times 10^6 A^{0.776} E/1{,}000^{-4.47}$	50	0.294	73	0.342	93
$Q_{100} = 1.856 \times 10^6 A^{0.808} E/1{,}000^{-4.57}$	100	0.291	73	0.341	93
$Q_{500} = 3.430 \times 10^6 A^{0.876} E/1{,}000^{-4.71}$	500	0.289	72	0.344	94
Southeast plains flood region (4)					
$Q_2 = 4.771 \times 10^3 A^{0.467} E/1{,}000^{-1.36} S^{0.589}$	2	0.336	86	0.362	100
$Q_5 = 3.825 \times 10^4 A^{0.465} E/1{,}000^{-2.05} S^{0.532}$	5	0.213	51	0.233	58
$Q_{10} = 9.587 \times 10^4 A^{0.460} E/1{,}000^{-2.31} S^{0.494}$	10	0.159	38	0.180	43
$Q_{25} = 2.565 \times 10^5 A^{0.448} E/1{,}000^{-2.54} S^{0.477}$	25	0.126	30	0.151	36
$Q_{50} = 5.293 \times 10^5 A^{0.436} E/1{,}000^{-2.72} S^{0.483}$	50	0.130	31	0.158	38
$Q_{100} = 1.057 \times 10^6 A^{0.426} E/1{,}000^{-2.89} S^{0.489}$	100	0.152	36	0.182	44
$Q_{500} = 4.107 \times 10^6 A^{0.404} E/1{,}000^{-3.24} S^{0.484}$	500	0.227	55	0.261	66
Northern mountain flood region (5)					
$Q_2 = 0.301 \times 10^1 A^{0.805} E/1{,}000^{-1.61} I24{,}100^{3.41}$	2	0.296	74	0.306	80
$Q_5 = 3.760 \times 10^1 A^{0.761} E/1{,}000^{-2.58} I24{,}100^{3.76}$	5	0.247	60	0.257	65
$Q_{10} = 1.624 \times 10^2 A^{0.736} E/1{,}000^{-3.14} I24{,}100^{3.93}$	10	0.233	56	0.242	60
$Q_{25} = 8.304 \times 10^2 A^{0.709} E/1{,}000^{-3.76} I24{,}100^{4.10}$	25	0.232	56	0.242	60
$Q_{50} = 2.449 \times 10^3 A^{0.691} E/1{,}000^{-4.17} I24{,}100^{4.21}$	50	0.242	59	0.253	64
$Q_{100} = 6.592 \times 10^3 A^{0.675} E/1{,}000^{-4.55} I24{,}100^{4.32}$	100	0.257	63	0.268	68
$Q_{500} = 5.211 \times 10^4 A^{0.642} E/1{,}000^{-5.36} I24{,}100^{4.55}$	500	0.304	76	0.318	84
Central mountain-valley flood region (6)					
$Q_2 = 1.328 \times 10^2 A^{0.420}$	2	0.376	98	0.394	113
$Q_5 = 3.163 \times 10^2 A^{0.394}$	5	0.298	74	0.313	83
$Q_{10} = 4.906 \times 10^2 A^{0.383}$	10	0.269	66	0.284	73
$Q_{25} = 7.800 \times 10^2 A^{0.372}$	25	0.252	62	0.267	68
$Q_{50} = 1.051 \times 10^3 A^{0.365}$	50	0.248	60	0.265	67
$Q_{100} = 1.374 \times 10^3 A^{0.359}$	100	0.251	61	0.268	68
$Q_{500} = 2.354 \times 10^3 A^{0.348}$	500	0.273	68	0.292	76

Table 2. Regional flood-frequency equations using generalized least-squares regression.—Continued

[Q, peak discharge, in cubic feet per second, for indicated recurrence interval; A, drainage area, in square miles; S, average basin slope upstream from gaging station, in percent (ft/ft*100); I24,100, maximum precipitation intensity of a storm of 24 hours duration with a recurrence interval of 100 years, in inches; Pa, mean annual precipitation (1961–90), in inches; E, average basin elevation, in feet]

Equations	Recurrence interval (years)	Average standard error of estimates			
		Regresion		Prediction	
		Log units	Percent	Log units	Percent
Southwest desert flood region (7)					
$Q_2 = 1.465 \times 10^2 A^{0.454}$	2	0.233	57	0.251	63
$Q_5 = 2.777 \times 10^2 A^{0.468}$	5	0.180	43	0.196	48
$Q_{10} = 3.878 \times 10^2 A^{0.477}$	10	0.157	37	0.173	41
$Q_{25} = 5.537 \times 10^2 A^{0.488}$	25	0.140	33	0.157	38
$Q_{50} = 6.955 \times 10^2 A^{0.497}$	50	0.136	32	0.155	37
$Q_{100} = 8.518 \times 10^2 A^{0.506}$	100	0.138	32	0.159	38
$Q_{500} = 1.275 \times 10^3 A^{0.529}$	500	0.162	38	0.186	45
Southwest mountain flood region (8)					
$Q_2 = 8.990 \times A^{0.800}$	2	0.213	51	0.223	55
$Q_5 = 2.516 \times 10^1 A^{0.728}$	5	0.176	42	0.186	45
$Q_{10} = 4.310 \times 10^1 A^{0.691}$	10	0.169	40	0.180	43
$Q_{25} = 7.638 \times 10^1 A^{0.652}$	25	0.172	41	0.185	45
$Q_{50} = 1.105 \times 10^2 A^{0.626}$	50	0.181	43	0.195	46
$Q_{100} = 1.539 \times 10^2 A^{0.603}$	100	0.193	46	0.208	51
$Q_{500} = 3.012 \times 10^2 A^{0.557}$	500	0.229	55	0.246	62
Northeastern Arizona flood Region (9)					
$Q_2 = 4.069 \times 10^2 A^{0.495} S^{0.777}$	2	0.340	87	0.360	99
$Q_5 = 1.029 \times 10^3 A^{0.488} S^{0.787}$	5	0.268	66	0.286	74
$Q_{10} = 1.750 \times 10^3 A^{0.481} S^{0.805}$	10	0.251	61	0.270	69
$Q_{25} = 3.157 \times 10^3 A^{0.473} S^{0.831}$	25	0.255	62	0.276	71
$Q_{50} = 4.642 \times 10^3 A^{0.466} S^{0.850}$	50	0.269	66	0.292	76
$Q_{100} = 6.574 \times 10^3 A^{0.460} S^{0.867}$	100	0.289	72	0.313	83
$Q_{500} = 1.335 \times 10^4 A^{0.446} S^{0.904}$	500	0.345	89	0.373	104

Improvement of Estimates at Gaging Stations

Flood-frequency estimates for gaging stations that have short-term records can be improved by weighting the station data with estimates from the regional regression equation (Interagency Advisory Committee on Water Data, 1982). The GLSNET (Regional Hydrologic Regression and Network Analysis using Generalized Least-Squares) (Stedinger and Tasker, 1985) computer program computes the weighted estimate by using the observed station peak discharge, the regression-equation-predicted peak discharge, the equivalent years of record, and the actual record length. The observed (first line of data), predicted (second line of data), and weighted (third line of data) flood-frequency data are listed in appendix 1 for each gaging station. Weighted estimates, considered to be the best estimates at gaging stations, were determined by the following equation:

$$Q_w = (n_i\, y_i + en_i\, x_i b) / (n_i + en_i), \qquad (2)$$

where

Q_w = weighted flood-frequency data at the gaging station, in cubic feet per second;
n_i = actual record length, in years;
y_i = flood-frequency data at the gaging station, in cubic feet per second;
en_i = equivalent record length, in years; and
$x_i b$ = predicted flood-frequency data at the gaging station determined using the regression equation, in cubic feet per second.

The weighted estimate determined by equation 2 is a function of actual record length and equivalent years from the regression analysis. If actual record length is longer than equivalent years, more weight is given to the observed station data. Conversely, if actual record length is shorter than equivalent years, more weight is given to the regression estimate.

Limitations and Accuracy of Regression Equations

The intended use of regression equations is to provide reliable estimates of peak discharges for selected recurrence intervals at unregulated, ungaged stream sites in New Mexico and surrounding areas. Estimates commonly are required for unregulated, ungaged sites and, often, for unregulated, ungaged sites on streams that have gaging stations located near the ungaged sites. Estimates at ungaged sites in a basin located in two regions are less common and somewhat more difficult to develop than are those for basins in one region. In parts of some regions, regression equations may not be reliable for areas with sparse data or for ungaged sites that have basin and climatic characteristics beyond the range of those listed in table 1. Extrapolation beyond the upper and lower ranges of the basin and climatic characteristics may result in an exponential change in the value from the equation and unreliable regression estimates. The application of regional equations is not intended to preclude the use of sound hydrologic judgment or any other hydrologic or engineering method that may provide a more reliable estimate. Unit-hydrograph techniques that use gaged precipitation in a basin lacking gaging-station data may yield more reliable estimates of peak discharge than regional equations.

Accuracy of the GLS regression equations generally is measured by the average standard error of prediction and the equivalent years of record. The average standard error of prediction is the sum of the average regression or model error and the average sampling error. The average standard error of regression presented in table 2 for a 100-year recurrence interval peak discharge ranged from 32 to 73 percent (mean is 54, and median value is 54) for the regions. The average standard error of prediction presented in table 2 for a 100-year recurrence interval peak discharge ranged from 38 to 93 percent (mean value is 62, and median value is 59) for the regions. The Waltemeyer (1996) investigation standard error of prediction for the flood regions ranged from 41 to 96 percent (mean value is 67 and median value is 68). Improvements over errors previously reported are attributed to improved GIS determination of drainage area, improved estimates of average basin elevation, and the improved determination of average basin slope available for the first time in New Mexico. Overall, the equations based on GLS regression techniques are more reliable than those in the previous report (Waltemeyer, 1996) because of the increased length of record and improved GIS method. The average standard error of prediction was calculated in log units and converted to percent by means of the methods described by Hardison (1971).

Equivalent years of record are an alternative measure of the accuracy of regression equations that are particularly useful for comparison to gaging-station data. Equivalent years of record are the number of years of actual peak-discharge record that would be required to achieve the same accuracy in the estimate of the t-year (recurrence interval) peak discharge as that obtained from the regional equation. Equivalent years of record are computed by the GLSNET computer program using the method described by Hardison (1971).

Estimate of Magnitude and Frequency of Peak Discharges at Ungaged Sites

Peak discharges that have various recurrence intervals can be estimated for ungaged sites on unregulated, ungaged streams from the regional equations listed in table 2. Gaging-station data can be extrapolated to estimate peak discharge at an ungaged site on a stream that has a nearby gaging station. Additionally, flood-frequency data are available for gaging stations on the main stems of some streams not used in this report for the development of regional regression relations. Data at these gaging stations can be used to make estimates at ungaged sites on the same stream. The independent variables that pertain to the equation for each region need to be measured as previously described for the development of the equations. These methods are described in more detail in “National Handbook of Recommended Methods for Water-Data Acquisition” (U.S. Geological Survey, 1977) and in the section “Determination of Basin and Climatic Characteristics” in this report. The following sections present examples of the previous procedures.

Ungaged Site on an Ungaged Stream

An estimate of peak discharge with a recurrence interval of 100 years is required for an ungaged site in flood region 2 that has a drainage area of 523 mi^2, average basin slope of 0.2422, in percent; and a mean basin elevation of 6,940 ft. When the equation in table 2 is applied, the peak discharge for a 100-year recurrence interval is:

$$\begin{aligned} Q_{100} &= 1.531 \text{ x } 10^5 A^{0.295} S^{0.457} E/1{,}000^{-1.99} \\ &= (1.531 \text{ x } 10^5)\,(523)^{0.295}\,(0.2422)^{0.457}\,(6{,}940/1{,}000)^{-1.99} \\ &= 10{,}800 \text{ ft}^3/\text{s}. \end{aligned}$$

Ungaged Site on a Stream Having a Nearby Gaging Station

Flood-frequency estimates can be made for ungaged sites upstream or downstream from gaging stations by using a method developed by Saur (1974). Using this method, flood-frequency data at the gaging station is transferred to the ungaged site by using the following drainage-area ratio adjustment equation:

$$Q_{T(u)} = Q_{T(g)}\,(A_u/A_g)^x, \qquad (3)$$

where

$Q_{T(u)}$ = weighted flood-frequency estimate at the ungaged site, in cubic feet per second;

$Q_{T(g)}$ = flood-frequency estimate at the gaging station, in cubic feet per second;

A_u = drainage area at the ungaged site, in square miles;

A_g = drainage area at the gaging station, in square miles; and

x = exponent of the drainage area of the applicable regional regression equation listed in table 2.

According to Saur (1974), the equation is applicable when the drainage-area ratio is between 0.5 and 1.5. For example, to estimate a 50-year peak discharge at an ungaged site in region 2 upstream from gaging station Cisco Wash near Cisco, Utah (09163700), the station value listed in appendix 1 is 4,670 ft^3/s. Note that the weighted value of 5,500 ft^3/s was not used because when using this technique, a regional adjustment is made by using the exponent from the regional equation. The weighted value is considered the best flood-frequency value, and when using this technique, a double weight would be made based on the regional flood information. The drainage area at the gaging station is 90.7 mi^2 (app. 1). The exponent of the drainage area of the regression equation for a 50-year recurrence interval for region 2 is 0.308 (table 2). The drainage area at the ungaged site is 75.5 mi^2, and when equation 4 is used the peak discharge at the ungaged site is:

$$Q_{50\,u} = Q_{50\,g} \quad (A_u/A_g)^x \qquad (4)$$
$$= (4{,}670) \quad (75.5/90.7)^{0.308}$$
$$= 4{,}410 \text{ ft}^3/\text{s}.$$

Analysis of Maximum Observed Peak Discharge

Envelope curves relating maximum observed peak discharge to drainage area were developed for New Mexico. Envelope curves provide an indication of the upper limits of peak discharge based on all currently available data and thus can serve as a guide to the reasonableness of flood frequency estimates for large recurrence intervals. Extreme events commonly are used in the design and appraisal of bridge crossings and other structures. Bridge-scour evaluations commonly are made by using the 500-year peak discharge for these appraisals. Peak-discharge data collected at 293 gaging stations (fig. 1) and 367 miscellaneous sites (fig. 2) were used to develop a maximum peak-discharge relation as an alternative method of estimating peak discharge of an extreme event.

Maximum peak discharges for 293 gaging stations (app. 1) and 367 miscellaneous sites (app. 3) in New Mexico were compared to drainage area for each of nine flood regions in New Mexico (figs. 3–11). These relations between maximum peak discharge and drainage area are used by the New Mexico Department of Transportation (NMDOT) to determine a maximum extreme flood or superflood (New Mexico Department of Transportation, 1995). Originally, similar relations have been shown for maximum floodflows in the United States (Crippen and Bue, 1977). The new envelope curves for New Mexico provide the best estimate of the maximum peak discharge expected because the data extend through 2004 and use data from miscellaneous sites. Because the envelope curves are based on maximum peak discharges without regard to record length, the envelope curves are not related to any specific recurrence interval. Thus, the curve only can be used as a general guide to determine whether regression estimates are reasonable. Regardless, the envelope curve indicates the maximum flood response observed in New Mexico and is useful for extreme-flood comparisons.

Future Data Needs and Network Improvements

Statistical flood-frequency relations can be improved by continuing operation of the 293 gaging stations and (or) 367 miscellaneous sites in New Mexico and surrounding areas to collect additional peak-flow data. Flood-frequency equations also might be improved by including new basin and climatic characteristics other than the new variables determined with GIS in this investigation.

Flood-frequency relations based on channel-geometry characteristics have been determined to provide reliable estimates in other States (Hedman and Osterkamp, 1982) and in New Mexico in a limited study based on data from 79 gaging stations (Scott and Kunkler, 1976). Channel-geometry characteristics have been measured by the USGS (Waltemeyer, USGS files, Albuquerque, New Mexico) at most crest-stage gages and continuously recording gaging stations, except for the gaging stations in the four corners area. The active-channel width measurements at about 91 gaging stations in Utah and Arizona are needed to complete that investigation. Flood-frequency equations based on channel-geometry characteristics then could be developed for the nine physiographic regions in New Mexico; the new equations would provide users with an alternative method for estimating flood magnitude and frequency to corroborate results from regression equations presented in this report.

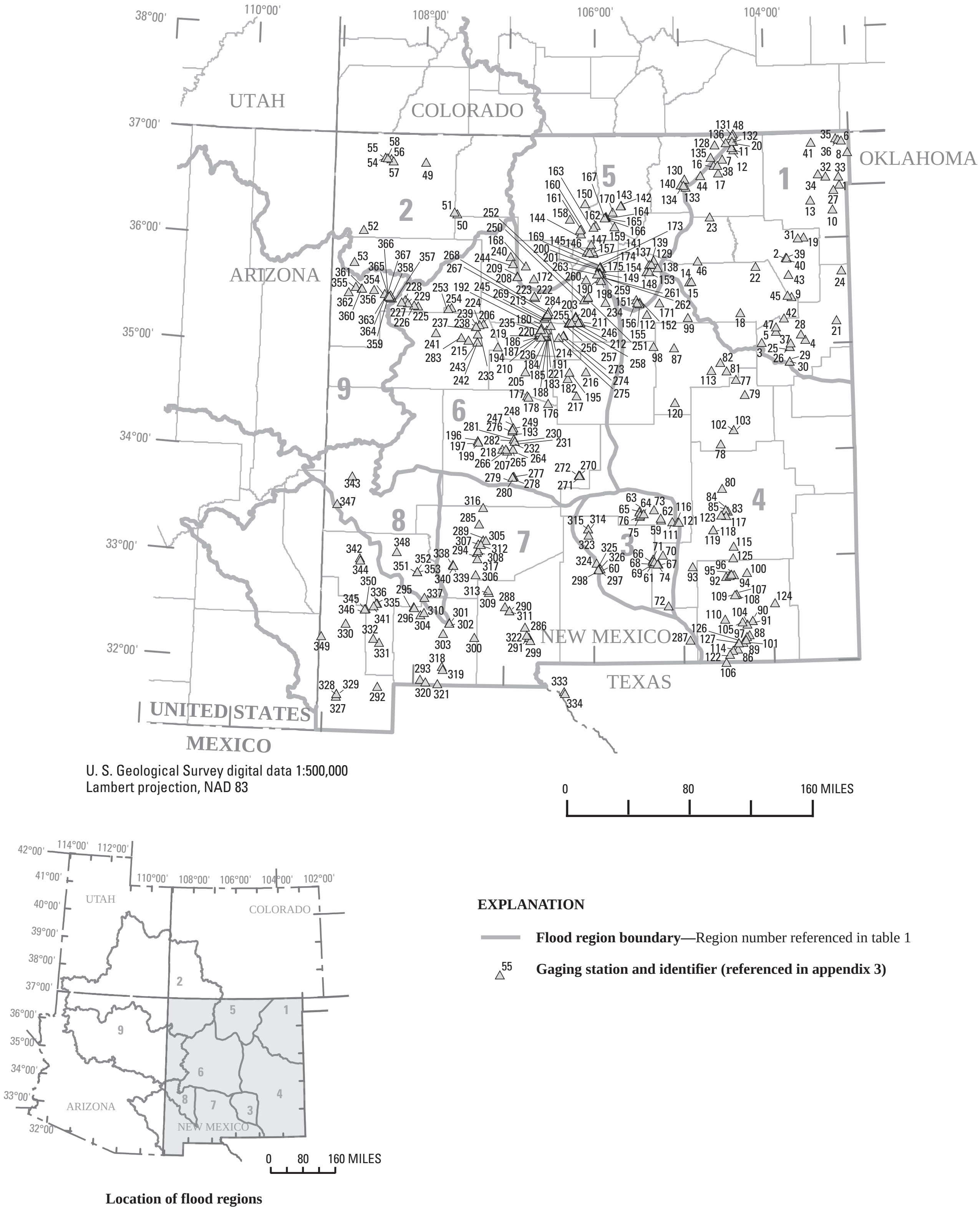


Figure 2. Flood regions and location of miscellaneous sites in New Mexico and surrounding areas.

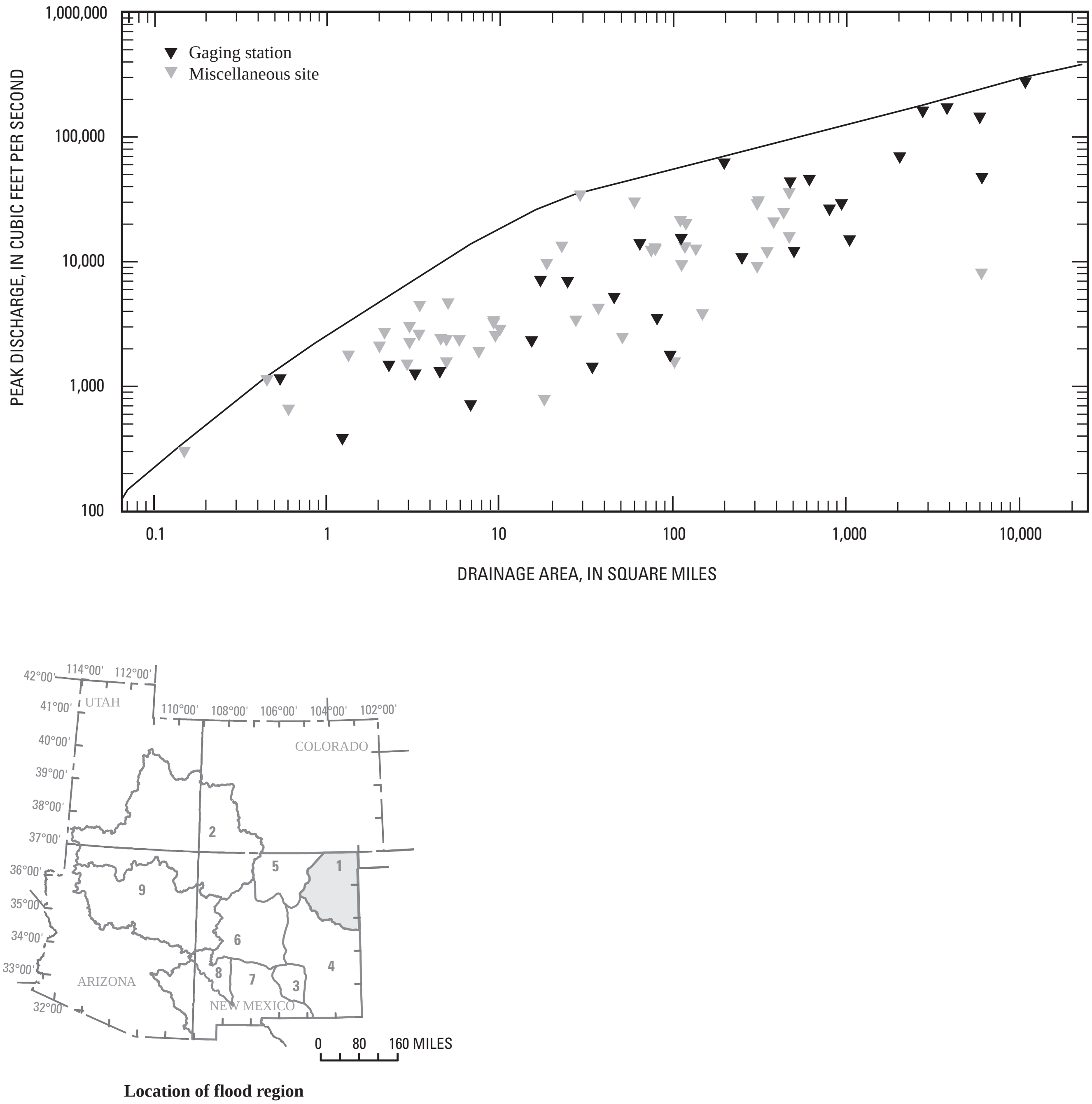


Figure 3. Envelope curve comparing maximum observed peak discharge to drainage area in the northeast plains flood region 1.

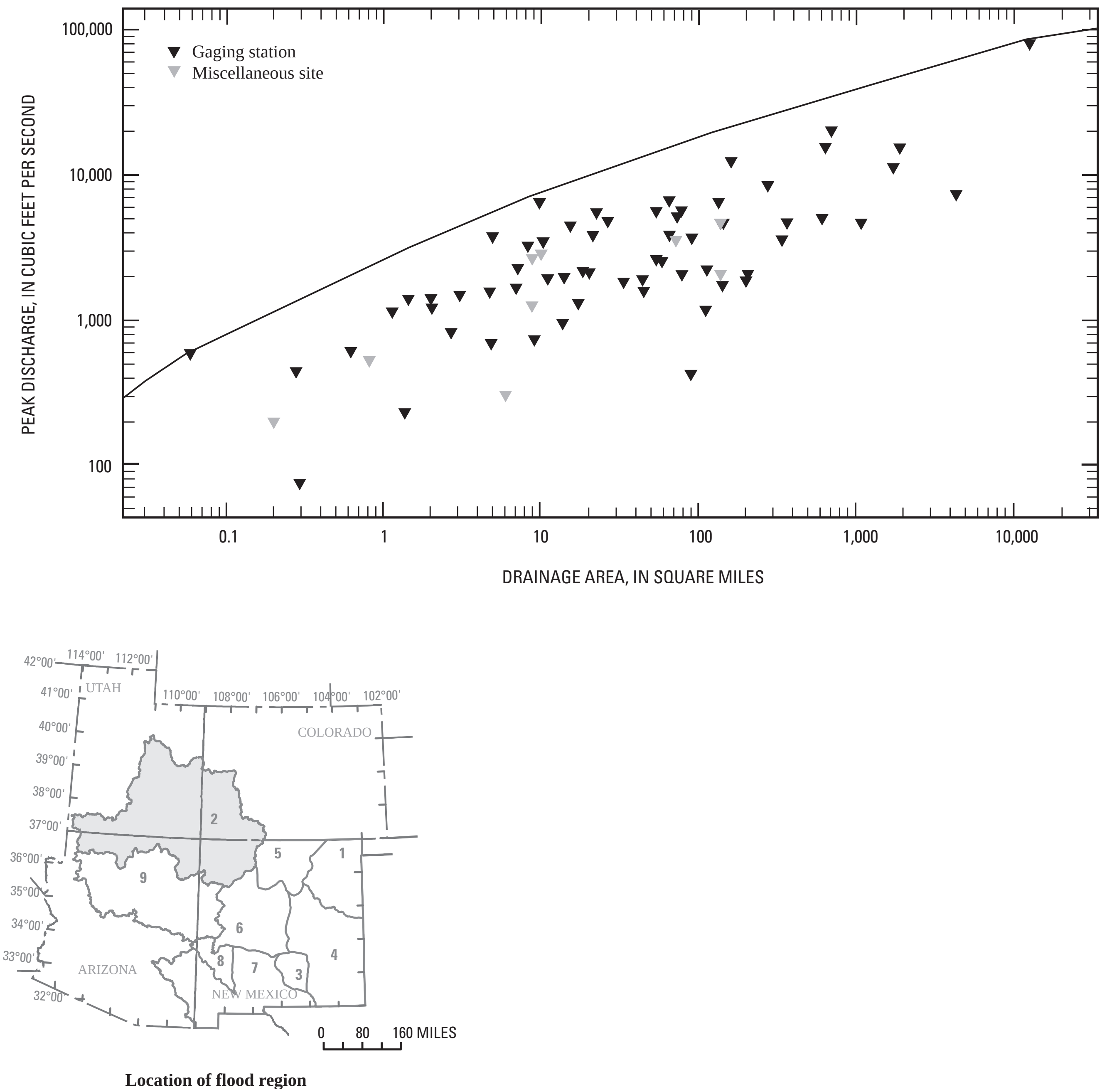
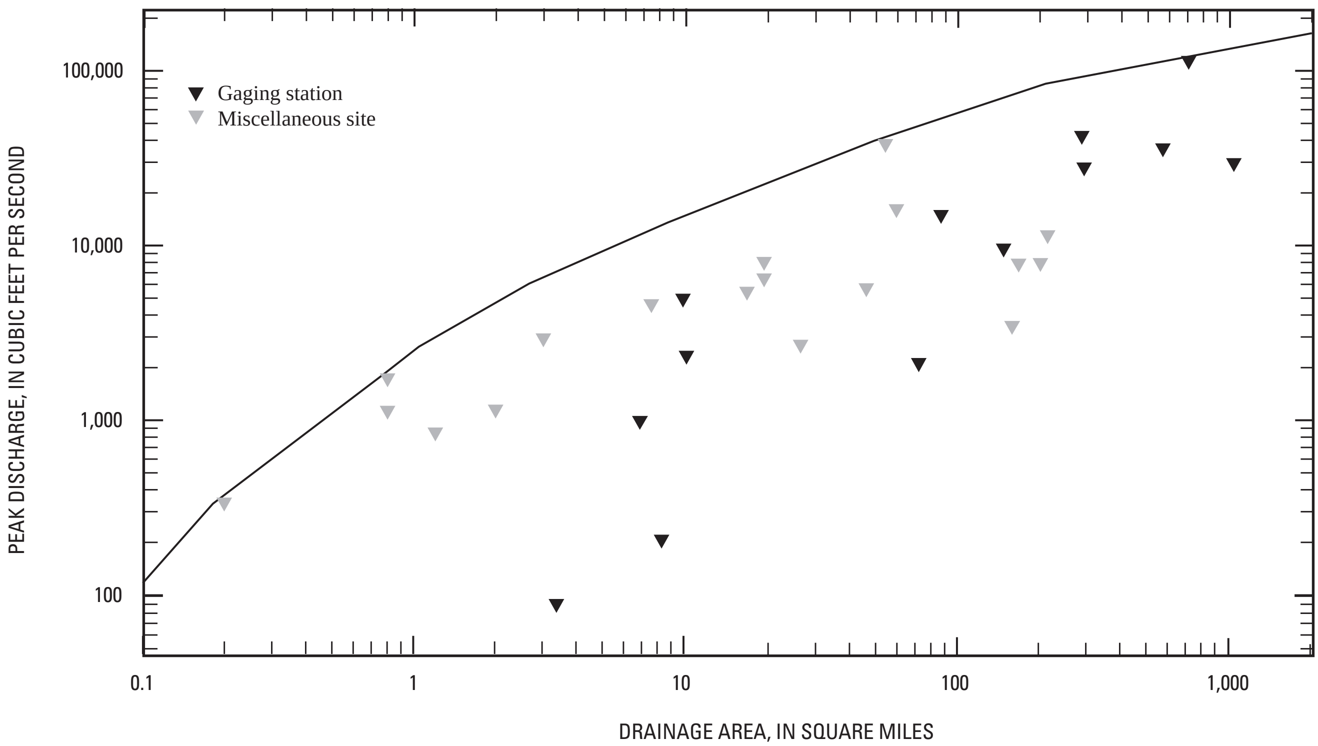
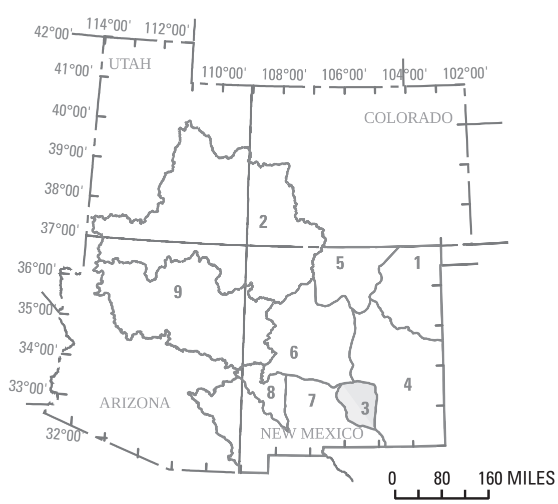


Figure 4. Envelope curve comparing maximum observed peak discharge to drainage area in the northwest plateau flood region 2.





Location of flood region

Figure 5. Envelope curve comparing maximum observed peak discharge to drainage area in the southeast mountain flood region 3.

