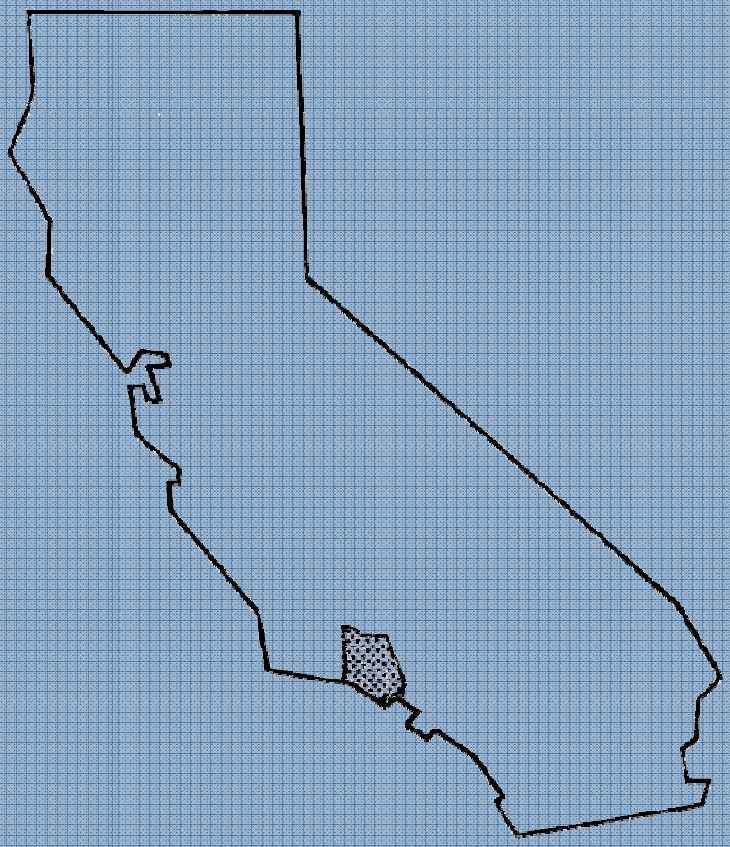
Federal Emergency Management Agency
Task Order #34

Hydrologic Review For The Ventura River Watershed And Several Tributary Streams Flood Insurance Study

Ventura County, CA

Final Technical Memorandum



February 2010

Project No. 200543-84011-141

HDR

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TASK ORDER 34

HYDROLOGIC REVIEW FOR THE VENTURA RIVER WATERSHED AND SEVERAL TRIBUTARY STREAMS FLOOD INSURANCE STUDY

VENTURA COUNTY, CALIFORNIA

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1.0 Introduction

HDR was contracted by the Federal Emergency Management Agency (FEMA) to provide updated hydraulic models for the Ventura River and Tributaries Flood Insurance Study (FIS) using hydrology provided by Ventura County. Section 1.0 presents the scope of services and discusses of the hydrologic review by HDR. The topics discussed in this section include the following:

- Purpose
- Scope of Work
- Study Streams and Watershed
- Effective FEMA Discharges
- Overview of Proposed Hydrology

1.1 Purpose

The purpose of this Technical Memorandum (TM) is to provide HDR's evaluation of the peak flow results provided by Ventura County for the Ventura River and Tributaries FIS update. Ventura County provided recommended peak flows for the Ventura River developed by the U.S. Bureau of Reclamation (USBR). The USBR did not develop a rainfall-runoff hydrologic model, but used Weibull plotting positions to estimate peak flows for the Ventura River. The methodology is included in the report entitled *Ventura River Peak Flow Flood Frequency Study for Use with Matilija Dam Ecosystem Restoration Feasibility Study, Ventura County, CA* dated February 2002.

Peak flows for the Ventura River Tributaries were provided by Ventura County using the Hydrologic Simulation Program-FORTRAN (HSPF) model. The HSPF peak flow results were provided in a separate draft report entitled *Ventura River Watershed Design Storm Modeling* dated July 2009.

HDR's scope of services did not include receiving and reviewing the electronic files of the hydrologic models to provide a detailed review of the input parameters. Ventura County recommended the HSPF peak flow results to be used for the tributaries and the USBR peak flow results to be used for the Ventura River.

1.2 Scope of Work

1.2.1 Ventura River Comparison

HDR's evaluation in this report will compare the USBR recommended peak discharges (500-, 100-, 50- and 10-year) for the Ventura River to a Log-Pearson Type III analyses (LPIII), available USGS flow frequency analysis data, current FEMA effective peak discharges, and regional regression equations. To evaluate the respective peak discharge values, HDR duplicated

the LPIII analysis provided by Ventura County and the USBR to determine the Weibull plotting positions and the 68-percent confidence limits.

1.2.2 Ventura River Tributaries Comparison

HDR's evaluation in this report will compare the HSPF peak flow results (500-, 100-, 50- and 10-year) provided by Ventura County to LPIII analysis, effective FEMA peak flow data, and Regional Regression equations.

1.3 Study Streams and Watershed

The stream reaches and watershed boundary for the Ventura River and Tributaries being studied are depicted in **Figure 1**, and study streams lengths are listed in **Table 1**. The study streams include approximately 17 miles of the Ventura River and approximately 39 miles of Ventura River tributaries.

The Ventura River watershed is approximately 228 square miles. Approximately 90 percent of the Ventura River watershed is contained within Ventura County, with the remaining 10 percent of the watershed located within Santa Barbara County. The communities within the Ventura River watershed include unincorporated areas of Ventura County, the City of Ojai, and the City of San Buenaventura.

Two major reservoirs are located within the watershed. Lake Casitas is located on Coyote Creek, and the Matilija Reservoir is located on the Ventura River. Both serve as water supply reservoirs, with no flood control capacity (Ventura County Watershed Protection District, 2009). The USBR is recommending the removal of the Matilija Dam due to a high level of sediment collecting behind the dam. The potential dam removal may occur within five years based on discussions with Ventura County staff.

Los Robles Diversion Dam is located on the Ventura River within the study reach. The dam is used to divert discharge from the river to Lake Casitas, with the capability of diverting up to approximately 500 cubic feet per second (cfs). The dam includes an overflow weir for bypassing large discharges.

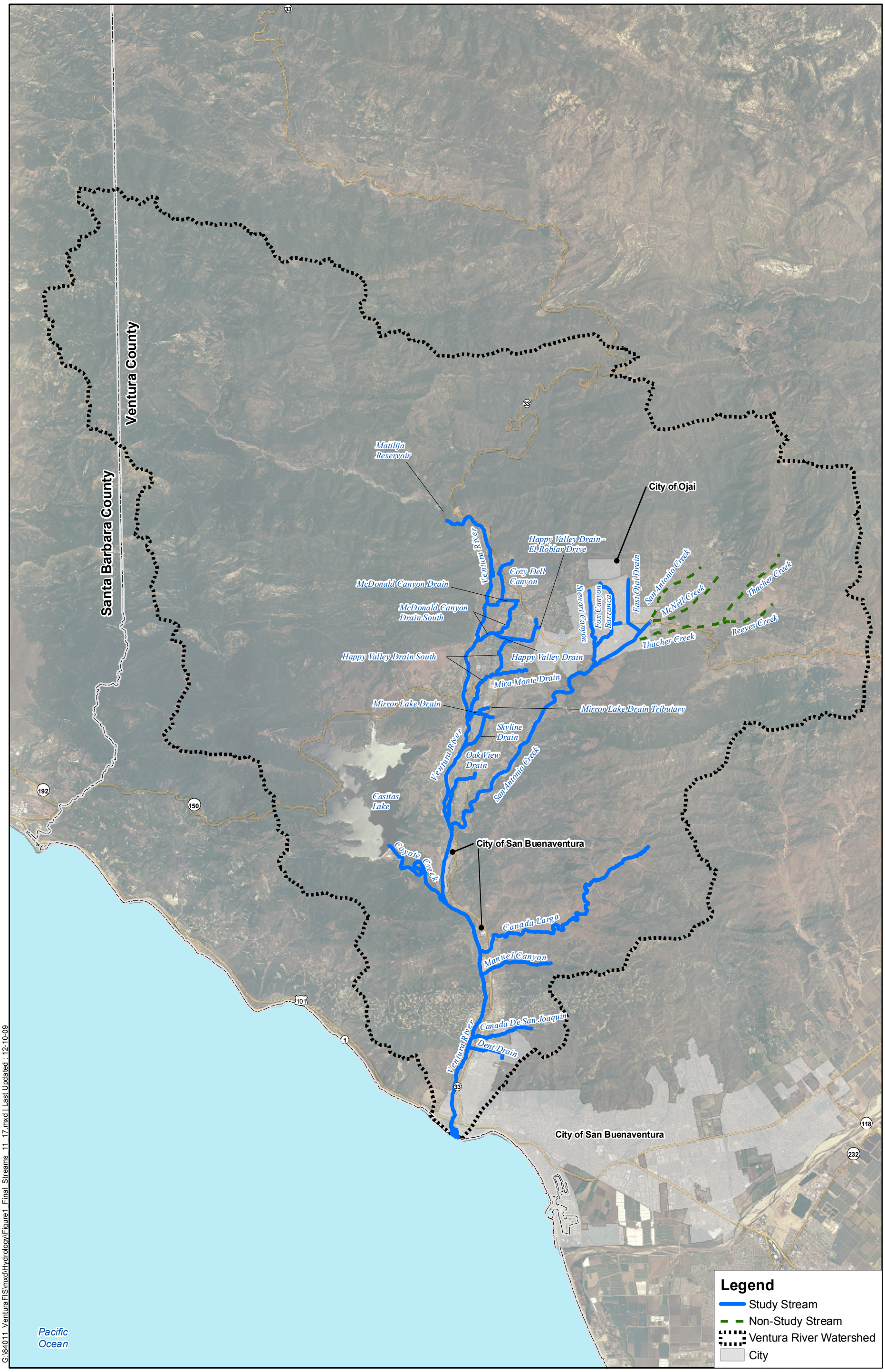
The topography of the watershed can be described as rugged in the upper basins and flat valleys toward the downstream areas. Approximately 15 percent of the watershed can be classified as valley area. Forty percent can be classified as foothill area and 45 percent can be classified as mountainous. The weather can be described as having hot daytime highs in the summer and a moderately cool winter (Ventura County Watershed Protection District, 2009).

The average rainfall varies throughout the watershed. Near Matilija Dam, the upstream portion of the Ventura River averages approximately 23.9 inches of rainfall per year, while the average near the mouth of the Ventura River at the Pacific Ocean is approximately 16.9 inches per year (Ventura County Watershed Protection District, 2009). For the entire watershed, the average

rainfall is approximately 20.0 inches per year (Ventura County Watershed Protection District, 2009).

Table 1 - Study Streams and Reach Lengths

Stream Name	Estimated Length of Study Reach (miles)
Canada de San Joaquin	1.5
Canada Larga	6.7
Coyote Creek	2.9
Cozy Dell Canyon	1.2
Dent Drain	1.0
East Ojai Avenue Drain	0.2
East Ojai Drain	1.4
Fox Canyon Barranca	1.9
Happy Valley Drain	1.4
Happy Valley Drain - El Roblar Drive	0.1
Happy Valley Drain South	2.5
Manuel Canyon	1.8
McDonald Canyon Drain	0.5
McDonald Canyon Drain South	1.7
Mira Monte Drain	0.8
Mirror Lake Drain	0.7
Mirror Lake Drain Tributary	0.1
Oak View Drain	1.3
San Antonio Creek	7.8
Skyline Drain	1.3
Stewart Canyon	2.2
Ventura River	16.8
Total	**55.8**



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Study Streams and Watershed

FIGURE 1

FIS for the Ventura River Watershed and Several Tributary Streams - Ventura, CA | HDR Project No. 141-84011.

1.4 Effective FEMA Discharges

The effective FEMA peak discharges for the study streams are documented in the following FIS documents:

- City of Ojai, dated April 19, 1983
- City of San Buenaventura, dated August 19, 1987
- Ventura County (Unincorporated Areas), dated September 3, 1997.

The effective FEMA hydrology was prepared during the 1970s by the U.S. Army Corps of Engineers (USACE). The USACE used unspecified regional regression techniques to develop flow-frequency curves for eight stream gages in the study watershed. The periods of record at the time of the analysis ranged from 13 to 44 years. Flow-frequency curves for nearby gaged sites were applied to ungaged locations by adjusting the curves based on relative tributary areas (ungaged versus gaged area).

On January 20, 2010, the Digital Flood Insurance Rate Maps (DFIRM) and FIS went effective in a countywide format. The DFIRM process included digitizing floodplain boundaries from the effective paper FIRM panels and using a best-fit process to locate the floodplain boundaries on a digital base map, thus converting the existing Flood Insurance Rate Maps (FIRM) panels to a digitally produced FIRM, referred to as DFIRM. For the Ventura River and Tributaries study reaches, no new hydrologic analysis were incorporated into the DFIRM; therefore, the peak discharge data, for the Ventura River and Tributaries study reaches from the documents listed above, are represented in the updated 2010 FIS. Hereinafter the effective FEMA discharges will be referred to collectively as from the 2010 FIS.

1.5 Overview of Proposed Hydrology

The proposed hydrology is based on hydrologic information provided by Ventura County. The information is derived from two main sources: (1) a flow-frequency analysis recently conducted by the USBR and (2) a hydrologic model recently developed by Ventura County. Ventura County recommends that the USBR flow-frequency analysis results be used for the Ventura River and the HSPF model results to be used for the river tributaries. The sources of hydrology are discussed separately as follows:

- USBR Flow-Frequency Analysis
- Ventura County HSPF Hydrologic Model

1.5.1 USBR Flow-Frequency Analysis

The USBR recently developed peak discharge information for the Ventura River as part of a study for the removal of Matilija Dam, which is located in the upper Ventura River study limits.

The study is documented in a report entitled *Hydrology, Hydraulics and Sediment Studies of Alternatives for the Matilija Dam Ecosystem Restoration Project, Ventura, CA*, dated September 2004. Details regarding the hydrologic analysis are described in the report titled *Ventura River Peak Flow Flood Frequency Study for Use with Matilija Dam Ecosystem Restoration Feasibility Study, Ventura County, California* dated February 2002. The basis of the proposed peak discharges is a flow-frequency analysis of stream flow gage records for the Ventura River.

The flow-frequency analysis was conducted for two gage locations on the Ventura River, with one gage located at Matilija Dam (near the upstream end of the river study reach), and one located near the City of San Buenaventura (near the downstream end of the study reach). At the time of the study, there were 62 and 68 years of records, respectively. Per FEMA standards, the USBR based the flow-frequency analysis on Bulletin 17B (U.S. Geological Survey, 1982) procedures, and attempted to fit a Log-Pearson Type-III-distribution curve to the gage data. Trying various station skew values and treatments of data outliers, the USBR could not obtain a good fit of the Log-Pearson III curve to the gage data (for either gage location), with the fitted curves yielding 1-percent annual chance (100-year) peak discharges that the USBR deemed unreasonably low or high. As an alternative, the USBR computed a least-squares regression of the seven largest flow-frequency data. With this approach, the USBR was able to estimate a 1-percent annual chance (100-year) discharge that the USBR deemed to be reasonable.

Peak discharges at ungaged points of interest were then estimated based on both the flow-frequency information from the gaged sites and on the Ventura County FIS dated 2010. The 2010 FIS included flow-frequency analyses for the gages utilized by the USBR study, but also included peak discharge estimates at ungaged locations. To compute peak discharges at the ungaged locations, USBR estimated ratios between the ungaged and gaged locations along the Ventura River from the 2010 FIS using the nearest gage site.

1.5.2 Ventura County HSPF Hydrologic Model

Ventura County sponsored the development of a hydrologic model based on the watershed simulation model software, HSPF. HSPF is a comprehensive discharge and water quality simulation model supported by the U.S. Geologic Survey (USGS) and the U.S. Environmental Protection Agency (EPA). HSPF is also a FEMA-approved model software. The model was completed in 2009, and represents the entire 228 square-mile study watershed and 94 individual streams, including those being studied for the FIS. HSPF is a simulation model that represents existing conditions by converting precipitation data and other weather inputs to predict the flow throughout the watershed at a 15-minute time step. The development of the model included identifying saturated conditions and applying a 1-percent annual chance (100-yr) balanced design storm hyetograph for each rain gage. The development of the model and peak discharge results are documented in a draft report by Ventura County entitled *Ventura River Watershed Design Storm Modeling*, dated July 2009.

The model was developed for a 1-percent annual chance (100-year) storm event, and was calibrated to stream gage flow-frequency information developed for gages within the watershed for only the 1-percent annual chance event. The HSFP models were not calibrated to the 2-, 10- and 0.2-percent annual chance events. The model results for the Ventura River were calibrated based on the stream gage flow-frequency analysis prepared by the USBR. The model results were also calibrated for the river tributaries based on a stream gage flow-frequency analyses prepared by Ventura County for the two major tributaries and for two minor tributaries. The Ventura County flow-frequency analyses were based on Bulletin 17B procedures, as required by FEMA guidelines. Periods of record for the gages used in the analyses ranged from 31 to 72 years, which meets FEMA Guidelines and Specifications. Ventura County was able to get good calibration of the model for the 1-percent annual chance (100-year) peak discharges at the gage locations (both on the Ventura River and on its tributaries).

HSPF models were not developed for the 10-, 2-, and 0.2-percent annual chance (10-, 50-, and 500-year) storm events because of budgetary limits (Ventura County Watershed Protection District, July 2009). To develop peak discharges for these events, Ventura County developed multipliers based on the flow-frequency analyses (which include the full range of frequencies) for the gages discussed above. These multipliers were applied to 1-percent annual chance (100-year) peak discharges at the model node locations to estimate the other frequency discharges at those locations. This approach was not used to estimate discharges for the Ventura River because Ventura County considered the USBR peak discharges to be more accurate for the full range of flow frequencies. As a result, Ventura County recommends that the USBR discharge estimates be used for the river instead of estimates based on the HSPF model. Ventura County provided HDR with finalized peak discharge results in September 2009.

2.0 Review Criteria

The purpose of this section is to present the criteria used to review the proposed hydrology. The criteria are based, for the most part, on *FEMA Guidelines and Specifications for Flood Hazard Mapping Partners, Appendix C: Guidance for Riverine Flooding Analyses and Mapping* (Federal Emergency Management Agency, 2003). Criteria used are limited to those pertinent to HDRs scope of work. The major categories of criteria used for the review include the following:

- Gaging Station Data
- Rainfall-Runoff Models
- Regional Regression Equations
- Creager Enveloping Curve
- Discharge-Stage Information

2.1. Gaging Station Data

Analysis based on gaging station data should be checked for use of correct methodology and reasonableness. According to FEMA Guidelines and Specifications, reasonableness of peak discharge data estimated from gaging stations is assessed by (1) determining conformance with Bulletin 17B procedures, (2) comparison with published USGS flow frequency data, if available, and (3) comparison of effective FIS peak discharges to the confidence limits of the proposed peak discharges.

In order to determine the 1-percent annual chance (100 year) flood event using Bulletin 17B procedures, the period of record for gage stations analyzed should be at least 10 years and data should be from periods of similar watershed conditions, for example, regulated versus unregulated. If other procedures were used, the reasonableness of these procedures should be determined. As recognized in Bulletin 17B, peak discharge data for some gaging stations will not always conform to a Log-Pearson III distribution, and other approaches are needed. The results of the alternative approach shall be compared to results based on standard Bulletin 17B procedures.

LPIII analyses conducted by the USBR, Ventura County, and HDR are provided in **Appendix A1- A3 respectively.** The gages analyzed are shown in **Figure 2** and are listed in **Tables 2 and 3**. Note that the stream flow gage on San Antonio Creek (San Antonio Creek at Casitas Springs) was operated and maintained by USGS until 1984, but Ventura County has provided operation and maintenance since 1984 to the present date. This gage is listed in both tables and provides a total of 50 years of record.

Table 2 - Ventura County Maintained Stream Flow Gaging Stations

Stream Name	Gage Name	Gage Number	Area (sq mi)	Years of Record	Dates of Record
North Fork Matilija Creek	North Fork Matilija Creek at Matilija Hot Springs	604	15.6	72	1933-2005
San Antonio Creek	San Antonio Creek at Casitas Springs	605	51.2	21	1984-2005
Canada Larga	Canada Larga at Ventura Avenue	630	19.12	35	1970-2005
Fox Canyon Barranca	Fox Canyon Drain below Ojai Avenue	631	1.99	35	1970-2005
Happy Valley Drain	Happy Valley Drain at Rice Road	633	1.51	31	1974-2005

Table 3 - USGS Maintained Stream Flow Gaging Stations

Stream Name	Gage Name	Gage Number	Area (sq mi)	Years of Record	Dates of Record
Matilija Creek	Matilija Creek AB RES NR Matilija Hot Springs, CA	11114500	50.7	21	1949-1969
Matilija Creek	Matilija Creek at Matilija Hot Springs, CA	11115500	54.6	64	1934-1998
San Antonio Creek	San Antonio Creek At Casitas Springs	11117500	51.2	34	1950-1983
Ventura River	Ventura River Near Ventura	11118500	188.0	75	1933-2000

2.2 Rainfall-Runoff Models

According to the FEMA Guidelines and Specifications, rainfall-runoff models may be used for streams, where gaging station data or regional regression data is not applicable, due to unique characteristics of the watershed. Rainfall-runoff models, that will be utilized to develop peak flows, are included on FEMA's accepted models list. HSPF is found on the list of FEMA approved models; however, calibration to actual flood events is required. Also, the model shall not include any storage capability in reservoirs below the Normal Pool Elevation. The HSPF models developed by Ventura County satisfies each of these criteria, but the hydrologic models were only calibrated to the one storm frequency event (100-year) and the peak flows developed from the HSPF models will only be utilized for the Ventura River tributaries.

To check for reasonableness, HSPF proposed peak discharges will be compared to discharges estimated from gaging data, to USGS regional regression equations, and to the effective FEMA discharges. The proposed discharges will be considered reasonable if the HSPF discharges are within the 68-percent confidence interval (equivalent to plus or minus one standard error per normal distribution) of the USBR LPIII analysis and the Ventura County LPIII. Peak discharge values outside one standard error may require closer evaluation of the rainfall-runoff model to determine the reason for the differences or may be explained by some unique characteristic of the watershed.

HDR reproduced the LPIII analyses prepared by the USBR (See **Appendix A1**) and Ventura County (See **Appendix A2**) because the 68-percent confidence limits were not included with their respective analyses. The HDR analyses are also provided in **Appendix A3**. To reproduce the LPIII analyses, HDR used the same parameters (for example, regional skew) as were used in each analysis. The USGS software PEAKFQ was used to apply Bulletin 17B procedures.

2.3 Regional Regression Equations

The peak discharges for the 10-, 2-, 1-, and 0.2-percent annual chance flood events using the available regional regression equations developed by the USGS were determined. The most recent published USGS regional regression equations for California are found in the USGS publication entitled *Water-Resources Investigations Report 94-4002, Nationwide Summary of U.S. Geological Survey Regional Regression Equations for Estimating Magnitude and Frequency of Floods for Ungaged Sites dated 1993*.

The Ventura River watershed is found within the South Coast Hydrologic Region in California. No size limitations regarding drainage area or maximum mean annual precipitation is specified for the South Coast Hydrologic Region; therefore, the regional regression equations can be used for all proposed streams for the Ventura River and tributaries within the study area.

The equations for the South Coast Region for the 10-, 2-, and 1-percent annual chance (10-, 50-, and 100-year) flood events are shown below:

$$Q_{10} = 0.63\ A^{0.79}\ P^{1.62}$$

$$Q_{50} = 1.50\ A^{0.82}\ P^{1.85}$$

$$Q_{100} = 1.95\ A^{0.83}\ P^{1.87}$$

Where, $Q_{10,50,100}$ = Peak Discharge for the 10, 50, 100-year event in cubic feet per second (cfs),

A = Drainage Area in square miles (mi^2), and

P = Mean Annual Precipitation in inches (in) obtained from Open-File Map for Mean Annual Precipitation in California (Rantz, 1993)

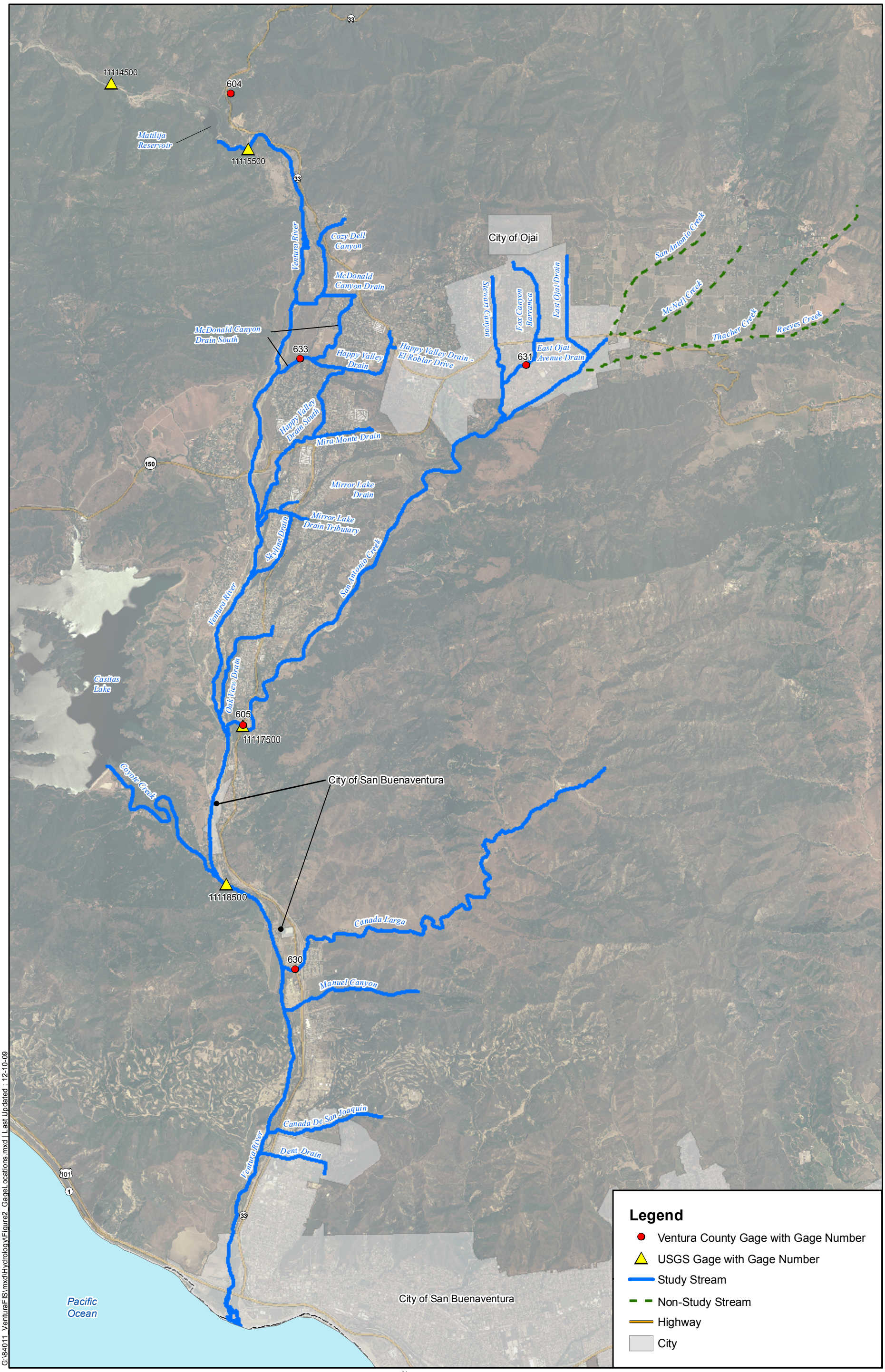
There is no regional regression equation available for the 0.2-percent annual chance peak discharge; therefore, the 0.2-percent annual chance flood event was extrapolated based on the discharges estimated with the regional regression equation above using NFF analysis software (version 5.0.0).

2.4 Creager Enveloping Curve

Proposed discharges versus drainage area will be plotted against the Creager Enveloping Curve of Maximum Peak Discharges in California (USGS publication, *Magnitude and Frequency of Floods in California, Water-Resources Investigations 77-21).* Discharges falling below this curve will be considered reasonable.

2.5 Available Discharge-Stage Information

Historical highwater marks from previous storms can play a major role in model result verification. If available, proposed discharges will be compared to water surface elevations (stages), such as high water mark information. Recorded stages can be estimated from USGS annual data reports, USGS internet site postings, and information provided by Ventura County. Adjustments will be made for shifts in datums or rating curves, if necessary.



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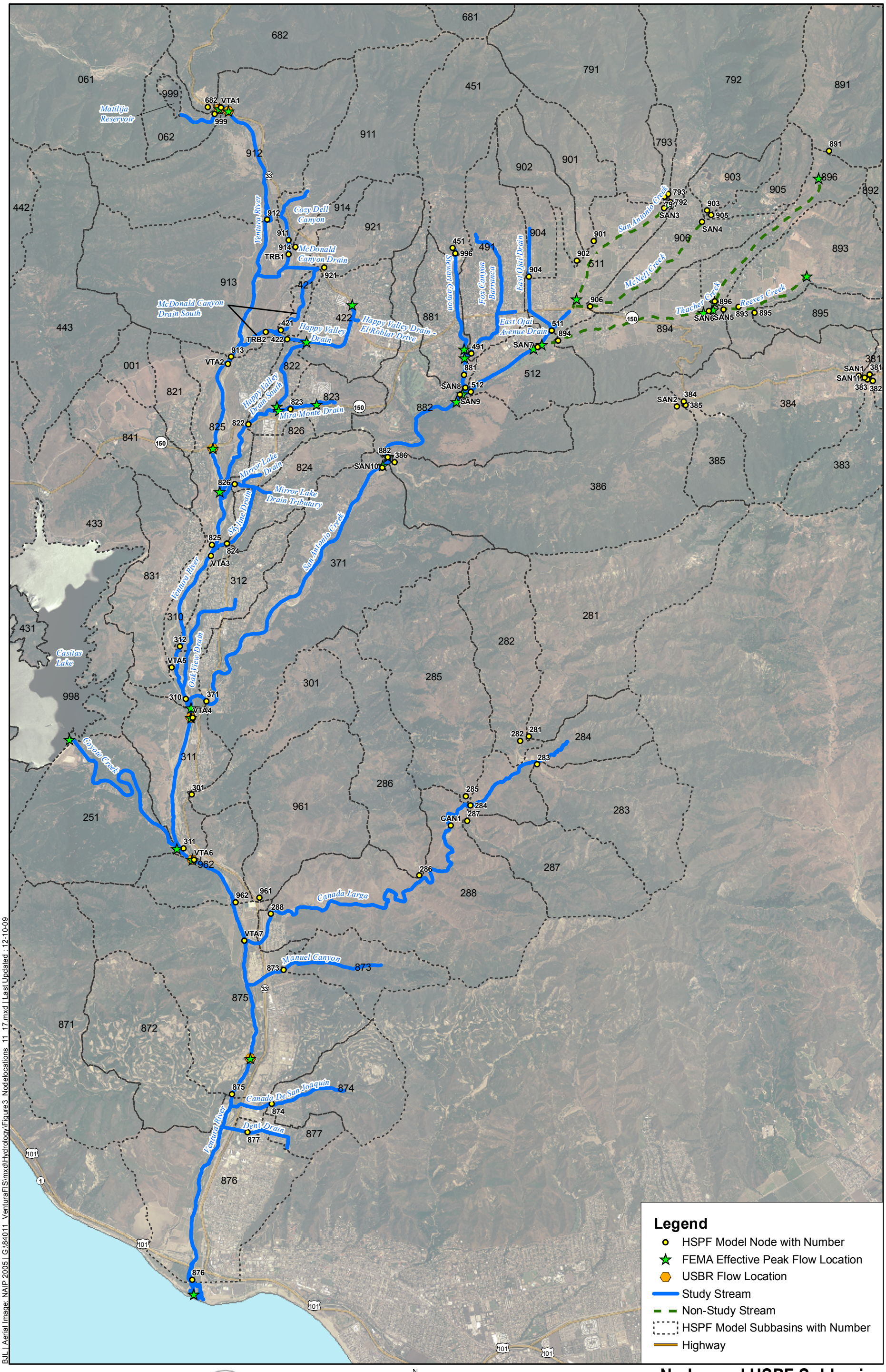
Stream Gages

FIGURE 2

FIS for the Ventura River Watershed and Several Tributary Streams - Ventura, CA | HDR Project No. 141-84011.