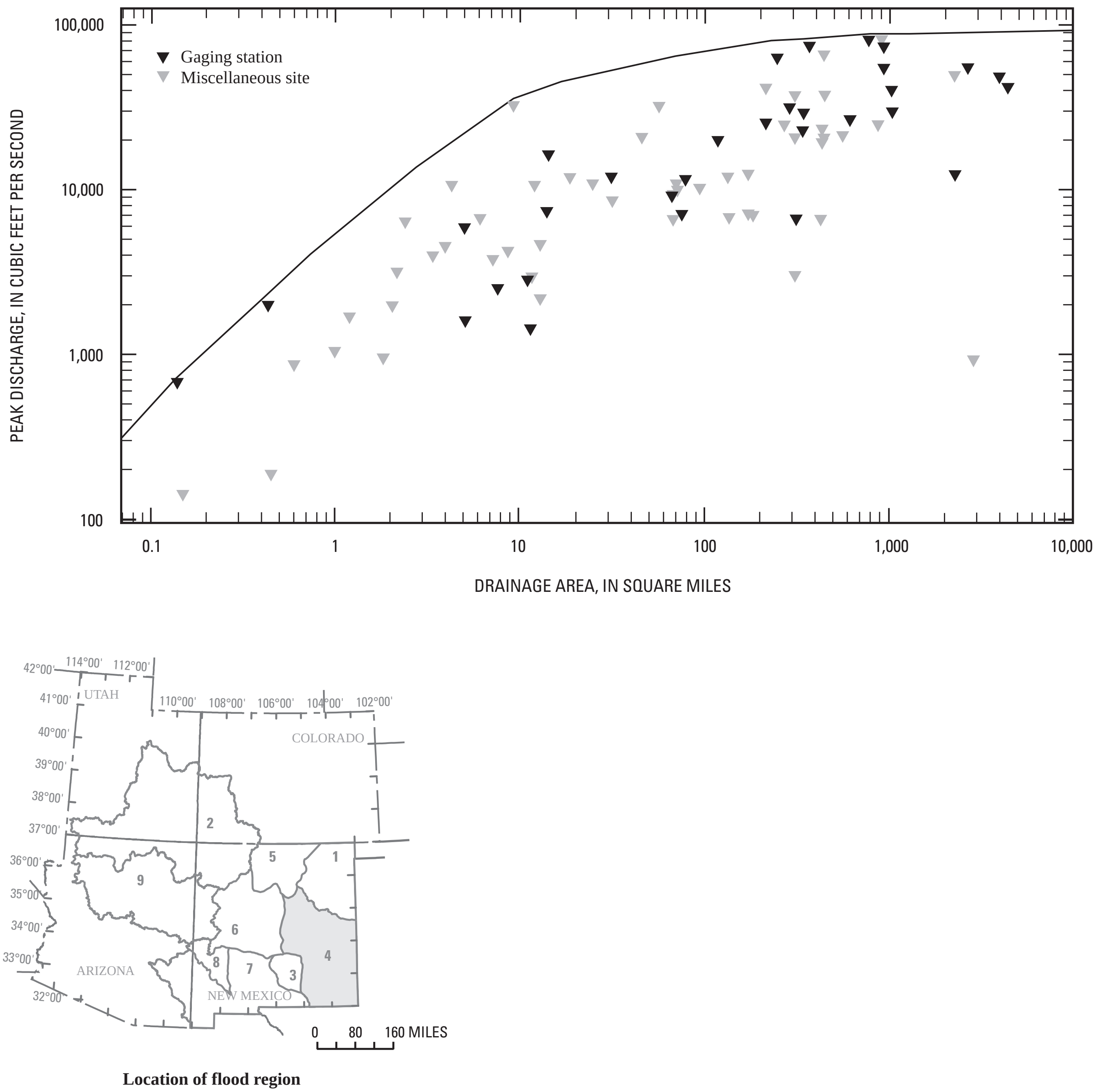
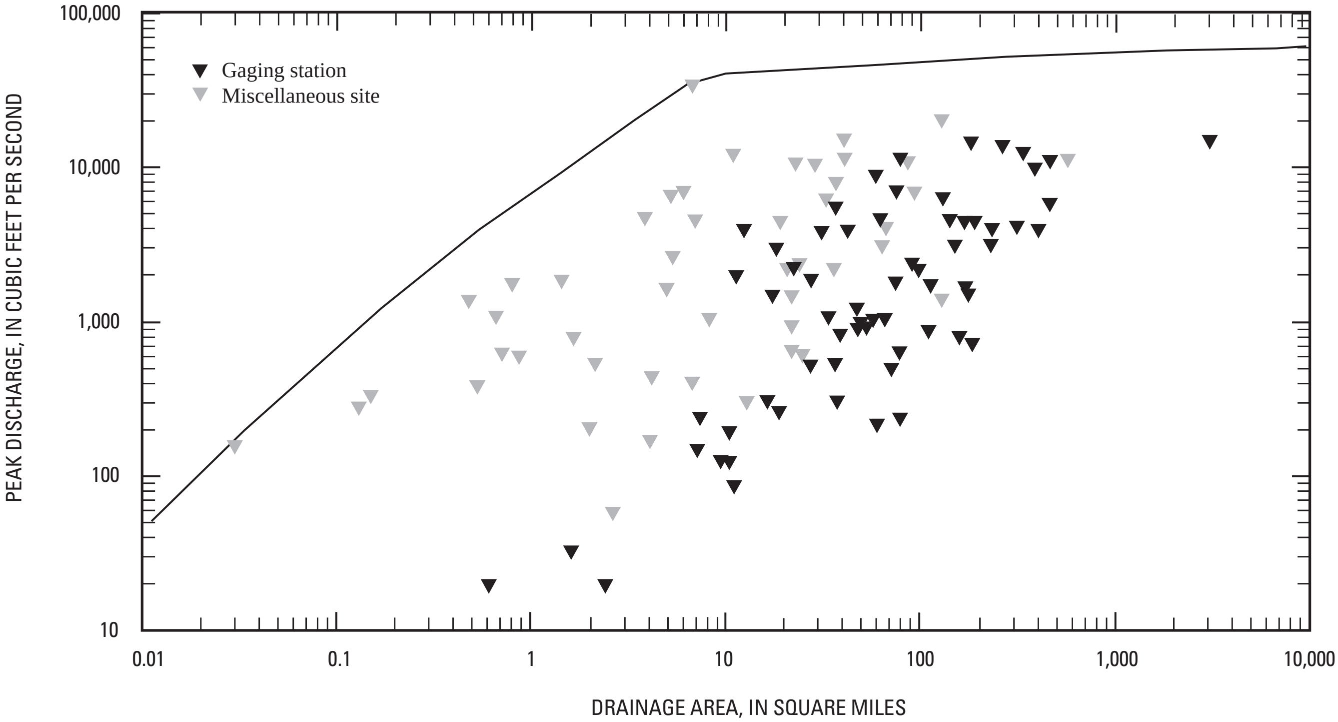
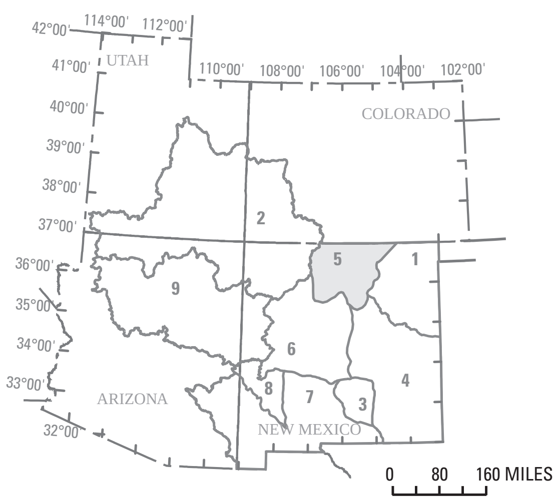


Figure 6. Envelope curve comparing maximum observed peak discharge to drainage area in the southeast plains flood region 4.





Location of flood region

Figure 7. Envelope curve comparing maximum observed peak discharge to drainage area in the northern mountain flood region 5.

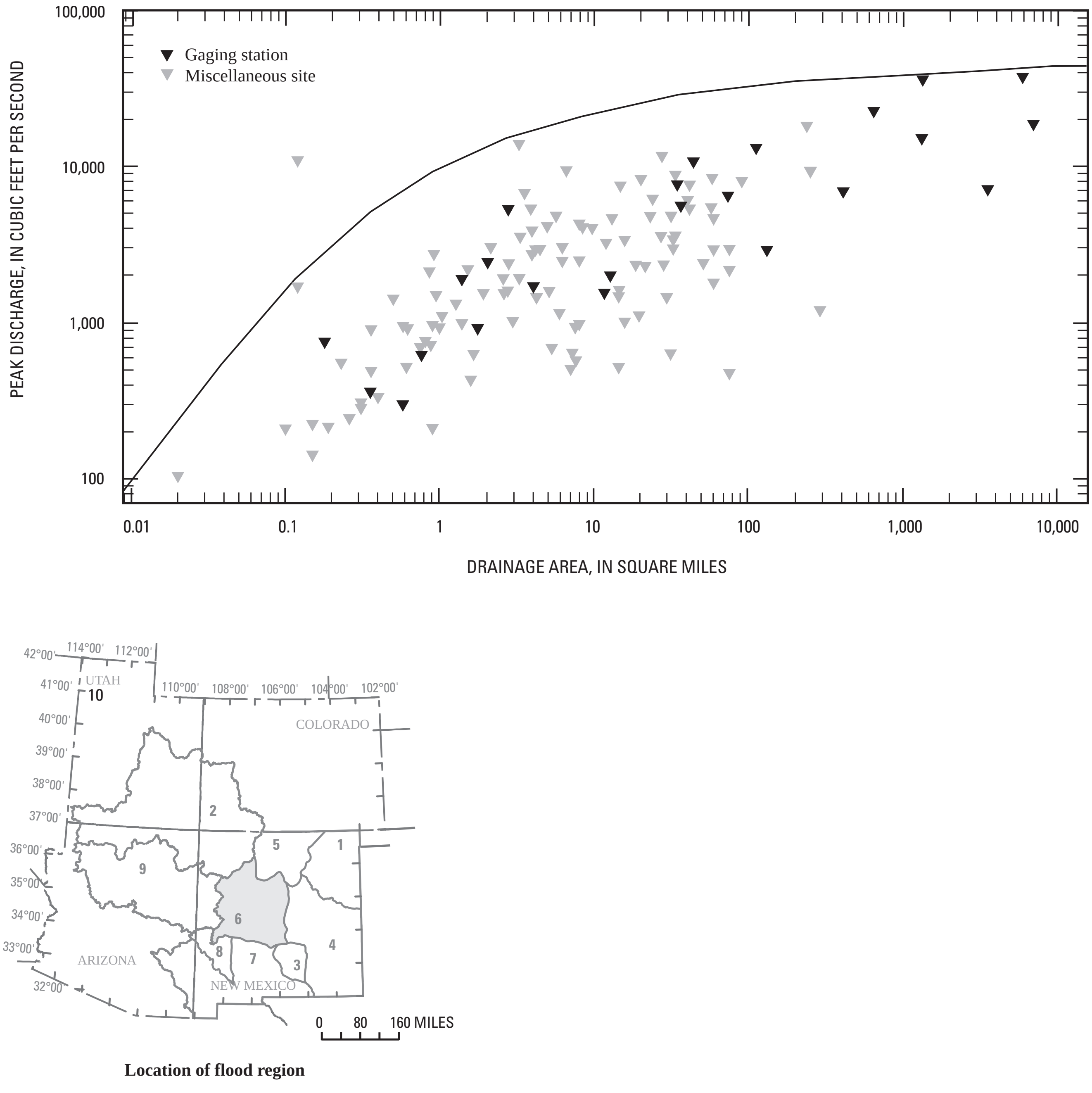
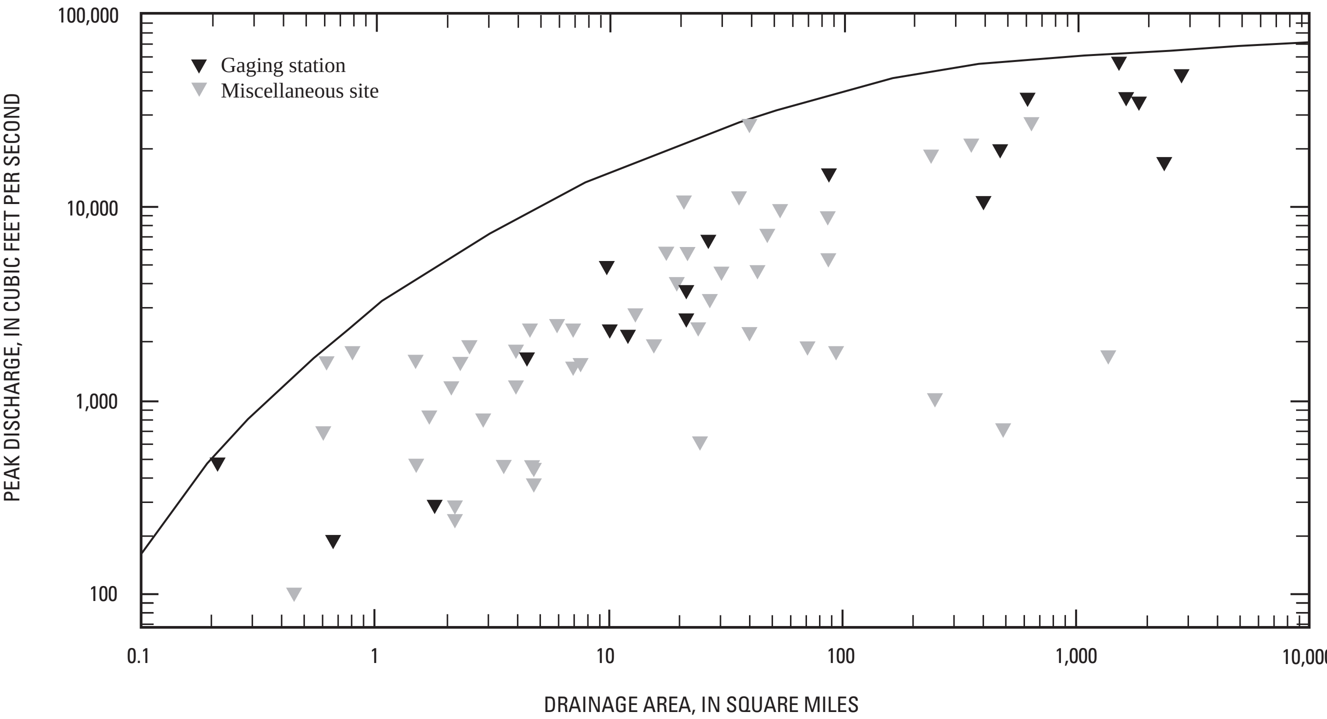


Figure 8. Envelope curve comparing maximum observed peak discharge to drainage area in the central mountain valley flood region 6.



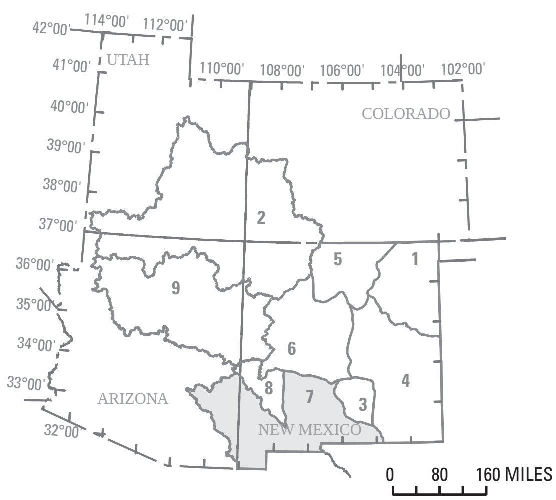
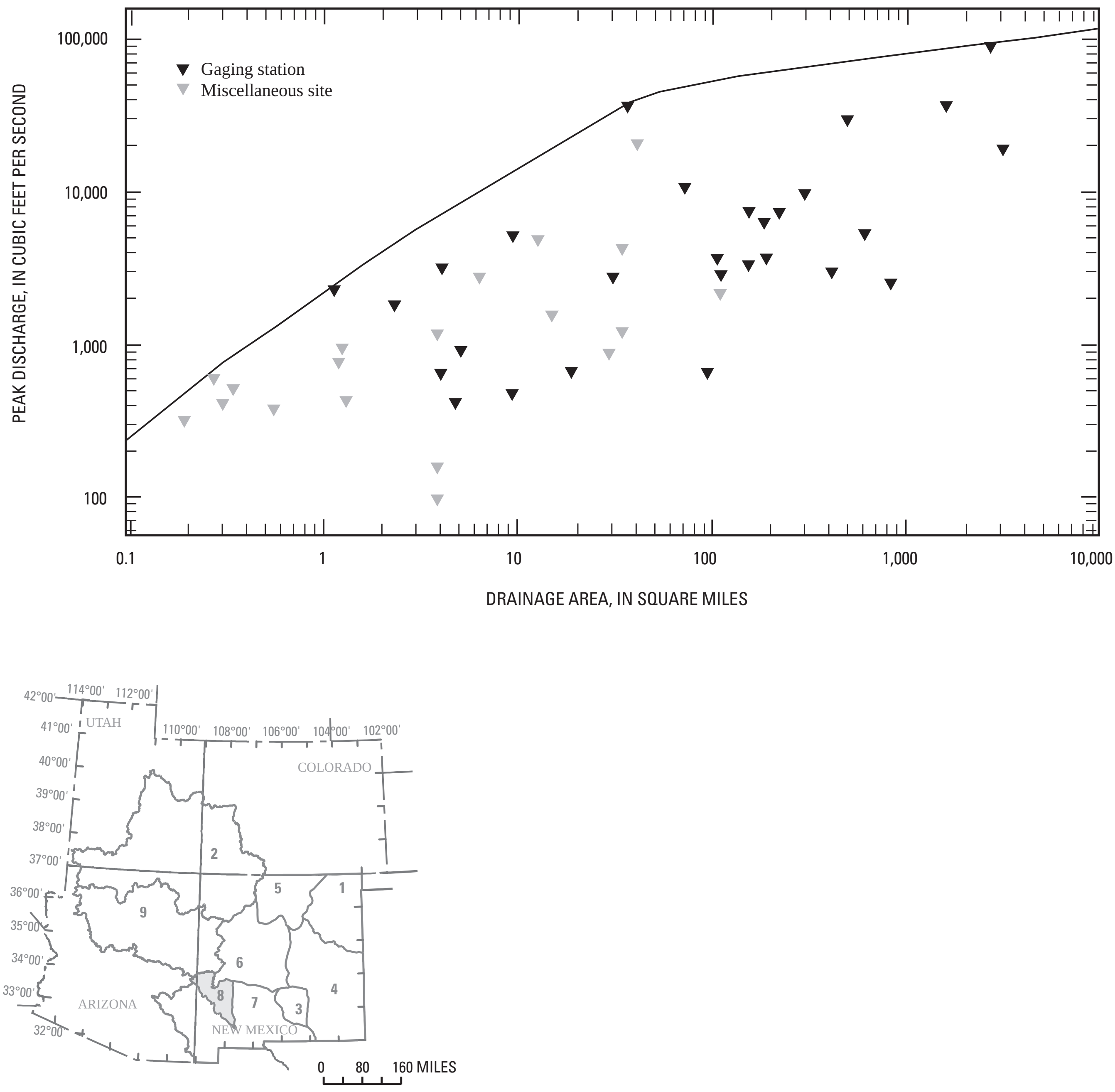


Figure 9. Envelope curve comparing maximum observed peak discharge to drainage area in the southwest desert flood region 7.



Location of flood region

Figure 10. Envelope curve comparing maximum observed peak discharge to drainage area in the southwest mountain flood region 8.

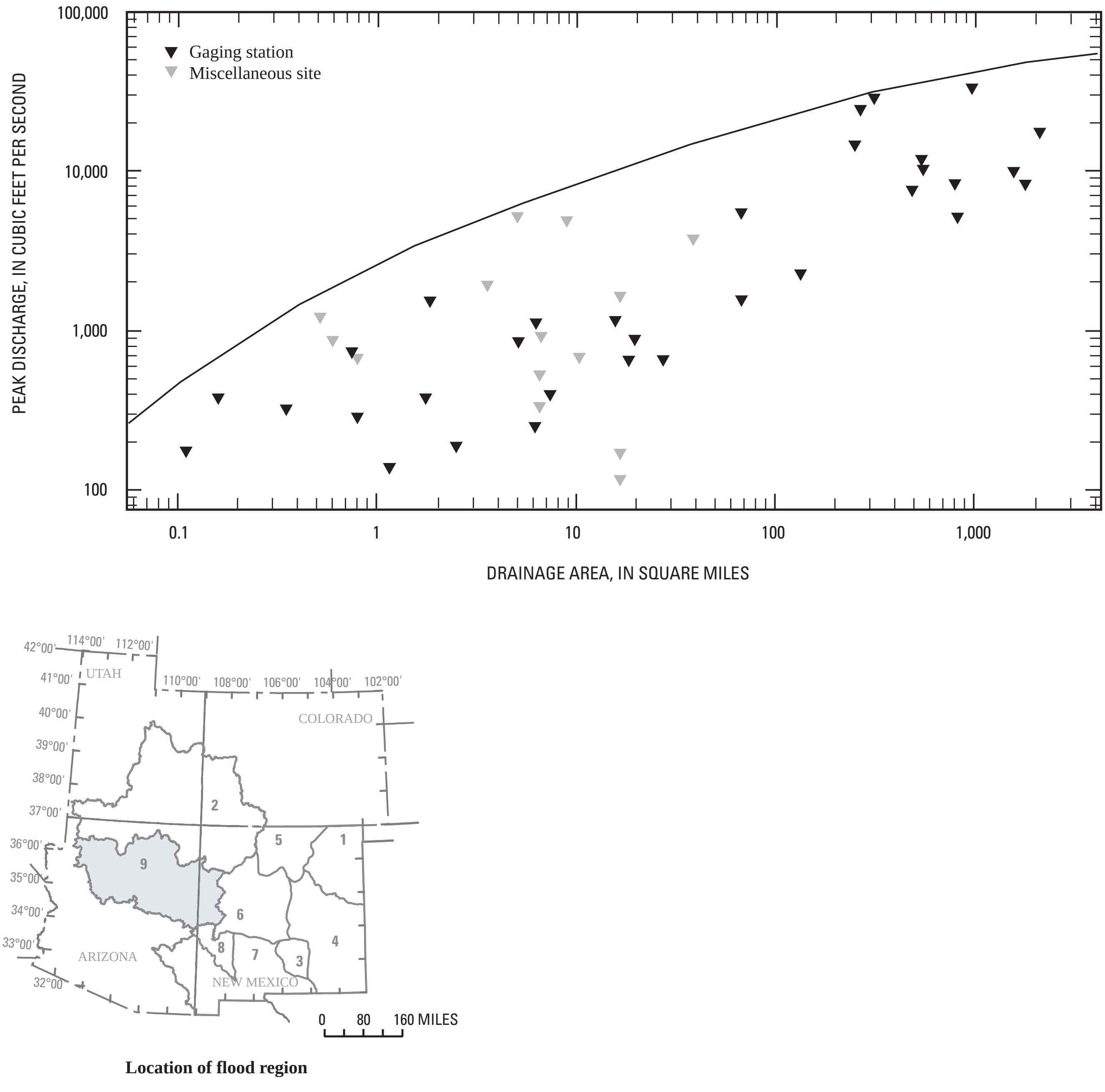


Figure 11. Envelope curve comparing maximum observed peak discharge to drainage area in the northern Arizona flood region 9.

Summary

Estimates of the magnitude and frequency of peak discharge are necessary for reliable bridge, culvert, and open-channel hydraulic analysis and for flood-hazard mapping in New Mexico and surrounding areas. The U.S. Geological Survey (USGS), in cooperation with the New Mexico Department of Transportation, updated estimates of peak discharge magnitude for gaging stations in the region and updated regional equations for estimation of peak discharge and peak discharge frequency at ungaged sites.

Equations were developed for estimating the magnitude of peak discharges for recurrence intervals of 2, 5, 10, 25, 50, 100, and 500 years at ungaged sites by use of data collected through 2004 for 293 gaging stations on unregulated streams that have 10 or more years of record.

Peak discharges for selected recurrence intervals were determined at gaging stations by fitting observed data to a log-Pearson Type III probability distribution with adjustments for a low-discharge threshold and a zero skew coefficient. A low-discharge threshold was applied to frequency analysis of 140 gaging stations. An improved fit of the log-Pearson Type III frequency distribution is provided using this analysis. Use of the low-discharge threshold generally eliminated the peak discharges that have a recurrence interval of less than 1.4 years in the probability-density function.

The National Elevation Dataset (30-m resolution) was used with the USGS computer program GIS Weasel for determining basin and climatic characteristics. Statistically significant characteristics are drainage area, average basin slope, average basin elevation, average basin maximum 24-hour precipitation for 100-year recurrence intervals for NOAA Atlas 2 and Atlas 14, and average basin annual precipitation (1961–90). These characteristics are used in regression equations for one or more flood regions. Other characteristics not statistically significant but determined by using GIS include average basin mean annual winter precipitation (1961–90), average basin maximum 24-hour and 6-hour precipitation for 100-year recurrence intervals for NOAA Atlas 2 and Atlas 14, and average basin aspect.

Flood response for nine distinct flood regions are reflected in the equations developed for this report. The flood regions were delineated on the basis of the hydrologic unit codes from a 1996 investigation and were expanded into the four corners area. Within each region, logarithms of the maximum peak discharges for selected recurrence intervals were related to logarithms of basin and climatic characteristics by using stepwise ordinary least-squares regression techniques for exploratory data analysis. Generalized least-squares regression techniques, an improved regression procedure that accounts for time and spatial sampling errors, then were applied to the same data used in the ordinary least-squares regression analyses. The average standard error of prediction, which includes average sampling error and average standard error of regression, ranged from 38 to 93 percent (mean value is 62, and median value is 59) for the 100-year flood in this investigation. The 1996 investigation standard error of prediction for the flood regions ranged from 41 to 96 percent (mean value is 67, and median value is 68) for the 100-year flood that was analyzed by using generalized least-squares regression analysis. Overall, the equations based on generalized least-squares regression techniques are improved and more reliable than those in the 1996 investigation because of the increased length of record and improved geographic information system method.

Flood-frequency estimates can be made for ungaged sites upstream or downstream from gaging stations by using a method that transfers flood-frequency data at the gaging station to the ungaged site by using a drainage-area ratio adjustment equation. The peak discharge for a given recurrence interval at the gaging station, drainage-area ratio, and the drainage-area exponent from the regional regression equation of the respective region is used to transfer the peak discharge for the recurrence interval to the ungaged site.

Maximum observed peak discharge as related to drainage area was determined for New Mexico. Extreme events commonly are used in the design and appraisal of bridge crossings and other structures. Bridge-scour evaluations are commonly made by using the 500-year peak discharge for these appraisals. Peak-discharge data collected at 293 gaging stations and 367 miscellaneous sites were used to develop a maximum peak-discharge relation as an alternative method of estimating peak discharge of an extreme event.

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Appendix 1—Selected Basin, Climatic, and Flood Characteristics; Maximum Peak Discharge Recorded; and Low-Discharge Threshold for Gaging Stations

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Average basin slope (percent [feet/foot*100])	Average basin mean annual precipitation 1961–90 (inches)	Map identifier (fig. 1)
	Northeast plains flood region (1)				
07153500	Dry Cimarron River near Guy, New Mexico	611 500	0.1132	16.85	1
07154400	Carrizozo Creek near Kenton, Oklahoma	111 111	0.1054	16.13	2
07199000	Canadian River near Hebron, New Mexico	197 229	0.1988	18.41	3
07201200	Chicorica Creek tributary near Raton, New Mexico	4.48 5.18	0.1363	17.03	4
07203600	Rio del Plano tributary near Taylor Springs, New Mexico	6.76 6.71	0.0205	15.86	5
07211000	Cimarron River at Springer, New Mexico	937 1,030	0.2023	18.74	6
07211500	Canadian River near Taylor Springs, New Mexico	2,760 2,850	0.1559	17.88	7
07213700	Canadian River triibutary near Mills, New Mexico	3.23 4.20	0.0497	15.89	8
07214000	Canadian River near Roy, New Mexico	3,810 4,070	0.1333	17.42	9
07220900	Dog Creek near Shoemaker, New Mexico	17.1 18.4	0.0563	16.97	10
07221000	Mora River near Shoemaker, New Mexico	1,040 1,100	0.1401	20.15	11
07221500	Canadian River near Sanchez, New Mexico	5,900 6,020	0.1280	17.70	12
07221600	Lagarita Creek near Sanchez, New Mexico	2.28 1.00	0.1789	15.06	13
07222000	Canadian River near Bell Ranch, New Mexico	6,080 6,200	0.1271	17.62	14

gaging stations.