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Legend

- HSPF Model Node with Number
- FEMA Effective Peak Flow Location
- USBR Flow Location
- Study Stream
- Non-Study Stream
- HSPF Model Subbasins with Number
- Highway

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0 0.5 1 Miles

Nodes and HSPF Subbasins

FIGURE 3

FIS for the Ventura River Watershed and Several Tributary Streams - Ventura, CA | HDR Project No. 141-84011.

3.0 Review of Proposed Hydrology

The purpose of this section is to present HDR's review of the proposed hydrology to revise the effective FEMA peak flows. The assessment is based on the criteria presented in Section 2.0. Proposed peak discharges and peak discharge estimates derived from USBR, USBR LPIII, Ventura County HSPF, Ventura County LPIII, USGS regional regression, and FEMA effective data are provided in **Appendices B and C**. The information provided in Appendix B and C aredescribed in detail in the following section. The proposed peak discharge node locations, identified by number, from the HSFP are illustrated in **Figure 3**. Because the hydrology for the Ventura River and tributaries are from different sources, and were developed with different approaches, the review is discussed as follows:

- Review of Ventura River Hydrology
- Review of Ventura River Tributaries Hydrology

3.1 Review of Ventura River Hydrology

The major elements of the hydrology review for the Ventura River are as follows:

- Gaging Station Data
- Comparison to USGS Published Flow Frequency Analysis
- Comparison of Effective Discharges to Confidence Limits of Proposed Discharges
- Comparison to Regional Regression Equation Discharges
- Comparison to Effective FEMA Discharges
- Comparison to Creager Enveloping Curve
- Comparison to Discharge-Stage Information
- Conclusions

3.1.1 Gaging Station Data

The proposed USBR peak discharges for the Ventura River at the gage locations compared to the USBR LPIII are shown in **Table B1 of Appendix B**. For gage locations on the Ventura River, the USBR conducted a flow-frequency analysis at two gage locations to estimate peak flow-frequency. The log-normal results are plotted on **Figures 4 and 5**, for one gage located near Matilija Dam (near the upstream end of the river study reach), and one gage located near the city of San Buenaventura (near the downstream end of the study reach).

At the time of the study, 62 and 68 years of records, respectively, were available for each gage location, which is more than the number of years required by FEMA Guidelines and Specifications, which require a minimum of 10 years. Per FEMA standards, the USBR based the

flow-frequency analysis on Bulletin 17B (U.S. Geological Survey, 1982) procedures. The USBR attempted to fit LPIII distribution curves to the gage data plotted based on Weibull plotting positions (per Bulletin 17B). The USBR tried various station skew values and treatments of data outliers to obtain a good fit of the LPIII curve to the gage data (for either gage location). This approach did not result with the fitted curves yielding 1-percent annual chance (100-year) peak discharges that the USBR deemed unreasonably low or high. Instead, the USBR computed a least-squares regression of the seven largest flow-frequency points from the annual maxima peak flow. With this approach, the USBR was able to estimate a 1-percent annual chance (100-year) discharge that seemed reasonable relative to the flow-frequency data. As recognized in Bulletin 17B, peak discharge data for some gaging stations will not always conform to a LPIII distribution and other approaches are needed. Example LPIII curve fits with confidence limits are shown in **Figures 4 and 5**.

The flood discharges on the Ventura River are regulated by Matilija Dam (Matilija Reservoir), with a minimal storage capacity, and Casitas Dam (Lake Casitas), which has a maximum storage capacity of 287,000 acre-feet. FEMA Guidelines and Specifications state that for reservoirs that are operated for purposes other than flood control, the storage capacity below the Normal Pool Elevation shall not be considered for storage and attenuating peak flows. Even though the capacity in the two reservoirs is not dedicated to flood control, the regulation will cause some non-homogeneousness in the peak discharge data (that is, differences in peak discharge for unregulated versus regulated periods of record). Annual peak discharges for the USGS 11118500 (Ventura River near Ventura) shows that the largest floods have occurred after 1960, when Casitas Dam was completed, thus any regulation effects are minor(Wilbert Thomas, 2009). Therefore, the USBRs analysis of the entire periods of record for the two gages, although the data is not fully homogeneous, appears to be reasonable.

The USBR used a transfer technique to estimate peak discharges for ungaged locations based on the flow-frequency analyses from the gaged locations. Peak discharges at ungaged points of interest were then estimated based on the flow-frequency information from the gaged sites and on the 2010 FIS. The 2010 FIS included flow-frequency analyses for the same gages as for the USBR study, but also included peak discharge estimates at ungaged locations. Peak discharges at the various ungaged locations were estimated for the USBR study by multiplying them by the ratios of the gage station peaks between the USBR study and the 2010 FIS. The USBR approach does meet FEMA Guidelines and Specifications when considering differences in drainage areas of the gaged and ungaged sites.

3.1.2 Comparison to USGS Published Flow Frequency Analysis

No published flow frequency analysis for gages USGS 11118500, 11114500, and 11115500 were found; therefore, no comparison to USGS published flow frequency data is provided.

3.1.3 Comparison of Effective Discharges to Confidence Limits of Proposed Discharges

See **Figures 4 and 5** for comparison of effective peak discharges to confidence limits of the LPIII analysis. The USBR did not use a standard Bulletin 17B analysis to determine the peak

discharges associated with the Ventura River; therefore, the effective peak discharges do not fall within the 68-percent confidence interval. However, the USBR recommended peak discharges do compare well with the effective peak discharges. See Section 3.1.5 for more detail.

3.1.4 Comparison of Regional Regression Equation Discharges

Per FEMA Guidelines and Specifications, comparison to regional regression equations is not required for hydrologic analysis based on gaging station data. The comparison to current regional regression equation peak discharges is shown for information purposes and will be used to determine if additional peak discharge location data is needed. A comparison of proposed peak discharges for the Ventura River versus peak discharges estimated from USGS regional regression equations is presented in **Table B2 of Appendix B**. The two sets of discharge data are depicted in **Figures 4 and 5** for the two gage locations. **Table B2** and **Figures 4 and 5** shows that the two sources, in general, are substantially different. Because the proposed peak discharges are based on a flow-frequency analysis for long-term gages from within the study watershed, they should be considered more reliable. Furthermore, the USGS is currently updating the regional regression equations applicable to the Ventura River watershed. Until they are updated, the discharges derived from the regional regression equations will not be relied on to assess reasonableness.

3.1.5 Comparison to Effective FEMA Discharges

A comparison of proposed peak discharges for the Ventura River versus effective FEMA discharges, where available, is presented in **Table B3 of Appendix B** and **Figures 4 and 5**. Because the USBR did not use a standard LPIII analysis, the LPIII analysis and the effective FEMA peak discharges cannot be compared based on the log-Pearson III confidence interval. However, the effective FEMA discharges and the USBR recommended peak discharges do compare well, with having a percent differences range from –24 to 21 (see **Table B3** and **Figures 4 and 5**). FEMA effective peak discharges were calculated during the 1970s. The USBR analysis was completed in 2002 and used a longer period of record. Based on this comparison, the proposed discharges are considered reasonable.

3.1.6 Comparison to Creager Enveloping Curve

Figure 6 shows the proposed peak discharges for the Ventura River versus drainage area in comparison to the Creager Enveloping Curve of Maximum Peak Discharges in California for the 1-percent event and the 0.2-percent event. Other discharges used for comparison (log-Pearson and regional regression equation discharges) are also shown. The proposed discharges fit well under the enveloping curve. The 0.2-percent regional regression equation discharges are at or above the curve, as are the 0.2-percent log-Pearson III discharges. These comparisons indicate that the proposed discharges for the Ventura River are reasonable, and may be more reasonable than the regional regression equation or log-Pearson III discharges.

3.1.7 Comparison to Discharge-Stage Information

Stages were estimated for proposed peak discharges using the hydraulic model from the USBR study. The stages were compared to high water mark information from the USGS 2008 Water Data Report and to rating curve information from the USGS internet site. A comparison between the estimated stages and the USGS information could not be made because there is an apparent discrepancy between the two sources of USGS information. The stages for the two largest discharges (1969 and 1978) are inconsistent between the two sources. The USGS is investigating a potential datum conversion issue. However, review of the rating curve information (from the USGS internet site) corresponding to each peak discharge event time period (1969 and 1978) indicated that each of the peak discharge measurements appear to be reasonable—despite the apparent discrepancy between the information for the two events (Wilbert Thomas, November 2009). It should be noted that Ventura County indicated that the Ventura River channel can shift several feet vertically during a major storm (Wilbert Thomas, November 2009); therefore only an approximate comparison of current estimated stages versus historical discharge-stages can be made.

3.1.8 Conclusions

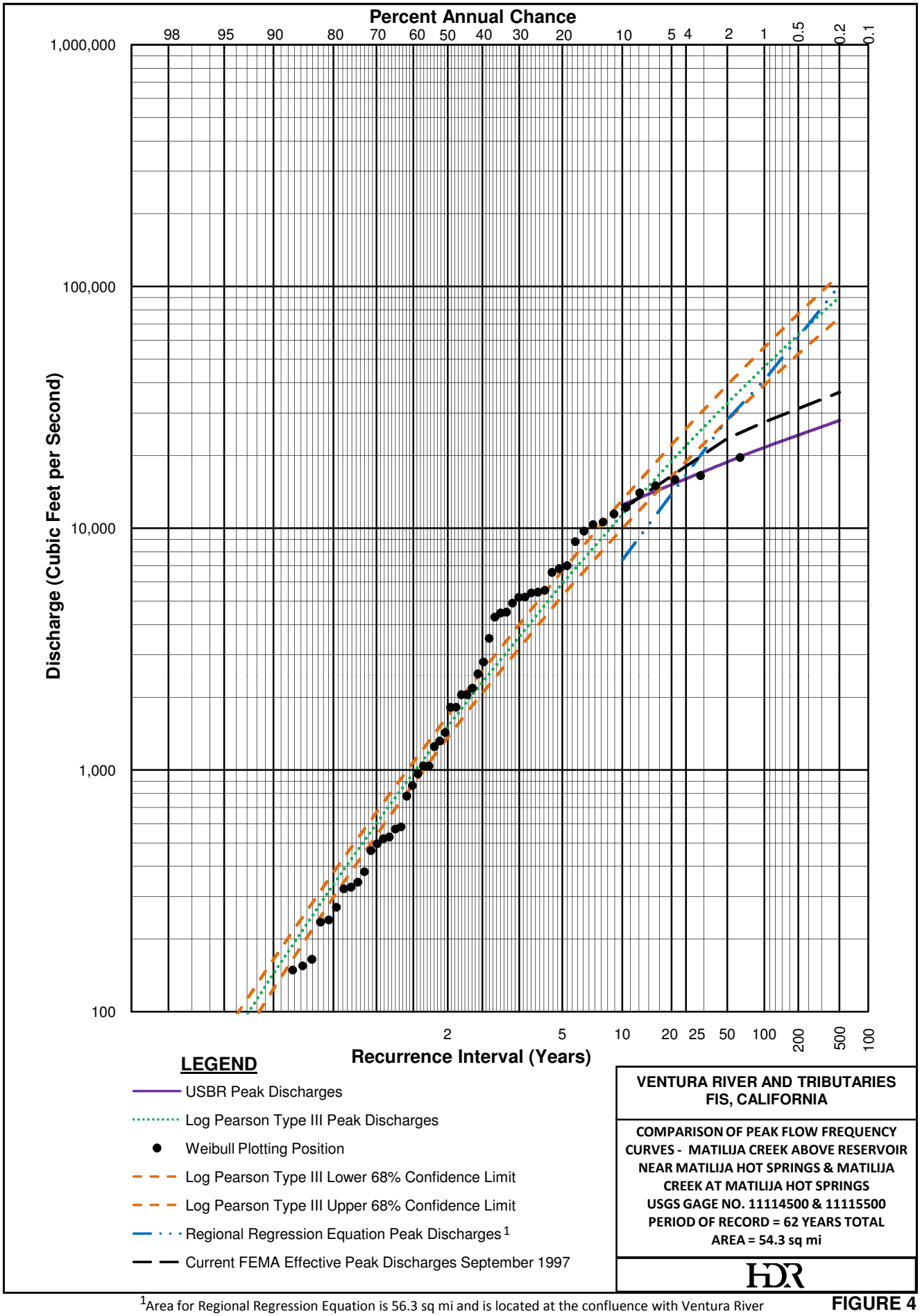
Based on HDR's review and comparisons, the proposed peak discharges for the Ventura River appear to be reasonable. The USBR analysis is considered to be the best available evaluation for the period of record available. HDR recommends that the proposed peak discharges for the Ventura River be used in the hydraulic analysis for this FIS.

See **Table 4** for HDR proposed peak discharges for the Ventura River.

Table 4 - HDR Recommended Peak Discharges for the Ventura River

Flooding Source and Location	Ventura County Description	Node /Location Number	Area (sq mi)	Peak Discharges (cubic feet per second)			
				10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance
Ventura River							
Upstream of Matilija Creek confluence with North Fork Matilija Creek[1]	NA	VTA1	56.4	12,500	18,800	21,600	27,900
Downstream of confluence with North Fork Matilija Creek[1]	NA	912a	72.44	15,000	24,000	27,100	35,200
At Baldwin Road/SR 150[1]	NA	825a	82.95	16,000	24,800	28,300	36,700
Upstream of San Antonio Creek[2]	NA	310a	92.8	16,449	25,493	29,104	37,856
At Casitas Springs[1]	NA	VTA4	143.91	35,200	56,600	66,600	89,000
Upstream of Coyote Creek[2]	NA	311	148.01	35,529	57,135	67,239	90,127
At Casitas Vista Road[1]	NA	VTA6	187.78	36,400	59,700	69,700	93,100
Upstream of Canada Larga[2]	NA	875a	191.46	36,583	59,999	70,055	93,593
At Shell Chemical Plant[1]	NA	875b	222.95	41,300	67,900	78,900	105,500
At Pacific Ocean[2]	NA	876	226.03	41,438	68,126	79,166	105,500

[1] USBR Recommended Peak Discharges
[2] Prorated Discharges Computed from HDR (See Section 4.0)



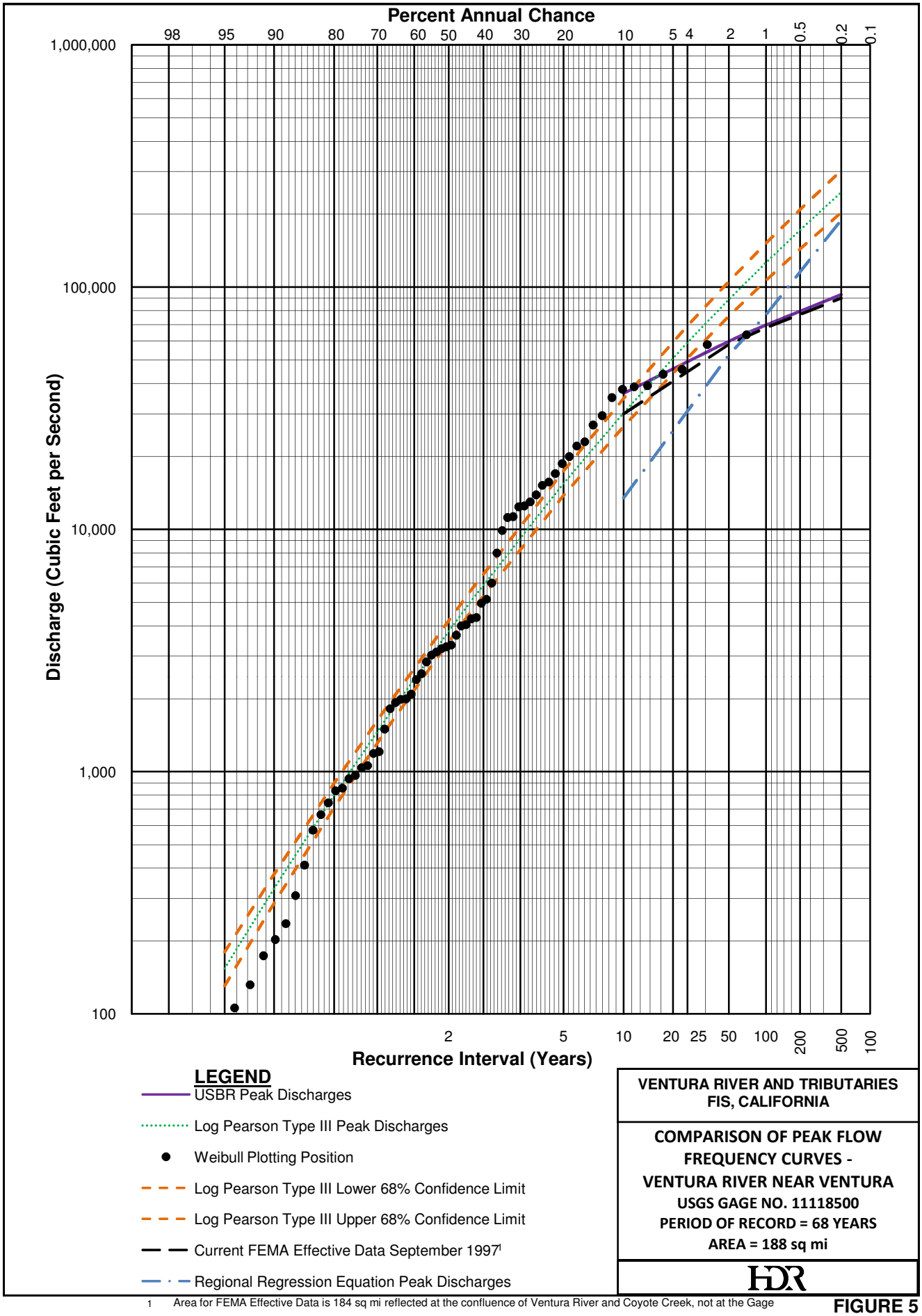
VENTURA RIVER AND TRIBUTARIES
FIS, CALIFORNIA

COMPARISON OF PEAK FLOW FREQUENCY CURVES - MATILIJA CREEK ABOVE RESERVOIR NEAR MATILIJA HOT SPRINGS & MATILIJA CREEK AT MATILIJA HOT SPRINGS
USGS GAGE NO. 11114500 & 11115500
PERIOD OF RECORD = 62 YEARS TOTAL
AREA = 54.3 sq mi

HDR

[1]Area for Regional Regression Equation is 56.3 sq mi and is located at the confluence with Ventura River

FIGURE 4



VENTURA RIVER AND TRIBUTARIES
FIS, CALIFORNIA

COMPARISON OF PEAK FLOW FREQUENCY CURVES -
VENTURA RIVER NEAR VENTURA
USGS GAGE NO. 11118500
PERIOD OF RECORD = 68 YEARS
AREA = 188 sq mi

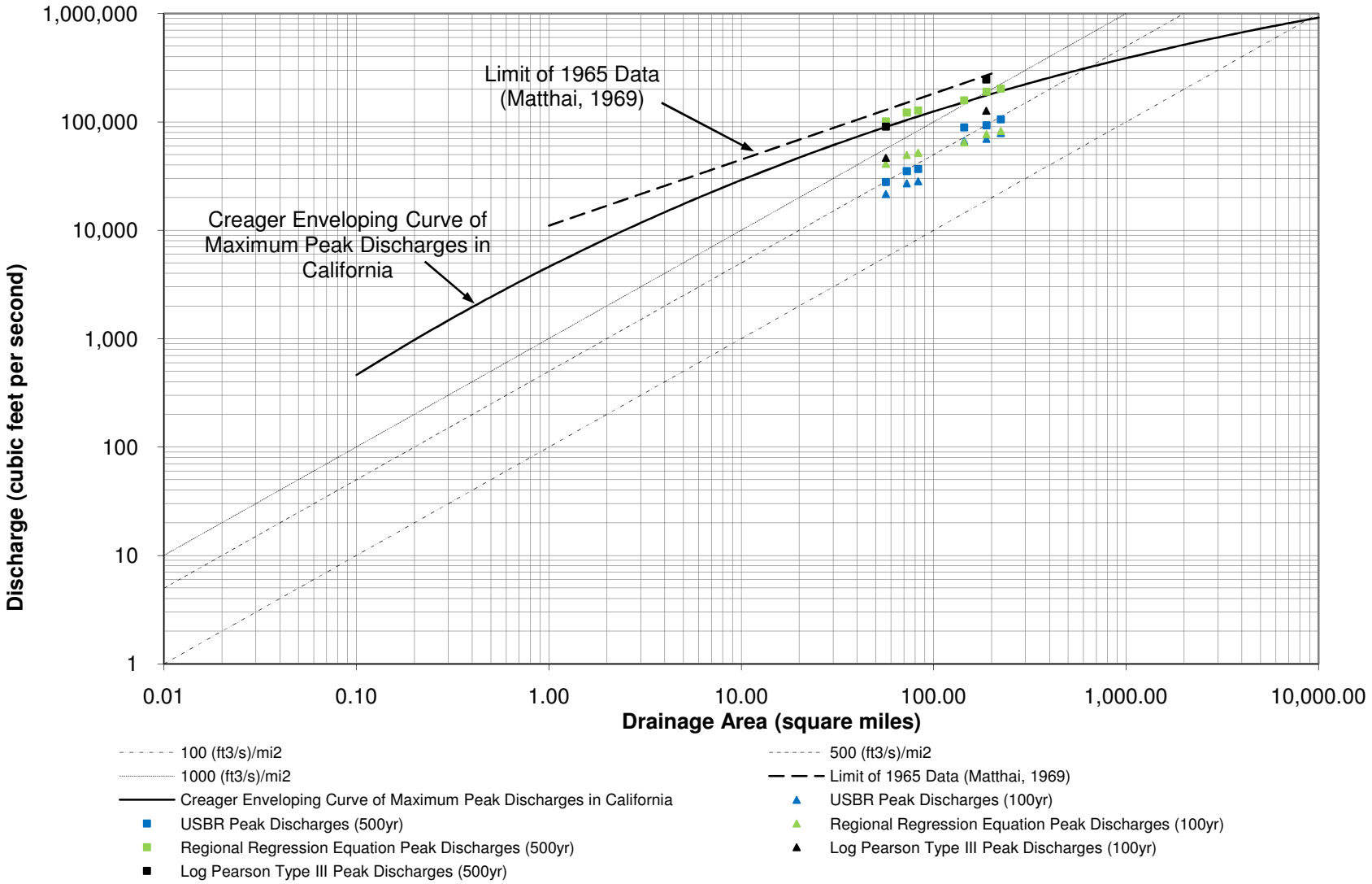
HDR

1 Area for FEMA Effective Data is 184 sq mi reflected at the confluence of Ventura River and Coyote Creek, not at the Gage

FIGURE 5

Figure 6: Maximum Peak Discharges in Relation to Drainage Area for Ventura River

Source for Creager Enveloping Curve: *Magnitude and Frequency of Floods in California, USGS Water-Resources Investigations 77-21* (June 1977)



3.2 Review of Ventura River Tributaries Hydrology

The major elements of the hydrology review for the Ventura River tributaries are as follows:

- Methodology
- Comparison to Gaging Station Data
- Comparison to Regional Regression Equation Discharges
- Comparison to Effective FEMA Discharges
- Comparison to Creager Enveloping Curve
- Comparison to Discharge-Stage Information
- Conclusions

3.2.1 Methodology

The proposed peak discharges for the Ventura River tributaries are based on the hydrologic model software, HSPF. HSPF is a FEMA-approved model software; however, FEMA requires calibration to actual flood events. The HSPF model was developed only for a 1-percent annual chance (100-year recurrence interval) storm event, and was calibrated to stream gage flow-frequency information only for the 1-percent annual chance developed for gages within the watershed, as is required by FEMA Guidelines and Specifications. The calibration information for the Ventura River tributaries includes flow-frequency analyses prepared by Ventura County Watershed Protection District (VCWPD) for Canada Larga, Fox Canyon Drain, Happy Valley Drain, North Fork Matilija Creek, and San Antonio Creek. The Ventura County flow-frequency analyses were based on Bulletin 17B procedures, as required by FEMA Guidelines and Specifications. Periods of record for the gages used in the analyses ranged from 31 to 72 years, which meets FEMA guidelines.

HSPF models were not developed for the 10-, 2-, and 0.2-percent annual chance (10-, 50-, and 500-year) storm events because of budgetary limits. To develop peak discharges for these additional events, Ventura County developed multipliers based on the flow-frequency analyses (which include the full range of frequencies) for the gages discussed above. These multipliers were applied to 1-percent annual chance (100-year) peak discharges at each ungaged location to estimate the other flow frequencies at each location. This approach was not used to estimate discharges for the Ventura River because Ventura County considered the approach used by the USBR to be more accurate. Ventura County recommends that the USBR discharge estimates are used for the river instead estimates based on the HSPF model.

The model does not include any storage capability in reservoirs below the Normal Pool Elevation and is consistent with FEMA Guidelines and Specifications.

3.2.2 Comparison to Gaging Station Data

A comparison of proposed peak discharges for the river tributaries to flow-frequency information estimated from gaging station data is presented in **Table C1 of Appendix C**. The five sets of

discharges are depicted in **Figures 7, 8, 9, 10, and 11** for the gage locations on Canada Larga, Fox Canyon Drain, Happy Valley Drain, North Fork Matilija Creek, and San Antonio Creek. Virtually all of the proposed peak discharges fall within the applicable confidence limits shown on the graphs. Based on this comparison, the proposed discharges are considered reasonable.

It should be noted that, even though the HSPF discharges were not proposed to be used for the Ventura River, the HSPF 1-percent annual chance (100-year) model was calibrated to the flow-frequency information for the USGS gage on the Ventura River (11118500) shown in **Figure 5**. The model results at that point calibrated to within one percent of the proposed 1-percent annual chance (100-year) discharge estimated for the gage.

3.2.3 Comparison to Regional Regression Equation Discharges

A comparison of proposed peak discharges for the Ventura River tributaries versus peak discharges estimated from USGS regional regression equations is presented in **Table C2 of Appendix C**. **Table C2** and **Figures 7, 8, 9, 10, and 11** for the gage locations on the tributaries show that the two sources of discharges, in general, are substantially different. Because the proposed peak discharges are based on a flow-frequency analysis for long-term gages from within the study watershed, they should be considered more reliable. Furthermore, the USGS is currently updating the regional regression equations applicable to the Ventura River watershed. Until they are updated, the discharges derived from the equations will not be relied on to assess reasonableness.

3.2.4 Comparison to Effective FEMA Discharges

A comparison of proposed peak discharges for the Ventura River tributaries versus effective FEMA discharges, where available, is presented in **Table C3 of Appendix C**. **Table C3** shows that the percent differences are substantial, ranging from –60 to 400 percent. However, the proposed discharges are based on gaging station data with nearly 40 more years of records than was used for the effective FEMA hydrology analysis. Furthermore, considering that the 1-percent chance HSPF model results (on which the proposed discharges are based) matched the gage station data closely, the proposed discharges are considered reasonable.

3.2.5 Comparison to Creager Enveloping Curve

Figure 12 shows the proposed peak discharges for the Ventura River tributaries versus area in comparison to the Creager Enveloping Curve of Maximum Peak Discharges in California for the 1-percent and the 0.2-percent events. Other discharges used for comparison (log-Pearson and regional regression equation equations) are also shown. Most of the proposed discharges fit well under the enveloping curve, and are reasonable. A few of the 0.2-percent proposed discharges for a few of the tributaries are at or slightly above the curve, and are marginally reasonable based on this comparison. As shown on **Figure 12**, the proposed discharges for Coyote Creek are low relative to the discharges of other tributaries. This difference is likely due to discharge attenuation that occurs when the upstream discharges are routed through Lake Casitas. Attenuation likely occurs despite the reservoir having been modeled with no storage below the

spillway; some storage is available above the spillway (as required by FEMA Guidelines and Specifications). Overall, these comparisons indicate that the proposed discharges for the tributaries are reasonable.