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year) Recurrence interval (years) 2	5	10	25	50	100	500	Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	Map identifier (fig. 1)
					Northeast plains flood region (1)						
07153500	2,810	6,740	11,000	18,800	26,900	37,500	75,300	46,100	0	33	1
	3,020	7,210	10,600	19,600	27,800	38,200	73,300	(1965)	--	--	
	2,820	6,790	10,100	19,000	27,200	37,800	74,400	--	--	--	
07154400	1,780	4,170	6,590	10,900	15,100	20,400	37,900	15,600	0	52	2
	1,330	3,390	5,590	9,610	13,700	18,800	35,800	(1958)	--	--	
	1,760	4,100	6,450	10,600	14,700	19,900	37,100	--	--	--	
07199000	3,090	6,880	10,800	17,800	24,900	34,000	65,500	62,400	300	40	3
	1,390	3,460	5,720	9,940	14,300	20,000	39,800	(1965)	--	--	
	2,980	6,460	9,860	15,700	21,500	28,800	54,000	--	--	--	
07201200	57	199	389	805	1,300	2,000	4,860	1,340	0	30	4
	195	531	896	1,570	2,240	3,090	5,860	(1982)	--	--	
	62	229	465	989	1,590	2,410	5,350	--	--	--	
07203600	134	299	454	701	926	1,190	1,940	724	0	12	5
	166	345	500	736	940	1,170	1,820	(1982)	--	--	
	136	307	465	713	931	1,180	1,870	--	--	--	
07211000	735	1,980	3,500	6,680	10,400	15,700	37,900	29,500	220	75	6
	3,140	7,460	12,100	20,900	30,000	41,900	83,900	(1965)	--	--	
	760	2,100	3,820	7,610	12,100	18,700	45,600	--	--	--	
07211500	4,370	10,400	17,300	31,600	47,900	71,000	168,000	162,000	0	65	7
	6,290	14,600	23,400	39,700	56,600	78,600	156,000	(1965)	--	--	
	4,410	10,500	17,700	32,500	49,200	72,400	164,000	--	--	--	
07213700	220	732	1,310	2,340	3,340	4,550	8,190	1,280	100	13	8
	149	364	576	932	1,260	1,660	2,840	(1966)	--	--	
	209	623	999	1,550	2,020	2,540	4,070	--	--	--	
07214000	9,310	26,400	46,100	84,000	124,000	177,000	368,000	172,000	5,500	30	9
	7,880	18,100	28,800	48,500	68,900	95,200	187,000	--	--	--	
	9,230	25,400	42,700	73,600	104,000	143,000	274,000	--	--	--	
07220900	836	1,890	2,940	4,740	6,490	8,630	15,500	7,180	300	48	10
	308	702	1,080	1,720	2,310	3,030	5,240	(1982)	--	--	
	809	1,780	2,660	4,040	5,270	6,700	11,100	--	--	--	
07221000	2,350	4,870	7,250	11,200	15,000	19,600	34,000	15,200	900	79	11
	2,220	4,640	7,060	11,300	15,700	21,100	39,800	(1948)	--	--	
	2,350	4,860	7,240	11,200	15,100	19,700	34,800	--	--	--	
07221500	6,260	16,400	28,400	52,900	80,600	119,000	276,000	145,000	900	70	12
	9,350	20,800	32,700	54,400	76,800	106,000	206,000	(1965)	--	--	
	6,320	16,600	28,700	53,100	80,100	117,000	258,000	--	--	--	
07221600	210	600	1,020	1,770	2,510	3,420	6,310	1,500	0	16	13
	235	755	1,380	2,620	3,930	5,620	11,300	(1984)	--	--	
	214	645	1,160	2,190	3,290	4,740	9,610	--	--	--	
07222000	11,000	22,600	32,600	47,900	61,300	76,200	118,000	47,800	0	13	14
	9,650	21,500	33,800	56,400	79,600	110,000	214,000	(1937)	--	--	
	10,800	22,300	32,900	51,200	69,400	92,400	170,000	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Average basin slope (percent [feet/foot*100])	Average basin mean annual precipitation 1961–90 (inches)	Map identifier (fig. 1)
	Northeast plains flood region (1)—Continued				
07222300	Tremintina Creek at Tremintina, New Mexico	64.1 65.0	0.1607	15.35	15
07222500	Conchas River at Variadero, New Mexico	474 523	0.0716	15.23	16
07222800	Garita Creek tributary near Variadero, New Mexico	24.5 12.0	0.0423	14.50	17
07225000	Pajarito Creek near Newkirk, New Mexico	80.8 55.0	0.0315	14.87	18
07225300	Bluewater Creek near Tucumcari, New Mexico	15.2 15.2	0.0571	15.62	19
07225500	Ute Creek near Gladstone, New Mexico	249 256	0.0589	16.84	20
07226200	Bueyeros Creek at Bueyeros, New Mexico	45.6 34.0	0.0916	15.48	21
07226300	Carrizo Creek near Roy, New Mexico	96.1 68.0	0.0250	16.07	22
07226500	Ute Creek near Logan, New Mexico	2,030 2,060	0.0467	15.87	23
07227000	Canadian River near Logan, New Mexico	10,800 11,140	0.0984	16.61	24
07227050	Plaza Larga Creek tributary near Ragland, New Mexico	.536 .360	0.1378	16.30	25
07227100	Revuelto Creek near Logan, New Mexico	798 786	0.0492	16.21	26
07227150	Arroyo del Puerto near Endee, New Mexico	34.1 25.0	0.0507	17.03	27
07227200	Tramperos Creek near Stead, New Mexico	498 556	0.0604	15.58	28
07227295	Sandy Arroyo tributary near Clayton, New Mexico	1.23 1.25	0.0213	15.48	29

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year) Recurrence interval (years) 2	5	10	25	50	100	500	Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	Map identifier (fig. 1)
					Northeast plains flood region (1)—Continued						
07222300	1,390	3,740	6,220	10,700	15,100	20,500	38,100	14,100	0	43	15
	1,370	3,960	6,970	12,800	18,900	26,900	54,300	(1965)	--	--	
	1,390	3,760	6,340	11,200	16,200	22,600	44,400	--	--	--	
07222500	3,060	6,940	11,300	20,100	29,900	43,500	98,900	44,000	900	60	16
	3,280	7,960	12,800	21,500	30,200	41,000	76,500	(1942)	--	--	
	3,060	7,000	11,500	20,300	29,900	43,000	91,800	--	--	--	
07222800	515	1,590	2,910	5,570	8,520	12,500	27,600	7,020	50	31	17
	621	1,540	2,450	4,020	5,500	7,270	12,700	(1977)	--	--	
	520	1,590	2,820	5,130	7,440	10,300	19,500	--	--	--	
07225000	986	1,830	2,530	3,560	4,420	5,380	7,960	3,550	0	48	18
	995	2,230	3,400	5,320	7,100	9,190	15,500	(1962)	--	--	
	986	1,860	2,610	3,780	4,850	6,090	9,740	--	--	--	
07225300	542	1,160	1,700	2,530	3,250	4,060	6,320	2,350	300	31	19
	398	979	1,570	2,570	3,540	4,700	8,300	(1981)	--	--	
	532	1,130	1,670	2,540	3,340	4,300	7,200	--	--	--	
07225500	6,160	9,280	11,500	14,500	16,900	19,400	25,600	10,900	0	17	20
	1,450	3,170	4,830	7,650	10,400	13,600	24,200	(1969)	--	--	
	5,220	7,400	8,850	11,100	13,300	16,000	24,700	--	--	--	
07226200	568	2,180	4,120	7,770	11,400	15,900	29,600	5,240	0	25	21
	901	2,360	3,940	6,800	9,670	13,300	25,000	(1961)	--	--	
	595	2,210	4,070	7,390	10,600	14,500	26,800	--	--	--	
07226300	453	715	925	1,240	1,500	1,800	2,650	1,800	300	47	22
	753	1,510	2,180	3,220	4,160	5,240	8,450	(1981)	--	--	
	459	741	987	1,390	1,760	2,200	3,510	--	--	--	
07226500	5,290	11,300	17,300	27,600	37,700	50,300	91,700	70,000	2,100	64	23
	5,460	11,500	17,400	27,200	36,800	48,400	85,800	(1941)	--	--	
	5,290	11,300	17,300	27,600	37,600	50,000	90,400	--	--	--	
07227000	42,000	86,200	128,000	199,000	266,000	349,000	612,000	278,000	0	85	24
	15,300	33,800	53,100	88,000	124,000	169,000	327,000	(1904)	--	--	
	41,300	83,400	122,000	185,000	244,000	315,000	545,000	--	--	--	
07227050	183	337	468	667	840	1,040	1,600	1,170	0	47	25
	70	208	364	653	944	1,310	2,480	(1958)	--	--	
	174	322	451	664	868	1,120	1,900	--	--	--	
07227100	5,580	9,860	13,600	19,700	25,300	31,900	52,300	26,700	1,200	45	26
	3,30	6,480	9,770	15,400	20,700	27,200	48,000	(1960)	--	--	
	5,470	9,600	13,200	19,000	24,300	30,700	51,000	--	--	--	
07227150	288	706	1,130	1,880	2,620	3,530	6,460	1,450	20	14	27
	432	950	1,440	2,250	3,010	3,920	6,710	(1991)	--	--	
	300	745	1,210	2,010	2,790	3,720	6,610	--	--	--	
07227200	965	2,560	4,280	7,420	10,600	14,600	28,200	12,300	400	38	28
	2,910	6,720	10,600	17,200	23,800	31,900	58,000	(1966)	--	--	
	1,020	2,800	4,870	8,910	13,200	18,800	37,600	--	--	--	
07227295	42	112	184	310	433	582	1,050	388	0	43	29
	71	157	234	350	451	564	878	(1956)	--	--	
	43	115	189	316	436	578	995	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Average basin slope (percent [feet/foot*100])	Average basin elevation (feet)	Map identifier (fig. 1)
	Northwest plateau flood region (2)				
09163700	Cisco Wash near Cisco, Utah	90.7 29.0	0.1241	4,820	30
09181000	Onion Creek near Moab, Utah	20.2 18.8	0.3612	5,640	31
09182600	Salt Wash near Thompson, Utah	1.43 3.90	0.0541	5,050	32
09183000	Courthouse Wash near Moab, Utah	161 162	0.1224	4,770	33
09184000	Mill Creek near Moab, Utah	73.3 74.9	0.2709	7,060	34
09185200	Kane Springs Canyon near Moab, Utah	17.2 17.8	0.2167	6,270	35
09185500	Hatch Wash near La Sal, Utah	366 378	0.0869	6,730	36
09187000	Cottonwood Creek near Monticello, Utah	113 115	0.3029	7,380	37
09314280	Desert Seep Wash near Wellington, Utah	206 191	0.0613	5,750	38
09314500	Price River at Woodside, Utah	1,730 1,540	0.2025	6,500	39
09315200	Saleratus Wash tributary no. 2 near Woodside, Utah	4.92 4.40	0.1740	4,830	40
09315900	Browns Wash tributary near Green River, Utah	3.04 3.89	0.0547	4,320	41
09316000	Browns Wash near Green River, Utah	78.1 75.0	0.2154	5,030	42
09327600	Ferron Creek tributary near Ferron, Utah	.618 .960	0.0793	6,180	43
09328300	Sids Draw near Castle Dale, Utah	18.4 17.6	0.1393	6,400	44

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year) Recurrence interval (years) 2	5	10	25	50	100	500	Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	Map identifier (fig. 1)
					Northwest plateau flood region (2)						
09163700	2,140	3,030	3,580	4,220	4,670	5,090	6,010	3,650	2,000	15	30
	664	2,120	3,370	5,500	7,450	9,690	16,200	(1963)	--	--	
	2,020	2,910	3,540	4,550	5,500	6,570	9,240	--	--	--	
09181000	939	1,270	1,500	1,820	2,060	2,300	2,950	2,100	600	13	31
	349	1,390	2,300	3,920	5,500	7,420	13,400	(1951)	--	--	
	878	1,290	1,690	2,490	3,320	4,300	7,000	--	--	--	
09182600	275	723	1,190	2,000	2,780	3,740	6,750	1,380	0	15	32
	113	318	535	927	1,310	1,780	3,280	(1959)	--	--	
	256	640	982	1,510	2,010	2,620	4,640	--	--	--	
09183000	2,120	4,620	7,040	11,200	15,200	20,100	35,800	12,300	50	31	33
	849	2,640	4,170	6,720	9,020	11,600	19,200	(1957	--	--	
	2,080	4,490	6,730	10,400	13,800	17,800	30,600	--	--	--	
09184000	698	1,790	2,940	5,020	7,100	9,720	18,500	5,110	60	47	34
	607	1,360	2,120	3,400	4,620	6,080	10,500	(1953)	--	--	
	696	1,760	2,860	4,760	6,600	8,850	16,200	--	--	--	
09185200	541	826	1,030	1,320	1,540	1,780	2,370	1,290	200	15	35
	326	906	1,460	2,440	3,390	4,540	8,110	(1970)	--	--	
	524	838	1,120	1,650	2,180	2,800	4,540	--	--	--	
09185500	505	1,190	1,910	3,220	4,550	6,260	12,200	4,650	100	22	36
	1,210	1,760	2,570	3,870	5,040	6,380	10,300	(1970)	--	--	
	518	1,220	1,960	3,320	4,650	6,290	11,600	--	--	--	
09187000	390	1,270	2,330	4,410	6,650	9,580	19,900	2,200	0	17	37
	730	1,540	2,370	3,760	5,080	6,650	11,400	(1963)	--	--	
	401	1,300	2,330	4,220	6,050	8,290	15,600	--	--	--	
09314280	536	854	1,110	1,500	1,840	2,220	3,310	2,060	200	15	38
	944	1,640	2,450	3,770	4,950	6,290	10,100	(1977)	--	--	
	550	900	1,240	1,840	2,430	3,110	4,950	--	--	--	
09314500	4,260	6,330	7,730	9,530	10,900	12,200	15,400	11,200	2,500	53	39
	2,350	4,470	6,520	9,780	12,700	15,900	25,000	(1991)	--	--	
	4,230	6,280	7,680	9,550	11,000	12,600	16,500	--	--	--	
09315200	1,070	2,390	3,570	5,390	6,970	8,730	13,600	3,720	100	15	40
	191	824	1,410	2,470	3,510	4,770	8,740	(1962)	--	--	
	949	2,010	2,810	3,990	5,090	6,430	10,700	--	--	--	
09315900	206	607	1,070	1,980	2,940	4,200	8,700	1,470	1	15	41
	155	547	927	1,610	2,270	3,050	5,480	(1959)	--	--	
	202	599	1,040	1,850	2,650	3,640	6,960	--	--	--	
09316000	1,790	3,750	5,460	8,090	10,400	13,000	20,100	5,620	0	19	42
	623	2,280	3,680	6,100	8,340	11,000	18,700	(1959)	--	--	
	1,710	3,570	5,120	7,500	9,660	12,200	19,500	--	--	--	
09327600	111	341	607	1,110	1,630	2,290	4,530	600	0	12	43
	79	191	322	561	803	1,110	2,120	(1967)	--	--	
	107	303	495	811	1,120	1,500	2,820	--	--	--	
09328300	439	1,190	1,950	3,270	4,530	6,030	10,600	2,150	0	15	44
	336	764	1,210	1,990	2,730	3,630	6,410	(1967)	--	--	
	432	1,120	1,760	2,760	3,680	4,770	8,230	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Average basin slope (percent [feet/foot*100])	Average basin elevation (feet)	Map identifier (fig. 1)
	Northwest plateau flood region (2)—Continued				
09328600	Georges Draw near Hanksville, Utah	6.95 6.63	0.1126	6,940	45
09328700	Temple Wash near Hanksville, Utah	44.2 38.2	0.0898	5,200	46
09330120	Sulphur Creek near Fruita. Utah	54.0 56.7	0.2344	6,980	47
09330200	Pleasant Creek at Notom, Utah	78.5 80.6	0.2334	7,400	48
09330300	Neilson Wash near Caineville, Utah	22.5 22.3	0.0730	4,790	49
09330400	Fremont River near Hanksville, Utah	1,900 1,900	0.1740	7,280	50
09336400	Upper Valley Creek near Escalante, Utah	53.9 ---	0.2187	7,520	51
09338900	Deer Creek near Boulder, Utah	65.4 62.7	0.2127	7,360	52
09339200	Twentymile Wash near Escalante, Utah	144 140	0.2699	6,460	53
09350800	Vaqueros Canyon near Gobernador, New Mexico	58.8 60.5	0.1523	7,360	54
09356520	Burro Canyon near Lindrith, New Mexico	9.06 9.11	0.0958	7,270	55
09357200	Gallegos Canyon tributary near Nageezi, New Mexico	0.059 0.200	0.0231	6,650	56
09357230	West Draw near Farmington, New Mexico	0.292 0.320	0.0491	5,980	57
09367400	La Plata River tributary near Farmington, New Mexico	1.13 1.03	0.1019	5,570	58
09367530	Locke Arroyo near Kirtland, New Mexico	2.68 2.96	0.0720	5,500	59

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year)										Map identifier (fig. 1)
	Recurrence interval (years)							Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	
	2	5	10	25	50	100	500				
	Northwest plateau flood region (2)—Continued										
09328600	210	587	1,010	1,830	2,680	3,800	7,750	1,650	10	14	45
	221	432	687	1,130	1,570	2,100	3,800	(1959)	--	--	
	211	561	924	1,540	2,120	2,850	5,330	--	--	--	
09328700	139	381	671	1,270	1,940	2,890	6,680	1,880	20	10	46
	488	1,270	2,020	3,280	4,450	5,810	9,860	(1962)	--	--	
	155	469	907	1,870	2,900	4,190	8,350	--	--	--	
09330120	524	1,210	1,880	2,960	3,950	5,110	8,530	2,600	0	16	47
	532	1,180	1,840	2,960	4,030	5,320	9,260	(1961)	--	--	
	524	1,220	1,870	2,960	3,980	5,200	8,860	--	--	--	
09330200	256	814	1,460	2,690	3,940	5,540	10,800	2,040	0	14	48
	625	1,220	1,880	2,980	4,020	5,270	9,100	(1965)	--	--	
	268	857	1,540	2,780	3,970	5,420	9,960	--	--	--	
09330300	1,140	2,250	3,220	4,720	6,040	7,550	11,800	5,450	350	15	49
	366	1,060	1,710	2,840	3,880	5,110	8,760	(1965)	--	--	
	1,070	2,070	2,860	4,060	5,150	6,430	10,300	--	--	--	
09330400	4,300	7,330	9,640	12,900	15,500	18,300	25,500	15,300	0	15	50
	2,440	3,620	5,150	7,580	9,740	12,200	19,100	(1973)	--	--	
	4,220	6,960	8,920	11,600	13,700	16,200	23,100	--	--	--	
09336400	719	1,580	2,440	3,950	5,440	7,320	13,600	5,560	0	16	51
	532	1,010	1,560	2,480	3,370	4,440	7,730	(1959)	--	--	
	708	1,500	2,240	3,440	4,560	5,940	10,500	--	--	--	
09338900	617	1,430	2,170	3,320	4,340	5,500	8,700	3,820	300	19	52
	578	1,120	1,710	2,730	3,690	4,840	8,370	(1961)	--	--	
	615	1,390	2,090	3,160	4,120	5,240	8,560	--	--	--	
09339200	1,760	2,910	3,820	5,120	6,210	7,390	10,600	4,620	600	10	53
	810	2,030	3,140	5,020	6,770	8,830	15,000	(1963)	--	--	
	1,660	2,740	3,620	5,080	6,470	8,120	12,900	--	--	--	
09350800	158	409	704	1,300	1,980	2,930	6,720	2,520	0	47	54
	552	951	1,450	2,290	3,080	4,030	6,930	(1965)	--	--	
	161	422	740	1,390	2,120	3,100	6,760	--	--	--	
09356520	66	193	330	572	806	1,090	1,960	725	50	28	55
	248	414	648	1,050	1,440	1,920	3,440	(1981)	--	--	
	70	206	362	655	950	1,310	2,400	--	--	--	
09357200	138	252	347	488	609	744	1,120	580	60	35	56
	29	46	77	135	195	273	540	(1964)	--	--	
	129	223	288	377	458	559	890	--	--	--	
09357230	23	38	49	64	76	88	120	74	0	21	57
	57	129	218	383	550	761	1,470	(1976)	--	--	
	24	45	70	122	180	250	444	--	--	--	
09367400	59	185	333	619	918	1,310	2,640	1,130	24	27	58
	102	311	529	928	1,330	1,820	3,440	(1973)	--	--	
	60	196	361	692	1,040	1,490	2,960	--	--	--	
09367530	106	250	394	639	874	1,160	2,050	812	0	35	59
	147	384	635	1,080	1,520	2,060	3,760	(1957)	--	--	
	107	258	417	710	1,010	1,370	2,500	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Average basin slope (percent [feet/foot*100])	Average basin elevation (feet)	Map identifier (fig. 1)
	Northwest plateau flood region (2)—Continued				
09367550	Stevens Arroyo near Kirtland, New Mexico	4.72 4.59	0.0569	5,490	60
09367561	Shumway Arroyo near Waterflow, New Mexico	134 73.8	0.1109	5,640	61
09367680	Chaco Wash at Chaco Canyon National Monument, New Mexico	611 578	0.0710	6,700	62
09367840	Yazzie Wash near Mexican Springs, New Mexico	1.99 2.10	0.2106	7,160	63
09367860	Chusca Wash near Mexican Springs, New Mexico	9.78 8.70	0.1922	7,240	64
09367680	Catron Wash at Bisti Trading Post, New Mexico	26.5 26.9	0.1794	6,970	65
09367900	Black Springs Wash near Mexican Springs, New Mexico	7.13 7.05	0.1513	6,690	66
09367930	Hunter Wash at Bisti Trading Post, New Mexico	45.0 45.6	0.0494	6,200	67
09367950	Chaco River near Waterflow, New Mexico	4,350 4,350	0.0681	6,290	68
09367980	Rattlesnake Arroyo near Shiprock, New Mexico	21.3 --	0.0317	5,230	69
09368000	San Juan River at Shiprock, New Mexico	12,700 12,900	0.1463	6,690	70
09368020	Malpais Arroyo near Shiprock, New Mexico	2.02 --	0.0567	5,330	71
09378480	Montezuma Creek near Monticello, Utah	142 117	0.1209	7,030	72
09378950	Comb Wash near Blanding, Utah	10.3 10.3	0.2549	5,810	73
09379000	Comb Wash near Bluff, Utah	276 278	0.2009	5,880	74

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year) Recurrence interval (years) 2	5	10	25	50	100	500	Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	Map identifier (fig. 1)
Northwest plateau flood region (2)—Continued											
09367550	143	468	871	1,690	2,590	3,820	8,340	1,550	20	21	60
	188	435	706	1,180	1,640	2,190	3,920	(1991)	--	--	
	145	464	840	1,530	2,230	3,090	6,080	--	--	--	
09367561	183	783	1,680	3,820	6,500	10,500	27,800	6,420	1	16	61
	785	1,800	2,770	4,380	5,850	7,550	12,500	(1978)	--	--	
	196	847	1,820	3,960	6,280	9,300	20,100	--	--	--	
09367680	573	1,080	1,560	2,380	3,180	4,160	7,430	4,970	0	27	62
	1,500	1,980	2,850	4,230	5,450	6,830	10,800	(2003)	--	--	
	586	1,110	1,630	2,550	3,450	4,560	8,020	--	--	--	
09367840	285	587	855	1,270	1,640	2,060	3,260	1,390	40	37	63
	130	326	540	928	1,320	1,820	3,470	(1941)	--	--	
	277	560	802	1,180	1,540	1,980	3,340	--	--	--	
09367860	1,220	2,390	3,440	5,110	6,620	8,390	13,700	6,400	600	29	64
	256	553	883	1,460	2,030	2,730	4,960	(1967)	--	--	
	1,150	2,110	2,830	3,820	4,690	5,760	9,380	--	--	--	
09367680	1,720	3,020	4,030	5,470	6,660	7,930	11,300	4,750	100	18	65
	392	828	1,300	2,110	2,890	3,830	6,750	(1967)	--	--	
	1,600	2,590	3,230	4,080	4,860	5,820	8,880	--	--	--	
09367900	542	1,130	1,620	2,350	2,970	3,650	5,450	2,250	320	50	66
	224	517	833	1,390	1,940	2,610	4,750	(1999)	--	--	
	532	1,080	1,520	2,160	2,720	3,370	5,250	--	--	--	
09367930	826	1,160	1,390	1,680	1,900	2,120	2,650	1,570	400	18	67
	492	765	1,160	1,820	2,420	3,130	5,250	(1976)	--	--	
	807	1,120	1,350	1,710	2,030	2,390	3,360	--	--	--	
09367950	3,880	5,270	6,190	7,350	8,220	9,090	11,100	7,300	2,500	30	68
	3,480	4,450	6,180	8,850	11,100	13,500	20,200	(1969)	--	--	
	3,880	5,250	6,190	7,460	8,480	9,560	12,100	--	--	--	
09367980	143	568	1,230	2,900	5,150	8,780	26,900	3,800	0	17	69
	357	660	1,030	1,650	2,220	2,880	4,860	(1995)	--	--	
	151	576	1,190	2,520	3,990	5,970	14,000	--	--	--	
09368000	14,600	25,500	34,800	49,200	62,000	76,700	120,000	80,000	0	76	70
	5,510	7,830	10,800	15,300	19,200	23,300	34,400	(1929)	--	--	
	14,500	25,200	34,000	47,200	58,700	71,700	111,000	--	--	--	
09368020	119	270	426	710	1,000	1,370	2,670	1,200	40	21	71
	130	335	556	951	1,340	1,810	3,310	(2002)	--	--	
	120	277	449	776	1,110	1,540	2,940	--	--	--	
09378480	475	1,140	1,790	2,900	3,960	5,240	9,220	1,720	0	10	72
	805	1,300	1,950	3,010	4,000	5,150	8,580	(1968)	--	--	
	504	1,170	1,840	2,950	3,980	5,190	8,810	--	--	--	
09378950	746	1,440	2,090	3,150	4,150	5,360	9,160	3,430	100	10	73
	262	907	1,500	2,570	3,620	4,890	8,890	(1968)	--	--	
	677	1,300	1,870	2,850	3,840	5,070	8,980	--	--	--	
09379000	1,730	3,150	4,420	6,480	8,380	10,600	17,700	8,390	1,200	10	74
	1,070	2,710	4,150	6,560	8,750	11,300	18,600	(1968)	--	--	
	1,680	3,080	4,360	6,510	8,540	11,000	18,200	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Average basin slope (percent [feet/foot*100])	Average basin elevation (feet)	Map identifier (fig. 1)
	Northwest plateau flood region (2)—Continued				
09379060	Lukachukai Creek tributary near Lukachukai, Arizona	1.36 1.37	0.0319	5,830	75
09379300	Lime Creek near Mexican Hat, Utah	62.2 32.0	0.1831	5,190	76
09379800	Coyote Creek near Kanab, Utah	89.6 89.0	0.1508	4,840	77
09379820	Buck Tank Draw near Kanab, Utah	4.81 5.25	0.0785	5,100	78
09381800	Paria River near Kanab, Utah	642 647	0.2335	6,260	79
09395600	Wagon Trail wash near Gamerco, New Mexico	0.277 0.380	0.0451	6,760	80
09403780	Kanab Creek near Fredonia, Utah	1,080 1,080	0.1294	5,870	81
09403800	Bitter Seeps Wash tributary near Fredonia, Arizona	2.48 2.85	0.2243	5,050	82
09404500	Mineral Gulch near Mount Carmel, Utah	8.26 7.60	0.1297	5,960	83
09404900	East Fork Virgin River near Springdale, Utah	339 343	0.2449	6,180	84
09406700	South Ash Creek below Mill Creek near Pintura, Utah	11.0 11.0	0.447	6,840	85
09406800	South Ash Creek near Pintura, Utah	13.7 14.0	0.4152	6,590	86
09407200	Ash Creek below West Field Ditch at Toquerville, Utah	200 201	0.2998	5,920	87
09408000	Leeds Creek near Leeds, Utah	15.3 15.5	0.3708	6,130	88
09408150	Virgin River near Hurricane, Utah	700 1,490	0.2830	5,250	89

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year) Recurrence interval (years) 2	5	10	25	50	100	500	Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	Map identifier (fig. 1)
				Northwest plateau flood region (2)—Continued							
09379060	20	46	74	126	182	255	522	227	12	14	75
	110	202	328	551	768	1,040	1,890	(1965)	--	--	
	24	58	107	218	343	505	1,030	--	--	--	
09379300	1,680	4,150	6,560	10,500	14,200	18,600	31,400	6,600	100	15	76
	577	1,910	3,070	5,050	6,900	9,060	15,500	(1968)	--	--	
	1,590	3,770	5,620	8,350	10,800	13,600	22,500	--	--	--	
09379800	1,410	2,740	3,850	5,490	6,880	8,390	12,500	419	200	14	77
	661	2,250	3,600	5,900	8,020	10,500	17,600	(1959)	--	--	
	1,350	2,680	3,800	5,610	7,290	9,210	14,600	--	--	--	
09379820	10	70	208	685	1,510	3,100	13,900	680	0	10	78
	189	558	924	1,570	2,200	2,960	5,320	(1969)	--	--	
	13	110	341	1,020	1,860	3,020	7,560	--	--	--	
09381800	2,850	5,210	7,330	10,800	14,000	17,800	29,700	15,400	1,000	16	79
	1,540	3,500	5,260	8,120	10,700	13,700	22,200	(1963)	--	--	
	2,780	5,020	6,970	10,000	12,900	16,200	26,500	--	--	--	
09395600	75	172	264	414	551	710	1,180	437	10	24	80
	56	100	166	286	409	565	1,090	(1958)	--	--	
	73	163	244	374	498	651	1,140	--	--	--	
09403780	871	1,780	2,620	3,970	5,220	6,700	11,200	4,630	100	16	81
	1,920	3,800	5,600	8,480	11,000	13,800	21,700	(1970)	--	--	
	896	1,880	2,880	4,650	6,350	8,350	14,000	--	--	--	
09403800	129	560	1,190	2,640	4,380	6,890	17,000	1,950	0	14	82
	142	653	1,130	2,020	2,910	4,010	7,540	(1971)	--	--	
	130	581	1,170	2,310	3,470	4,940	10,000	--	--	--	
09404500	315	931	1,650	3,050	4,540	6,500	13,500	3,210	30	14	83
	238	627	1,020	1,710	2,380	3,200	5,760	(1963)	--	--	
	309	875	1,460	2,450	3,390	4,550	8,480	--	--	--	
09404900	823	2,050	3,280	5,360	7,330	9,690	16,900	3,540	100	13	84
	1,170	2,880	4,400	6,920	9,220	11,900	19,600	(1999)	--	--	
	837	2,140	3,470	5,800	8,000	10,600	18,100	--	--	--	
09406700	207	528	869	1,490	2,110	2,900	5,540	938	0	14	85
	269	864	1,420	2,420	3,410	4,640	8,580	(1966)	--	--	
	211	571	985	1,790	2,620	3,670	7,010	--	--	--	
09406800	194	468	739	1,200	1,630	2,140	3,720	1,850	0	10	86
	296	972	1,600	2,710	3,810	5,170	9,480	(1978)	--	--	
	199	532	913	1,670	2,450	3,410	6,320	--	--	--	
09407200	265	829	1,480	2,730	4,030	5,700	11,400	4,420	0	41	87
	932	2,750	4,300	6,910	9,330	12,100	20,400	(1988)	--	--	
	289	1,010	1,970	3,940	5,990	8,450	15,800	--	--	--	
09408000	151	664	1,450	3,320	5,700	9,260	24,800	20,100	1,500	37	88
	310	1,100	1,810	3,080	4,330	5,860	10,700	(1967)	--	--	
	154	686	1,480	3,280	5,340	8,170	19,200	--	--	--	
09408150	6,130	10,600	14,200	19,400	23,700	28,400	41,200	1,160	0	15	89
	1,590	5,220	8,070	12,800	17,000	21,700	35,200	(1995)	--	--	
	6,000	10,300	13,600	18,400	22,400	27,000	39,800	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Average basin slope (percent [feet/foot*100])	Average basin elevation (feet)	Map identifier (fig. 1)
	Northwest plateau flood region (2)—Continued				
09409100	Santa Clara River above Baker Reservoir near Central, Utah	111 116	0.2783	7,230	90
09409500	Moody Wash near Veyo, Utah	33.5 33.0	0.2953	6,010	91

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year)										Map identifier (fig. 1)
	Recurrence interval (years)							Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	
	2	5	10	25	50	100	500				
Northwest plateau flood region (2)—Continued											
09409100	63	207	399	825	1,340	2,100	5,350	1,810	50	15	90
	724	1,540	2,360	3,750	5,060	6,630	11,400	(1967)	--	--	
	71	263	566	1,320	2,220	3,420	7,600	--	--	--	
09409500	271	852	1,510	2,710	3,910	5,410	10,200	1,910	20	16	91
	434	1,390	2,250	3,750	5,190	6,920	12,200	(1967)	--	--	
	279	915	1,660	3,040	4,420	6,080	11,200	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Average basin elevation (feet)	Map identifier (fig. 1)
	Southeast mountain flood region (3)			
08387000	Rio Ruidoso at Hollywood, New Mexico	72.5 120	7,600	92
08387600	Eagle Creek below South Fork near Alto, New Mexico	8.16 8.14	8,570	93
08388000	Rio Ruidoso at Hondo, New Mexico	289 290	7,150	94
08389500	Rio Bonito at Hondo, New Mexico	295 295	6,770	95
08390100	Rio Hondo at Picacho, New Mexico	716 715	6,760	96
08397400	Hyatt Canyon near Cloudcroft, New Mexico	3.35 3.08	8,240	97
08397600	Rio Penasco near Dunken, New Mexico	575 583	7,570	98
08480650	Minnie Hall Draw near Three Rivers, New Mexico	9.80 9.70	6,140	99
08480700	Indian Creek near Three Rivers, New Mexico	6.81 6.80	8,820	100
08481000	Three Rivers at Three Rivers, New Mexico	87.5 96.0	6,160	101
08481100	Tularosa Basin tributary near Three Rivers, New Mexico	10.1 13.8	4,890	102
08482000	Tularosa Creek near Tularosa, New Mexico	149 140	7,600	103