3.2.6 Comparison to Discharge-Stage Information

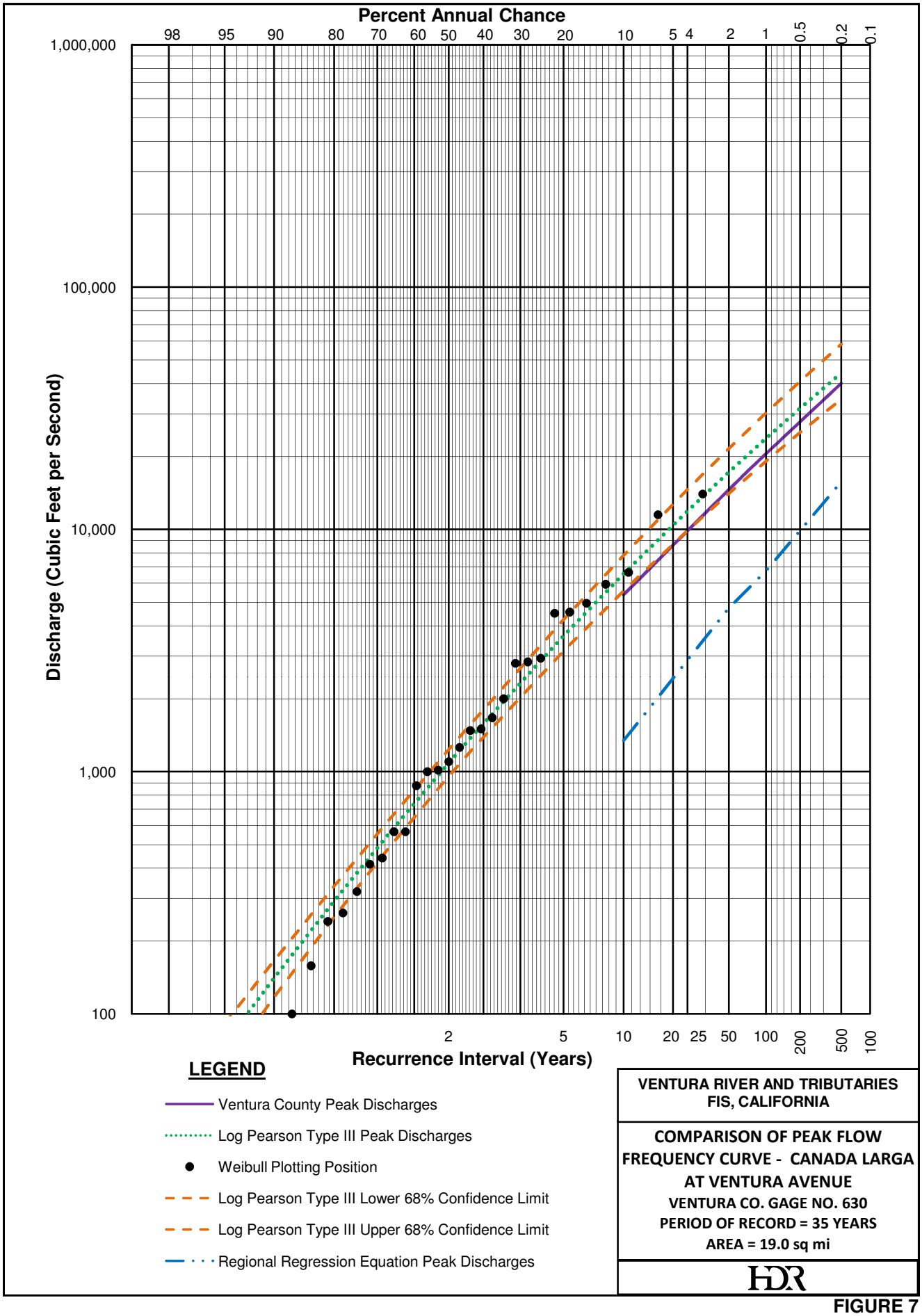
High water marks and rating curve information for the Ventura River tributaries were not available from Ventura County at the time of this report. Thus, such information was not used to assess reasonableness. If the information does become available, it should be evaluated.

3.2.7 Conclusions

Based on the HDR's review, the proposed peak discharges for the Ventura River and tributaries appear to be reasonable since the results were compared to historical data. HDR recommends that the Ventura County proposed peak discharges for the Ventura River tributaries be used in the hydraulic analysis for this FIS.

However, HDR does recommend to calibrate the HSPF models for the 10-, 2-, and 0.2-percent annual chance (10-, 50-, and 500-year) storm events to verify the parameters are reasonable for each of these storm frequency events.

See **Table 5** for HDR proposed peak discharges for the Ventura River tributaries.

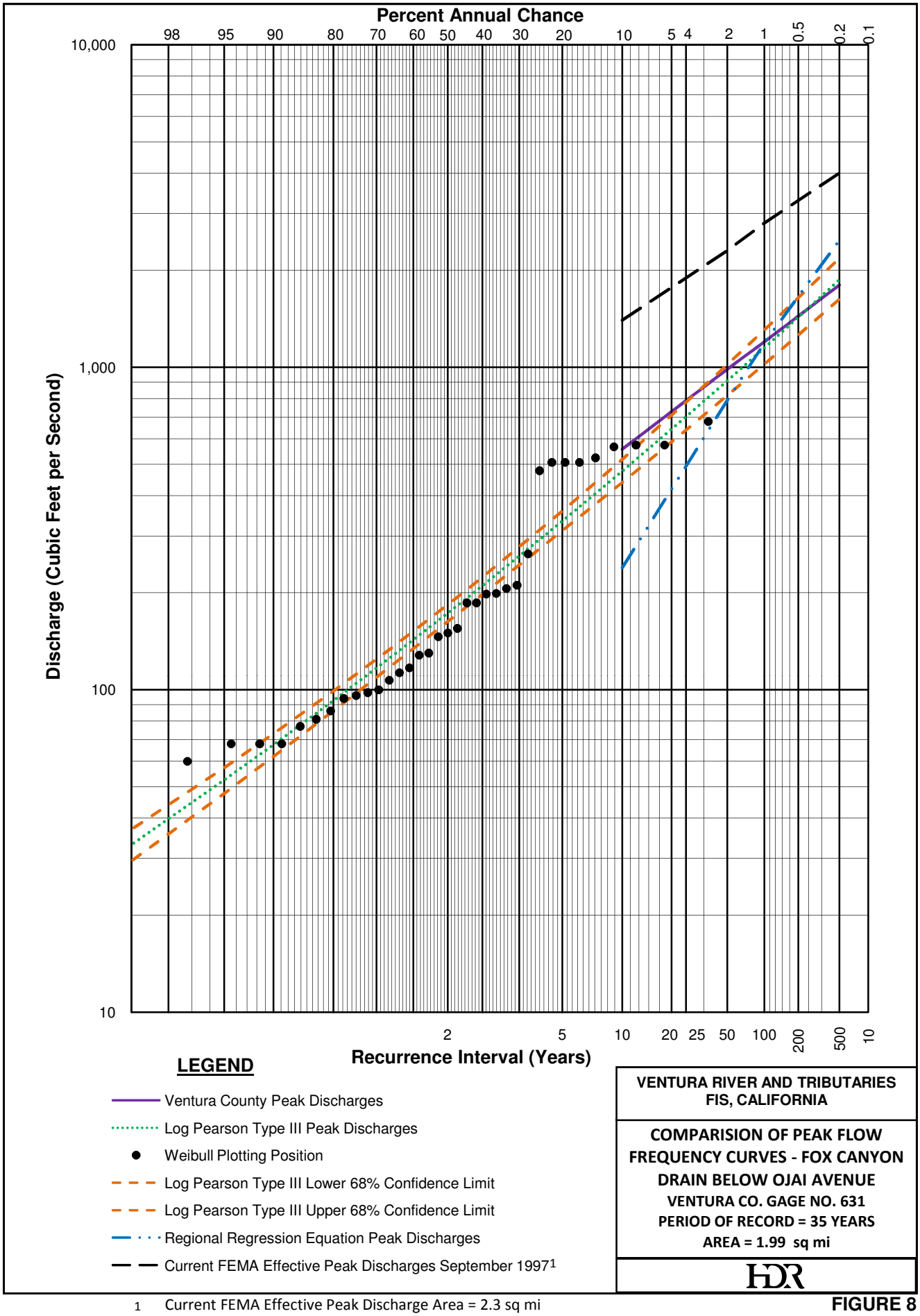


VENTURA RIVER AND TRIBUTARIES
FIS, CALIFORNIA

COMPARISON OF PEAK FLOW FREQUENCY CURVE - CANADA LARGA AT VENTURA AVENUE
VENTURA CO. GAGE NO. 630
PERIOD OF RECORD = 35 YEARS
AREA = 19.0 sq mi

HDR

FIGURE 7



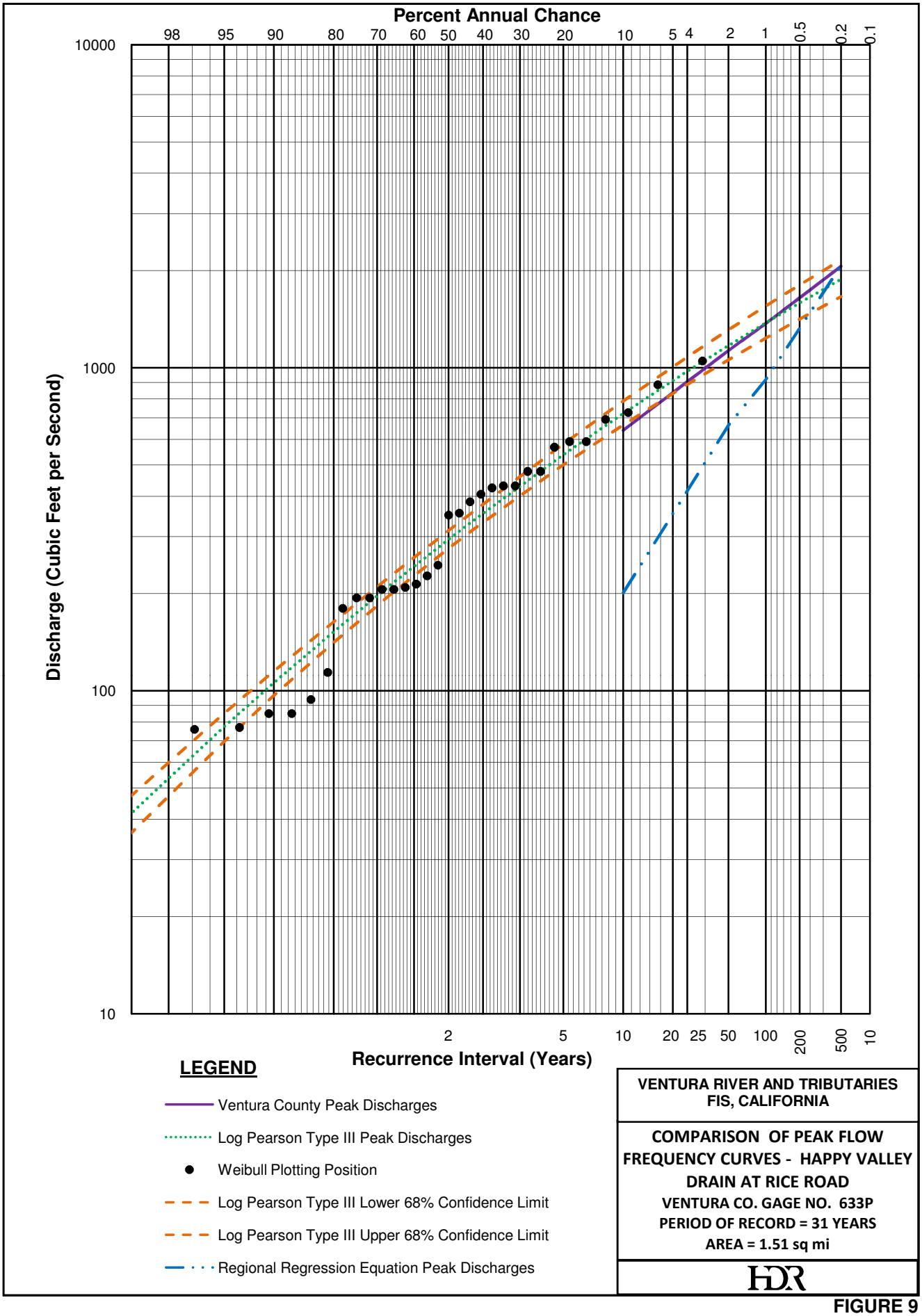
VENTURA RIVER AND TRIBUTARIES
FIS, CALIFORNIA

COMPARISION OF PEAK FLOW FREQUENCY CURVES - FOX CANYON DRAIN BELOW OJAI AVENUE
VENTURA CO. GAGE NO. 631
PERIOD OF RECORD = 35 YEARS
AREA = 1.99 sq mi

HDR

1 Current FEMA Effective Peak Discharge Area = 2.3 sq mi

FIGURE 8

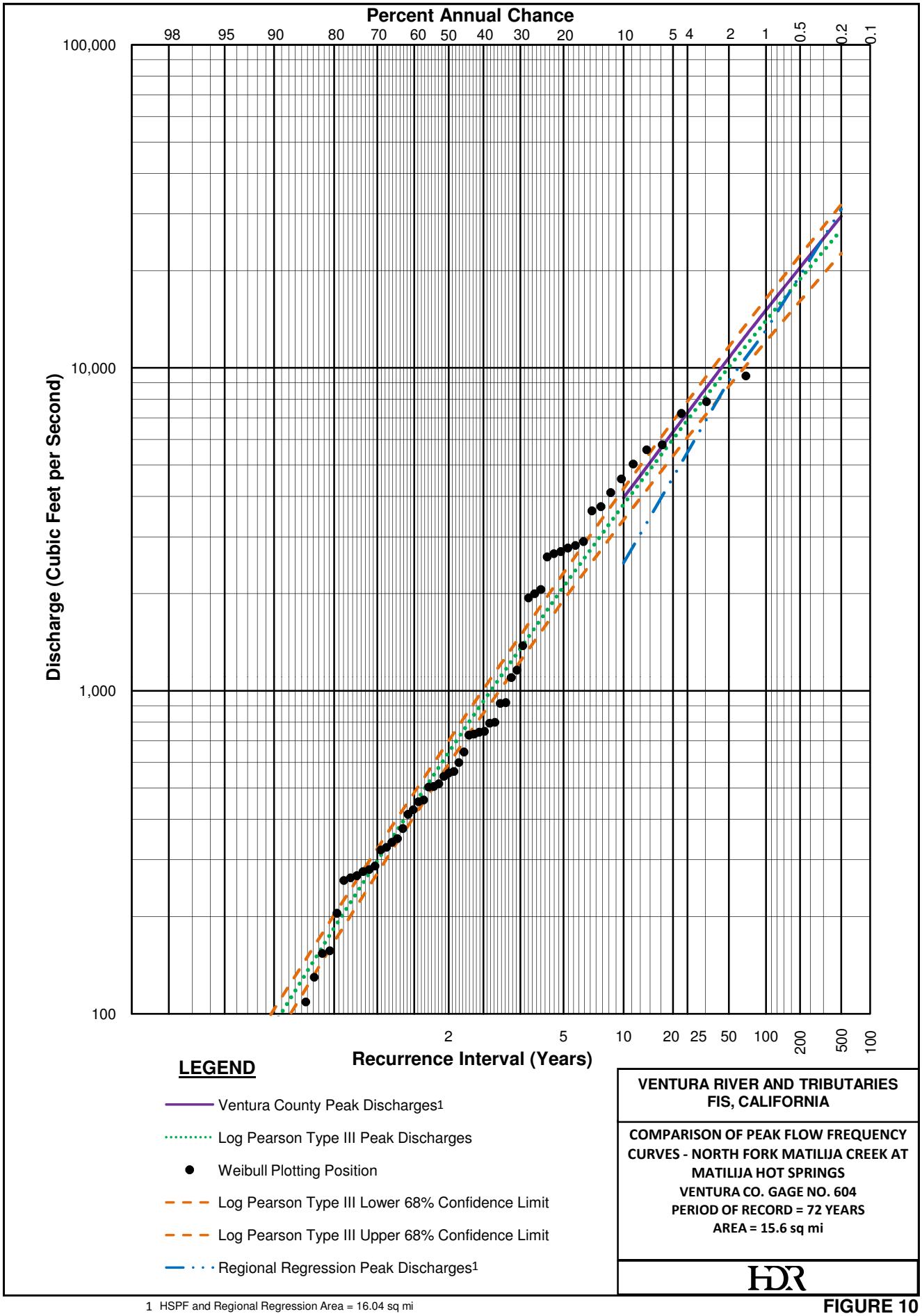


VENTURA RIVER AND TRIBUTARIES
FIS, CALIFORNIA

COMPARISON OF PEAK FLOW FREQUENCY CURVES - HAPPY VALLEY DRAIN AT RICE ROAD
VENTURA CO. GAGE NO. 633P
PERIOD OF RECORD = 31 YEARS
AREA = 1.51 sq mi

HDR

FIGURE 9



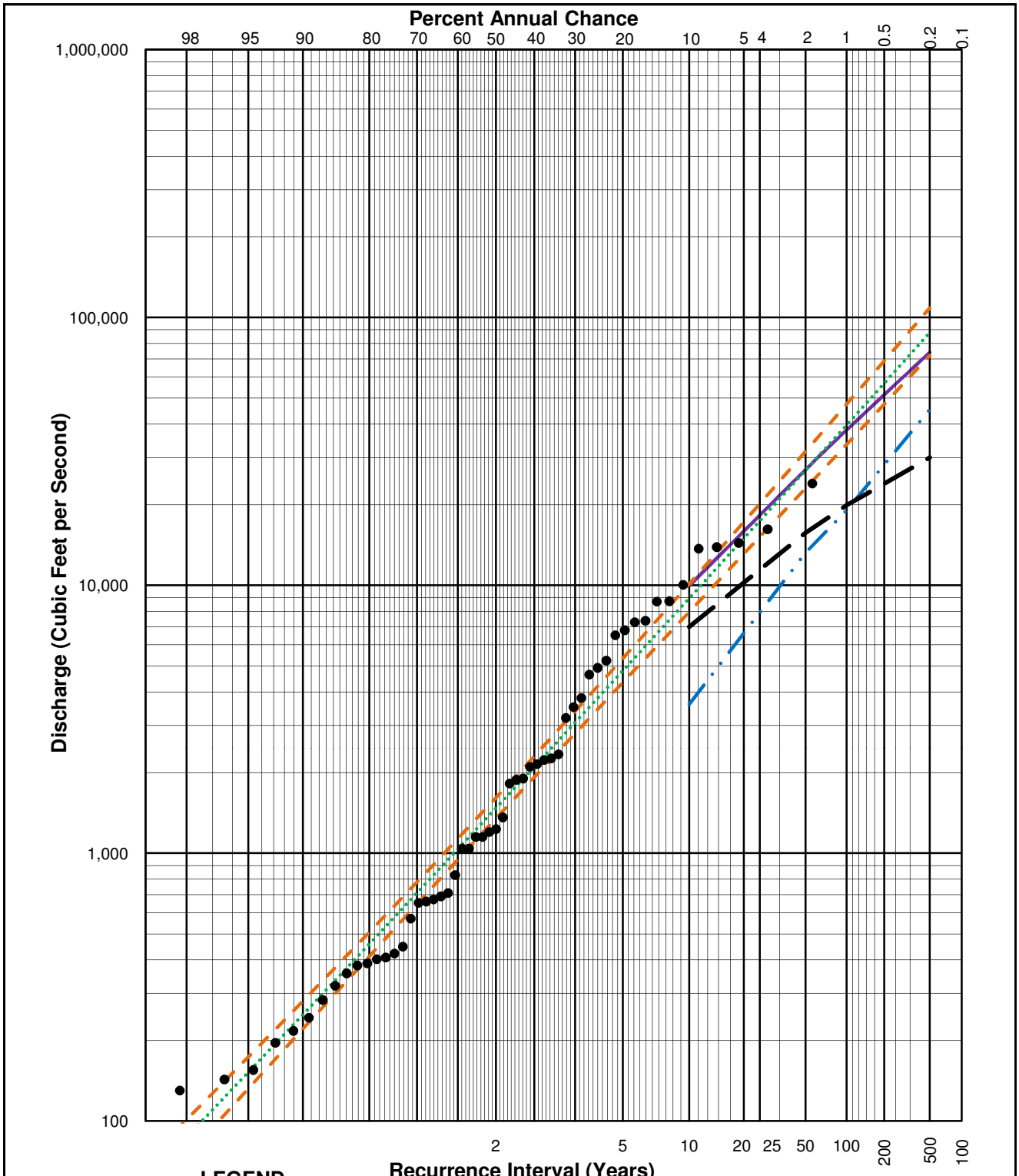
VENTURA RIVER AND TRIBUTARIES
FIS, CALIFORNIA

COMPARISON OF PEAK FLOW FREQUENCY CURVES - NORTH FORK MATILIJA CREEK AT MATILIJA HOT SPRINGS
VENTURA CO. GAGE NO. 604
PERIOD OF RECORD = 72 YEARS
AREA = 15.6 sq mi

HDR

1 HSPF and Regional Regression Area = 16.04 sq mi

FIGURE 10



LEGEND

- Ventura County Peak Discharges
- Log Pearson Type III Peak Discharges
- Weibull Plotting Position
- Log Pearson Type III Lower 68% Confidence Limit
- Log Pearson Type III Upper 68% Confidence Limit
- Regional Regression Equation Peak Discharges
- Current FEMA Effective Data September 1997

VENTURA RIVER AND TRIBUTARIES
FIS, CALIFORNIA

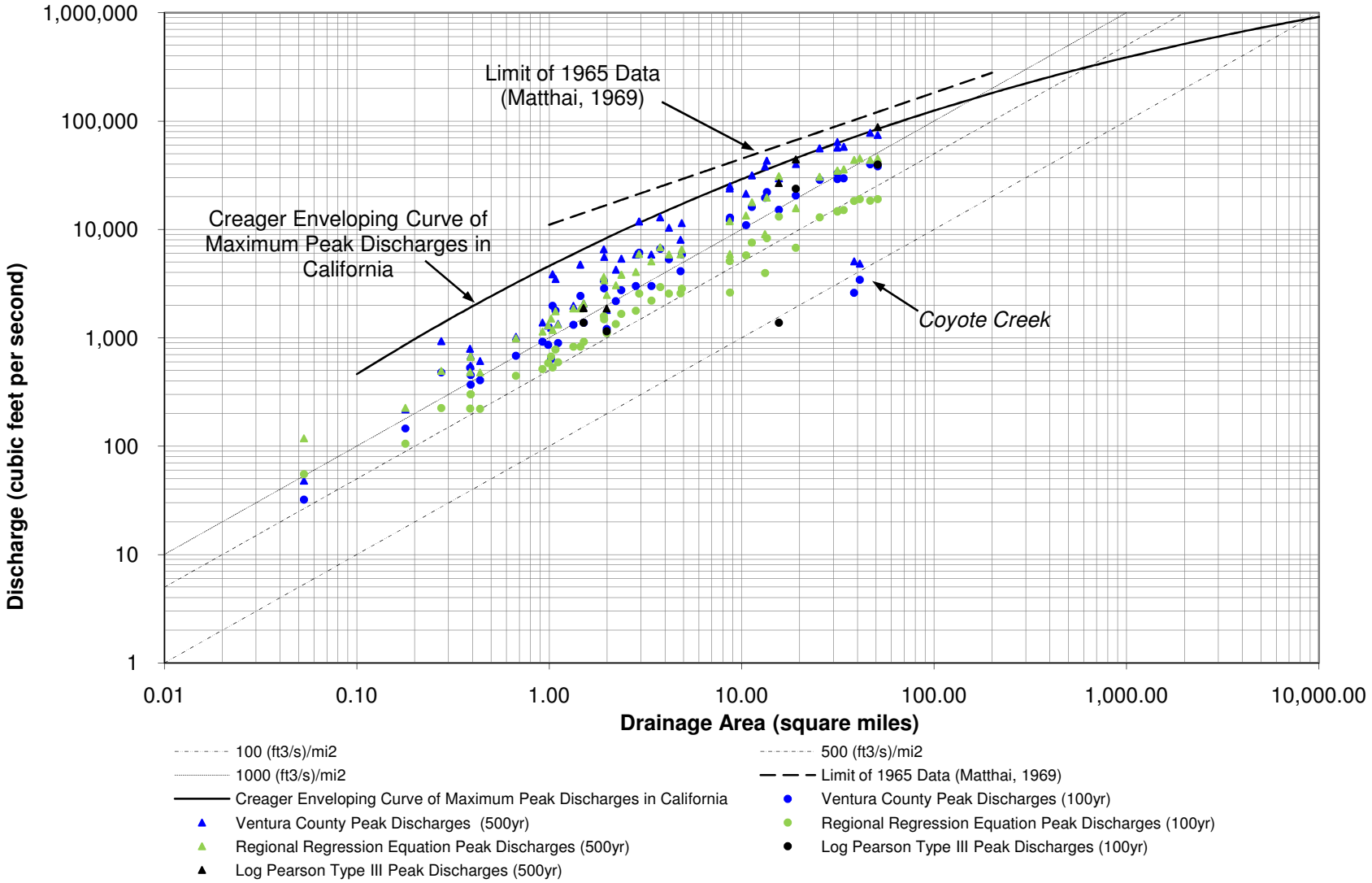
COMPARISON OF PEAK FLOW FREQUENCY CURVES - SAN ANTONIO CREEK AT CASITAS SPRINGS
USGS GAGE NO. 11117500/
VENTURA CO.GAGE NO. 605
PERIOD OF RECORD = 55 YEARS
AREA = 51.2 sq mi

HDR

FIGURE 11

Figure 12:Maximum Peak Discharges in Relation to Drainage Area for Ventura River Tributaries

Source for Creager Enveloping Curve: *Magnitude and Frequency of Floods in California, USGS Water-Resources Investigations 77-21* (June 1977)



4.0 Recommended Peak Discharges

The purpose of this section is to present the recommended peak discharges for the hydraulic analysis of the subject FIS. The proposed hydrology for the study streams appears to be reasonable relative to FEMA Guidelines and Specifications. HDR recommends that the hydrology be adopted for use in the hydraulic analysis. However, peak discharges are needed at additional locations. Additional peak discharges will be estimated by HDR and included with the proposed hydrology for the hydraulic analysis. The topics discussed in this section include the following:

- Estimation of Additional Peak Discharges
- Summary of Recommended Peak Discharges

4.1 Estimation of Additional Peak Discharges

Computing peak discharges at the optimum locations in the hydraulic models is critical for developing acceptable hydraulic profiles. HDR recommends further subdividing the hydrologic model watersheds for additional detail and refinement. Ventura County has provided the watershed delineations that correspond to the HSPF model. HDR will further subdivide the watersheds and estimate peak discharges for additional locations of analysis shown in **Figures 13 and 14**.

Once the watersheds for the additional locations are subdivided, the tributary areas will be determined, and the mean annual precipitation will be estimated based on a report entitled *Open-File Map for Mean Annual Precipitation in California* (Rantz, 1993). Using these two parameters, the USGS regional regression equations will be used to estimate the discharges at the additional locations. For estimating the additional peak discharges, the peak discharges from the proposed hydrology at nearby locations will be prorated based on the USGS regional regression equations as follows:

$$Q_A = Q_P * (Q_{RR,A} / Q_{RR,P})$$

Where, Q_A = Peak Discharge at Additional Location of Analysis

Q_P = Peak Discharge at Nearest Location from Proposed Hydrology

$Q_{RR,I}$ = Peak Discharge Determined from USGS Regional Regression Equations at Additional Location of Analysis

$Q_{RR,P}$ = Peak Discharge Determined from USGS Regional Regression Equations at Nearest Location from Proposed Hydrology

4.2 Summary of Recommended Peak Discharges

Table 5 lists the recommended peak discharges to be used in the hydraulic analysis and **Figures 13 and 14** show the locations of the recommended peak discharges. The recommended discharges include discharges from the proposed hydrology and discharges at additional locations of analysis estimated by HDR. Because the discharges estimated for additional locations are based on the USGS regional regression equations, and these equations are in the process of being updated by the USGS, FEMA has directed HDR to update the recommend peak discharges once the USGS equations have been updated. At the time of this report, the USGS has not updated the regional regression equations.

Table 5 - HDR Recommended Peak Discharges

Flooding Source and Location	Ventura County Description	Node /Location Number	Area (sq mi)	Peak Discharges (cubic feet per second)			
				10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance
VENTURA RIVER							
Ventura River							
Upstream of Matilija Creek confluence with North Fork Matilija Creek[4]	NA	VTA1	56.4	12,500	18,800	21,600	27,900
Downstream of confluence with North Fork Matilija Creek[1]	NA	912a	72.44	15,000	24,000	27,100	35,200
At Baldwin Road/SR 150[1]	NA	825a	82.95	16,000	24,800	28,300	36,700
Upstream of San Antonio Creek[5]	NA	310a	92.8	16,449	25,493	29,104	37,856
At Casitas Springs[1]	NA	VTA4	143.91	35,200	56,600	66,600	89,000
Upstream of Coyote Creek[2]	NA	311	148.01	35,529	57,135	67,239	90,127
At Casitas Vista Road[1]	NA	VTA6	187.78	36,400	59,700	69,700	93,100
Upstream of Canada Larga[2]	NA	875a	191.46	36,583	59,999	70,055	93,593
At Shell Chemical Plant[1]	NA	875b	222.95	41,300	67,900	78,900	105,500
At Pacific Ocean[2]	NA	876	226.03	41,438	68,126	79,166	105,500
VENTURA RIVER TRIBUTARIES							
Canada de San Joaquin							
Upstream of confluence with Ventura River[3]	Canada de San Joaquin above Ventura River	874	1.45	630	1,720	2,420	4,720

[1] USBR Recommended Peak Discharges
[2] Prorated Discharges Computed from HDR
[3] Ventura County HSPF Peak Discharges

Flooding Source and Location	Ventura County Description	Node /Location Number	Area (sq mi)	Peak Discharges (cubic feet per second)			
				10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance
Canada Larga							
Downstream of confluence with Sulphur Creek[2]	NA	284a	8.15	3,190	8,649	12,158	23,705
Upstream of confluence with Coche Creek[3]	Canada Larga Abv Coche	284	8.68	3,350	9,100	12,800	24,990
Downstream of confluence with Coche Creek[3]	Canada Larga Blw Coche	CAN1	13.23	5,110	13,860	19,500	38,060
Downstream of confluence with Canada de Aliso[4]	NA	288a	16.15	5,240	14,220	20,004	39,050
Upstream of confluence with Ventura River[3]	Canada Larga above Ventura River	288	19.12	5,370	14,580	20,500	40,020
Coyote Creek							
At Casitas Dam Spillway[3]	Coyote Creek at Dam Spillway	998	38.46	120	370	2,590	3,750
Approximately 2.30 miles downstream of the downstream end of the Casitas Dam Concrete Spillway[2]	NA	251a	40.11	671	1,953	3,363	4,766
Upstream of confluence with Ventura River[3]	Coyote Ck above Ventura River	251	41.1	680	1,980	3,410	4,830
Cozy Dell Canyon							
Upstream of confluence with Cozy Dell Canyon Tributary[3]	Cozy Dell Canyon Trib.	911	2.09	590	1,610	2,262	4,420
Upstream of confluence with McDonald Canyon Drain[3]	Cozy Dell Canyon Above McDonald Canyon	TRB1	2.36	720	1,950	2,740	5,350
Downstream of confluence with McDonald Canyon Drain[3]	Cozy Dell Canyon below McDonald Canyon	913a	3.39	790	2,130	2,998	5,850
Dent Drain							
At Intersection of Shoshone Street and Cedar Street[2]	NA	877a	0.21	162	284	343	512

[2] Prorated Discharges Computed by HDR
[3] Ventura County HSPF Peak Discharges
[4] Linear Interpolation Computed by Ventura County