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year) Recurrence interval (years) 2	5	10	25	50	100	500	Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	Map identifier (fig. 1)
					Southeast mountain flood region (3)						
08387000	220	472	730	1,190	1,670	2,280	4,420	2,120	0	51	92
	481	1,040	1,810	2,980	4,140	5,590	10,300	(1984)	--	--	
	225	490	772	1,300	1,840	2,560	5,120	--	--	--	
08387600	40	82	118	175	224	280	437	206	0	28	93
	87	170	240	348	444	553	864	(1979)	--	--	
	41	85	124	186	242	307	495	--	--	--	
08388000	1,000	2,640	4,690	9,130	14,500	22,300	57,400	42,700	220	40	94
	1,360	3,580	6,080	10,900	15,900	22,600	46,100	(1965)	--	--	
	1,020	2,700	4,800	9,330	14,700	22,400	54,500	--	--	--	
08389500	2,040	5,230	8,520	14,300	19,900	26,700	48,500	28,200	200	38	95
	1,630	4,470	7,720	14,000	20,700	29,400	60,700	(1965)	--	--	
	2,020	5,170	8,430	14,200	20,000	27,300	51,400	--	--	--	
08390100	2,260	6,980	13,300	27,800	45,800	73,100	198,000	115,000	0	14	96
	2,820	8,090	14,400	27,200	41,400	60,6300	133,000	(1965)	--	--	
	2,320	7,160	13,600	27,600	44,200	67,900	164,000	--	--	--	
08397400	38	60	77	99	116	134	177	88	0	39	97
	57	109	151	213	265	322	477	(1993)	--	--	
	38	63	82	110	133	159	227	--	--	--	
08397600	1,200	3,680	6,630	12,500	18,900	27,400	58,300	36,300	0	50	98
	1,730	4,540	7,790	14,100	21,000	30,300	64,300	(1955)	--	--	
	1,220	3,720	6,710	12,600	19,100	27,700	59,400	--	--	--	
08480650	908	1,830	2,680	4,080	5,400	6,990	11,900	4,970	0	26	99
	278	681	1,070	1,700	2,270	2,940	4,880	(1959)	--	--	
	850	1,680	2,400	3,540	4,560	5,740	9,210	--	--	--	
08480700	147	364	570	900	1,200	1,530	2,480	990	0	45	100
	71	135	188	269	339	4193	644	(1961)	--	--	
	145	355	547	842	1,100	1,380	2,130	--	--	--	
08481000	1,790	4,240	6,670	10,800	14,800	19,600	34,700	15,000	0	26	101
	1,050	2,860	4,860	8,500	12,300	16,900	32,700	(1955)	--	--	
	1,730	4,070	6,370	10,300	14,100	18,800	34,000	--	--	--	
08481100	254	938	1,750	3,260	4,760	6,600	12,200	2,340	200	25	102
	581	1,650	2,770	4,660	6,440	8,520	14,700	(1955)	--	--	
	267	986	1,850	3,460	5,050	6,990	12,900	--	--	--	
08482000	2,220	4,890	7,360	11,300	15,000	19,200	31,800	9,640	0	11	103
	747	1,830	2,980	5,090	7,250	9,990	19,400	(1938)	--	--	
	1,940	4,080	5,910	8,780	11,400	14,600	24,800	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Average basin slope (percent [feet/foot*100])	Average basin elevation (feet)	Map identifier (fig. 1)
	Southeast plains flood region (4)				
08379300	Tecolote Creek at Tecolote, New Mexico	119 122	0.1682	7,130	104
08379500	Pecos River near Anton Chico, New Mexico	1,040 1,050	0.1877	7,030	105
08379550	Canon Blanco near Leyba, New Mexico	11.5 11.2	0.0665	7,050	106
08380300	Sandoval Canyon at Gallinas, New Mexico	7.65 7.60	0.1749	7,620	107
08382000	Gallinas River near Lourdes, New Mexico	317 313	0.1357	6,780	108
08382500	Gallinas River near Colonias, New Mexico	620 610	0.1190	6,560	109
08382600	Pecos River above Canon del Uta near Colonias, New Mexico	2,300 2,330	0.1365	6,590	110
08382730	Los Esteros Creek above Santa Rosa Lake, New Mexico	67.3 65.6	0.0311	5,080	111
08382760	Los Esteros Creek tributary above Santa Rosa Lake, New Mexico	14.1 13.7	0.0327	5,000	112
08383000	Pecos River at Santa Rosa, New Mexico	2,700 2,650	0.1216	6,360	113
08383370	Pecos River tributary near Puerto de Luna, New Mexico	0.434 0.370	0.1208	4,720	114
08383500	Pecos River near Puerto de Luna, New Mexico	4,010 3,970	0.0968	6,080	115
08384500	Pecos River below Sumner Dam, New Mexico	4,460 4,390	0.0911	5,890	116
08385530	Alamosa Creek tributary near Jordan, New Mexico	11.1 9.71	0.0194	5,120	117
08385600	Yeso Creek near Fort Sumner, New Mexico	344 242	0.0263	4,770	118

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year) Recurrence interval (years) 2	5	10	25	50	100	500	Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	Map identifier (fig. 1)
Southeast plains flood region (4)											
08379300	962	2,570	4,410	7,980	11,800	17,000	36,000	20,000	0	49	104
	1,070	2,430	3,820	6,300	8,670	11,500	20,500	(1937)	--	--	
	964	2,560	4,310	7,460	10,700	15,200	32,000	--	--	--	
08379500	6,110	11,200	15,100	20,500	24,700	29,200	40,100	40,300	0	85	105
	3,090	7,280	11,300	18,200	24,500	31,800	54,200	(1937)	--	--	
	6,050	11,000	14,700	20,000	24,700	29,700	41,800	--	--	--	
08379550	227	681	1,210	2,210	3,260	4,610	9,310	1,440	0	12	106
	211	513	847	1,460	2,060	2,790	5,260	(1976)	--	--	
	225	630	1,030	1,710	2,420	3,380	6,890	--	--	--	
08380300	84	281	559	1,220	2,060	3,360	9,530	2,530	0	42	107
	277	605	945	1,590	2,230	3,010	5,540	(1966)	--	--	
	89	298	607	1,310	2,110	3,260	8,560	--	--	--	
08382000	2,780	4,120	5,040	6,240	7,150	8,070	10,300	6,680	0	12	108
	1,590	3,800	6,060	10,000	13,700	18,200	32,300	(1961)	--	--	
	2,620	4,030	5,500	8,520	11,200	13,800	19,400	--	--	--	
08382500	3,240	6,090	8,590	12,500	16,000	20,100	32,300	26,700	1,000	54	109
	2,110	5,170	8,350	13,800	18,900	25,000	44,200	(1937)	--	--	
	3,200	6,010	8,550	12,900	17,000	21,500	34,600	--	--	--	
08382600	3,630	6,800	9,350	13,000	16,000	19,200	27,600	12,400	0	29	110
	4,180	10,100	16,200	26,200	35,300	46,000	79,000	(1982)	--	--	
	3,650	7,190	10,900	17,800	23,400	28,400	39,600	--	--	--	
08382730	907	2,610	4,540	8,220	12,100	17,100	34,500	9,200	0	25	111
	480	1,520	2,800	5,170	7,510	10,500	21,500	(1993)	--	--	
	861	2,310	3,750	6,340	9,150	13,000	27,700	--	--	--	
08382760	133	609	1,400	3,520	6,490	11,400	36,500	7,400	0	17	112
	244	782	1,450	2,740	4,060	5,820	12,400	(1977)	--	--	
	143	658	1,430	2,980	4,710	7,300	19,600	--	--	--	
08383000	8,850	18,500	26,600	38,900	49,400	60,800	91,700	55,200	0	66	113
	4,420	11,100	17,800	29,200	39,500	51,600	89,500	(1937)	--	--	
	8,710	18,000	25,100	35,900	46,100	58,100	91,200	--	--	--	
08383370	109	267	455	842	1,290	1,920	4,580	2,000	20	41	114
	112	349	636	1,240	1,960	2,960	6,860	(1987)	--	--	
	109	279	500	992	1,550	2,310	5,250	--	--	--	
08383500	9,680	17,000	23,000	31,900	39,600	48,100	72,100	48,600	0	67	115
	4,940	12,900	21,200	35,100	47,500	62,200	109,000	(1942)	--	--	
	9,530	16,600	22,700	32,700	41,800	51,700	78,400	--	--	--	
08384500	8,630	15,000	20,300	28,300	35,100	42,800	64,600	42,000	0	89	116
	5,240	14,000	23,300	38,700	52,700	69,300	122,000	(1914)	--	--	
	8,550	15,000	20,700	30,400	39,000	48,000	71,900	--	--	--	
08385530	36	135	278	619	1,050	1,720	4,820	2,850	10	39	117
	155	505	950	1,810	2,670	3,800	8,070	(1972)	--	--	
	40	171	412	1,020	1,660	2,490	5,870	--	--	--	
08385600	1,390	3,620	6,150	11,100	16,300	23,400	49,700	22,900	100	50	118
	1,020	3,390	6,310	11,600	16,800	23,300	47,100	(1999)	--	--	
	1,370	3,590	6,190	11,300	16,500	23,400	48,900	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Average basin slope (percent [feet/foot*100])	Average basin elevation (feet)	Map identifier (fig. 1)
	Southeast plains flood region (4)—Continued				
08385670	Aragon Creek tributary near Encinoso, New Mexico	5.09 6.07	0.1191	6,680	119
08390500	Rio Hondo at Diamond A Ranch near Roswell, New Mexico	945 947	0.1966	6,580	120
08393200	Rocky Arroyo above Two Rivers Reservoir near Roswell, New Mexico	31.5 31.0	0.0644	4,500	121
08394300	Twin Buttes Canyon tributary near Roswell, New Mexico	5.05 5.01	0.0673	4,500	122
08394500	Rio Felix at Old Highway Bridge near Hagerman, New Mexico	945 932	0.1166	5,240	123
08398500	Rio Penasco at Dayton, New Mexico	1,050 1,060	0.1691	6,630	124
08400000	Fourmile Draw near Lakewood, New Mexico	348 265	0.0881	4,900	125
08401200	South Seven Rivers near Lakewood, New Mexico	217 220	0.0791	4,170	126
08401800	Rocky Arroyo near Carlsbad, New Mexico	250 254	0.0934	4,680	127
08401900	Rocky Arroyo at Highway Bridge near Carlsbad, New Mexico	292 285	0.0948	4,470	128
08405050	Last Chance Canyon tributary near Carlsbad, New Mexico	0.140 0.200	0.0328	4,220	129
08405100	Mosley Canyon near White City, New Mexico	14.4 14.6	0.1251	3,970	130
08405500	Black River above Malaga, New Mexico	374 343	0.1674	4,080	131
08408500	Delaware River near Red Bluff, New Mexico	784 689	0.0813	4,080	132

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year)										Map identifier (fig. 1)
	Recurrence interval (years)							Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	
	2	5	10	25	50	100	500				
Southeast plains flood region (4)—Continued											
08385670	502	828	1,080	1,450	1,750	2,080	2,960	1,610	0	37	119
	218	534	879	1,540	2,220	3,070	5,980	(1961)	--	--	
	487	788	1,030	1,480	1,920	2,400	3,610	--	--	--	
08390500	2,130	6,990	13,600	28,400	46,500	73,400	191,000	54,800	110	65	120
	3,430	8,170	12,900	21,000	28,700	37,800	66,100	(1965)	--	--	
	2,150	7,060	13,500	26,300	40,500	61,800	157,000	--	--	--	
08393200	672	2,400	4,590	9,090	14,000	20,700	44,800	12,000	0	18	121
	611	2,020	3,740	7,090	10,700	15,500	33,400	(1968)	--	--	
	661	2,240	4,060	7,540	11,300	16,600	36,700	--	--	--	
08394300	207	1,020	2,250	5,020	8,260	12,800	29,700	5,900	40	33	122
	267	884	1,650	3,190	4,900	7,260	16,300	(1995)	--	--	
	212	986	1,960	3,810	5,940	9,050	21,800	--	--	--	
08394500	5,150	12,900	20,400	32,800	44,200	57,400	96,100	74,000	1,000	56	123
	3,440	9,870	16,900	29,300	41,400	56,600	108,000	(1955)	--	--	
	5,080	12,500	19,600	31,400	43,000	57,100	99,300	--	--	--	
08398500	918	4,480	9,870	22,300	37,100	58,100	140,000	29,800	110	53	124
	3,260	7,800	12,300	20,100	27,400	36,000	62,600	(1966)	--	--	
	952	4,710	10,300	21,500	33,200	49,400	115,000	--	--	--	
08400000	379	2,250	5,540	14,200	25,800	43,700	124,000	29,300	100	52	125
	2,010	6,130	10,800	19,400	28,100	39,200	77,900	(1966)	--	--	
	416	2,660	6,850	16,600	26,900	41,400	104,000	--	--	--	
08401200	896	5,070	12,100	29,700	52,300	86,100	229,000	25,500	200	38	126
	1,880	6,470	12,000	22,500	33,600	48,500	103,000	(1965)	--	--	
	950	5,350	12,100	25,500	40,400	62,500	158,000	--	--	--	
08401800	4,740	16,900	32,500	64,700	100,000	149,000	326,000	63,300	0	14	127
	1,890	5,960	10,600	19,400	28,300	40,000	81,400	(1955)	--	--	
	4,110	11,400	17,000	26,500	38,200	56,100	131,000	--	--	--	
08401900	2,290	9,180	18,100	36,200	55,500	80,600	166,000	31,600	200	41	128
	2,190	7,100	12,800	23,500	34,600	49,200	101,000	(1966)	--	--	
	2,280	8,720	16,000	28,700	42,400	61,700	133,000	--	--	--	
08405050	103	253	401	647	877	1,150	1,970	683	0	35	129
	36	130	257	535	862	1,340	3,320	(1966)	--	--	
	95	220	341	587	869	1,240	2,470	--	--	--	
08405100	1,700	3,320	4,730	6,920	8,880	11,100	17,600	16,400	100	44	130
	743	2,590	4,840	9,420	14,700	22,100	50,400	(1965)	--	--	
	1,620	3,170	4,760	8,000	11,400	15,400	26,500	--	--	--	
08405500	2,030	7,670	15,100	30,700	48,200	72,000	160,000	74,600	0	59	131
	3,890	13,000	23,500	43,400	65,000	94,000	198,000	(1966)	--	--	
	2,080	8,190	16,800	34,900	54,200	79,500	170,000	--	--	--	
08408500	2,580	8,730	16,800	34,300	54,700	83,800	201,000	81,400	0	67	132
	3,590	12,500	23,100	42,900	63,300	90,400	189,000	(1956)	--	--	
	2,620	8,190	18,200	37,400	58,100	86,300	197,000	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Average basin elevation (feet)	Maximum 24-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Map identifier (fig. 1)
	Northern mountain flood region (5)				
07201000	Raton Creek at Raton, New Mexico	12.5 14.4	7,570	5.51	133
07203000	Vermejo River near Dawson, New Mexico	342 301	8,100	3.95	134
07204000	Moreno Creek at Eagle Nest, New Mexico	79.3 73.8	9,360	3.63	135
07204500	Cieneguilla Creek near Eagle Nest, New Mexico	71.6 56.0	9,070	3.65	136
07205000	Sixmile Creek near Eagle Nest, New Mexico	9.48 10.5	9,330	3.64	137
07206400	Clear Creek near Ute Park, New Mexico	7.17 7.44	9,810	3.94	138
07207500	Ponil Creek near Cimarron, New Mexico	184 171	8,310	3.79	139
07208500	Rayado Creek near Cimarron, New Mexico	59.4 65.0	9,640	4.26	140
07214500	Mora River near Holman, New Mexico	62.7 57.0	9,360	4.19	141
07214800	Rio La Casa near Cleveland, New Mexico	22.5 23.0	10,400	4.64	142
07215500	Mora River at La Cueva, New Mexico	178 173	8,620	4.16	143
07216500	Mora River near Golondrinas, New Mexico	267 267	8,180	4.16	144
07217000	Coyote Creek below Black Lake, New Mexico	48.0 48.0	9,260	4.10	145
07217100	Coyote Creek above Guadalupita, New Mexico	75.2 71.0	9,040	4.09	146
07218000	Coyote Creek near Golondrinas, New Mexico	236 215	8,060	4.06	147

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year)										Map identifier (fig. 1)
	Recurrence interval (years)							Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	
	2	5	10	25	50	100	500				
Northern mountain flood region (5)											
07201000	401	916	1,420	2,260	3,060	4,030	7,060	3,990	0	47	133
	298	850	1,490	2,710	4,010	5,720	12,000	(1965)	--	--	
	395	909	1,430	2,330	3,230	4,330	7,860	--	--	--	
07203000	1,600	3,120	4,510	6,810	8,960	11,500	19,600	12,600	500	76	134
	1,230	2,530	3,720	5,600	7,310	9,320	15,400	(1965)	--	--	
	1,590	3,090	4,470	6,720	8,820	11,300	19,200	--	--	--	
07204000	66	115	151	197	233	269	353	240	50	67	135
	226	417	578	817	1,020	1,250	1,880	(1946)	--	--	
	68	120	160	215	258	300	399	--	--	--	
07204500	100	217	322	485	629	793	1,260	505	10	66	136
	223	427	604	875	1,110	1,380	2,140	(1965)	--	--	
	102	222	332	505	657	829	1,310	--	--	--	
07205000	25	49	71	106	138	176	288	128	6	70	137
	41	84	124	186	241	306	497	(1969)	--	--	
	25	50	73	110	144	184	302	--	--	--	
07206400	24	48	72	110	148	193	341	151	0	39	138
	40	81	117	175	225	284	455	(1965)	--	--	
	25	50	75	117	156	204	355	--	--	--	
07207500	410	1,270	2,330	4,530	7,010	10,500	23,800	14,700	0	60	139
	623	1,270	1,850	2,770	3,600	4,560	7,450	(2004)	--	--	
	414	1,270	2,300	4,340	6,580	9,620	21,200	--	--	--	
07208500	145	348	575	1,020	1,500	2,140	4,620	9,000	20	82	140
	294	566	799	1,150	1,450	1,790	2,770	(1965)	--	--	
	146	353	583	1,020	1,490	2,120	4,470	--	--	--	
07214500	561	1,630	2,860	5,220	7,710	11,000	22,400	4,700	0	21	141
	305	598	854	1,250	1,590	1,980	3,110	(1954)	--	--	
	543	1,480	2,400	3,960	5,490	7,450	14,300	--	--	--	
07214800	193	449	717	1,200	1,700	2,350	4,580	2,260	0	14	142
	160	307	431	616	775	953	1,460	(1959)	--	--	
	191	428	653	1,030	1,380	1,830	3,330	--	--	--	
07215500	518	832	1,060	1,380	1,630	1,890	2,550	1,530	200	73	143
	786	1,590	2,320	3,450	4,470	5,650	9,150	(1941)	--	--	
	522	850	1,110	1,470	1,770	2,070	2,840	--	--	--	
07216500	740	1,530	2,350	3,890	5,500	7,650	15,700	14,000	200	80	144
	1,200	2,510	3,720	5,660	7,430	9,520	15,900	(1952)	--	--	
	746	1,550	2,410	3,990	5,640	7,800	15,700	--	--	--	
07217000	42	175	386	929	1,670	2,870	8,920	913	0	12	145
	232	463	666	982	1,260	1,580	2,520	(1958)	--	--	
	49	206	439	945	1,520	2,330	5,730	--	--	--	
07217100	115	331	600	1,170	1,820	2,760	6,600	1,820	0	17	146
	343	686	991	1,460	1,880	2,360	3,780	(1965)	--	--	
	124	363	657	1,230	1,840	2,640	5,660	--	--	--	
07218000	555	1,210	1,860	2,980	4,070	5,420	9,830	4,050	110	76	147
	1,010	2,150	3,200	4,910	6,490	8,350	14,100	(1961)	--	--	
	561	1,240	1,920	3,090	4,230	5,630	10,100	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Average basin elevation (feet)	Maximum 24-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Map identifier (fig. 1)
	Northern mountain flood region (5)—Continued				
07220000	Sapello River at Sapello, New Mexico	132 132	7,800	4.37	148
08247500	San Antonio River at Ortiz, Colorado	114 110	9,270	3.83	149
08248000	Los Pinos River near Ortiz, Colorado	152 167	9,930	4.33	150
08252500	Costilla Creek above Costilla Dam, New Mexico	31.3 25.1	10,700	3.67	151
08253000	Casias Creek near Costilla, New Mexico	10.5 16.6	10,700	3.66	152
08253500	Santistevan Creek near Costilla, New Mexico	2.42 2.15	11,200	3.71	153
08255000	Ute Creek near Amalia, New Mexico	11.1 12.0	10,900	3.76	154
08263000	Latir Creek near Cerro, New Mexico	10.5 10.5	11,100	3.81	155
08264000	Red River near Red River, New Mexico	18.9 19.1	11,000	3.91	156
08265000	Red River near Questa, New Mexico	111 113	10,100	3.65	157
08267000	Red River at mouth, near Questa, New Mexico	187 190	9,890	3.50	158
08267500	Rio Hondo near Valdez, New Mexico	36.8 36.2	10,500	3.71	159
08268500	Arroyo Hondo at Arroyo Hondo, New Mexico	66.1 65.6	9,530	3.45	160
08269000	Rio Pueblo de Taos near Taos, New Mexico	57.6 66.6	9,520	3.58	161
08271000	Rio Lucero near Arroyo Seco, New Mexico	16.5 16.6	10,900	3.79	162

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year)										Map identifier (fig. 1)
	Recurrence interval (years)							Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	
	2	5	10	25	50	100	500				
				Northern mountain flood region (5)—Continued							
07220000	2,470	4,190	5,530	7,450	9,040	10,800	15,300	6,420	300	17	148
	859	1,980	3,090	4,980	6,790	9,000	16,100	(1966)	--	--	
	2,250	3,700	4,830	6,600	8,230	10,100	15,600	--	--	--	
08247500	501	786	988	1,260	1,460	1,670	2,190	1,750	300	80	149
	368	690	961	1,360	1,710	2,100	3,200	(1937)	--	--	
	499	783	987	1,260	1,480	1,700	2,240	--	--	--	
08248000	1,310	1,800	2,120	2,530	2,830	3,130	3,840	3,160	800	85	150
	632	1,140	1,550	2,140	2,630	3,170	4,650	(1941)	--	--	
	1,300	1,780	2,100	2,510	2,820	3,130	3,880	--	--	--	
08252500	59	138	229	412	619	908	2,090	3,870	10	66	151
	89	152	200	268	322	380	532	(1954)	--	--	
	59	138	228	404	598	864	1,930	--	--	--	
08253000	60	100	130	171	204	238	326	196	15	68	152
	37	65	89	122	150	180	261	(1994)	--	--	
	60	99	128	168	200	234	321	--	--	--	
08253500	9	13	15	19	21	24	30	20	5	67	153
	11	20	27	38	48	57	85	(1995)	--	--	
	9	13	16	20	22	25	32	--	--	--	
08255000	45	65	78	94	106	117	145	88	30	10	154
	41	72	97	132	161	193	277	(1955)	--	--	
	45	66	81	103	119	136	176	--	--	--	
08263000	47	77	100	132	159	188	263	126	0	33	155
	40	69	92	125	152	181	257	(1965)	--	--	
	47	77	99	132	158	187	263	--	--	--	
08264000	107	166	208	263	305	348	453	264	0	24	156
	71	122	162	219	264	313	443	(1952)	--	--	
	105	163	203	257	299	343	452	--	--	--	
08265000	244	416	548	734	885	1,050	1,460	886	0	74	157
	266	452	596	797	960	1,140	1,600	(1942)	--	--	
	244	417	550	737	888	1,050	1,470	--	--	--	
08267000	311	472	585	731	843	957	1,230	730	0	28	158
	364	606	792	1,050	1,260	1,480	2,060	(1964)	--	--	
	313	478	598	758	882	1,010	1,310	--	--	--	
08267500	158	263	344	459	552	653	916	541	50	70	159
	109	187	249	337	408	484	687	(1941)	--	--	
	157	261	340	452	543	642	901	--	--	--	
08268500	154	319	470	717	945	1,220	2,040	1,060	0	51	160
	159	286	391	545	674	817	1,210	(1948)	--	--	
	154	318	466	703	920	1,170	1,950	--	--	--	
08269000	170	362	525	766	968	1,190	1,770	1,050	0	70	161
	162	297	410	577	720	878	1,320	(1979)	--	--	
	170	360	519	753	950	1,160	1,730	--	--	--	
08271000	122	181	222	275	315	356	455	310	0	76	162
	58	100	134	181	219	261	370	(1979)	--	--	
	122	179	218	270	310	351	451	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Average basin elevation (feet)	Maximum 24-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Map identifier (fig. 1)
	Northern mountain flood region (5)—Continued				
08275000	Rio Fernando de Taos near Taos, New Mexico	60.3 71.7	9,070	3.51	163
08275500	Rio Grande del Rancho near Talpa, New Mexico	78.7 83.0	9,360	4.06	164
08275600	Rio Chiquito near Talpa, New Mexico	37.7 37.0	9,460	3.82	165
08277470	Rio Pueblo near Penasco, New Mexico	98.9 --	9,850	4.38	166
08278500	Rio Santa Barbara near Penasco, New Mexico	39.1 38.0	11,000	4.60	167
08279000	Embudo Creek at Dixon, New Mexico	317 305	9,000	3.83	168
08281200	Wolf Creek near Chama, New Mexico	27.7 27.7	9,760	4.60	169
08283500	Rio Chama at Park View, New Mexico	392 405	9,780	4.33	170
08284000	Rito de Tierra Amarilla at Tierra Amarilla, New Mexico	49.7 49.7	8,770	3.72	171
08284100	Rio Chama near La Puente, New Mexico	468 480	9,570	4.20	172
08284300	Horse Lake Creek above Heron Reservoir near Park View, New Mexico	42.7 45.0	7,900	3.46	173
08284500	Willow Creek near Park View, New Mexico	192 193	7,740	3.36	174
08286650	Canjilon Creek above Abiquiu Reservoir, New Mexico	143 144	7,970	3.13	175
08286700	Arroyo Seco near Abiquiu, New Mexico	160 162	7,900	3.08	176
08288000	El Rito near El Rito, New Mexico	47.6 50.5	9,130	3.64	177

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year)										Map identifier (fig. 1)
	Recurrence interval (years)							Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	
	2	5	10	25	50	100	500				
				Northern mountain flood region (5)—Continued							
08275000	59	113	161	238	308	390	636	219	20	19	163
	170	324	457	660	837	1,040	1,610	(1973)	--	--	
	63	126	188	291	383	488	788	--	--	--	
08275500	161	293	396	541	658	783	1,100	644	40	47	164
	328	632	892	1,290	1,630	2,020	3,120	(1991)	--	--	
	164	304	419	586	724	869	1,240	--	--	--	
08275600	72	152	225	345	455	586	982	309	10	24	165
	145	279	395	571	725	898	1,390	(1979)	--	--	
	74	160	241	375	496	637	1,050	--	--	--	
08277470	399	1,020	1,690	2,920	4,190	5,810	11,400	2,200	0	13	166
	471	877	1,210	1,700	2,120	2,580	3,880	(1994)	--	--	
	404	1,000	1,590	2,560	3,480	4,620	8,400	--	--	--	
08278500	238	384	505	688	848	1,030	1,560	838	125	17	167
	221	391	525	713	867	1,030	1,480	(1995)	--	--	
	237	385	508	692	851	1,030	1,540	--	--	--	
08279000	1,030	1,540	1,950	2,540	3,030	3,590	5,140	4,200	700	67	168
	880	1,620	2,240	3,150	3,930	4,800	7,230	(1977)	--	--	
	1,030	1,550	1,960	2,570	3,090	3,660	5,260	--	--	--	
08281200	559	920	1,210	1,650	2,020	2,440	3,620	1,900	0	13	169
	203	410	593	875	1,120	1,410	2,250	(1965)	--	--	
	515	812	1,040	1,380	1,680	2,040	3,100	--	--	--	
08283500	4,010	5,770	6,980	8,550	9,750	11,000	13,900	10,000	0	33	170
	1,390	2,440	3,270	4,430	5,390	6,440	9,260	(1926)	--	--	
	3,910	5,540	6,620	8,030	9,150	10,300	13,300	--	--	--	
08284000	282	540	742	1,030	1,260	1,500	2,110	1,000	210	24	171
	187	379	553	829	1,080	1,360	2,210	(1975)	--	--	
	277	522	712	987	1,220	1,470	2,130	--	--	--	
08284100	3,750	6,070	7,830	10,300	12,300	14,500	20,300	11,200	1,000	49	172
	1,490	2,630	3,530	4,810	5,870	7,020	10,200	--	--	--	
	3,700	5,900	7,530	9,800	11,700	13,700	19,200	--	--	--	
08284300	121	255	398	666	950	1,330	2,760	3,960	50	33	173
	153	337	517	819	1,100	1,450	2,530	(1968)	--	--	
	122	262	411	690	978	1,350	2,710	--	--	--	
08284500	1,150	1,870	2,420	3,230	3,910	4,650	6,670	4,500	300	34	174
	479	999	1,480	2,270	3,000	3,860	6,480	(1942)	--	--	
	1,120	1,780	2,300	3,070	3,750	4,510	6,640	--	--	--	
08286650	641	1,180	1,680	2,510	3,300	4,270	7,420	4,620	300	33	175
	283	566	825	1,240	1,610	2,040	3,320	(1998)	--	--	
	624	1,120	1,570	2,280	2,970	3,810	6,550	--	--	--	
08286700	310	577	793	1,110	1,370	1,660	2,440	810	0	12	176
	298	594	865	1,300	1,680	2,140	3,480	(1962)	--	--	
	309	581	814	1,180	1,500	1,850	2,840	--	--	--	
08288000	220	405	571	835	1,080	1,360	2,240	1,240	0	38	177
	157	305	434	632	806	1,000	1,570	(1942)	--	--	
	218	399	557	808	1,040	1,310	2,130	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Average basin elevation (feet)	Maximum 24-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Map identifier (fig. 1)
	Northern mountain flood region (5)—Continued				
08289000	Rio Ojo Caliente at La Madera, New Mexico	409 419	8,520	3.37	178
08290000	Rio Chama near Chamita, New Mexico	3,120 3,140	7,750	3.34	179
08291000	Santa Cruz River at Cundiyo, New Mexico	91.5 86.0	9,140	3.70	180
08294300	Rio Nambe at Nambe Falls near Nambe, New Mexico	34.0 25.1	9,180	3.73	181
08295000	Rio Nambe near Nambe, New Mexico	37.1 38.2	9,020	3.68	182
08295200	Rio en Medio near Santa Fe, New Mexico	0.606 0.630	11,500	4.10	183
08302200	North Fork Tesuque Creek near Santa Fe, New Mexico	1.61 1.60	10,900	4.04	184
08313350	Rito de los Frijoles in Bandelier National Monument, New Mexico	18.3 17.5	7,700	3.78	185
08313400	Bland Canyon near Cochiti, New Mexico	7.40 7.57	7,870	3.76	186
08316000	Santa Fe River near Santa Fe, New Mexico	17.5 18.2	9,280	3.83	187
08317500	Galisteo Creek at Canoncito, New Mexico	11.4 11.3	7,660	3.52	188
08321500	Jemez River below East Fork near Jemez Springs, New Mexico	172 173	8,860	4.10	189
08321900	Rio de las Vacas near Senorita, New Mexico	27.5 26.8	9,820	4.71	190
08323000	Rio Guadalupe at Box Canyon near Jemez, New Mexico	233 235	8,520	3.94	191
08324000	Jemez River near Jemez, New Mexico	467	8,570	3.93	192

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year) Recurrence interval (years) 2	5	10	25	50	100	500	Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	Map identifier (fig. 1)
					Northern mountain flood region (5)—Continued						
08289000	1,050	1,750	2,270	3,000	3,580	4,200	5,790	3,990	200	73	178
	763	1,400	1,940	2,740	3,430	4,210	6,380	(1998)	--	--	
	1,050	1,740	2,260	2,980	3,570	4,200	5,820	--	--	--	
08290000	5,440	8,180	10,200	13,000	15,200	17,600	23,700	15,000	0	85	179
	4,420	8,130	11,200	15,900	20,000	24,600	37,500	(1920)	--	--	
	5,430	8,180	10,200	13,100	15,400	17,900	24,300	--	--	--	
08291000	303	590	853	1,280	1,680	2,160	3,650	2,420	50	74	180
	281	531	746	1,070	1,350	1,660	2,560	(1931)	--	--	
	303	589	848	1,270	1,660	2,120	3,560	--	--	--	
08294300	87	221	374	678	1,010	1,470	3,230	1,090	70	16	181
	129	255	366	539	692	866	1,370	(1967)	--	--	
	89	225	373	641	913	1,270	2,540	--	--	--	
08295000	201	622	1,130	2,170	3,320	4,870	10,700	5,580	0	33	182
	136	271	391	580	747	939	1,500	(1955)	--	--	
	199	587	1,020	1,810	2,640	3,730	7,770	--	--	--	
08295200	8	14	18	23	28	32	44	20	3	20	183
	5	9	14	20	25	31	48	(1975)	--	--	
	8	13	17	23	27	32	45	--	--	--	
08302200	9	15	20	29	36	45	70	33	0	11	184
	11	22	31	45	58	71	111	(1966)	--	--	
	9	16	22	33	42	52	82	--	--	--	
08313350	26	94	201	481	878	1,550	5,310	3,030	10	28	185
	109	263	425	711	993	1,340	2,520	(1978)	--	--	
	29	107	228	525	905	1,500	4,370	--	--	--	
08313400	33	79	122	192	255	328	535	243	22	42	186
	50	122	199	337	474	646	1,220	(1985)	--	--	
	33	82	130	210	285	373	626	--	--	--	
08316000	90	227	386	702	1,050	1,540	3,440	1,500	0	87	187
	81	165	241	360	467	590	955	(1921)	--	--	
	90	225	378	675	998	1,440	3,140	--	--	--	
08317500	786	1,140	1,390	1,740	2,010	2,300	3,040	2,000	0	43	188
	59	142	230	387	542	735	1,380	(1966)	--	--	
	704	956	1,120	1,360	1,580	1,850	2,610	--	--	--	
08321500	532	959	1,290	1,750	2,110	2,500	3,480	1,700	0	28	189
	696	1,370	1,960	2,860	3,660	4,570	7,230	(1975)	--	--	
	537	985	1,350	1,880	2,320	2,790	3,970	--	--	--	
08321900	274	390	460	542	599	651	763	530	250	38	190
	216	438	634	937	1,210	1,510	2,410	(1958)	--	--	
	272	393	473	578	657	733	898	--	--	--	
08323000	444	875	1,240	1,790	2,250	2,780	4,200	3,190	50	47	191
	826	1,640	2,370	3,490	4,500	5,650	9,050	(1941)	--	--	
	451	902	1,300	1,910	2,440	3,020	4,610	--	--	--	
08324000	1,330	2,390	3,240	4,480	5,500	6,610	9,580	5,900	0	60	192
	1,420	2,720	3,840	5,540	7,020	8,700	13,500	(1958)	--	--	
	1,330	2,400	3,270	4,540	5,610	6,770	9,870	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Average basin elevation (feet)	Maximum 24-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Map identifier (fig. 1)
	Northern mountain flood region (5)—Continued				
08377900	Rio Mora near Terrero, New Mexico	53.2 53.2	10,400	4.75	193
08378500	Pecos River near Pecos, New Mexico	170 189	10,100	4.37	194
08380500	Gallinas Creek near Montezuma, New Mexico	76.0 84.0	8,640	4.57	195
08381000	Gallinas Creek at Montezuma, New Mexico	79.7 87.0	8,510	4.57	196

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year)										Map identifier (fig. 1)
	Recurrence interval (years)							Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	
	2	5	10	25	50	100	500				
Northern mountain flood region (5)—Continued											
08377900	253	435	579	789	964	1,160	1,680	937	0	41	193
	346	645	891	1,250	1,550	1,890	2,820	(1991)	--	--	
	254	442	596	822	1,010	1,220	1,770	--	--	--	
08378500	622	1,160	1,580	2,200	2,720	3,270	4,740	4,500	0	82	194
	694	1,230	1,650	2,260	2,750	3,290	4,750	(1929)	--	--	
	623	1,160	1,590	2,210	2,720	3,270	4,740	--	--	--	
08380500	555	1,490	2,520	4,410	6,360	8,840	17,300	7,120	0	88	195
	544	1,180	1,780	2,750	3,650	4,720	8,020	(1966)	--	--	
	555	1,480	2,480	4,280	6,100	8,410	16,300	--	--	--	
08381000	490	1,320	2,250	4,040	5,950	8,460	17,600	11,600	0	58	196
	579	1,270	1,930	3,020	4,020	5,220	8,970	(1904)	--	--	
	492	1,310	2,220	3,920	5,690	7,990	16,200	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Map identifier (fig. 1)
	Central mountain valley flood region (6)		
08313100	Canada Ancha tributary near Santa Fe, New Mexico	0.577 1.23	197
08316600	North Frijoles Arroyo near Santa Fe, New Mexico	0.356 0.330	198
08316650	Arroyo de los Frijoles, Locust Tree, near Santa Fe, New Mexico	1.40 1.30	199
08316700	Arroyo de los Frijoles near Santa Fe, New Mexico	2.80 2.92	200
08317600	San Cristobal Arroyo near Galusteo, New Mexico	114 116	201
08317700	Tarhole Canyon near Galisteo, New Mexico	2.06 2.15	202
08317720	Canada de la Cueva near Galisteo, New Mexico	1.77 1.79	203
08318000	Galisteo Creek at Domingo, New Mexico	661 640	204
08318900	San Pedro Creek near Golden, New Mexico	44.7 45.2	205
08330500	Tijeras Arroyo at Albuquerque, New Mexico	74.7 75.3	206
08330600	Tijeras Arroyo near Albuquerque, New Mexico	134 128	207
08331100	Belen Highline Canal tributary near Los Lunas, New Mexico	0.180 0.160	208
08331650	Canada Montoso near Scholle, New Mexico	37.0 35.0	209
08334000	Rio Puerco above Arroyo Chico near Guadalupe, New Mexico	420 420	210
08340500	Arroyo Chico near Guadalupe, New Mexico	1,360 1,390	211

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year) Recurrence interval (years) 2	5	10	25	50	100	500	Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	Map identifier (fig. 1)
					Central mountain valley flood region (6)						
08313100	17	71	147	316	517	802	1,940	298	5	32	197
	105	255	397	636	860	1,130	1,940	(1967)	--	--	
	19	80	170	367	588	882	1,940	--	--	--	
08316600	141	242	320	429	518	612	856	360	20	13	198
	86	211	330	531	721	948	1,640	(1966)	--	--	
	135	236	323	462	590	739	1,160	--	--	--	
08316650	510	1,010	1,450	2,100	2,680	3,320	5,120	1,900	40	14	199
	153	361	558	884	1,190	1,550	2,650	(1957)	--	--	
	464	864	1,160	1,590	1,980	2,440	3,820	--	--	--	
08316700	473	1,540	2,910	5,840	9,240	14,000	33,300	5,340	30	14	200
	205	475	728	1,140	1,530	1,990	3,370	(1951)	--	--	
	444	1,290	2,130	3,500	4,790	6,420	12,200	--	--	--	
08317600	1,820	3,500	5,010	7,440	9,680	12,300	20,300	13,200	800	44	201
	971	2,050	3,010	4,540	5,920	7,520	12,200	(1999)	--	--	
	1,800	3,420	4,830	7,040	9,050	11,400	18,600	--	--	--	
08317700	315	731	1,120	1,740	2,310	2,960	4,840	2,440	250	34	202
	180	420	647	1,020	1,370	1,780	3,030	(1952)	--	--	
	309	703	1,050	1,600	2,080	2,650	4,300	--	--	--	
08317720	114	255	397	647	896	1,210	2,250	919	0	25	203
	169	396	611	964	1,290	1,690	2,870	(1982)	--	--	
	117	268	426	711	993	1,340	2,450	--	--	--	
08318000	6,440	11,000	14,700	20,100	24,700	29,800	43,900	22,800	2,000	29	204
	2,030	4,090	5,900	8,720	11,200	14,100	22,500	(1966)	--	--	
	6,240	10,400	13,500	18,000	21,700	25,900	38,000	--	--	--	
08318900	928	1,550	2,120	3,060	3,950	5,040	8,610	10,800	600	49	205
	655	1,410	2,100	3,200	4,210	5,380	8,830	(1955)	--	--	
	922	1,550	2,120	3,070	3,980	5,090	8,640	--	--	--	
08330500	702	1,870	3,070	5,150	7,140	9,530	16,900	6,500	450	52	206
	813	1,730	2,560	3,880	5,070	6,460	10,600	(1967)	--	--	
	704	1,870	3,040	5,000	6,840	9,020	15,600	--	--	--	
08330600	665	1,160	1,570	2,160	2,670	3,230	4,770	2,930	0	50	207
	1,040	2,180	3,200	4,820	6,280	7,970	12,900	(1988)	--	--	
	670	1,190	1,640	2,330	2,950	3,640	5,550	--	--	--	
08331100	199	310	390	497	580	666	878	754	0	41	208
	65	161	254	412	562	742	1,300	(1965)	--	--	
	192	297	373	483	576	680	960	--	--	--	
08331650	369	1,090	1,970	3,780	5,820	8,660	19,800	5,600	0	42	209
	605	1,310	1,960	2,990	3,930	5,020	8,270	(1997)	--	--	
	374	1,100	1,970	3,670	5,500	7,920	16,800	--	--	--	
08334000	1,890	3,070	3,900	4,970	5,780	6,590	8,490	6,940	1,000	53	210
	1,680	3,420	4,960	7,370	9,530	12,000	19,200	(1967)	--	--	
	1,890	3,090	3,950	5,140	6,080	7,070	9,480	--	--	--	
08340500	4,030	6,800	9,040	12,400	15,200	18,300	27,200	15,200	1,000	43	211
	2,750	5,430	7,770	11,400	14,600	18,300	29,000	(1972)	--	--	
	4,010	6,740	8,960	12,300	15,100	18,300	27,400	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Map identifier (fig. 1)
	Central mountain valley flood region (6)—Continued		
08343100	Grants Canyon at Grants, New Mexico	11.8 13.0	212
08351500	Rio San Jose at Correo, New Mexico	3,650 3,660	213
08352500	Rio Puerco at Rio Puerco, New Mexico	6,130 6,590	214
08353000	Rio Puerco near Bernardo, New Mexico	7,220 7,350	215
08354000	Rio Salado near San Acacia, New Mexico	1,380 1,380	216
08358600	Chupadera Wash tributary at Bingham, New Mexico	0.765 1.29	217
08480150	White Oaks Canyon near Carrizozo, New Mexico	35.1 31.0	218
08489000	Big Draw near Mountainair, New Mexico	4.08 3.90	219

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year)										Map identifier (fig. 1)
	Recurrence interval (years)							Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	
	2	5	10	25	50	100	500				
Central mountain valley flood region (6)—Continued											
08343100	175	508	844	1,400	1,900	2,470	4,050	1,550	0	34	212
	375	837	1,260	1,950	2,590	3,330	5,550	(1963)	--	--	
	179	525	879	1,470	2,010	2,630	4,360	--	--	--	
08351500	1,420	3,070	4,560	6,880	8,950	11,300	18,000	7,150	0	52	213
	4,160	8,020	11,300	16,500	21,000	26,100	40,800	(1955)	--	--	
	1,440	3,160	4,750	7,320	9,630	12,300	19,700	--	--	--	
08352500	5,180	10,300	14,900	22,500	29,600	38,000	63,800	37,700	0	51	214
	5,170	9,830	13,800	20,000	25,400	31,500	48,900	(1929)	--	--	
	5,180	10,300	14,900	22,400	29,200	37,300	62,000	--	--	--	
08353000	2,690	5,480	7,980	12,000	15,500	19,700	31,900	18,800	0	65	215
	5,540	10,500	14,700	21,200	26,900	33,400	51,700	(1941)	--	--	
	2,710	5,560	8,150	12,300	16,100	20,500	33,300	--	--	--	
08354000	7,250	15,100	21,300	30,000	36,800	44,000	61,200	36,200	1,000	38	216
	2,770	5,460	7,820	11,500	14,700	18,400	29,100	(1965)	--	--	
	7,120	14,500	20,000	27,300	33,000	39,100	54,500	--	--	--	
08358600	79	223	362	582	774	987	1,550	620	0	40	217
	119	285	443	706	953	1,250	2,140	(1980)	--	--	
	80	227	370	601	807	1,040	1,680	--	--	--	
08480150	1,110	1,980	2,770	4,050	5,250	6,690	11,300	7,690	0	44	218
	591	1,290	1,920	2,930	3,850	4,930	8,110	(1959)	--	--	
	1,090	1,940	2,690	3,900	5,030	6,380	10,600	--	--	--	
08489000	45	182	370	773	1,230	1,850	4,170	1,710	30	45	219
	240	550	841	1,320	1,760	2,280	3,840	(1954)	--	--	
	47	195	401	835	1,310	1,930	4,100	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Map identifier (fig. 1)
	Southwest desert flood region (7)		
08360000	Alamosa Creek near Monticello, New Mexico	401 403	220
08361650	Percha Creek near Kingston, New Mexico	21.4 21.5	221
08477500	Mimbres River near Faywood, New Mexico	472 440	222
08477580	Silva Creek at Silver City, New Mexico	21.4 10.0	223
08477600	San Vicente Arroyo at Silver City, New Mexico	26.6 26.5	224
08478000	Cameron Creek at Central, New Mexico	12.1 18.8	225
08478600	Mimbres Basin tributary near Florida, New Mexico	0.212 0.550	226
08478800	Seventysix Draw tributary near Waterloo, New Mexico	1.80 0.200	227
08479300	Deer Creek tributary near Antelope Wells, New Mexico	4.46 4	228
09430500	Gila River near Gila, New Mexico	1,850 1,860	229
09431000	Gila River near Cliff, New Mexico	2,380 2,440	230
09431500	Gila River near Redrock, New Mexico	2,820 2,830	231
09443000	San Francisco River near Alma, New Mexico	1,520 1,550	232
09536350	Surprise Canyon near Dos Cabezas, Arizona	0.662 0.650	233

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year)								Low-discharge threshold	Record length (years)	Map identifier (fig. 1)
	Recurrence interval (years)							Maximum peak discharge recorded (year)			
	2	5	10	25	50	100	500				
				Southwest desert flood region (7)							
08360000	1,670	3,570	5,310	8,130	10,700	13,700	22,600	10,800	500	57	220
	2,230	4,600	6,770	10,300	13,700	17,700	33,300	(1964)	--	--	
	1,680	3,640	5,490	8,560	11,400	14,700	24,600	--	--	--	
08361650	499	867	1,200	1,730	2,230	2,830	4,740	3,740	0	42	221
	589	1,170	1,670	2,470	3,190	4,020	6,440	(1972)	--	--	
	503	894	1,270	1,900	2,490	3,190	5,270	--	--	--	
08477500	2,970	6,510	9,860	15,400	20,600	26,800	45,700	20,000	300	30	222
	2,400	4,960	7,320	11,200	14,900	19,300	33,100	(1939)	--	--	
	2,920	6,250	9,200	13,800	18,100	23,200	39,600	--	--	--	
08477580	639	1,350	1,940	2,820	3,560	4,350	6,440	2,670	350	36	223
	589	1,170	1,670	2,470	3,190	4,020	6,440	(1960)	--	--	
	636	1,320	1,890	2,720	3,430	4,230	6,440	--	--	--	
08477600	1,950	3,130	4,050	5,400	6,540	7,800	11,300	6,800	0	13	224
	651	1,290	1,860	2,750	3,550	4,490	7,220	(1938)	--	--	
	1,730	2,550	3,100	3,910	4,700	5,680	8,700	--	--	--	
08478000	583	1,030	1,380	1,880	2,290	2,730	3,870	2,200	400	43	225
	455	893	1,270	1,870	2,400	3,010	4,760	(1959)	--	--	
	577	1,020	1,360	1,880	2,320	2,820	4,160	--	--	--	
08478600	141	250	333	448	540	636	877	480	0	36	226
	72	134	185	260	322	388	561	(1991)	--	--	
	137	235	304	393	465	545	760	--	--	--	
08478800	54	101	142	205	260	324	505	290	0	34	227
	71	131	180	252	312	377	544	(2,000)	--	--	
	55	104	148	216	275	340	518	--	--	--	
08479300	232	442	643	988	1,330	1,750	3,170	1,680	100	36	228
	289	560	792	1,150	1,460	1,820	2,810	(1960)	--	--	
	234	454	667	1,030	1,370	1,770	3,030	--	--	--	
09430500	1,910	5,640	10,200	19,300	29,500	43,500	96,900	35,200	0	77	229
	4,470	9,410	14,000	21,800	29,300	38,500	68,100	(1985)	--	--	
	1,950	5,830	10,500	19,700	29,500	42,300	89,400	--	--	--	
09431000	6,280	9,920	12,500	16,000	18,600	21,400	28,100	17,200	4,000	29	230
	5,020	10,600	15,800	24,700	33,200	43,700	77,800	(19	--	--	
	6,180	10,000	13,200	18,500	23,500	29,100	43,800	--	--	--	
09431500	6,060	12,200	18,300	28,800	39,300	52,500	97,300	48,800	2,000	71	231
	5,420	11,500	17,200	26,800	36,100	47,600	85,100	(1979)	--	--	
	6,040	12,200	18,100	28,500	38,600	51,300	94,200	--	--	--	
09443000	5,130	13,000	21,800	38,900	57,300	82,100	175,000	56,600	300	23	232
	4,090	8,580	12,800	19,800	26,600	34,800	61,300	(1984)	--	--	
	5,030	12,000	18,800	29,700	40,200	53,800	104,000	--	--	--	
09536350	45	111	171	261	339	424	648	191	20	14	233
	121	229	319	453	567	691	1,020	(1969)	--	--	
	52	134	215	344	453	567	854	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Map identifier (fig. 1)
	Southwest mountain flood region (8)		
09177500	Taylor Creek near Gateway, Colorado	15.3 12.0	234
09183500	Mill Creek at Sheley Tunnel near Moab, Utah	26.4 26.8	235
09317997	Huntington Creek near Huntington, Utah	177 178	236
09326500	Ferron Creek near Ferron, Utah	136 138	237
09327550	Ferron Creek below Paradise Ranch near Clawson, Utah	218 221	238
09329900	Pine Creek near Bicknell, Utah	107 104	239
09330500	Muddy Creek near Emery, Utah	108 105	240
09331500	Ivie Creek above diversions near Emery, Utah	45.1 50.0	241
09332100	Muddy Creek below Interstate 70 near Emery, Utah	414 418	242
09332500	Muddy Creek below Ivie Creek near Emery, Utah	430 440	243
09337000	Pine Creek near Escalante, Utah	66.7 68.1	244
09337500	Escalante River near Escalante, Utah	315 320	245
09338000	East Fork Boulder Creek near Boulder, Utah	20.4 21.4	246
09338500	East Fork Deer Creek near Boulder, Utah	1.70 1.90	247
09378170	South Creek above reservoir near Monticello, Utah	8.25 8.64	248

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year) Recurrence interval (years) 2	5	10	25	50	100	500	Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	Map identifier (fig. 1)
Southwest mountain flood region (8)											
09177500	111	264	407	637	844	1,080	1,770	555	0	23	234
	80	183	284	452	610	798	1,380	(1948)	--	--	
	107	242	364	561	743	958	1,600	--	--	--	
09183500	179	400	626	1,030	1,440	1,960	3,730	1,080	0	23	235
	123	272	413	644	858	1,110	1,870	(1993)	--	--	
	171	367	553	870	1,180	1,560	2,840	--	--	--	
09317997	832	1,580	2,190	3,090	3,840	4,660	6,870	1,680	0	17	236
	565	1,090	1,540	2,230	2,820	3,500	5,390	(1984)	--	--	
	796	1,460	1,990	2,770	3,440	4,200	6,290	--	--	--	
09326500	796	1,300	1,730	2,370	2,950	3,610	5,550	4,180	300	70	237
	458	898	1,280	1,880	2,400	2,980	4,660	(1952)	--	--	
	782	1,270	1,680	2,310	2,870	3,520	5,420	--	--	--	
09327550	1,240	2,130	2,800	3,730	4,480	5,260	7,230	2,670	0	11	238
	667	1,270	1,780	2,550	3,220	3,970	6,060	(1985)	--	--	
	1,120	1,850	2,390	3,180	3,860	4,620	6,670	--	--	--	
09329900	74	232	422	798	1,210	1,750	3,720	707	0	16	239
	378	754	1,090	1,600	2,060	2,580	4,070	(1968)	--	--	
	92	305	565	1,040	1,490	2,050	3,860	--	--	--	
09330500	460	981	1,490	2,360	3,200	4,250	7,650	3,340	0	62	240
	380	759	1,090	1,610	2,070	2,600	4,090	(1952)	--	--	
	457	962	1,440	2,240	3,000	3,940	6,950	--	--	--	
09331500	190	392	577	875	1,150	1,470	2,430	1,240	50	24	241
	189	402	598	913	1,200	1,530	2,520	(1965)	--	--	
	190	394	583	887	1,170	1,490	2,460	--	--	--	
09332100	1,220	2,210	3,080	4,500	5,800	7,350	12,100	9,400	300	31	242
	1,110	2,020	2,770	3,870	4,810	5,840	8,660	(1981)	--	--	
	1,210	2,190	3,040	4,380	5,590	7,010	11,300	--	--	--	
09332500	1,100	1,690	2,110	2,680	3,120	3,580	4,720	2,890	200	17	243
	1,150	2,080	2,840	3,970	4,920	5,980	8,840	(1951)	--	--	
	1,100	1,750	2,260	2,990	3,580	4,190	5,730	--	--	--	
09337000	175	353	515	772	1,010	1,280	2,090	1,010	50	53	244
	259	535	784	1,180	1,530	1,940	3,130	(1967)	--	--	
	179	368	544	829	1,090	1,380	2,260	--	--	--	
09337500	814	1,680	2,430	3,560	4,540	5,630	8,620	4,550	100	50	245
	896	1,650	2,290	3,240	4,050	4,950	7,440	(1998)	--	--	
	817	1,680	2,410	3,520	4,470	5,530	8,440	--	--	--	
09338000	199	303	375	467	537	607	773	483	0	20	246
	100	226	346	545	730	950	1,620	(1964)	--	--	
	181	282	365	496	610	735	1,060	--	--	--	
09338500	20	64	122	248	398	614	1,520	350	0	20	247
	14	37	62	108	154	212	405	(1955)	--	--	
	19	55	95	173	258	373	819	--	--	--	
09378170	47	100	143	204	253	304	430	163	30	20	248
	49	117	185	302	414	550	976	(1987)	--	--	
	47	104	157	241	316	400	628	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Map identifier (fig. 1)
	Southwest mountain flood region (8)—Continued		
09378630	Recapture Creek near Blanding, Utah	3.88 3.77	249
09378650	Recapture Creek below Johnson Creek near Blanding, Utah	37.1 50.2	250
09383500	Nutrioso Creek above Nelson Reservoir near Springerville, Arizona	78.2 83.3	251
09383600	Fish Creek near Eagar, Arizona	17.0 16.9	252
09386100	Largo Creek near Quemado, New Mexico	138 151	253
09386900	Rio Nutria near Ramah, New Mexico	71.2 71.4	254
09408400	Santa Clara River near Pine Valley, Utah	18.3 18.7	255
09442650	Romero Creek near Arizona State line near Luna, New Mexico	9.37 10.8	256
09442660	Trout Creek near Luna, New Mexico	31.0 31.9	257
09489200	Pacheta Creek near Maverick, Arizona	16.4 14.8	258
09489700	Big Bonito Creek near Fort Apache, Arizona	114 119	259
09490800	North Fork White River near Greer, Arizona	39.3 40.2	260
09491000	North Fork White River near McNary, Arizona	69.1 78.2	261

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year)										Map identifier (fig. 1)
	Recurrence interval (years)							Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	
	2	5	10	25	50	100	500				
	Southwest mountain flood region (8)—Continued										
09378630	13	34	55	95	136	188	368	142	1	40	249
	27	67	110	185	258	349	641	(1987)	--	--	
	14	38	64	114	164	227	436	--	--	--	
09378650	120	330	546	914	1,260	1,670	2,890	695	0	18	250
	162	349	523	804	1,060	1,360	2,260	(1981)	--	--	
	125	335	538	867	1,170	1,530	2,590	--	--	--	
09383500	107	256	407	672	933	1,260	2,310	700	10	17	251
	294	600	875	1,310	1,690	2,140	3,420	(1983)	--	--	
	122	313	517	863	1,180	1,560	2,710	--	--	--	
09383600	62	163	258	408	539	684	1,070	236	50	13	252
	87	198	305	484	651	851	1,460	(1964)	--	--	
	67	175	278	446	598	773	1,280	--	--	--	
09386100	289	520	706	979	1,210	1,460	2,150	1,320	250	48	253
	463	908	1,300	1,890	2,420	3,010	4,690	(1954)	--	--	
	296	549	768	1,100	1,380	1,690	2,510	--	--	--	
09386900	316	628	882	1,250	1,550	1,870	2,700	1,840	50	36	254
	273	561	820	1,230	1,600	2,020	3,250	(1995)	--	--	
	313	619	870	1,240	1,560	1,910	2,830	--	--	--	
09408400	67	149	234	386	541	737	1,420	776	10	46	255
	92	209	321	508	682	889	1,520	(1966)	--	--	
	68	156	248	411	572	773	1,440	--	--	--	
09442650	55	136	225	392	567	794	1,610	480	0	19	256
	54	128	202	328	448	594	1,050	(1967)	--	--	
	54	134	216	363	509	693	1,310	--	--	--	
09442660	160	467	831	1,560	2,350	3,430	7,430	2,790	0	48	257
	140	306	462	716	949	1,220	2,040	(1983)	--	--	
	158	444	754	1,320	1,920	2,690	5,490	--	--	--	
09489200	105	179	234	312	374	439	607	323	20	23	258
	84	193	298	473	637	832	1,430	(1973	--	--	
	102	182	252	363	460	567	855	--	--	--	
09489700	644	1,510	2,370	3,840	5,240	6,950	12,300	4,510	0	24	259
	397	790	1,140	1,670	2,140	2,680	4,220	(1978)	--	--	
	616	1,360	2,000	3,040	4,000	5,150	8,790	--	--	--	
09490800	188	261	315	390	451	516	689	510	100	13	260
	169	364	544	835	1,100	1,410	2,330	(1973)	--	--	
	184	290	392	559	704	863	1,280	--	--	--	
09491000	404	740	1,030	1,480	1,890	2,350	3,720	2,310	0	39	261
	266	549	803	1,210	1,570	1,980	3,190	(1983	--	--	
	393	713	987	1,420	1,810	2,260	3,590	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Average basin slope (percent [feet/foot*100])	Map identifier (fig. 1)
	Northeastern Arizona flood region (9)			
09385800	Little Colorado River tributary near St. Johns, Arizona	0.351 0.350	0.0985	262
09386200	Carrizo Creek near Salt Lake, New Mexico	1,820 560	0.0827	263
09386950	Zuni River above Black Rock Reservoir, New Mexico	831 848	0.0871	264
09387050	Galestena Canyon tributary near Black Rock, Arizona	18.5 19.0	0.0729	265
09390500	Show Low Creek near Lakeside, Arizona	67.9 68.6	0.0579	266
09395100	Carr Lake Draw tributary near Holbrook, Arizona	1.16 1.28	0.0298	267
09395200	Decker Wash near Snowflake, Arizona	15.8 16.5	0.0640	268
09395500	Puerco River near Gallup, New Mexico	548 558	0.1106	269
09395900	Black Creek near Lupton, Arizona	491 494	0.1188	270
09396100	Puerco River near Chambers, Arizona	2,150 2,460	0.0976	271
09396400	Dead Wash near Holbrook, Arizona	0.750 1.22	0.0653	272
09397100	Leroux Wash near Holbrook, Arizona	806 809	0.0471	273
09397500	Chevelon Fork below Wildcat Canyon near Winslow, Arizona	270 271	0.1132	274
09397800	Brookbank Canyon near Heber, Arizona	27.5 27.9	0.0802	275
09398000	Chevelon Creek near Winslow, Arizona	983 785	0.0686	276

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year)										Map identifier (fig. 1)
	Recurrence interval (years)							Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	
	2	5	10	25	50	100	500				
Northern Arizona flood region (9)											
09385800	51	126	205	352	503	697	1,380	326	0	14	262
	40	100	164	280	398	545	1,030	(1965)	--	--	
	50	121	194	328	465	641	1,250	--	--	--	
09386200	329	1,260	2,490	5,110	8,070	12,100	27,300	8,380	250	38	263
	2,420	5,640	8,740	13,800	18,500	23,900	39,700	(1959)	--	--	
	353	1,400	2,840	5,850	9,120	13,400	28,900	--	--	--	
09386950	673	1,970	3,270	5,420	7,360	9,570	15,700	5,200	540	30	264
	1,710	4,010	6,250	9,960	13,400	17,400	29,400	(1974)	--	--	
	700	2,090	3,540	5,970	8,150	10,600	17,400	--	--	--	
09387050	76	174	274	454	636	867	1,660	660	0	46	265
	226	545	867	1,420	1,950	2,600	4,590	(1970)	--	--	
	79	187	305	522	738	1,010	1,900	--	--	--	
09390500	292	1,210	2,550	5,640	9,420	15,000	38,100	5,550	0	51	266
	359	857	1,350	2,170	2,950	3,870	6,650	(1979)	--	--	
	294	1,190	2,420	5,110	8,280	12,800	31,400	--	--	--	
09395100	27	73	120	198	271	356	606	140	0	13	267
	29	70	111	183	251	335	595	(1966)	--	--	
	27	73	117	193	264	348	602	--	--	--	
09395200	52	212	448	1,010	1,710	2,750	7,350	1,170	0	14	268
	189	455	724	1,180	1,630	2,160	3,800	(1966)	--	--	
	61	253	520	1,070	1,670	2,490	5,640	--	--	--	
09395500	1,800	4,370	6,710	10,300	13,500	16,900	26,100	12,000	1,000	41	269
	1,670	3,960	6,200	9,980	13,500	17,700	30,300	(1972)	--	--	
	1,790	4,340	6,660	10,300	13,500	17,000	26,700	--	--	--	
09395900	2,650	4,360	5,670	7,500	8,980	10,600	14,700	7,680	1,000	19	270
	1,670	3,960	6,220	10,100	13,600	17,900	30,800	(1982)	--	--	
	2,570	4,310	5,770	8,020	9,970	12,100	17,700	--	--	--	
09396100	5,130	9,560	13,100	18,300	22,600	27,300	39,700	17,800	1,000	33	271
	2,990	6,980	10,800	17,200	23,000	29,800	49,700	(1971)	--	--	
	5,030	9,340	12,900	18,100	22,700	27,700	41,000	--	--	--	
09396400	202	373	515	730	917	1,130	1,710	743	100	13	272
	42	105	170	285	400	541	996	(1967)	--	--	
	173	293	387	543	695	876	1,430	--	--	--	
09397100	4,610	6,190	7,220	8,500	9,440	10,400	12,500	8,460	2,000	14	273
	1,040	2,440	3,750	5,890	7,830	10,100	16,600	(1993)	--	--	
	4,100	5,380	6,280	7,710	8,950	10,300	13,600	--	--	--	
09397500	1,940	5,980	10,900	20,800	31,800	46,600	102,000	24,700	0	45	274
	1,200	2,850	4,490	7,280	9,910	13,000	22,600	(1993)	--	--	
	1,910	5,720	10,100	18,500	27,500	39,700	84,900	--	--	--	
09397800	153	306	439	642	821	1,020	1,590	666	80	13	275
	296	712	1,130	1,860	2,550	3,380	5,970	(1964)	--	--	
	163	360	563	904	1,210	1,550	2,500	--	--	--	
09398000	2,460	6,310	10,700	19,200	28,400	40,900	87,900	33,600	550	49	276
	1,540	3,610	5,590	8,840	11,800	15,300	25,500	(1979)	--	--	
	2,430	6,130	10,200	17,800	26,000	36,800	77,200	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Average basin slope (percent [feet/foot*100])	Map identifier (fig. 1)
	Northern Arizona flood region (9)—Continued			
09398500	Clear Creek below Willow Creek near Winslow, Arizona	316 317	0.1533	277
09400200	Steamboat Wash tributary near Ganado, Arizona	0.156 0.320	0.0863	278
09400290	Teshbito Wash tributary near Holbrook, Arizona	19.8 20.0	0.0675	279
09400300	Teshbito Wash near Holbrook, Arizona	68.0 60.3	0.0690	280
09400530	Cow Canyon near Winslow, Arizona	6.25 7.53	0.0177	281
09400560	Oraibi Wash tributary near Oraibi, Arizona	1.76 1.78	0.1545	282
09400565	Polacca Wash tributary near Chinle, Arizona	6.33 6.45	0.1236	283
09400580	Castle Butte Wash near Winslow, Arizona	5.16 5.57	0.0726	284
09400650	Sinclair Wash at Flagstaff, Arizona	7.44 8.11	0.0884	285
09401220	Cedar Wash near Cameron, Arizona	558 579	0.0744	286
09401245	Klethla Valley tributary near Kayenta, Arizona	0.800 0.790	0.1247	287
09401260	Moenkopi Wash at Moenkopi, Arizona	1,590 1,630	0.0955	288
09404050	Spring Valley Wash tributary near Williams, Arizona	2.51 5.00	0.0320	289
09404310	Yampai Canyon tributary near Peach Springs, Arizona	0.107 0.200	0.0833	290
09502800	Williamson Valley Wash near Paulden, Arizona	253 255	0.1196	291