Flooding Source and Location	Ventura County Description	Node /Location Number	Area (sq mi)	Peak Discharges (cubic feet per second)			
				10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance
At Cameron Street[2]	NA	877b	0.31	209	368	447	668
At Ventura Avenue North[2]	NA	877c	0.33	218	385	467	700
Upstream of confluence with Ventura River[3]	Dent Drain above Ventura River	877	0.39	244	433	527	790
East Ojai Avenue Drain							
Upstream of confluence with Fox Canyon Barranca	East Ojai Avenue Drain above Fox Canyon Barranca	491a	0.142	36	65	79	118
East Ojai Drain							
At Pleasant Avenue[2]	NA	904a	0.2	129	224	271	402
At Mountain View Avenue[2]	NA	904b	0.32	187	330	401	596
At Grand Avenue[3]	East Ojai Drain above San Antonio Creek	904	0.39	219	388	472	705
Upstream of confluence with San Antonio Creek[2]	NA	511a	0.57	296	530	647	971
Fox Canyon Barranca							
Upstream Limit of Detailed Study[2]	NA	491b	0.34	147	248	296	437
Upstream of confluence with East Ojai Avenue Drain[2]	NA	491c	0.74	270	465	561	835
Downstream of confluence with East Ojai Avenue Drain[2]	NA	491d	1.3	416	729	883	1,328
Upstream of confluence with Stewart Canyon with East Ojai Drain[3]	Fox Drain above Stewart With East Ojai Drain	491	1.99	557	986	1,200	1,800
Happy Valley Drain							
Upstream of El Roblar Drive[2]	NA	422b	0.35	213	363	435	645

[2] Prorated Discharges Computed by HDR
[3] Ventura County HSPF Peak Discharges

Flooding Source and Location	Ventura County Description	Node /Location Number	Area (sq mi)	Peak Discharges (cubic feet per second)			
				10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance
Upstream of Happy Valley Drain Tributary[2]	NA	422c	0.97	471	825	998	1,493
Upstream of Confluence with Happy Valley Drain South[2]	NA	422d	1.32	603	1,067	1,294	1,906
Upstream of confluence with McDonald Canyon Drain South[3]	Happy Valley Drain above McDonald Canyon Drain South	422	1.34	610	1,080	1,310	1,970
Downstream of confluence with McDonald Canyon Drain South[3]	Happy Valley Drain below McDonald Canyon Drain South	TRB2	1.51	640	1,130	1,370	2,060
Happy Valley Drain - El Roblar Drive							
Upstream of confluence with Happy Valley Drain[2]	NA	422a	0.19	129	216	257	377
Happy Valley Drain South							
Approximately 0.58 mile downstream of confluence with Happy Valley Drain[2]	NA	822a	0.07	65	111	134	201
Upstream of confluence with Mira Monte Drain[2]	NA	822b	0.23	166	296	359	546
Approximately 0.41 mile downstream of confluence with Mira Monte Drain[3]	Happy Valley Drain South above Mira Monte Drain	822	0.44	188	333	405	610
At Baldwin Road/State Route 150[3]	Happy Valley Drain South at Baldwin Road and Hwy 150	823+822	1.13	410	730	890	1,340
Manuel Canyon							
Upstream of confluence with Ventura River[3]	Manuel Canyon above Ventura River	873	1.04	520	1,400	1,970	3,850
McDonald Canyon Drain							
Upstream of confluence with Cozy Dell Canyon[3]	McDonald Canyon above Cozy Dell Canyon; below dam	921	1.02	170	450	634	1,240
McDonald Canyon Drain South							

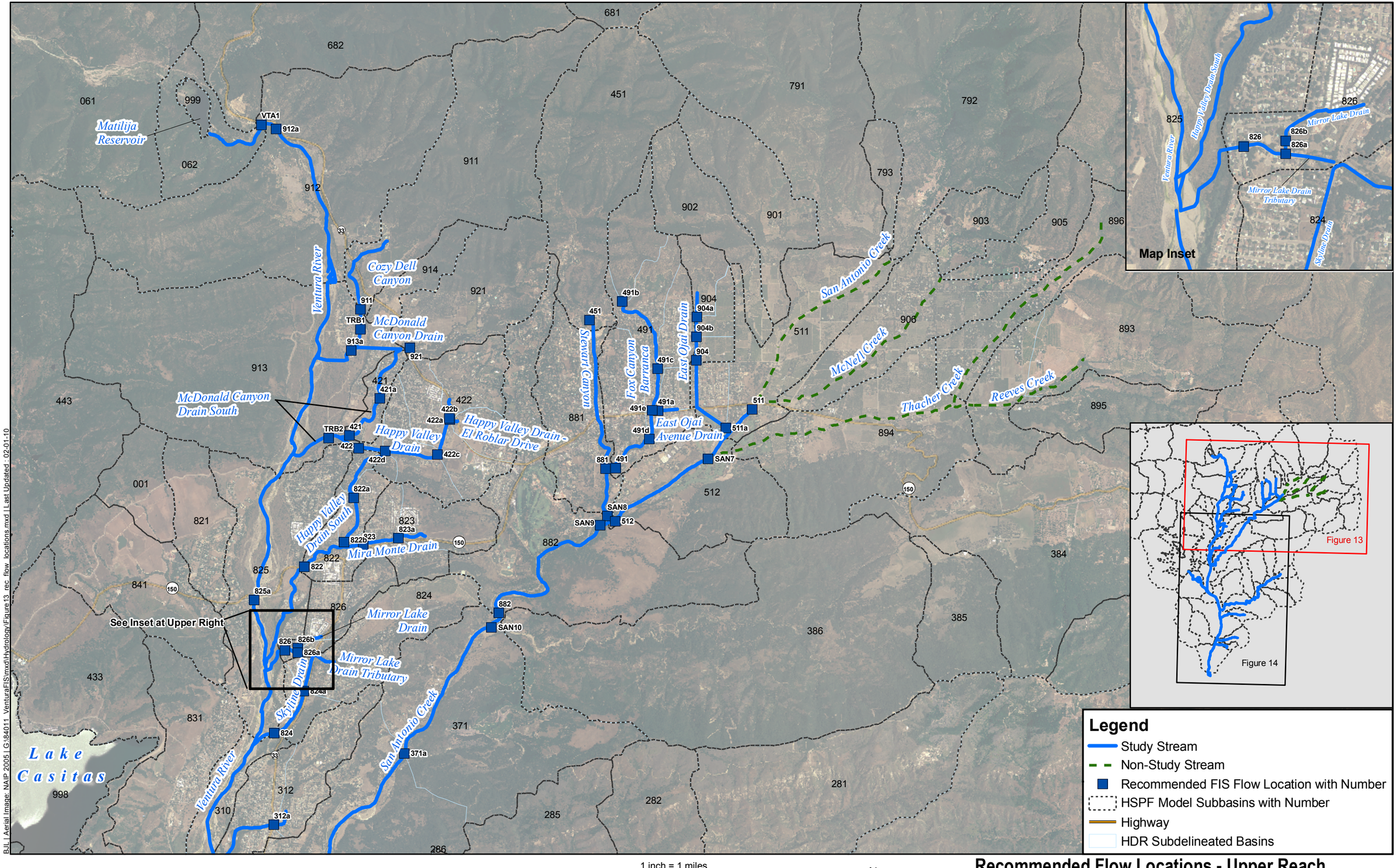
[2] Prorated Discharges Computed by HDR
[3] Ventura County HSPF Peak Discharges

Flooding Source and Location	Ventura County Description	Node /Location Number	Area (sq mi)	Peak Discharges (cubic feet per second)			
				10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance
Approximately 0.50 mile downstream of confluence with McDonald Canyon Drain[2]	NA	421a	0.07	47	83	100	152
Upstream of confluence with Happy Valley Drain[3]	McDonald Canyon Drain South	421	0.18	67	119	145	218
Mira Monte Drain							
Upstream of Loma Drive[2]	NA	823a	0.38	107	280	394	773
Upstream of confluence with Happy Valley Drain South[3]	Mira Monte Drain above Happy Valley Drain South	823	0.69	180	480	680	1,330
Mirror Lake Drain							
Upstream of confluence with Mirror Lake Drain Tributary[2]	NA	826b	0.34	108	286	403	784
Upstream of confluence with Ventura River[3]	Mirror Lake Drain above Ventura River	826	0.39	120	320	452	880
Mirror Lake Drain Tributary							
Upstream of confluence with Mirror Lake Drain[2]	NA	826a	0.03	16	39	54	102
Oak View Drain							
At Ventura Highway[2]	NA	312a	0.48	223	383	460	680
Upstream of confluence with Ventura River[3]	Oak View Drain above Ventura River	312	0.92	430	760	919	1,380
San Antonio Creek							
Downstream of confluence with McNell Creek[3]	San Antonio Creek below McNell Creek	511	13.5	5,760	15,630	21,980	42,900
Downstream of confluence with Thacher Creek[3]	San Antonio Creek below Thacher confluence	SAN7	25.36	7,490	20,330	28,600	55,830
Upstream of confluence with Stewart Canyon[3]	San Antonio Creek above Stewart Canyon	512	26.49	7,620	20,690	29,100	56,800

[2] Prorated Discharges Computed by HDR
[3] Ventura County HSPF Peak Discharges

Flooding Source and Location	Ventura County Description	Node /Location Number	Area (sq mi)	Peak Discharges (cubic feet per second)			
				10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance
Downstream of confluence with Stewart Canyon[3]	San Antonio Creek after Stewart Confluence	SAN9	31.3	8,590	23,320	32,800	64,030
Upstream of confluence with Lion Canyon Creek[3]	San Antonio Creek above Lion Confluence	882	33.8	7,760	21,050	29,600	57,780
Downstream of confluence with Lion Canyon Creek[3]	San Antonio Creek after Lion Canyon Confluence	SAN10	46.46	10,430	28,300	39,800	77,690
Downstream of confluence with San Antonio Creek Tributary[2]	NA	371a	49.66	9,930	26,946	37,893	73,689
Upstream of confluence with Ventura River[3]	San Antonio Creek above Ventura River confluence	371	51.1	9,960	27,020	38,000	74,180
Skyline Drain							
At Barbara Street[2]	NA	824a	0.83	340	598	726	1,092
Upstream of confluence with Ventura River[3]	Skyline Drain above Ventura River	824	0.99	399	707	860	1,290
Stewart Canyon							
At Upstream Limit of Detailed Study[3]	Stewart Canyon Upper	451	1.93	750	2,030	2,850	5,560
Upstream of confluence with Fox Canyon Barranca[3]	Stewart Canyon above Fox	881	2.83	780	2,130	2,990	5,840
Upstream of confluence with San Antonio Creek[3]	Stewart Canyon above San Antonio Creek with Fox Drain	SAN8	4.81	1,070	2,920	4,100	8,000

[2] Prorated Discharges Computed by HDR
[3] Ventura County HSPF Peak Discharges



BJL | Aerial Image: NAIP 2005 | G:\84011 VenturaFIS\mxd\Hydrology\Figure13_rec_flow_locations.mxd | Last Updated : 02-01-10

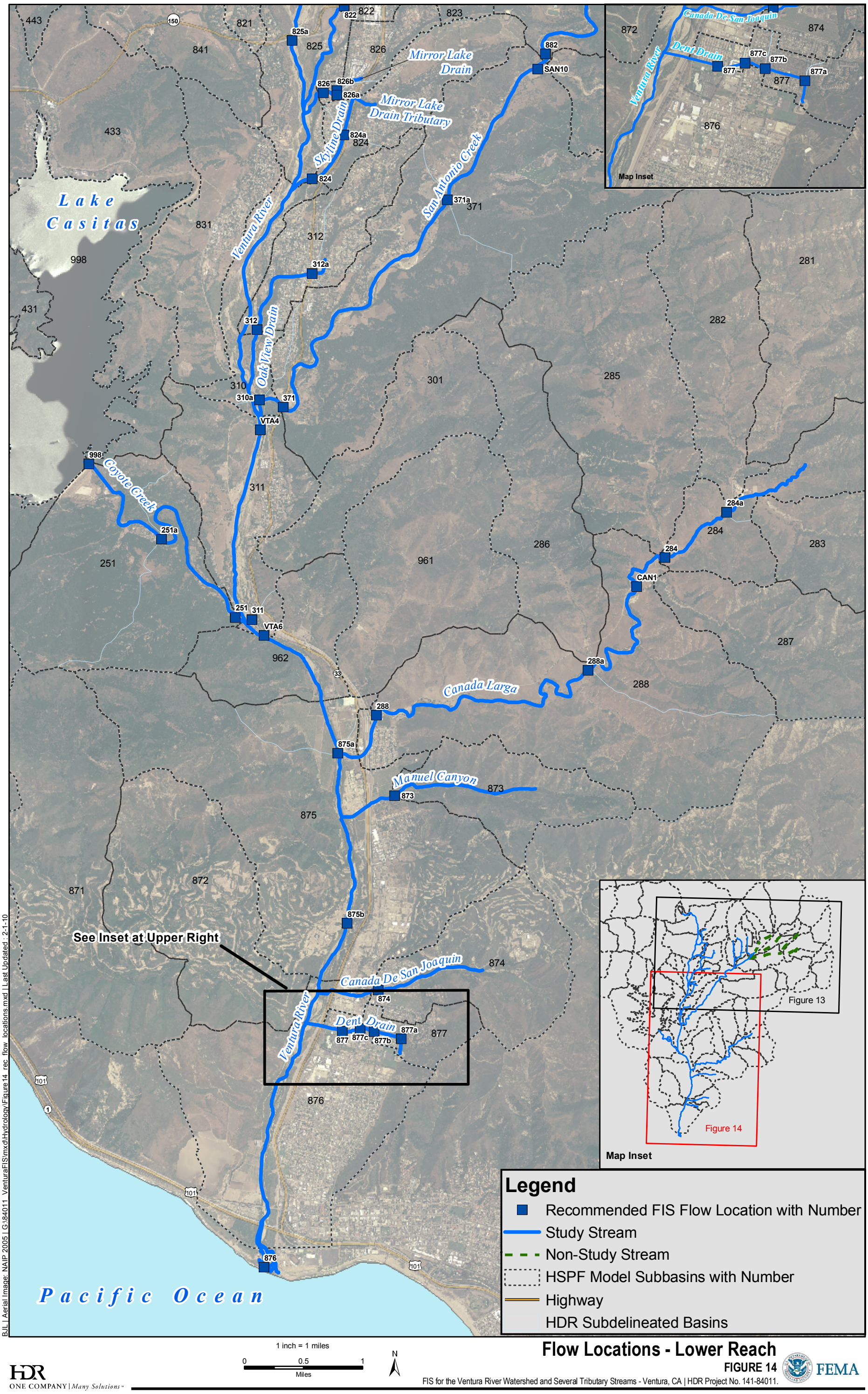
Recommended Flow Locations - Upper Reach

FIGURE 13

FIS for the Ventura River Watershed and Several Tributary Streams - Ventura, CA | HDR Project No. 141-84011.

HDR ONE COMPANY | *Many Solutions*™

FEMA



BJL | Aerial Image: NAIP 2005 | G:\84011 VenturaFIS\mxd\Hydrology\Figure14 rec flow locations.mxd | Last Updated : 2-1-10

HDR ONE COMPANY | Many Solutions™

Flow Locations - Lower Reach

FIGURE 14

FIS for the Ventura River Watershed and Several Tributary Streams - Ventura, CA | HDR Project No. 141-84011.