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year)										Map identifier (fig. 1)
	Recurrence interval (years)							Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	
	2	5	10	25	50	100	500				
Northeastern Arizona flood region (9)—Continued											
09398500	2,420	7,180	12,500	22,400	32,500	45,300	87,500	29,100	0	45	277
	1,640	3,900	6,180	10,100	13,800	18,200	31,800	(1993)	--	--	
	2,400	6,930	11,800	20,500	29,300	40,400	77,400	--	--	--	
09400200	47	163	311	619	966	1,440	3,240	383	10	14	278
	24	61	100	171	244	334	636	(1964)	--	--	
	44	135	233	416	615	884	1,900	--	--	--	
09400290	611	758	843	940	1,010	1,070	1,200	890	400	15	279
	220	530	842	1,380	1,890	2,510	4,410	(1970)	--	--	
	556	711	843	1,060	1,230	1,420	1,830	--	--	--	
09400300	663	1,040	1,320	1,680	1,970	2,260	2,990	1,580	400	14	280
	412	985	1,550	2,510	3,420	4,500	7,800	(1967)	--	--	
	635	1,030	1,370	1,900	2,350	2,830	4,060	--	--	--	
09400530	65	127	179	255	318	388	575	253	30	15	281
	44	105	165	263	354	462	787	(1964)	--	--	
	63	124	176	257	327	406	622	--	--	--	
09400560	124	237	333	481	609	755	1,170	383	30	14	282
	126	312	511	874	1,240	1,690	3,170	(1965)	--	--	
	124	249	370	573	761	977	1,600	--	--	--	
09400565	365	707	985	1,390	1,720	2,080	3,010	1,130	200	13	283
	200	489	791	1,330	1,860	2,510	4,590	(1975)	--	--	
	343	659	930	1,370	1,760	2,220	3,480	--	--	--	
09400580	86	283	523	1,000	1,520	2,200	4,630	860	10	13	284
	120	291	467	775	1,070	1,440	2,590	(1975)	--	--	
	90	285	506	913	1,330	1,860	3,710	--	--	--	
09400650	74	166	258	416	571	762	1,380	401	0	11	285
	167	406	653	1,090	1,510	2,020	3,640	(1970)	--	--	
	81	202	340	589	828	1,120	2,010	--	--	--	
09401220	1,510	4,460	7,840	14,200	20,900	29,500	59,000	10,400	100	10	286
	1,240	2,920	4,540	7,240	9,730	12,700	21,300	(1969)	--	--	
	1,480	4,070	6,670	11,200	15,600	21,200	40,000	--	--	--	
09401245	121	191	241	307	359	412	543	290	60	15	287
	72	179	294	504	713	976	1,840	(1971)	--	--	
	116	189	252	354	442	538	787	--	--	--	
09401260	3,710	5,740	7,210	9,180	10,700	12,300	16,300	10,100	2,500	31	288
	2,530	5,920	9,190	14,600	19,600	25,400	42,600	(1983)	--	--	
	3,650	5,760	7,420	9,840	11,800	13,900	19,100	--	--	--	
09404050	20	58	101	182	266	374	745	190	0	14	289
	44	108	171	279	383	508	895	(1968)	--	--	
	22	65	115	207	299	413	790	--	--	--	
09404310	14	36	62	110	161	229	473	177	0	13	290
	19	49	81	139	198	273	521	(1966)	--	--	
	15	39	67	120	175	245	491	--	--	--	
09502800	1,350	3,840	6,570	11,600	16,700	23,100	44,400	14,800	0	25	291
	1,210	2,880	4,550	7,390	10,100	13,300	23,000	(1983)	--	--	
	1,340	3,720	6,220	10,600	15,100	20,600	38,800	--	--	--	

Appendix 1. Selected basin, climatic, and flood characteristics; maximum peak discharge recorded; and low-discharge threshold for

[Peak discharge values in cubic feet per second: first line, station value used in regression analysis; second line, predicted value determined by using regression geographic information system analysis; second line, previously published from manual delineation (Dempster, 1983)]

Gaging-station number	Gaging-station name	Drainage area (square miles)	Average basin slope (percent [feet/foot*100])	Map identifier (fig. 1)
	Northern Arizona flood region (9)—Continued			
09503800	Volunteer Wash near Bellemont, Arizona	135 131	0.0726	292
09505220	Rocky Gulch near Rimrock, Arizona	1.85 1.40	0.1201	293

gaging stations.—Continued

equation; third line, weighted value determined with skew coefficient with station and predicted value. --, no data. Drainage area: first line determined from

Gaging-station number	Peak discharge (cubic feet per year)										Map identifier (fig. 1)
	Recurrence interval (years)							Maximum peak discharge recorded (year)	Low-discharge threshold	Record length (years)	
	2	5	10	25	50	100	500				
Northern Arizona flood region (9)—Continued											
09503800	507	1,130	1,670	2,500	3,200	3,980	6,060	2,300	200	14	292
	602	1,430	2,250	3,630	4,920	6,450	11,100	(1,550)	--	--	
	516	1,180	1,810	2,820	3,720	4,730	7,490	--	--	--	
09505220	38	122	235	490	804	1,270	3,380	1,550	10	30	293
	106	262	428	725	1,020	1,390	2,580	(1970)	--	--	
	40	131	254	523	840	1,300	3,220	--	--	--	

Appendix 2—Basin and Climatic Characteristics Determined Using Geographical Information System

Appendix 2. Basin and climatic characteristics determined using Geographical Information System.

[NOAA2, NOAA14, National Oceanic and Atmospheric Administration Atlases 2 (Miller and others, 1973) and 14 (Bonnin and others, 2004), respectively; NAVD 88, North American Vertical Datum of 1988]

Station number	Average basin mean annual precipitation (inches), 1961–90	Average basin mean annual winter precipitation (inches), 1961–90	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin slope (percent [feet/foot*100])	Drainage area (square miles)	Average basin elevation (feet above NAVD 88)	Average basin aspect (azimuth degree)
07153500	16.85	5.26	5.51	4.25	5.38	3.88	0.113	611	6,340	0
07154400	16.13	4.44	6.20	4.83	5.42	4.25	0.105	111	5,120	90
07199000	18.41	6.15	5.53	4.37	4.65	3.54	0.199	197	7,650	90
07201000	18.49	5.98	5.54	4.36	5.51	3.99	0.211	12.50	7,570	225
07201200	17.03	5.33	5.42	4.18	5.39	3.89	0.136	4.48	6,940	225
07203000	19.49	7.74	5.50	4.35	3.95	3.14	0.225	342	8,100	90
07203600	15.86	4.10	5.06	3.84	5.05	3.56	0.021	6.76	6,320	225
07204000	20.60	9.47	3.58	2.72	3.63	3.16	0.243	79.3	9,360	270
07204500	20.58	8.63	3.78	2.97	3.65	2.98	0.174	71.6	9,070	270
07205000	18.60	7.93	3.27	2.49	3.64	3.09	0.271	9.48	9,330	90
07206400	20.60	9.06	5.08	4.27	3.94	3.24	0.450	7.17	9,810	45
07207500	19.95	8.02	5.26	4.20	3.79	3.17	0.251	184	8,310	90
07208500	22.99	9.58	5.07	4.01	4.26	3.44	0.224	59.4	9,640	45
07211000	18.74	6.71	4.85	3.80	3.94	3.25	0.202	937	8,160	45
07211500	17.88	5.92	5.15	4.00	4.42	3.40	0.156	2,760	7,220	135
07213700	15.89	4.11	5.05	3.87	5.01	3.88	0.050	3.23	6,090	180
07214000	17.42	5.47	5.11	3.93	4.49	3.46	0.133	3,810	6,860	135
07214500	25.82	11.73	4.49	3.53	4.19	3.77	0.266	62.7	9,360	90
07214800	34.89	16.92	5.25	4.21	4.64	4.06	0.317	22.5	10,400	45
07215500	25.22	10.84	4.93	3.85	4.16	3.74	0.254	178	8,620	90
07216500	23.70	9.57	5.03	3.90	4.17	3.71	0.226	267	8,180	90
07217000	23.05	9.33	4.12	3.21	4.10	3.44	0.128	48.0	9,260	45
07217100	22.51	8.97	4.38	3.42	4.09	3.53	0.179	75.2	9,040	90
07218000	20.78	7.33	4.92	3.76	4.06	3.56	0.169	236	8,060	90
07220000	23.83	9.30	5.21	4.05	4.37	3.90	0.222	132	7,800	135

Appendix 2. Basin and climatic characteristics determined using Geographical Information System.—Continued

[NOAA2, NOAA14, National Oceanic and Atmospheric Administration Atlases 2 (Miller and others, 1973) and 14 (Bonnin and others, 2004), respectively; NAVD 88, North American Vertical Datum of 1988]

Station number	Average basin mean annual precipitation (inches), 1961–90	Average basin mean annual winter precipitation (inches), 1961–90	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin slope (percent [feet/foot*100])	Drainage area (square miles)	Average basin elevation (feet above NAVD 88)	Average basin aspect (azimuth degree)
07220900	16.97	4.56	5.17	3.87	4.73	3.64	0.056	17.1	6,730	180
07221000	20.15	6.82	5.11	3.91	4.34	3.68	0.140	1,040	7,310	90
07221500	17.70	5.53	5.09	3.90	4.51	3.54	0.128	5,900	6,780	135
07221600	15.06	4.13	5.02	3.75	5.01	3.88	0.179	2.28	4,810	180
07222000	17.62	5.49	5.09	3.89	4.53	3.56	0.127	6,080	6,730	135
07222300	15.35	4.39	4.88	3.69	5.07	4.01	0.161	64.1	5,270	135
07222500	15.23	4.4	4.57	3.59	4.89	3.76	0.072	474	5380	0
07222800	14.50	4.29	4.65	3.74	5.16	4.10	0.042	24.5	4,530	45
07225000	14.87	4.43	5.10	4.04	5.67	4.06	0.032	80.8	5,020	0
07225300	15.62	4.73	5.18	4.07	5.36	4.33	0.057	15.2	4,290	0
07225500	16.84	4.63	5.22	3.98	5.37	4.00	0.059	249	6,430	135
07226200	15.48	3.83	6.00	4.69	5.74	4.21	0.092	45.6	4,940	135
07226300	16.07	4.07	5.28	4.08	5.18	4.03	0.025	96.1	5,990	0
07226500	15.87	4.11	5.66	4.40	5.46	4.10	0.047	2,030	5,490	0
07227000	16.61	4.92	5.17	4.00	4.90	3.79	0.098	10,800	6,060	135
07227050	16.30	4.83	5.73	4.57	5.51	4.59	0.138	0.54	4,840	180
07227100	16.21	4.86	5.35	4.23	5.41	4.45	0.049	798	4,250	0
07227150	17.03	5.08	5.09	4.05	5.57	4.67	0.051	34.1	4,150	0
07227200	15.58	3.81	6.12	4.77	5.51	4.30	0.060	498	5,060	135
07227295	15.48	3.88	6.14	4.79	5.46	4.44	0.021	1.23	5,180	180
08247500	25.82	17.05	3.14	2.36	3.83	3.24	0.133	114	9,270	90
08248000	31.31	21.58	3.42	2.51	4.33	3.19	0.202	152	9,930	90
08252500	25.90	14.90	4.46	3.33	3.67	3.26	0.248	31.3	10,700	90
08253000	24.80	13.80	4.26	3.15	3.66	3.32	0.256	10.5	10,700	90
08253500	24.50	13.30	4.07	2.97	3.71	3.35	0.373	2.42	11,200	135

Appendix 2. Basin and climatic characteristics determined using Geographical Information System.—Continued

[NOAA2, NOAA14, National Oceanic and Atmospheric Administration Atlases 2 (Miller and others, 1973) and 14 (Bonnin and others, 2004), respectively; NAVD 88, North American Vertical Datum of 1988]

Station number	Average basin mean annual precipitation (inches), 1961–90	Average basin mean annual winter precipitation (inches), 1961–90	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin slope (percent [feet/foot*100])	Drainage area (square miles)	Average basin elevation (feet above NAVD 88)	Average basin aspect (azimuth degree)
08255000	23.70	12.60	4.11	2.95	3.76	3.41	0.332	11.1	10,900	225
08263000	30.51	17.00	3.70	2.78	3.81	3.29	0.398	10.5	11,100	0
08264000	30.60	16.80	3.68	2.73	3.91	3.37	0.361	18.9	11,000	90
08265000	26.70	13.80	3.42	2.61	3.65	3.19	0.399	111	10,100	90
08267000	24.20	12.40	3.34	2.56	3.50	3.08	0.364	187	9,890	315
08267500	25.90	13.90	3.68	2.75	3.71	3.22	0.518	36.8	10,500	225
08268500	20.58	10.38	3.31	2.53	3.45	3.00	0.403	66.1	9,530	225
08269000	22.54	11.52	3.37	2.59	3.58	3.00	0.360	57.6	9,520	180
08271000	25.57	13.62	3.74	2.90	3.79	3.26	0.514	16.5	10,900	180
08275000	18.92	9.07	3.35	2.59	3.51	2.86	0.288	60.3	9,070	315
08275500	25.62	14.70	3.61	2.80	4.06	3.26	0.308	78.7	9,360	315
08275600	23.74	12.62	3.57	2.74	3.82	3.12	0.317	37.7	9,460	0
08277470	31.89	18.36	4.19	3.31	4.38	3.69	0.301	98.9	9,850	90
08278500	34.91	20.36	4.64	3.72	4.60	3.74	0.374	39.1	11,000	270
08279000	24.50	13.50	3.60	2.87	3.83	3.21	0.269	317	9,000	270
08281200	35.06	24.11	3.33	2.56	4.60	2.93	0.233	27.7	9,760	315
08283500	31.25	20.88	3.32	2.53	4.33	2.88	0.198	392	9,780	225
08284000	24.49	14.95	3.13	2.42	3.72	2.82	0.145	49.7	8,770	225
08284100	30.26	20.02	3.27	2.50	4.20	2.85	0.186	468	9,570	225
08284300	19.87	10.78	3.03	2.46	3.46	2.54	0.143	42.7	7,900	225
08284500	19.03	10.07	2.96	2.36	3.36	2.51	0.115	192	7,740	225
08286650	18.61	10.24	2.81	2.13	3.13	2.78	0.137	143	7,970	270
08286700	17.55	9.33	2.78	2.11	3.08	2.73	0.143	160	7,900	270
08288000	24.78	15.67	3.11	2.32	3.64	3.20	0.186	47.6	9,130	90
08289000	19.51	11.20	3.12	2.34	3.37	2.88	0.180	409	8,520	90

Appendix 2. Basin and climatic characteristics determined using Geographical Information System.—Continued

[NOAA2, NOAA14, National Oceanic and Atmospheric Administration Atlases 2 (Miller and others, 1973) and 14 (Bonnin and others, 2004), respectively; NAVD 88, North American Vertical Datum of 1988]

Station number	Average basin mean annual precipitation (inches), 1961–90	Average basin mean annual winter precipitation (inches), 1961–90	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin slope (percent [feet/foot*100])	Drainage area (square miles)	Average basin elevation (feet above NAVD 88)	Average basin aspect (azimuth degree)
08290000	19.20	10.45	3.01	2.32	3.34	2.65	0.163	3,120	7,750	90
08291000	20.95	10.71	3.85	3.20	3.70	3.00	0.366	91.5	9,140	270
08294300	22.24	11.04	4.19	3.46	3.73	2.98	0.419	34.0	9,180	315
08295000	19.97	9.63	4.09	3.37	3.68	2.95	0.402	37.1	9,020	270
08295200	32.40	17.60	5.13	4.10	4.10	3.21	0.382	0.61	11,500	315
08302200	29.50	15.60	4.99	3.99	4.04	3.16	0.363	1.61	10,900	270
08313100	14.60	5.70	2.94	2.31	3.28	2.62	0.035	0.58	6,520	45
08313350	19.62	8.45	3.95	2.95	3.78	2.81	0.286	18.3	7,700	180
08313400	21.14	9.44	3.96	2.98	3.76	2.81	0.439	7.40	7,870	90
08316000	22.16	10.80	4.72	3.72	3.83	3.01	0.442	17.5	9,280	135
08316600	12.90	5.07	3.00	2.53	3.13	2.59	0.076	0.36	7,260	180
08316650	12.80	5.01	3.00	2.51	3.12	2.58	0.070	1.40	7,170	315
08316700	13.00	5.01	2.99	2.46	3.13	2.57	0.071	2.80	7,080	315
08317500	17.10	6.51	3.79	2.87	3.52	2.77	0.252	11.4	7,660	135
08317600	15.64	5.81	3.65	2.86	3.54	2.86	0.090	114	7,130	225
08317700	13.27	4.94	3.62	2.83	3.42	2.82	0.099	2.06	6,660	270
08317720	12.89	4.92	3.34	2.68	3.25	2.68	0.056	1.77	6,260	180
08318000	13.54	5.14	3.41	2.71	3.30	2.70	0.100	661	6,470	270
08318900	16.80	7.56	3.59	2.76	3.47	2.56	0.146	44.7	6,900	90
08321500	25.69	12.77	4.29	3.27	4.10	2.94	0.227	172	8,860	270
08321900	37.83	22.44	4.17	3.15	4.71	3.18	0.135	27.5	9,820	180
08323000	26.04	13.83	4.12	3.14	3.94	2.83	0.225	233	8,520	135
08324000	24.50	12.50	4.12	3.14	3.93	2.83	0.234	467	8,570	135
08330500	16.70	7.47	3.54	2.76	3.54	2.53	0.202	74.7	6,980	90
08330600	14.72	6.48	3.38	2.68	3.31	2.45	0.183	134	6,690	270

Appendix 2. Basin and climatic characteristics determined using Geographical Information System.—Continued

[NOAA2, NOAA14, National Oceanic and Atmospheric Administration Atlases 2 (Miller and others, 1973) and 14 (Bonnin and others, 2004), respectively; NAVD 88, North American Vertical Datum of 1988]

Station number	Average basin mean annual precipitation (inches), 1961–90	Average basin mean annual winter precipitation (inches), 1961–90	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin slope (percent [feet/foot*100])	Drainage area (square miles)	Average basin elevation (feet above NAVD 88)	Average basin aspect (azimuth degree)
08331100	9.44	3.71	2.64	2.30	2.75	2.26	0.050	0.18	5,360	315
08331650	14.40	5.66	3.44	2.73	3.77	2.73	0.089	37.0	6,310	315
08334000	14.10	6.61	3.13	2.44	3.10	2.40	0.136	420	7,100	270
08340500	10.50	4.35	2.81	2.22	2.69	2.18	0.079	1,360	6,800	0
08343100	11.02	4.37	2.83	2.26	2.70	2.23	0.170	11.8	7,020	180
08351500	12.33	5.19	2.87	2.23	2.90	2.40	0.087	3,650	7,240	0
08352500	11.60	4.87	2.88	2.27	2.82	2.32	0.092	6,130	6,900	0
08353000	11.53	4.80	2.88	2.27	2.83	2.34	0.088	7,220	6,850	0
08354000	11.85	4.17	3.03	2.45	3.10	2.54	0.126	1,380	6,710	90
08358600	11.52	3.98	3.34	2.73	3.55	2.94	0.087	0.77	5,610	315
08360000	15.17	5.16	3.76	3.00	3.56	2.92	0.191	401	7,320	135
08361650	18.16	6.60	4.29	3.44	4.18	3.09	0.371	21.4	6,840	90
08377900	38.90	19.50	4.78	3.89	4.75	4.38	0.280	53.2	10,400	315
08378500	34.00	17.20	4.82	3.82	4.37	3.85	0.305	170	10,100	270
08379300	19.38	6.41	4.58	3.57	4.38	3.88	0.168	119	7,130	90
08379500	19.15	7.62	4.17	3.24	4.03	3.46	0.188	1,040	7,030	135
08379550	14.41	4.95	3.57	2.84	3.72	3.06	0.067	11.5	7,050	0
08380300	19.25	6.33	5.07	3.92	4.52	4.04	0.175	7.65	7,620	270
08380500	27.34	11.87	5.14	4.04	4.57	4.29	0.310	76.0	8,640	90
08381000	26.96	11.59	5.13	4.03	4.57	4.28	0.310	79.7	8,510	90
08382000	19.40	6.30	4.81	3.74	4.53	3.92	0.136	317	6,780	0
08382500	16.70	5.16	4.55	3.54	4.52	3.73	0.119	620	6,560	0
08382600	17.03	6.11	4.18	3.25	4.21	3.49	0.137	2,300	6,590	135
08382730	14.71	4.61	4.39	3.48	4.94	3.75	0.031	67.3	5,080	135
08382760	14.71	4.64	4.36	3.42	4.93	3.73	0.033	14.1	5,000	135

Appendix 2. Basin and climatic characteristics determined using Geographical Information System.—Continued

[NOAA2, NOAA14, National Oceanic and Atmospheric Administration Atlases 2 (Miller and others, 1973) and 14 (Bonnin and others, 2004), respectively; NAVD 88, North American Vertical Datum of 1988]

Station number	Average basin mean annual precipitation (inches), 1961–90	Average basin mean annual winter precipitation (inches), 1961–90	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin slope (percent [feet/foot*100])	Drainage area (square miles)	Average basin elevation (feet above NAVD 88)	Average basin aspect (azimuth degree)
08383000	16.67	5.90	4.18	3.26	4.30	3.52	0.122	2,700.0	6,360	0
08383370	14.38	4.48	4.57	3.73	5.01	3.89	0.121	0.43	4,720	270
08383500	15.70	5.38	4.12	3.24	4.41	3.52	0.097	4,010	6,080	0
08384500	15.59	5.28	4.21	3.32	4.51	3.58	0.091	4,460	5,890	0
08385530	16.70	4.78	5.54	4.50	5.65	4.60	0.019	11.1	5,120	135
08385600	14.05	4.38	4.66	3.76	5.03	3.88	0.026	344	4,770	0
08385670	17.92	5.50	4.39	3.29	4.18	3.49	0.119	5.09	6,680	45
08387000	23.45	8.09	4.46	3.37	4.50	3.73	0.275	72.5	7,600	135
08387600	27.78	9.73	4.86	3.54	4.80	3.84	0.425	8.16	8,570	135
08388000	20.43	6.74	4.45	3.31	4.40	3.64	0.250	289	7,150	0
08389500	18.84	5.94	4.48	3.35	4.41	3.59	0.205	295	6,770	135
08390100	18.82	6.00	4.48	3.35	4.43	3.62	0.217	716	6,760	135
08390500	17.70	5.53	4.50	3.39	4.46	3.63	0.197	945	6,580	135
08393200	12.52	3.58	4.87	3.87	4.76	3.83	0.064	31.5	4,500	90
08394300	12.86	3.71	5.00	3.91	4.82	3.88	0.067	5.05	4,500	90
08394500	15.04	4.40	4.77	3.73	4.80	3.81	0.117	945	5,240	0
08397400	25.93	10.13	4.72	3.52	4.80	3.84	0.278	3.35	8,240	0
08397600	22.11	7.56	4.66	3.54	4.77	3.75	0.229	575	7,570	135
08398500	19.14	6.18	4.83	3.71	4.87	3.81	0.169	1,050	6,630	0
08400000	14.37	4.12	5.06	3.97	5.16	4.03	0.088	348	4,900	0
08401200	15.09	4.10	5.05	3.96	5.55	4.33	0.079	217	4,170	0
08401800	16.37	4.23	5.05	3.93	5.67	4.49	0.093	250	4,680	0
08401900	16.15	4.20	5.05	3.94	5.69	4.49	0.095	292	4,470	0
08405050	16.21	4.20	5.07	3.96	5.88	4.63	0.033	0.14	4,220	135
08405100	15.37	4.07	5.00	4.02	6.08	4.72	0.125	14.4	3,970	0

Appendix 2. Basin and climatic characteristics determined using Geographical Information System.—Continued

[NOAA2, NOAA14, National Oceanic and Atmospheric Administration Atlases 2 (Miller and others, 1973) and 14 (Bonnin and others, 2004), respectively; NAVD 88, North American Vertical Datum of 1988]

Station number	Average basin mean annual precipitation (inches), 1961–90	Average basin mean annual winter precipitation (inches), 1961–90	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin slope (percent [feet/foot*100])	Drainage area (square miles)	Average basin elevation (feet above NAVD 88)	Average basin aspect (azimuth degree)
08405500	16.16	4.27	5.00	4.00	5.80	4.74	0.167	374	4,080	135
08408500	14.48	3.98	4.93	4.06	5.61	4.78	0.081	784	4,080	0
08477500	19.00	7.45	3.88	3.15	4.12	3.08	0.280	472	6,730	135
08477580	18.30	7.41	4.19	3.27	3.99	3.05	0.158	21.4	6,420	135
08477600	18.07	7.26	4.19	3.26	3.99	3.04	0.156	26.6	6,390	135
08478000	20.94	9.05	4.06	3.20	4.22	3.11	0.156	12.1	6,640	135
08478600	11.21	4.09	3.66	3.03	3.47	2.85	0.114	0.21	4,510	225
08478800	10.55	3.92	3.77	3.18	3.52	2.98	0.116	0.20	4,310	45
08479300	17.78	7.29	4.27	3.51	4.11	3.68	0.141	4.46	5,460	0
08480150	15.87	5.82	4.30	3.29	3.99	3.33	0.210	35.1	6,740	270
08480650	14.86	5.35	3.81	3.11	3.65	3.16	0.177	9.80	6,140	135
08480700	23.92	8.79	4.42	3.64	4.76	3.92	0.536	6.81	8,820	315
08481000	16.63	6.06	4.02	3.30	3.96	3.38	0.248	87.5	6,160	270
08481100	12.53	4.70	3.72	3.00	3.35	2.97	0.076	10.1	4,890	225
08482000	22.25	8.56	3.95	3.07	4.21	3.65	0.273	149	7,600	270
08489000	16.06	6.74	4.03	2.92	4.06	3.01	0.035	4.08	7,000	135
09163700	9.32	5.53	2.42	1.78	2.34	2.06	0.124	90.7	4,820	180
09177500	24.27	15.00	3.12	2.03	4.00	2.79	0.155	15.3	8,840	45
09181000	12.97	7.56	2.79	1.89	2.80	2.38	0.361	20.2	5,640	45
09182600	9.36	5.21	2.45	1.77	2.38	2.13	0.054	1.43	5,050	135
09183000	9.52	5.58	2.42	1.76	2.70	2.39	0.122	161	4,770	270
09183500	27.26	17.23	3.21	2.10	3.97	3.03	0.340	26.4	8,770	225
09184000	20.11	12.19	2.94	1.97	3.47	2.83	0.271	73.3	7,060	270
09185200	15.77	9.15	2.88	1.92	3.08	2.64	0.217	17.2	6,270	315
09185500	13.67	7.79	2.95	2.00	3.15	2.26	0.087	366	6,730	270

Appendix 2. Basin and climatic characteristics determined using Geographical Information System.—Continued

[NOAA2, NOAA14, National Oceanic and Atmospheric Administration Atlases 2 (Miller and others, 1973) and 14 (Bonnin and others, 2004), respectively; NAVD 88, North American Vertical Datum of 1988]

Station number	Average basin mean annual precipitation (inches), 1961–90	Average basin mean annual winter precipitation (inches), 1961–90	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin slope (percent [feet/foot*100])	Drainage area (square miles)	Average basin elevation (feet above NAVD 88)	Average basin aspect (azimuth degree)
09187000	18.70	11.48	3.22	2.19	3.68	2.47	0.303	113	7,380	90
09314280	9.60	4.88	2.59	1.78	2.33	1.74	0.061	206	5,750	90
09314500	14.07	8.27	2.84	1.97	2.61	1.97	0.203	1,730	6,500	90
09315200	8.07	4.36	2.58	1.76	2.48	1.88	0.174	4.92	4,830	270
09315900	6.80	3.58	2.40	1.76	2.37	1.78	0.055	3.04	4,320	45
09316000	9.08	5.05	2.54	1.80	2.61	1.99	0.215	78.1	5,030	225
09317997	25.78	17.40	3.62	2.34	3.04	2.44	0.381	177	9,170	90
09326500	24.07	15.87	3.62	2.33	3.34	2.26	0.251	136	8,940	90
09327550	18.88	11.94	3.24	2.14	2.98	2.08	0.209	218	8,030	90
09327600	8.48	4.24	2.42	1.75	2.24	1.68	0.079	0.62	6,180	315
09328300	8.98	4.40	2.64	1.83	2.40	1.87	0.139	18.40	6,400	0
09328600	9.55	4.61	2.71	1.87	2.50	1.95	0.113	6.95	6,940	90
09328700	7.63	3.79	2.53	1.80	2.36	1.86	0.090	44.2	5,200	135
09329900	19.13	12.44	3.82	2.47	3.35	2.43	0.118	107	9,270	0
09330120	10.63	5.45	3.06	2.07	2.83	1.94	0.234	54.0	6,980	180
09330200	12.84	7.38	3.40	2.29	3.05	2.12	0.233	78.5	7,400	90
09330300	6.26	3.13	2.39	1.76	2.26	1.75	0.073	22.5	4,790	225
09330400	13.42	7.90	3.18	2.12	2.83	2.07	0.174	1,900	7,280	90
09330500	24.44	15.69	3.63	2.31	3.27	2.32	0.256	108	8,750	180
09331500	21.14	13.30	3.70	2.33	2.90	2.33	0.220	45.1	8,720	90
09332100	16.25	9.67	3.09	2.04	2.85	2.03	0.221	414	7,900	90
09332500	15.91	9.43	3.06	2.04	2.83	2.02	0.218	430	7,780	90
09336400	14.84	8.81	3.78	2.64	3.38	2.36	0.219	53.9	7520	90
09337000	22.17	14.88	4.18	2.78	3.83	2.67	0.198	66.7	9,730	270
09337500	17.44	11.07	3.93	2.67	3.57	2.46	0.230	315	7,800	90

Appendix 2. Basin and climatic characteristics determined using Geographical Information System.—Continued

[NOAA2, NOAA14, National Oceanic and Atmospheric Administration Atlases 2 (Miller and others, 1973) and 14 (Bonnin and others, 2004), respectively; NAVD 88, North American Vertical Datum of 1988]

Station number	Average basin mean annual precipitation (inches), 1961–90	Average basin mean annual winter precipitation (inches), 1961–90	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin slope (percent [feet/foot*100])	Drainage area (square miles)	Average basin elevation (feet above NAVD 88)	Average basin aspect (azimuth degree)
09338000	24.33	17.11	4.35	2.97	3.93	2.79	0.103	20.4	10,960	225
09338500	19.37	12.74	4.11	2.65	3.75	2.58	0.132	1.70	9,500	180
09338900	13.67	8.10	3.86	2.56	3.43	2.23	0.213	65.4	7,360	180
09339200	11.32	6.33	3.36	2.39	3.22	2.16	0.270	144	6,460	90
09350800	17.69	9.35	2.93	2.34	3.25	2.42	0.152	58.8	7,360	270
09356520	12.35	5.61	2.82	2.21	2.85	2.31	0.096	9.06	7,270	315
09357200	10.35	5.05	2.70	2.16	2.79	2.06	0.023	0.06	6,650	315
09357230	10.20	5.65	2.69	2.11	2.65	2.03	0.049	0.29	5,980	90
09367400	9.27	5.47	2.68	2.16	2.54	1.99	0.102	1.13	5,570	45
09367530	8.78	5.24	2.70	2.13	2.47	1.96	0.072	2.68	5,500	135
09367550	8.83	5.28	2.68	2.11	2.48	1.94	0.057	4.72	5,490	180
09367561	10.80	6.44	2.76	2.18	2.69	2.00	0.111	134	5,640	180
09367680	9.59	4.15	2.73	2.16	2.64	2.18	0.071	61.0	6,700	0
09367840	12.65	6.05	3.26	2.47	3.15	2.36	0.211	1.99	7,160	90
09367860	12.84	6.14	3.17	2.42	3.15	2.36	0.192	9.78	7,240	225
09367880	12.53	6.11	3.16	2.40	3.09	2.34	0.179	26.5	6,970	90
09367900	12.25	6.07	3.05	2.30	3.00	2.32	0.151	7.13	6,690	90
09367930	9.26	4.57	2.64	2.11	2.69	2.06	0.049	45.0	6,200	180
09367950	9.79	4.76	2.61	2.09	2.67	2.17	0.068	4,350	6,290	0
09367980	8.14	4.57	2.37	2.00	2.47	1.94	0.032	21.3	5,230	90
09368000	15.69	8.78	3.03	2.32	2.82	2.19	0.146	12,700	6,690	0
09368020	10.40	6.14	2.72	2.19	2.56	1.94	0.057	2.02	5,330	225
09378170	32.31	21.74	3.44	2.40	4.73	2.71	0.263	8.25	8,420	90
09378480	18.27	11.28	3.30	2.28	4.08	2.44	0.121	142	7,030	90
09378630	25.39	16.62	3.40	2.40	4.74	2.72	0.335	3.88	8,380	180

Appendix 2. Basin and climatic characteristics determined using Geographical Information System.—Continued

[NOAA2, NOAA14, National Oceanic and Atmospheric Administration Atlases 2 (Miller and others, 1973) and 14 (Bonnin and others, 2004), respectively; NAVD 88, North American Vertical Datum of 1988]

Station number	Average basin mean annual precipitation (inches), 1961–90	Average basin mean annual winter precipitation (inches), 1961–90	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin slope (percent [feet/foot*100])	Drainage area (square miles)	Average basin elevation (feet above NAVD 88)	Average basin aspect (azimuth degree)
09378650	23.87	15.51	3.40	2.38	4.38	2.61	0.239	37.1	7,680	90
09378950	13.26	7.82	3.17	2.18	3.10	2.20	0.255	10.3	5,810	90
09379000	12.39	7.43	3.11	2.18	2.97	2.17	0.201	276	5,880	90
09379060	9.61	5.36	2.95	2.26	2.73	2.08	0.032	1.36	5,830	315
09379300	9.45	5.59	3.13	2.17	2.64	2.04	0.183	65.2	5,190	225
09379800	7.23	4.88	3.05	2.28	2.71	1.98	0.151	89.6	4,840	0
09379820	8.76	4.81	2.89	2.19	2.75	2.00	0.079	4.81	5,100	0
09381800	11.77	6.75	3.39	2.55	3.01	2.16	0.234	642	6,260	90
09383500	23.32	11.38	4.39	3.20	3.99	3.31	0.203	78.2	8,500	315
09383600	28.93	15.59	5.26	3.72	4.59	3.80	0.085	17.0	9,160	90
09385800	12.26	5.32	3.17	2.39	3.07	2.54	0.099	0.35	6,360	0
09386100	16.97	7.66	3.09	2.28	3.43	2.75	0.151	138	8,010	315
09386200	14.31	6.27	2.94	2.25	3.11	2.63	0.083	1,820	7,300	0
09386900	17.74	9.88	2.93	2.25	3.71	2.79	0.086	71.2	7,960	225
09386950	15.11	7.67	2.83	2.20	3.19	2.57	0.087	831	7,280	0
09387050	14.37	7.01	2.82	2.23	3.16	2.59	0.073	18.5	7,440	315
09390500	27.71	16.04	5.12	3.69	4.88	3.71	0.058	67.9	7,240	270
09395100	9.38	4.38	2.87	2.20	3.12	2.49	0.030	1.16	5,450	315
09395200	19.81	10.47	5.50	3.81	4.42	3.26	0.064	15.8	6,670	90
09395500	13.29	6.48	2.87	2.23	3.08	2.52	0.111	548	7,230	0
09395600	12.26	6.08	2.70	2.15	3.00	2.38	0.045	0.28	6,760	225
09395900	13.60	6.67	3.12	2.35	3.26	2.39	0.119	491	7,370	135
09396100	13.06	6.48	2.95	2.27	3.18	2.47	0.098	2,150	6,990	135
09396400	9.56	4.66	2.85	2.09	3.01	2.39	0.065	0.75	5,720	135
09397100	10.70	5.50	2.97	2.28	3.10	2.38	0.047	806	5,980	180

Appendix 2. Basin and climatic characteristics determined using Geographical Information System.—Continued

[NOAA2, NOAA14, National Oceanic and Atmospheric Administration Atlases 2 (Miller and others, 1973) and 14 (Bonnin and others, 2004), respectively; NAVD 88, North American Vertical Datum of 1988]

Station number	Average basin mean annual precipitation (inches), 1961–90	Average basin mean annual winter precipitation (inches), 1961–90	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin slope (percent [feet/foot*100])	Drainage area (square miles)	Average basin elevation (feet above NAVD 88)	Average basin aspect (azimuth degree)
09397500	23.91	14.42	5.36	3.83	5.05	3.62	0.113	270	7,110	90
09397800	23.15	13.39	5.53	3.85	4.82	3.53	0.080	27.5	6,950	90
09398000	18.54	10.16	4.57	3.34	4.18	3.12	0.069	983	6,430	0
09398500	26.91	16.86	5.21	3.65	5.73	3.83	0.153	316	7,160	90
09400200	11.62	6.34	3.09	2.48	3.13	2.39	0.086	0.16	6,810	225
09400290	10.46	5.80	3.04	2.47	3.09	2.32	0.068	19.8	6,340	90
09400300	10.15	5.56	3.05	2.47	3.07	2.28	0.069	68.0	6,140	135
09400530	9.28	4.39	3.04	2.24	2.74	2.22	0.018	6.25	5,420	45
09400560	9.35	5.16	3.00	2.26	2.87	2.20	0.155	1.76	5,940	90
09400565	10.79	6.05	3.08	2.48	3.09	2.31	0.124	6.33	6,940	135
09400580	9.67	5.04	2.91	2.19	2.97	2.28	0.073	5.16	5,780	270
09400650	24.06	15.32	4.74	3.39	4.74	3.08	0.088	7.44	7,160	90
09401220	13.70	7.48	3.28	2.50	3.39	2.57	0.074	558	6,460	90
09401245	11.78	6.90	2.87	2.27	3.09	2.30	0.125	0.80	6,650	270
09401260	10.00	5.91	2.88	2.25	2.94	2.20	0.096	1,590	6,160	270
09403780	14.48	9.24	3.42	2.68	3.36	2.35	0.129	1,080	5,870	315
09403800	11.90	7.37	3.68	2.84	3.01	2.24	0.224	2.48	5,050	225
09404050	18.35	10.85	3.50	2.75	4.13	2.97	0.032	2.51	6,120	0
09404310	11.49	6.16	3.17	2.78	3.64	3.21	0.083	0.11	5,320	180
09404500	14.49	9.29	3.75	2.80	3.49	2.25	0.130	8.26	5,960	90
09404900	15.65	10.13	3.65	2.85	3.52	2.28	0.245	339	6,180	90
09406700	22.05	15.13	3.85	2.97	4.20	2.90	0.445	11.0	6,840	90
09406800	20.34	13.89	3.76	2.93	4.05	2.81	0.415	13.7	6,590	90
09407200	16.80	11.31	3.68	2.81	3.72	2.65	0.300	200	5,920	135
09408000	16.97	11.66	3.54	2.87	3.99	2.77	0.371	15.3	6,130	180

Appendix 2. Basin and climatic characteristics determined using Geographical Information System.—Continued

[NOAA2, NOAA14, National Oceanic and Atmospheric Administration Atlases 2 (Miller and others, 1973) and 14 (Bonnin and others, 2004), respectively; NAVD 88, North American Vertical Datum of 1988]

Station number	Average basin mean annual precipitation (inches), 1961–90	Average basin mean annual winter precipitation (inches), 1961–90	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA2 (inches)	Average basin maximum 24-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin maximum 6-hour precipitation for 100-year recurrence interval—NOAA14 (inches)	Average basin slope (percent [feet/foot*100])	Drainage area (square miles)	Average basin elevation (feet above NAVD 88)	Average basin aspect (azimuth degree)
09408150	14.73	9.87	3.57	2.77	3.47	2.46	0.283	700	5,250	135
09408400	28.72	20.06	4.14	3.01	4.48	3.16	0.413	18.3	8,970	315
09409100	22.65	15.80	4.04	2.93	4.12	3.02	0.278	111	7,230	270
09409500	22.64	16.87	3.58	2.85	4.34	2.91	0.295	33.5	6,010	180
09430500	20.08	9.01	3.61	2.91	4.09	3.26	0.231	1,850	7,520	180
09431000	19.67	8.86	3.65	2.93	4.05	3.18	0.234	2,380	7,360	180
09431500	19.00	8.50	3.69	2.95	3.98	3.14	0.224	2,820	7,140	180
09442650	25.83	13.31	3.87	2.92	4.24	3.34	0.177	9.37	8,760	225
09442660	24.53	12.34	4.05	3.01	4.16	3.32	0.153	31.0	8,580	180
09443000	20.23	9.78	3.50	2.76	3.66	2.85	0.220	1,520	7,370	180
09489200	28.27	15.83	5.42	3.80	4.59	3.73	0.140	16.4	8,450	135
09489700	28.08	16.01	5.65	3.94	4.71	3.70	0.258	114	8,070	135
09490800	31.19	17.50	6.12	4.33	4.87	3.88	0.175	39.3	9,310	0
09491000	31.25	17.67	6.10	4.27	5.14	3.90	0.191	69.1	9,180	270
09502800	15.10	7.96	4.64	3.52	4.22	2.98	0.120	253	5,010	0
09503800	24.92	15.92	4.93	3.53	4.81	3.13	0.073	135	7,390	225
09505220	29.49	20.38	6.47	4.37	5.49	3.83	0.120	1.85	7,220	180
09536350	24.87	10.76	4.90	4.09	4.64	3.99	0.317	0.66	6,290	270

Appendix 3—Miscellaneous Sites, Maximum Peak Discharge, Drainage Area, and Site Elevations

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Appendix 3. Miscellaneous sites, maximum peak discharge, drainage area, and site elevations.

[DMS, degrees minutes seconds; NGVD 29, National Geodetic Vertical Datum of 1929]

Map identifier (fig. 2)	Latitude (DMS)	Longitude (DMS)	Miscellaneous site name	Date	Maximum peak discharge (cubic feet per second)	Drainage area (square miles)	Site elevation (feet above NGVD 29)	Region
1	362958	1030731	Apache Creek at State Highway 18 near Clayton, New Mexico	1952	2,500	50.8	4,780	1
2	354906	1034621	Arroyo del Alamo near Mosquero, New Mexico	05/16/54	3,440	27.4	4,380	1
3	350110	1040426	Arroyo Laguana tributary near Montoya, New Mexico	07/05/60	2,660	3.40	4,460	1
4	350216	1033407	Barranca Creek near Norton, New Mexico	08/23/59	3,870	147	4,040	1
5	350714	1035416	Blanco Creek tributary at Palomas, New Mexico	07/05/60	1,540	2.90	4,330	1
6	365451	1030515	Bontz Arroyo near Guy, New Mexico	07/06/58	2,410	4.90	4,450	1
7	364546	1042933	Canadian River tributary near Hebron, New Mexico	06/17/65	2,130	2.01	6,300	1
8	364818	1030100	Carrizozo Creek tributary near Moses, New Mexico	07/06/58	307	0.15	4,730	1
9	352646	1034249	Carros Creek near Gallegos, New Mexico	07/08/60	2,590	9.40	4,050	1
10	361550	1031235	Carrizo Creek near Clayton, New Mexico	05/28/57	29,500	305	4,780	1
11	365210	1042246	Chicorica Creek near Raton, New Mexico	06/17/65	12,800	78.8	6,460	1
12	365100	1042125	Chicorica Creek tributary near Raton, New Mexico	06/17/65	1,810	1.33	6,470	1
13	362122	1032812	Carrizo Creek above State Road 56 near Clayton, New Mexico	06/17/65	9,270	305	5,245	1
14	353616	1045352	Conchas River tributary near Trujillo, New Mexico	07/05/67	4,530	3.43	6,480	1
15	353622	1045208	Conchas River near Trujillo, New Mexico	07/05/67	9,810	18.6	6,430	1
16	364216	1043536	Crow Creek below Waldron Canyon near Koehler, New Mexico	06/17/65	30,400	59.8	6,260	1
17	363755	1043225	Crow Creek near Maxwell, New Mexico	06/17/65	13,100	78.4	6,030	1
18	351813	1041843	Cuervo Creek near Conchas Dam, New Mexico	06/18/69	12,800	135	4,280	1
19	360020	1033331	Del Muerto Creek near Bueyeros, New Mexico	07/16/72	34,600	29.0	4,690	1
20	365540	1042130	East Fork Chicorica Creek at Yankee, New Mexico	06/17/65	13,500	22.7	6,780	1
21	351256	1031216	Frost Creek near Porter, New Mexico	07/16/58	2,910	10.0	3,900	1
22	354430	1040722	La Cinta Creek near Roy, New Mexico	08/17/77	13,300	116.5	4,700	1
23	361249	1043900	Ocate Creek at Colmar, New Mexico	07/04/51	25,000	434	5,900	1
24	354113	1030746	Minneosa Creek near Nara Visa, New Mexico	07/23/54	20,400	118	4,300	1
25	345838	1034502	Paris Creek near Quay, New Mexico	07/17/56	3,410	9.20	4,220	1

Appendix 3. Miscellaneous sites, maximum peak discharge, drainage area, and site elevations.—Continued

[DMS, degrees minutes seconds; NGVD 29, National Geodetic Vertical Datum of 1929]

Map identi-fier (fig. 2)	Latitude (DMS)	Longi-tude (DMS)	Miscellaneous site name	Date	Maximum peak discharge (cubic feet per second)	Drainage area (square miles)	Site elevation (feet above NGVD 29)	Region
26	345838	1034502	Paris Creek near Quay, New Mexico	07/16/58	3,290	9.20	4,220	1
27	362653	1031144	Perico Creek tributary at Clayton, New Mexico	09/09/60	1,600	4.90	4,990	1
28	350527	1033702	Plaza Larga Creek near Tucumcari, New Mexico	07/09/60	12,200	348	4,000	1
29	345005	1034524	Rincon Canyon Arroyo at Ragland, New Mexico	07/16/58	1,150	0.45	4,580	1
30	345005	1034524	Rincon Canyon Arroyo near Ragland, New Mexico	07/16/58	4,730	5.00	4,500	1
31	360008	1033735	Salado Creek near Bueyeros, New Mexico	08/08/60	799	18.0	4,610	1
32	363445	1031659	Seneca Creek above State Highway 370 near Clayton, New Mexico	05/18/55	1,600	102	5,080	1
33	363426	1030746	Seneca Creek at State Road 18 near Clayton, New Mexico	1941	21,600	110	4,820	1
34	363613	1032222	Seneca Creek near Clayton, New Mexico	06/17/65	9,580	112	5,300	1
35	365616	1030911	Sloan Creek near Guy, New Mexico	07/06/58	4,280	37.0	4,500	1
36	365536	1030731	Smiley Arroyo near Guy, New Mexico	07/06/58	1,930	7.55	4,470	1
37	350039	1034426	Spikes Creek near Quay, New Mexico	07/16/58	2,400	5.80	4,160	1
38	364213	1043300	Springer Arroyo near Colfax, New Mexico	06/17/65	2,280	3.00	6,260	1
39	354846	1034537	Tequesquite Creek near Mosquero, New Mexico	07/11/51	16,000	468	4,340	1
40	354846	1034537	Tequesquite Creek near Mosquero, New Mexico	1937	36,000	468	4,340	1
41	365404	1032645	Travesser Creek near Guy, New Mexico	06/17/65	12,500	74.7	5,080	1
42	351446	1034832	Trinchera Creek near Tucumcari, New Mexico	05/16/54	2,740	2.15	4,150	1
43	353922	1034442	Ute Creek tributary near Gallegos, New Mexico	08/09/60	668	0.60	4,240	1
44	363634	1044510	Vermejo River below Dawson at Vermejo diversion weir, New Mexico	08/04/57	21,000	380	6,180	1
45	352740	1034545	Wynn Creek near Gallegos, New Mexico	07/08/60	3,060	3.00	4,170	1
46	354800	1044745	Mora River 1.5 miles above gage near Shoemaker, New Mexico	07/31/51	8,200	6,040	6,170	1
47	350953	1035405	Pajarito Creek near Hanley, New Mexico	06/01/37	31,000	310	4,110	1
48	370004	1042132	Chicorica Creek above Lake Maloya near Morley, Colorado	05/18/55	2,450	4.54		1
49	364332	1075828	Bloomfield Canyon at Bloomfield, New Mexico	08/24/96	2,830	10.0	5,540	2
50	361438	1073554	Blanco Wash tributary No. 1 near Nageezi, New Mexico	08/12/57	196	0.20	7,060	2

Appendix 3. Miscellaneous sites, maximum peak discharge, drainage area, and site elevations.—Continued

[DMS, degrees minutes seconds; NGVD 29, National Geodetic Vertical Datum of 1929]

Map identifier (fig. 2)	Latitude (DMS)	Longitude (DMS)	Miscellaneous site name	Date	Maximum peak discharge (cubic feet per second)	Drainage area (square miles)	Site elevation (feet above NGVD 29)	Region
51	361530	1073736	Blanco Wash tributary No. 2 near Nageezi, New Mexico	None	519	0.81	6,920	2
52	360418	1084105	Chaco River tributary at Naschitti, New Mexico	08/06/59	2,640	8.80	5,880	2
53	354605	1084655	Figuredo Wash near Mexican Springs, New Mexico	08/19/58	3,510	72.0	6,260	2
54	364540	1082700	Shumway Arroyo near Waterflow, New Mexico	1955	4,620	138	5,060	2
55	364540	1082700	Shumway Arroyo near Waterflow, New Mexico	07/15/57	2,050	138	5,060	2
56	364459	1082251	Stevens Arroyo at Fruitland, New Mexico	1955	1,240	8.75	5,140	2
57	364353	1082119	Dain Arroyo near Fruitland, New Mexico	1955	4,620	138	5,210	2
58	364531	1082525	Waughan Arroyo near Waterflow, New Mexico	1955	300	5.95	5,030	2
59	332130	1051445	Alamo Canyon near Tinnie, New Mexico	06/17/65	38,400	54.6	5,180	3
60	325356	1055534	Ballamah Ditch at Alamogordo, New Mexico	08/17/59	1,130	0.80	4,550	3
61	325640	1051952	Burnt Canyon at Elk, New Mexico	08/30/57	5,450	16.9	5,810	3
62	332220	1051450	Chavez Canyon near Tinnie, New Mexico	06/17/65	5,710	46.4	5,180	3
63	332640	1052900	Devils Canyon near Glencoe, New Mexico	06/17/65	1,740	0.80	6,140	3
64	332502	1052622	Devils Canyon at Glencoe, New Mexico	06/17/65	16,200	60.0	5,710	3
65	332555	1052920	Eagle Creek near Glencoe, New Mexico	06/17/54	2,700	26.6	5,980	3
66	325806	1052033	Elk Canyon near Elk, New Mexico	08/30/57	3,470	160	5,900	3
67	325620	1051636	Graveyard Canyon near Elk, New Mexico	08/11/60	1,150	2.00	5,700	3
68	325749	1051925	Little Felix Canyon near Elk, New Mexico	07/05/58	6,500	19.5	5,820	3
69	325749	1051925	Little Felix Canyon near Elk, New Mexico	01/07/58	8,080	19.5	5,820	3
70	330131	1051333	Lincoln Canyon near Elk, New Mexico	07/31/62	11,500	216	5,530	3
71	325913	1052020	Panther Draw near Elk, New Mexico	07/05/58	4,630	7.50	5,980	3
72	323250	1051000	Pinon Creek near Pinon, New Mexico	08/22/66	7,970	203	4,760	3
73	332710	1051920	Rio Bonito tributary near Hondo, New Mexico	06/17/65	850	1.20	5,500	3
74	325632	1051714	Rio Penasco tributary near Elk, New Mexico	08/11/60	336	0.20	5,700	3
75	332330	1052900	Rio Ruidoso at Buckhorn Courts near Glencoe, New Mexico	06/17/65	7,920	169	5,870	3

Appendix 3. Miscellaneous sites, maximum peak discharge, drainage area, and site elevations.—Continued

[DMS, degrees minutes seconds; NGVD 29, National Geodetic Vertical Datum of 1929]

Map identi-fier (fig. 2)	Latitude (DMS)	Longi-tude (DMS)	Miscellaneous site name	Date	Maximum peak discharge (cubic feet per second)	Drainage area (square miles)	Site elevation (feet above NGVD 29)	Region
76	332415	1052855	Silva Canyon near Glencoe, New Mexico	06/17/65	2,940	3.00	5,940	3
77	344037	1042237	Alamogordo Creek near Guadalupe, New Mexico	06/03/37	24,800	273	4,290	4
78	340407	1043338	Arroyo de La Mora near Dunlap, New Mexico	07/07/60	6,650	430	4,100	4
79	343150	1041630	Arroyo del Anil near Fort Sumner, New Mexico	06/03/37	12,000	135	4,080	4
80	333850	1043309	Arroyo del Macho near Roswell, New Mexico	05/28/37	49,500	2290	3,660	4
81	344530	1042858	Arroyo San Juan de Dios tributary 1 near Puerto de Luna, New Mexico	06/16/93	1,700	1.20	4,430	4
82	345012	1043309	Arroyo San Juan de Dios tributary 2 near Puerto de Luna, New Mexico	None	1,050	1.00	4,700	4
83	332601	1042928	Berrendo Creek at Roswell, New Mexico	06/01/38	37,700	453	3,530	4
84	332646	1043109	Berrendo Creek below US 285 at Roswell, New Mexico	05/17/54	23,400	438	3,570	4
85	332646	1043109	Berrendo Creek below US 285 at Roswell, New Mexico	10/06/54	19,400	438	3,570	4
86	320756	1042423	Black River at U.S. Highway 180 near White City, New Mexico	08/23/66	41,500	217	3,540	4
87	345852	1050457	Canon de Baca tributary near Pintada, New Mexico	07/19/71	3,190	2.17	5,500	4
88	321550	1041630	Cass Draw near Carlsbad, New Mexico	05/30/65	32,500	9.30	3,300	4
89	321127	1042042	Chinaberry Draw near White City, New Mexico	07/06/60	957	1.83	3,460	4
90	322338	1041418	Dark Canyon at Carlsbad, New Mexico	08/18/57	20,700	449	3,120	4
91	322338	1041418	Dark Canyon at Carlsbad, New Mexico	08/23/66	66,000	449	3,120	4
92	324853	1043125	Eagle Creek Draw near Artesia, New Mexico	10/06/54	12,500	174	3,620	4
93	325447	1045342	Eagle Creek near Hope, New Mexico	08/23/66	10,270	95.0	4,410	4
94	324959	1042606	Eagle Draw at Artesia, New Mexico	06/13/64	7,020	185	3,440	4
95	324920	1042859	Eagle Draw near Artesia, New Mexico	06/13/64	7,170	174	3,540	4
96	325009	1042757	Eagle Draw tributary near Artesia, New Mexico	06/13/64	10,700	4.30	3,500	4
97	321445	1041805	Elbow Canyon near Carlsbad, New Mexico	05/30/65	6,410	2.40	3,400	4
98	345948	1051857	Encinosa Draw near Milagro, New Mexico	None	6,800	137	5,990	4
99	351558	1045456	Gallinas River near Chaperito, New Mexico	1937	21,400	566	5,080	4
100	325056	1041718	Hart Canyon near Artesia, New Mexico	06/13/64	10,900	25.0	3,340	4

Appendix 3. Miscellaneous sites, maximum peak discharge, drainage area, and site elevations.—Continued

[DMS, degrees minutes seconds; NGVD 29, National Geodetic Vertical Datum of 1929]

Map identi-fier (fig. 2)	Latitude (DMS)	Longi-tude (DMS)	Miscellaneous site name	Date	Maximum peak discharge (cubic feet per second)	Drainage area (square miles)	Site elevation (feet above NGVD 29)	Region
101	321304	1041848	Jurnigan Draw near White City, New Mexico	08/23/66	6,710	6.13	3,440	4
102	341201	1042436	Little Conejo Creek near Dunlap, New Mexico	07/06/60	2,190	13.0	4,020	4
103	341201	1042436	Little Conejo Creek near Dunlap, New Mexico	None	4,680	13.0	4,020	4
104	322153	1041740	Little McKittrick Canyon above Sheep Draw near Carlsbad, New Mexico	None	32,200	57.2	3,260	4
105	322309	1042107	Little McKittrick Canyon near Carlsbad, New Mexico	08/18/57	20,900	46.2	3,390	4
106	320028	1043204	McKittrick Canyon Draw near New Mexico-Texas State Line	08/22/66	10,900	71.0	3,920	4
107	323851	1042439	North Sevens Rivers near Lakewood, New Mexico	10/07/54	20,800	312	3,340	4
108	323851	1042439	North Sevens Rivers near Lakewood, New Mexico	08/22/58	3,040	312	3,340	4
109	323837	1042543	North Sevens Rivers No. 2 near Lakewood, New Mexico	08/23/66	37,400	312	3,370	4
110	322451	1043235	Old Ranch Canyon near Carlsbad, New Mexico	07/06/60	1,990	2.05	3,930	4
111	332020	1050705	Patterson Canyon near Picacho, New Mexico	06/28/65	4,000	3.39	4,900	4
112	351805	1052330	Pecos River tributary at Sena, New Mexico	05/12/65	189	0.45	5,900	4
113	344553	1043918	Puerto Creek near Puerto de Luna, New Mexico	05/29/95	3,800	7.20	4,580	4
114	320702	1042724	Rattlesnake Canyon near White City, New Mexico	08/22/66	11,900	18.8	3,580	4
115	330605	1042557	Rio Felix near Hagerman, New Mexico	10/07/54	81,800	920	3,520	4
116	331956	1050334	Rio Hondo at Riverside, New Mexico	06/01/37	24,900	879	4,740	4
117	332327	1043056	Rio Hondo below railroad bridge at Roswell, New Mexico	05/17/54	934	2,900	3,560	4
118	331535	1043932	Rocky Arroyo at Lambert Well near Roswell, New Mexico	10/07/54	6,620	68.3	3,840	4
119	331535	1043932	Rocky Arroyo at Lambert Well near Roswell, New Mexico	1941	9,400	68.3	3,840	4
120	342758	1050434	Salado Creek tributary near Joffre, New Mexico	07/05/60	871	0.60	5,740	4
121	331959	1050245	Silver Canyon at Riverside, New Mexico	06/28/65	4,550	3.96	4,760	4
122	320454	1042933	Slaughter Canyon near White City, New Mexico	08/22/66	8,610	31.9	3,720	4
123	332338	1043412	Spring River near Roswell, New Mexico	05/17/54	4,270	8.68	3,600	4
124	323331	1035902	State Highway 31 Arroyo near Carlsbad, New Mexico	09/26/58	143	0.15	3,260	4
125	325932	1042622	Walnut Creek near Lake Arthur, New Mexico	07/29/65	10,000	72.0	3,420	4

Appendix 3. Miscellaneous sites, maximum peak discharge, drainage area, and site elevations.—Continued

[DMS, degrees minutes seconds; NGVD 29, National Geodetic Vertical Datum of 1929]

Map identifier (fig. 2)	Latitude (DMS)	Longitude (DMS)	Miscellaneous site name	Date	Maximum peak discharge (cubic feet per second)	Drainage area (square miles)	Site elevation (feet above NGVD 29)	Region
126	321118	1042349	Walnut Canyon near White City, New Mexico	08/31/63	10,700	12.1	3,540	4
127	321113	1042335	Walnut Canyon Arroyo near White City, New Mexico	06/23/86	2,980	11.7	3,560	4
128	365350	1043442	Canadian River near Raton, New Mexico	04/30/99	7,000	94.0	6,820	5
129	354842	1051818	Canon del Rocio near Tierra Monte, New Mexico	08/07/57	445	4.20	7,140	5
130	363430	1045625	Chase Canyon near Cimarron, New Mexico	06/17/65	10,800	23.0	6,640	5
131	365901	1042225	Chicorica Creek below Lake Maloya near Raton, New Mexico	05/18/55	2,230	20.8	7,480	5
132	365549	1042223	Chicorica Creek near Yankee, New Mexico	06/17/65	2,230	36.3	6,800	5
133	362958	1045539	Cimarron Creek tributary at Cimarron, New Mexico	06/05/58	1,870	1.44	6,460	5
134	363058	1045712	Cimarron Creek tributary near Cimarron, New Mexico	06/05/58	337	0.15	6,590	5
135	364645	1043740	Crow Creek near Koehler, New Mexico	06/17/65	10,600	29.0	6,630	5
136	365455	1042641	Raton Creek near Raton, New Mexico	08/20/51	307	12.9	6,730	5
137	354610	1052136	Rito Colorado at San Ignacio, New Mexico	08/04/57	1,660	5.00	7295	5
138	354429	1051539	Sanguijuela Arroyo near Sapello, New Mexico	08/04/57	7,050	6.10	6990	5
139	354627	1052008	Sapello River tributary near San Ignacio, New Mexico	08/04/57	544	2.14	7190	5
140	363125	1045855	Turkey Creek Canyon near Cimarron, New Mexico	06/17/65	6,660	5.25	6650	5
141	355243	1060020	Arroyo Cuyamungue near Pojoaque, New Mexico	08/22/61	4,770	3.86	5930	5
142	361955	1054055	Arroyo del Alamo near Ranchos de Taos, New Mexico	08/01/59	173	4.11	7020	5
143	361945	1054115	Arroyo del Alamo tributary near Ranchos de Taos, New Mexico	08/01/59	59	2.64	7040	5
144	360348	1060854	Arroyo de la Presa near Hernandez, New Mexico	08/22/61	12,300	11.0	5895	5
145	355306	1060309	Arroyo Ramon Martinez at El Rancho, New Mexico	08/28/52	1,780	0.80	5755	5
146	355324	1060456	Arroyo del Rancho at El Rancho, New Mexico	08/22/52	34,500	6.77	5660	5
147	355744	1060148	Arroyo Seco near Sombrillo, New Mexico	08/05/69	4,500	19.2	5720	5
148	354220	1052320	Beaver Creek at El Porvenir, New Mexico	08/04/57	619	25.0	7,360	5
149	354140	1055440	Canada Ancha at Santa Fe, New Mexico	08/24/57	800	1.66	7,360	5
150	362055	1060613	Canoncito de La Madera tributary near Ojo Caliente, New Mexico	06/14/59	606	0.87	6,850	5

Appendix 3. Miscellaneous sites, maximum peak discharge, drainage area, and site elevations.—Continued

[DMS, degrees minutes seconds; NGVD 29, National Geodetic Vertical Datum of 1929]

Map identifier (fig. 2)	Latitude (DMS)	Longitude (DMS)	Miscellaneous site name	Date	Maximum peak discharge (cubic feet per second)	Drainage area (square miles)	Site elevation (feet above NGVD 29)	Region
151	352616	1053044	Cow Creek near San Jose, New Mexico	06/01/63	1,420	130	6,200	5
152	352449	1052808	El Rito near San Jose, New Mexico	06/01/63	8,070	37.2	6,100	5
153	354170	1052125	Gallinas River at Gallinas, New Mexico	08/04/57	4,110	67.0	7,150	5
154	354403	1055446	Little Tesuque Creek near Tesuque, New Mexico	08/24/57	1,060	8.28	7,060	5
155	352401	1052830	Pecos River at San Jose, New Mexico	06/01/63	11,400	579	6,040	5
156	352438	1053013	Pecos River tributary near San Jose, New Mexico	06/01/63	208	2.00	6,260	5
157	355347	1060047	Pojaoque Creek at Pojaoque, New Mexico	07/31/55	11,000	86.9	5,850	5
158	361210	1061644	Rio Chama tributary near Abiquiu, New Mexico	05/26/64	2,670	5.35	6,020	5
159	360752	1054535	Rio de Las Trampas at Las Trampas, New Mexico	08/15/69	2,400	24.1	7,400	5
160	360631	1060911	Rio del Oso at Chili, New Mexico	09/01/94	15,400	41.0	5,750	5
161	360608	1060945	Rio del Oso near Hernandez, New Mexico	08/22/61	11,600	41.2	5,800	5
162	360844	1055854	Rio de Truchas near Velarde, New Mexico	None	6,300	33.1	5,830	5
163	360740	1060019	Rio Grande tributary near Lyden, New Mexico	07/26/59	1,100	0.66	5,800	5
164	361334	1055141	Rio Grande tributary No. 1 at Rinconada, New Mexico	07/26/59	388	0.53	5,970	5
165	361314	1055158	Rio Grande tributary No. 2 at Rinconada, New Mexico	07/26/59	1,390	0.48	5,940	5
166	361307	1055211	Rio Grande tributary No. 3 at Rinconada, New Mexico	08/06/59	159	0.03	5,900	5
167	361300	1055238	Rio Grande tributary No. 4 at Rinconada, New Mexico	08/06/59	283	0.13	5,900	5
168	354530	1064730	Rio Guadalupe tributary near Jemez Springs, New Mexico	07/31/56	410	6.74	6,740	5
169	354435	1055601	Rio Tesuque tributary near Tesuque, New Mexico	08/24/57	633	0.71	7,000	5
170	361619	1054703	Rito Cieneguilla at Pilar, New Mexico	07/28/52	4,600	7.00	6,060	5
171	352434	1051431	Tecolote Creek near Chapelle, New Mexico	1937	20,500	130	5,940	5
172	353805	1064140	Vallecito Creek near Jemez, New Mexico	None	3,130	64.1	5,750	5
173	354510	1055535	Rio Tesuque at Tesuque near Santa Fe, New Mexico	09/07/36	660	22.0	6,830	5
174	354510	1055535	Rio Tesuque at Tesuque near Santa Fe, New Mexico	07/19/38	952	22.0	6,830	5
175	354510	1055535	Rio Tesuque at Tesuque near Santa Fe, New Mexico	08/24/57	1,490	22.0	6,830	5

Appendix 3. Miscellaneous sites, maximum peak discharge, drainage area, and site elevations.—Continued

[DMS, degrees minutes seconds; NGVD 29, National Geodetic Vertical Datum of 1929]

Map identifier (fig. 2)	Latitude (DMS)	Longitude (DMS)	Miscellaneous site name	Date	Maximum peak discharge (cubic feet per second)	Drainage area (square miles)	Site elevation (feet above NGVD 29)	Region
176	342739	1063127	Abo Arroyo near Scholle, New Mexico	08/21/51	18,300	244	5,360	6
177	343137	1064542	Abo Arroyo at Veguita, New Mexico	07/30/56	9,350	257	4,780	6
178	343058	1064443	Abo Arroyo at Veguita, New Mexico	07/31/97	9,410	257	4,730	6
179	354149	1055606	Arroyo Barranca at Santa Fe, New Mexico	08/24/57	1,100	1.04	7,050	6
180	351030	1063615	Arroyo de Domingo Baca at Albuquerque, New Mexico	07/27/55	977	8.10	5,050	6
181	354145	1055604	Arroyo de la Piedra at Santa Fe, New Mexico	08/24/57	1,600	2.78	7,040	6
182	344140	1061810	Arroyo del Cuervo at State Highway 55 near Torreon, New Mexico	08/02/50	3,250	12.1	6,670	6
183	350554	1063326	Arroyo del Embudo above Palomas Drive at Albuquerque, New Mexico	08/11/61	3,590	27.5	5,230	6
184	350617	1063414	Arroyo del Embudo at Albuquerque, New Mexico	07/27/55	2,360	28.6	5,270	6
185	350553	1063325	Arroyo del Embudo between Pennsylvania and Hendola at Albuquerque, New Mexico	08/11/61	518	14.6	5,320	6
186	350639	1063708	Arroyo del Embudo above Princeton Street at Albuquerque, New Mexico	08/10/63	8,840	34.1	5,050	6
187	350639	1063719	Arroyo del Embudo below Princeton Street at Albuquerque, New Mexico	08/11/61	3,620	34.1	5,040	6
188	350553	1063325	Arroyo del Embudo between Pennsylvania and Hendola at Albuquerque, New Mexico	08/10/63	1,470	14.6	5,320	6
189	350523	1063300	Arroyo del Embudo tributary at Wyoming Boulevard at Albuquerque, New Mexico	08/11/61	572	7.70	5,350	6
190	353820	1055540	Arroyo de los Chamisos tributary at Santa Fe, New Mexico	07/26/71	695	0.75	7,000	6
191	350909	1063230	Arroyo del Pino near Albuquerque, New Mexico	07/27/55	1,150	6.00	5,520	6
192	350940	1063645	Arroyo del Pino overflow near Albuquerque, New Mexico	07/27/55	505	7.10	5,020	6
193	341147	1065531	Arroyo del Puertocito at Polvadera, New Mexico	08/01/56	333	0.40	4,680	6
194	345912	1070608	Arroyo de Miranda near Rio Puerco, New Mexico	None	2,740	4.00	5,540	6
195	344512	1061657	Arroyo de Tajique at Tajique, New Mexico	07/14/52	1,110	19.8	6,640	6
196	340549	1071910	Arroyo Gato tributary near Magdalena, New Mexico	None	2,500	8.10	6,280	6
197	340549	1071910	Arroyo Gatos tributary near Magdalena, New Mexico	None	4,310	8.10	6,280	6
198	353720	1055505	Arroyo Hondo near Santa Fe, New Mexico	07/26/71	4,050	9.80	7,140	6
199	340514	1071854	Arroyo Landavasco at dam near Magdalena, New Mexico	None	2,970	4.50	6,700	6
200	354120	1055715	Arroyo Mascaras at Santa Fe, New Mexico	08/24/57	3,040	6.27	6,890	6

Appendix 3. Miscellaneous sites, maximum peak discharge, drainage area, and site elevations.—Continued

[DMS, degrees minutes seconds; NGVD 29, National Geodetic Vertical Datum of 1929]

Map identi-fier (fig. 2)	Latitude (DMS)	Longi-tude (DMS)	Miscellaneous site name	Date	Maximum peak discharge (cubic feet per second)	Drainage area (square miles)	Site elevation (feet above NGVD 29)	Region
201	354120	1055715	Arroyo Mascaras at Santa Fe, New Mexico	07/25/68	2,490	6.27	6,890	6
202	354130	1055612	Arroyo Ranchito at Santa Fe, New Mexico	08/24/57	520	0.61	7,130	6
203	351700	1061240	Arroyo Tuerto near Golden, New Mexico	09/24/55	2,000	12.9	6,480	6
204	351615	1061245	Arroyo Val Verde at Golden, New Mexico	09/24/55	987	1.40	6,580	6
205	344528	1064713	Belen Highline Canal tributary near Los Chaves, New Mexico	06/14/61	2,130	0.86	4,920	6
206	351225	1071620	Bohart Creek near Moquino, New Mexico	08/21/58	4,840	32.0	6,230	6
207	340023	1065908	Box Canyon near Socorro, New Mexico	08/01/56	6,210	24.3	5,380	6
208	353920	1065320	Cachana Arroyo near San Ysidro, New Mexico	05/14/59	1,590	5.16	6,100	6
209	353935	1065325	Cachana Arroyo tributary near San Ysidro, New Mexico	05/14/59	552	0.23	6,140	6
210	350610	1063810	Campus Wash at Albuquerque, New Mexico	08/10/63	640	7.3	5,000	6
211	351320	1060920	Canada de las Narrias (lower) near San Pedro, New Mexico	09/24/55	4,830	5.71	6,820	6
212	351335	1061055	Canada de las Narrias (upper) near San Pedro, New Mexico	09/24/55	2,200	1.53	7,010	6
213	351750	1063200	Canon del Agua at Bernalillo, New Mexico	07/19/56	5,380	3.93	5,200	6
214	351135	1062956	Canon la Cuerva near Albuquerque, New Mexico	07/27/55	1,920	2.60	6,080	6
215	350246	1072640	Encinal Arroyo near New Laguna, New Mexico	08/10/55	8,320	20.4	5,910	6
216	344530	1060539	Estancia Valley tributary No.1 near Estancia, New Mexico	07/07/52	4,660	13.2	6,180	6
217	343158	1061158	Estancia Valley tributary No.2 near Mountainair, New Mexico	07/07/52	3,560	3.35	6,410	6
218	340125	1070225	Four Mile Canyon near Socorro, New Mexico	08/08/56	1,010	16.0	6,040	6
219	350755	1063755	Hahn Arroyo above Edith Avenue at Albuquerque, New Mexico	08/10/63	4,100	8.50	5,000	6
220	350756	1063746	Hahn Arroyo at Edith Avenue at Albuquerque, New Mexico	08/11/61	935	7.60	5,000	6
221	350737	1063350	Hahn Arroyo tributary at Albuquerque, New Mexico	08/10/63	1,420	0.50	5,320	6
222	352739	1064041	Jemez River tributary at Bridge 3049 near San Ysidro, New Mexico	07/23/51	14,000	3.29	5,370	6
223	352817	1064122	Jemez River tributary at Bridge 3050 near San Ysidro, New Mexico	07/23/51	4,150	5.00	5,360	6
224	351152	1071905	Meyer Draw near Moquino, New Mexico	08/21/58	2,310	21.7	6,180	6
225	352142	1080157	Mitchell Draw tributary at Prewitt, New Mexico	08/07/59	1,020	3.00	6,790	6

Appendix 3. Miscellaneous sites, maximum peak discharge, drainage area, and site elevations.—Continued

[DMS, degrees minutes seconds; NGVD 29, National Geodetic Vertical Datum of 1929]

Map identi-fier (fig. 2)	Latitude (DMS)	Longi-tude (DMS)	Miscellaneous site name	Date	Maximum peak discharge (cubic feet per second)	Drainage area (square miles)	Site elevation (feet above NGVD 29)	Region
226	352216	1080428	Mitchell Draw tributary near Prewitt, New Mexico	08/07/59	928	1.00	6,880	6
227	352354	1081324	Mitchell Draw tributary at Thoreau, New Mexico	08/07/59	2,350	18.8	7,120	6
228	352515	1081058	Mitchell Draw tributary near Thoreau, New Mexico	08/07/59	1,930	3.30	7,150	6
229	352325	1080850	Mitchell Draw tributary near South Chaves near Thoreau, New Mexico	09/01/58	430	1.60	6,980	6
230	340552	1065403	Nogal Arroyo near Socorro, New Mexico	None	1,800	60.4	4,640	6
231	340552	1065403	Nogal Arroyo near Socorro, New Mexico	8/00/1957	2,950	60.4	4,640	6
232	340552	1065403	Nogal Arroyo near Socorro, New Mexico	08/01/56	4,670	60.4	4,640	6
233	350627	1072011	Oak Canyon near Paguate, New Mexico	05/23/59	1,450	4.28	5,840	6
234	352448	1055200	Piedra Lumbre Canyon near Galisteo, New Mexico	08/06/91	688	5.36	6,240	6
235	350923	1063635	Rio Grande tributary near Albuquerque, New Mexico	07/27/55	1,620	14.7	5,060	6
236	350504	1063642	Campus Boulevard at Albuquerque, New Mexico	07/15/57	629	1.67	5,020	6
237	351040	1072133	Rio Moquino tributary at Moquino, New Mexico	08/21/58	475	76.4	6,110	6
238	351040	1072133	Rio Moquino tributary at Moquino, New Mexico	None	2,170	76.4	6,110	6
239	351040	1072133	Rio Moquino tributary at Moquino, New Mexico	None	2,970	76.4	6,110	6
240	355040	1065808	Rio Puerco at La Ventana, New Mexico	08/07/49	1,200	297	6,510	6
241	350657	1074912	Rio San Jose tributary near Grants, New Mexico	None	3,390	16.0	6,410	6
242	350204	1072028	Rio San Jose tributary No. 1 near Laguna, New Mexico	07/26/59	761	0.81	5,700	6
243	350204	1072028	Rio San Jose tributary No. 2 near Laguna, New Mexico	07/26/59	917	0.62	5,700	6
244	354635	1065630	Rito Olguin tributary near La Ventana, New Mexico	Aug-57	243	0.26	6,680	6
245	351606	1063404	Sandia Wash near Bernalillo, New Mexico	08/03/63	7,550	15.0	5,050	6
246	351335	1061023	San Lazarus Gulch near San Pedro, New Mexico	09/24/55	950	0.58	6,960	6
247	341334	1065518	San Lorenzo Arroyo near San Acacia, New Mexico	08/01/50	1,700	0.12	4,710	6
248	341334	1065518	San Lorenzo Arroyo near San Acacia, New Mexico	1929	11,000	0.12	4,710	6
249	341330	1065505	San Lorenzo Arroyo near Polvadera, New Mexico	09/19/60	11,700	27.9	4,710	6
250	352632	1060647	San Marcos Arroyo at Cerrillos, New Mexico	06/17/58	8,090	92.0	5,730	6

Appendix 3. Miscellaneous sites, maximum peak discharge, drainage area, and site elevations.—Continued

[DMS, degrees minutes seconds; NGVD 29, National Geodetic Vertical Datum of 1929]

Map identi-fier (fig. 2)	Latitude (DMS)	Longi-tude (DMS)	Miscellaneous site name	Date	Maximum peak discharge (cubic feet per second)	Drainage area (square miles)	Site elevation (feet above NGVD 29)	Region
251	352732	1060412	San Marcos Arroyo near Cerrillos, New Mexico	06/17/58	2,990	33.0	5,990	6
252	352802	1060411	San Marcos Arroyo tributary near Cerillos, New Mexico	06/17/58	209	0.10	6,060	6
253	352030	1074047	San Mateo Creek near San Mateo, New Mexico	07/19/56	4,820	23.4	7,050	6
254	352116	1073846	San Mateo Creek tributary near San Mateo, New Mexico	07/19/56	1,500	0.95	7,180	6
255	351315	1061740	San Pedro Creek tributary No. 1 near Golden, New Mexico	09/24/55	2,950	4.21	6,360	6
256	351310	1061700	San Pedro Creek tributary No. 1 (upper) near Golden, New Mexico	09/24/55	2,400	2.82	6,440	6
257	351255	1061705	San Pedro Creek tributary No. 1A near Golden, New Mexico	09/24/55	2,750	0.92	6,450	6
258	351330	1061530	San Pedro Creek tributary No. 2 near Golden, New Mexico	09/24/55	962	0.90	6,560	6
259	354106	1055626	Santa Fe River at Santa Fe, New Mexico	07/28/52	635	31.8	6,970	6
260	353740	1060528	Santa Fe River at Airport Road near Santa Fe, New Mexico	07/29/53	2,410	51.7	6,280	6
261	354103	1055602	Santa Fe River below Castillo Street Santa Fe, New Mexico	08/24/57	1,450	30.0	7,010	6
262	354104	1055555	Santa Fe River above Castillo Street Santa Fe, New Mexico	07/25/68	3,420	33.0	7,020	6
263	354111	1055745	Santa Fe River below Arroyo Mascaras at Santa Fe, New Mexico	07/25/68	6,110	40.9	6,840	6
264	340128	1065515	Socorro Canyon at Socorro, New Mexico	08/01/56	5,380	42.2	4,900	6
265	340128	1065515	Socorro Canyon at Socorro, New Mexico	None	7,650	42.2	4,900	6
266	340127	1070000	Socorro Canyon tributary near Socorro, New Mexico	08/01/56	9,480	6.67	5,560	6
267	351823	1063205	State Highway 422 Arroyo No. 1 at Bernalillo, New Mexico	07/19/56	1,320	1.28	5,110	6
268	351818	1063207	State Highway 422 Arroyo No. 2 at Bernalillo, New Mexico	07/19/56	104	0.02	5,110	6
269	351655	1063305	State Highway 422 Arroyo No. 3 at Bernalillo, New Mexico	07/19/56	1,540	2.63	5,080	6
270	334638	1060919	Taylor Canyon tributary 1 at culvert near Bingham, New Mexico	1959	3,890	3.99	5,980	6
271	334646	1061000	Taylor Canyon tributary 1 near Bingham, New Mexico	1959	6,770	3.58	6,000	6
272	334652	1061013	Taylor Canyon tributary 1A near Bingham, New Mexico	1959	3,040	2.16	6,040	6
273	350604	1062102	Tijeras Arroyo tributary No. 1 near Cedar Crest, New Mexico	07/15/60	307	0.31	6,500	6
274	350552	1062108	Tijeras Arroyo tributary No. 2 near Cedar Crest, New Mexico	07/15/60	142	0.15	6,540	6
275	350449	1062414	Tijeras Arroyo at Tijeras, New Mexico	1933	8,450	59.0	6,390	6

Appendix 3. Miscellaneous sites, maximum peak discharge, drainage area, and site elevations.—Continued

[DMS, degrees minutes seconds; NGVD 29, National Geodetic Vertical Datum of 1929]

Map identi-fier (fig. 2)	Latitude (DMS)	Longi-tude (DMS)	Miscellaneous site name	Date	Maximum peak discharge (cubic feet per second)	Drainage area (square miles)	Site elevation (feet above NGVD 29)	Region
276	341229	1065526	U.S. Highway 85 Arroyo at Polvadera, New Mexico	None	720	0.88	4,680	6
277	334607	1065427	U.S. Highway 85 Arroyo No. 1 near San Marcial, New Mexico	07/31/56	210	0.90	4,520	6
278	334549	1065450	U.S. Highway 85 Arroyo No. 2 near San Marcial, New Mexico	07/31/56	223	0.15	4,580	6
279	334535	1065521	U.S. Highway 85 Arroyo No. 3 near San Marcial, New Mexico	07/31/56	283	0.31	4,580	6
280	334535	1065521	U.S. Highway 85 Arroyo No. 4 near San Marcial, New Mexico	07/31/56	214	0.19	4,590	6
281	340718	1065439	U.S. Highway 85 Arroyo near Socorro, New Mexico	None	490	0.36	4,730	6
282	340718	1065439	U.S. Highway 85 Arroyo near Socorro, New Mexico	None	905	0.36	4,730	6
283	350416	1073134	Water Canyon at Budville, near Cuerbo, New Mexico	07/29/62	5,480	58.2	6,050	6
284	351938	1063135	Rio Grande tributary at State Highway 422 near Bernalillo, New Mexico	08/03/63	1,540	1.93	5,120	6
285	331845	1071728	Alamosa River near Truth or Consequences, New Mexico	09/04/67	27,500	643	4,680	7
286	322043	1064603	Alameda Arroyo at Las Cruces, New Mexico	08/22/65	1,960	15.6	4,050	7
287	321311	1045542	Box Canyon near El Paso Gap, New Mexico	08/23/66	5,450	87.0	4,510	7
288	323202	1065923	Broad Canyon near Radium Springs, New Mexico	09/13/58	11,400	36.0	4,000	7
289	330939	1071437	Cuchillo Negro River near Truth or Consequences, New Mexico	08/25/57	21,400	355	4,300	7
290	322951	1065628	Faulkner Canyon at Radium Springs, New Mexico	09/13/58	4,640	30.3	3,980	7
291	321450	1064320	Fillmore Arroyo near Tortugas, New Mexico	08/22/58	4,100	19.5	3,960	7
292	314555	1082312	Granite Pass Arroyo near Hachita, New Mexico	Sep-58	1,200	4.00	4,360	7
293	315026	1075515	Hermanas Draw near Hermanas, New Mexico	09/11/58	618	24.5	4,360	7
294	330239	1071841	King Arroyo near Las Palomas, New Mexico	07/12/50	27,000	40.0	4,330	7
295	323121	1080021	Lampbright Draw tributary 1 near Faywood, New Mexico	07/25/57	2,400	24.1	4,880	7
296	323055	1075953	Lampbright Draw tributary 2 near Faywood, New Mexico	07/25/57	2,370	4.60	4,880	7
297	325330	1055639	McKinley Ditch No. 1 at Alamogordo, New Mexico	08/17/59	2,500	6.00	4,360	7
298	325317	1055706	McKinley Ditch No. 2 at Alamogordo, New Mexico	08/17/59	2,840	13.0	4,340	7
299	321315	1064212	Mesquite Drainage Ditch tributary near Mesquite, New Mexico	08/22/58	809	2.90	3,940	7
300	321436	1071940	Mimbres Basin Arroyo near Akela, New Mexico	09/13/58	2,270	40.0	4,240	7

Appendix 3. Miscellaneous sites, maximum peak discharge, drainage area, and site elevations.—Continued

[DMS, degrees minutes seconds; NGVD 29, National Geodetic Vertical Datum of 1929]

Map identifier (fig. 2)	Latitude (DMS)	Longitude (DMS)	Miscellaneous site name	Date	Maximum peak discharge (cubic feet per second)	Drainage area (square miles)	Site elevation (feet above NGVD 29)	Region
301	322235	1073629	Mimbres Basin Arroyo No. 1 near Florida, New Mexico	09/13/58	695	0.60	4,470	7
302	322223	1073628	Mimbres Basin Arroyo No. 2 near Florida, New Mexico	09/13/58	1,570	7.58	4,480	7
303	321628	1074016	Mimbres River near Deming, New Mexico	07/12/59	1,720	1,370	4,260	7
304	322656	1075542	Mimbres River tributary No. 1 near Spalding, New Mexico	07/25/57	465	4.69	4,730	7
305	330928	1071255	Mims Lake tributary near Truth or Consequences, New Mexico	09/14/76	1,810	0.80	4,280	7
306	325004	1071914	Montoyo Arroyo near Arrey, New Mexico	07/12/50	9,800	54.0	4,180	7
307	330729	1071742	Mud Springs Canyon near Truth or Consequences, New Mexico	07/12/50	10,850	20.9	4,300	7
308	330340	1071755	Palomas River at Los Palomas, New Mexico	07/12/50	18,800	239	4,260	7
309	324013	1071008	Placitas Arroyo at Hatch, New Mexico	09/13/58	3,360	27.0	4,060	7
310	322807	1075319	Porter Draw near Spalding, New Mexico	09/12/58	1,910	70.8	4,830	7
311	322952	1065628	Rio Grande tributary at Radium Springs, New Mexico	09/13/58	1,190	2.12	3,980	7
312	330714	1071558	Rio Grande tributary at Truth or Consequences, New Mexico	07/12/50	1,840	4.00	4,270	7
313	324122	1071048	Rio Grande tributary No. 2 near Salem, New Mexico	06/28/66	1,600	0.62	4,080	7
314	331635	1060401	Rocky Arroyo near Three Rivers, New Mexico	07/06/63	2,370	7.03	4,490	7
315	331635	1060401	Rocky Arroyo near Three Rivers, New Mexico	08/24/59	1,500	7.03	4,490	7
316	332808	1071447	San Jose Arroyo near Truth or Consequences, New Mexico	06/26/54	5,890	17.6	5,110	7
317	325904	1071815	Seco Creek near Caballo, New Mexico	07/12/50	9,000	86.6	4,240	7
318	315751	1074051	Seventy-six Draw near Waterloo, New Mexico	08/06/54	721	487	4,110	7
319	315616	1074016	Seventy-six Draw tributary No. 2 near Waterloo, New Mexico	Sep-58	474	1.50	4,180	7
320	314903	1075139	Simpson Draw near Hermanas, New Mexico	10/14/58	1,810	94.0	4,200	7
321	314808	1074343	State Highway 9 Arroyo near Mimbres, New Mexico	09/11/58	467	3.55	4,300	7
322	321609	1064442	Tortugas Arroyo at Tortugas, New Mexico	08/22/58	5,880	21.7	3,930	7
323	331259	1060341	Tularosa Basin tributary near Three Rivers, New Mexico	08/24/59	1,940	2.53	4,470	7
324	325659	1055816	U.S. Highway 54 Arroyo near Alamogordo, New Mexico	Aug-55	102	0.45	4,490	7
325	325349	1055636	Washington Ave Ditch at Alamogordo, New Mexico	08/17/59	245	2.20	4,400	7

Appendix 3. Miscellaneous sites, maximum peak discharge, drainage area, and site elevations.—Continued

[DMS, degrees minutes seconds; NGVD 29, National Geodetic Vertical Datum of 1929]

Map identi-fier (fig. 2)	Latitude (DMS)	Longi-tude (DMS)	Miscellaneous site name	Date	Maximum peak discharge (cubic feet per second)	Drainage area (square miles)	Site elevation (feet above NGVD 29)	Region
326	325349	1055636	Washington Ave Ditch at Alamogordo, New Mexico	08/26/59	288	2.20	4,400	7
327	313934	1085020	Animas Creek near Rodeo, New Mexico	09/13/58	1,030	248	4,860	7
328	314107	1085004	Animas Creek tributary near Rodeo, New Mexico	None	450	4.78	4,850	7
329	314107	1085004	Animas Creek tributary near Rodeo, New Mexico	None	375	4.78	4,850	7
330	322102	1084526	Lordsburg Draw tributary near Lordsburg, New Mexico	09/11/64	1,590	2.32	4,300	7
331	321045	1082258	Burro Cienaga near Separ, New Mexico	Sep-58	7,310	47.6	`	7
332	321300	1082649	Ninety-Six Creek near Separ, New Mexico	Sep-58	4,730	43.3	4,480	7
333	314426	1061941	Jesuit Draw at El Paso, Texas	08/18/63	1,630	1.49	3,780	7
334	314325	1061905	Pendall Draw at El Paso, Texas	08/18/63	838	1.71	3,790	7
335	323248	1082439	Keese Canyon near White Signal, New Mexico	Sep-58	954	1.24	6,220	8
336	323244	1082515	Keese Canyon tributary near White Signal, New Mexico	Sep-58	320	0.19	6,280	8
337	323642	1075321	Mimbres River tributary near Dwyer, New Mexico	09/01/58	2,790	6.34	5,140	8
338	325532	1073442	North Percha Creek at Hillsboro, New Mexico	09/31/72	20,900	41.4	5,310	8
339	325515	1073420	Percha Creek at Hillsboro, New Mexico	1952	1,220	34.6	5,310	8
340	325515	1073420	Percha Creek at Hillsboro, New Mexico	09/22/52	4,300	34.6	5,310	8
341	323116	1082658	Walking X Canyon tributary near White Signal, New Mexico	Sep-58	770	1.19	6,060	8
342	325805	1083703	Duck Creek tributary at Cliff, New Mexico	Aug-58	1,570	15.0	4,500	8
343	334426	1084352	Largo Canyon tributary near Reserve, New Mexico	07/19/60	882	29.6	5,970	8
344	325701	1083658	Lobo Creek at Cliff, New Mexico	08/04/66	4,890	12.7	4,500	8
345	322926	1083251	Wood Canyon tributary near Lordsburg, New Mexico	Sep-58	603	0.27	5,680	8
346	322921	1083301	Wood Canyon tributary 1A near Lordsburg, New Mexico	Sep-58	518	0.34	5,700	8
347	332839	1085338	Saliz Canyon tributary near Reserve, New Mexico	07/20/59	414	0.30	6,040	8
348	330213	1081231	Sapillo Creek near Pinos Altos, New Mexico	08/01/62	2,180	111	5,840	8
349	321326	1090118	Steins Creek tributary near Steins, New Mexico	Sep-58	380	0.55	4,210	8
350	322936	1083222	Peterson Canyon near Lordsburg, New Mexico	Sep-58	432	1.30	5,720	8

Appendix 3. Miscellaneous sites, maximum peak discharge, drainage area, and site elevations.—Continued

[DMS, degrees minutes seconds; NGVD 29, National Geodetic Vertical Datum of 1929]

Map identifier (fig. 2)	Latitude (DMS)	Longitude (DMS)	Miscellaneous site name	Date	Maximum peak discharge (cubic feet per second)	Drainage area (square miles)	Site elevation (feet above NGVD 29)	Region
351	325120	1075835	Willow Springs Canyon at Mimbres, New Mexico	07/31/70	158	3.84		8
352	325120	1075835	Willow Springs Canyon at Mimbres, New Mexico	07/15/72	98	3.84		8
353	325120	1075835	Willow Springs Canyon at Mimbres, New Mexico	08/04/74	1,180	3.84		8
354	352824	1082507	Four Mile Canyon near Coolidge, New Mexico	None	690	10.4	7,120	9
355	353150	1084522	Gamerco Wash above Maloney Street Gallup, New Mexico	07/22/77	930	6.70	6,500	9
356	353036	1083233	South Fork Puerco River tributary at Fort Wingate, New Mexico	Sep-58	1,950	3.60	6,740	9
357	352604	1082010	South Fork Puerco River tributary No. 1 near Coolidge, New Mexico	08/06/59	877	0.60	7,150	9
358	352748	1082112	South Fork Puerco River tributary No. 2 near Coolidge, New Mexico	08/06/59	5,250	5.10	7,060	9
359	352618	1082125	South Fork Puerco River tributary No. 3 near Coolidge, New Mexico	08/06/59	679	0.80	7,190	9
360	353100	1084105	Perritti Canyon near Gallup, New Mexico	07/31/56	4,940	9.00	6,610	9
361	353108	1084118	Perritti Canyon tributary near Gallup, New Mexico	07/31/56	1,230	0.52	6,610	9
362	352850	1085018	Saltwater Wash near Montmore, New Mexico	08/17/58	3,810	39.0	6,320	9
363	352659	1082257	Smith Canyon near Coolidge, New Mexico	None	534	6.60	7,110	9
364	352659	1082257	Smith Canyon near Coolidge, New Mexico	July-56	337	6.60	7,110	9
365	352650	1082153	Foster Canyon at Coolidge, New Mexico	None	1,660	16.7	7,100	9
366	352650	1082153	Foster Canyon at Coolidge, New Mexico	None	172	16.7	7,100	9
367	352650	1082153	Foster Canyon at Coolidge, New Mexico	07/08/56	118	16.7	7,100	9

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