FEMA

5.0 References

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Ventura County Watershed Protection District, Ventura River Watershed Design Storm Modeling, Draft July 2009

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Wilbert Thomas, personal communication, November 2009

Appendix A

APPENDIX A1 - VENTURA COUNTY LOG PEARSON TYPE III ANALYSIS

GAGE 604 – NORTH FORK MATILIJA

```
************************************        *************************************
 *              FFA                  *       *                                   *
 *     FLOOD FREQUENCY ANALYSIS      *       *   U.S. ARMY CORPS OF ENGINEERS    *
 *     PROGRAM DATE:  FEB 1995       *       * THE HYDROLOGIC ENGINEERING CENTER *
 *          VERSION:  3.1            *       *         609 SECOND STREET         *
 *     RUN  DATE   AND   TIME:       *       *      DAVIS, CALIFORNIA 95616      *
 *        27 JUN 07    11:10:37      *       *          (916) 756-1104           *
 *                                   *       *                                   *
 *************************************       *************************************



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 **TITLE RECORD(S)**
 TT   FLOOD FLOW FREQUENCY PROGRAM - NORTH FORK MATILIJA CR.AT M.HOT SPRINGS
 TT   REGIONAL SKEW -.3 TO DUPLICATE C.O.E. RESULTS ON OTHER PROJECTS IN VENTURA CO

 **STATION IDENTIFICATION**
 ID    1160 NO.FORK MATILIJA CR.AT M.H.SPNGS(VC #604)A=15.6SQMI REC BEGAN:1933 TYPE

 **GENERALIZED SKEW**
      ISTN   GGMSE    SKEW
 GS   1160    .000    -.30

 **SYSTEMATIC EVENTS**
      72 EVENTS TO BE ANALYZED

 **END OF INPUT DATA**
 ED ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++



 ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄPRELIMINARY RESULTS ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ


 -SKEW WEIGHTING -
 ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
 BASED ON  72 EVENTS, MEAN-SQUARE ERROR OF STATION SKEW =    .111
 DEFAULT OR INPUT MEAN-SQUARE ERROR OF GENERALIZED SKEW =    .302
 ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ


  PRELIMINARY RESULTS

 -FREQUENCY CURVE-  1160 NO.FORK MATILIJA CR.AT M.H.SPNGS(VC #6
 ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÑÍÍÍÍÍÍÍÍÍÍÍÍÍÍÑÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
 º  COMPUTED   EXPECTED   ³   PERCENT   ³    CONFIDENCE LIMITS  º
 º   CURVE   PROBABILITY  ³   CHANCE    ³       .05       .95   º
 º      FLOW IN CFS       ³  EXCEEDANCE ³      FLOW IN CFS      º
 ÇÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÅÄÄÄÄÄÄÄÄÄÄÄÄÄÅÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ¶
 º     22300.     24700.  ³        .2   ³    43600.     13200.  º
 º     16900.     18400.  ³        .5   ³    31800.     10200.  º
 º     13200.     14200.  ³       1.0   ³    24100.      8220.  º
 º      9980.     10500.  ³       2.0   ³    17500.      6360.  º
 º      6330.      6570.  ³       5.0   ³    10500.      4200.  º
 º      4080.      4190.  ³      10.0   ³     6420.      2800.  º
 º      2300.      2340.  ³      20.0   ³     3410.      1640.  º
 º       672.       672.  ³      50.0   ³      921.       493.  º
 º       163.       159.  ³      80.0   ³      228.       111.  º
```

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	72.	69.		90.0		106.	45.	
	35.	33.		95.0		55.	20.	
	8.	7.		99.0		15.	4.	

SYSTEMATIC STATISTICS

LOG TRANSFORM: FLOW, CFS			NUMBER OF EVENTS	
MEAN	2.7703		HISTORIC EVENTS	0
STANDARD DEV	.6914		HIGH OUTLIERS	0
COMPUTED SKEW	-.5929		LOW OUTLIERS	0
REGIONAL SKEW	-.3000		ZERO OR MISSING	0
ADOPTED SKEW	-.5000		SYSTEMATIC EVENTS	72

FINAL RESULTS

-PLOTTING POSITIONS- 1160 NO.FORK MATILIJA CR.AT M.H.SPNGS(VC #6

EVENTS ANALYZED					ORDERED EVENTS			
			FLOW		WATER		FLOW	WEIBULL
MON	DAY	YEAR	CFS	RANK	YEAR		CFS	PLOT POS
12	31	1933	2770.	1	1969		9440.	1.37
1	14	1935	1160.	2	1992		7860.	2.74
2	2	1936	460.	3	1998		7230.	4.11
12	27	1936	920.	4	1978		5780.	5.48
3	2	1938	5580.	5	1938		5580.	6.85
3	9	1939	154.	6	1995		5040.	8.22
2	25	1940	349.	7	2005		5010.	9.59
3	4	1941	1100.	8	1958		4530.	10.96
12	28	1941	276.	9	1973		4110.	12.33
1	22	1943	2700.	10	1980		3720.	13.70
2	22	1944	1380.	11	1986		3610.	15.07
2	2	1945	557.	12	1966		2900.	16.44
3	30	1946	750.	13	1952		2820.	17.81
12	25	1946	415.	14	1934		2770.	19.18
4	28	1948	18.	15	1943		2700.	20.55
3	10	1949	91.	16	1983		2660.	21.92
2	6	1950	157.	17	1993		2599.	23.29
1	11	1951	4.	18	1971		2060.	24.66
1	15	1952	2820.	19	1967		2000.	26.03
12	1	1952	268.	20	1962		1940.	27.40
2	13	1954	280.	21	2001		1640.	28.77
4	30	1955	31.	22	2004		1450.	30.14
1	26	1956	340.	23	1944		1380.	31.51
1	13	1957	795.	24	1935		1160.	32.88
4	3	1958	4530.	25	1941		1100.	34.25
2	16	1959	915.	26	1937		920.	35.62
2	1	1960	62.	27	1959		915.	36.99
1	26	1961	74.	28	1988		800.	38.36
2	9	1962	1940.	29	1957		795.	39.73
2	9	1963	730.	30	1946		750.	41.10
4	1	1964	563.	31	1975		745.	42.47
12	20	1964	205.	32	1997		735.	43.84
11	24	1965	2900.	33	1963		730.	45.21
12	6	1966	2000.	34	2003		698.	46.58
11	21	1967	68.	35	1991		647.	47.95
2	24	1969	9440.	36	1972		600.	49.32
3	1	1970	516.	37	1964		563.	50.68
11	29	1970	2060.	38	1945		557.	52.05
12	25	1971	600.	39	1974		544.	53.42
2	6	1973	4110.	40	1970		516.	54.79
1	7	1974	544.	41	1982		506.	56.16
12	4	1974	745.	42	1979		504.	57.53
9	29	1976	375.	43	1936		460.	58.90
5	5	1977	54.	44	1984		454.	60.27
3	4	1978	5780.	45	2000		429.	61.64

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```
°   3  28  1979      504.  ³    46   1947       415.    63.01  °
°   2  16  1980     3720.  ³    47   1976       375.    64.38  °
°   3   1  1981      322.  ³    48   1940       349.    65.75  °
°   4   1  1982      506.  ³    49   1956       340.    67.12  °
°   3   1  1983     2660.  ³    50   1994       328.    68.49  °
°  12  25  1983      454.  ³    51   1981       322.    69.86  °
°  12  19  1984      259.  ³    52   1996       287.    71.23  °
°   2  14  1986     3610.  ³    53   1954       280.    72.60  °
°   3   6  1987      264.  ³    54   1942       276.    73.97  °
°   2  29  1988      800.  ³    55   1953       268.    75.34  °
°   2   9  1989      109.  ³    56   1987       264.    76.71  °
°   1  13  1990      130.  ³    57   1985       259.    78.08  °
°   3  18  1991      647.  ³    58   1965       205.    79.45  °
°   2  12  1992     7860.  ³    59   1950       157.    80.82  °
°   1  13  1993     2599.  ³    60   1939       154.    82.19  °
°   2   7  1994      328.  ³    61   1990       130.    83.56  °
°   1  10  1995     5040.  ³    62   1989       109.    84.93  °
°   2  20  1996      287.  ³    63   1949        91.    86.30  °
°  12  22  1996      735.  ³    64   1999        80.    87.67  °
°   2  23  1998     7230.  ³    65   1961        74.    89.04  °
°   2   9  1999       80.  ³    66   1968        68.    90.41  °
°   2  23  2000      429.  ³    67   1960        62.    91.78  °
°   3   6  2001     1640.  ³    68   1977        54.    93.15  °
°  11  24  2001       14.  ³    69   1955        31.    94.52  °
°   3  15  2003      698.  ³    70   1948        18.    95.89  °
°   2  25  2004     1450.  ³    71   2002        14.    97.26  °
°   1  10  2005     5010.  ³    72   1951         4.    98.63  °
```

-OUTLIER TESTS -

LOW OUTLIER TEST

BASED ON 72 EVENTS, 10 PERCENT OUTLIER TEST VALUE K(N) = 2.903

1 LOW OUTLIER(S) IDENTIFIED BELOW TEST VALUE OF 5.8

STATISTICS AND FREQUENCY CURVE ADJUSTED FOR 1 LOW OUTLIER(S)

HIGH OUTLIER TEST

BASED ON 71 EVENTS, 10 PERCENT OUTLIER TEST VALUE K(N) = 2.897

0 HIGH OUTLIER(S) IDENTIFIED ABOVE TEST VALUE OF 46887.

-SKEW WEIGHTING -

BASED ON 72 EVENTS, MEAN-SQUARE ERROR OF STATION SKEW = .090
DEFAULT OR INPUT MEAN-SQUARE ERROR OF GENERALIZED SKEW = .302

FINAL RESULTS

-FREQUENCY CURVE- 1160 NO.FORK MATILIJA CR.AT M.H.SPNGS(VC #6

```
°  COMPUTED   EXPECTED   ³   PERCENT   ³    CONFIDENCE LIMITS  °
°   CURVE   PROBABILITY  ³    CHANCE   ³       .05        .95   °
°      FLOW IN CFS       ³  EXCEEDANCE ³      FLOW IN CFS      °
```

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```
°    25600.     28900.   ³        .2    ³    49900.     15100.  °
°    18400.     20300.   ³        .5    ³    34300.     11200.  °
°    13900.     15000.   ³       1.0    ³    24900.      8730.  °
°    10100.     10800.   ³       2.0    ³    17400.      6560.  °
°     6170.      6430.   ³       5.0    ³     9960.      4180.  °
°     3900.      4010.   ³      10.0    ³     5960.      2740.  °
°     2190.      2220.   ³      20.0    ³     3150.      1600.  °
°      668.       668.   ³      50.0    ³      893.       501.  °
°      184.       181.   ³      80.0    ³      251.       128.  °
°       90.        87.   ³      90.0    ³      129.        58.  °
°       49.        46.   ³      95.0    ³       73.        29.  °
°       15.        13.   ³      99.0    ³       25.         7.  °
ÌÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¹
°                        SYNTHETIC STATISTICS                   °
ÇÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ¶
° LOG TRANSFORM: FLOW, CFS       ³       NUMBER OF EVENTS       °
ÇÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ¶
°  MEAN                    2.7927  ³  HISTORIC EVENTS        0  °
°  STANDARD DEV             .6415  ³  HIGH OUTLIERS      0      °
°  COMPUTED SKEW          -.2989  ³  LOW OUTLIERS       1      °
°  REGIONAL SKEW          -.3000  ³  ZERO OR MISSING    0      °
°  ADOPTED SKEW           -.3000  ³  SYSTEMATIC EVENTS     72  °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼



+++++++++++++++++++++++++
+ END OF RUN            +
+ NORMAL STOP IN FFA    +
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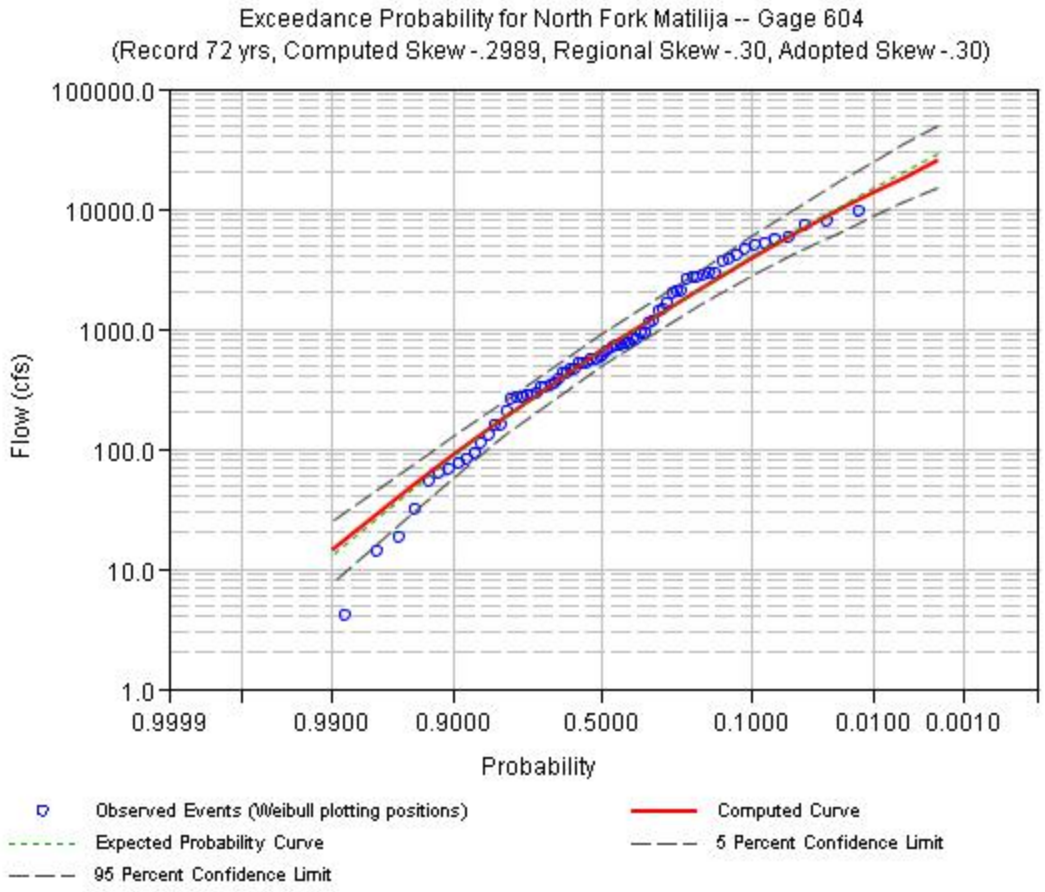
Exceedance Probability for North Fork Matilija -- Gage 604
(Record 72 yrs, Computed Skew -.2989, Regional Skew -.30, Adopted Skew -.30)
100000.0
10000.0
1000.0
100.0
10.0
1.0
Flow (cfs)
0.9999
0.9900
0.9000
0.5000
0.1000
0.0100
0.0010
Probability
Observed Events (Weibull plotting positions)
Computed Curve
Expected Probability Curve
5 Percent Confidence Limit
95 Percent Confidence Limit

GAGE 633 – HAPPY VALLEY DRAIN AT RICE ROAD

```
************************************      *************************************
 *              FFA                  *     *                                    *
 *     FLOOD FREQUENCY ANALYSIS      *     *   U.S. ARMY CORPS OF ENGINEERS     *
 *     PROGRAM DATE:  FEB 1995       *     * THE HYDROLOGIC ENGINEERING CENTER *
 *          VERSION:  3.1            *     *          609 SECOND STREET         *
 *     RUN  DATE   AND   TIME:       *     *      DAVIS, CALIFORNIA 95616       *
 *        27 JUN 07    13:19:42      *     *          (916) 756-1104            *
 *                                   *     *                                    *
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 TT   REGIONAL SKEW -.3 TO DUPLICATE C.O.E. RESULTS ON OTHER PROJECTS IN VENTURA CO

 **STATION IDENTIFICATION**
 ID     633 HAPPY VALLEY DRAIN AT RICE ROAD         DA= 1.6SQMI REC BEGAN5-74TYPEBR

 **GENERALIZED SKEW**
      ISTN   GGMSE    SKEW
 GS    633    .000    -.30

 **SYSTEMATIC EVENTS**
      31 EVENTS TO BE ANALYZED

 **END OF INPUT DATA**
 ED +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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 ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ   FINAL RESULTS    ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ

 -PLOTTING POSITIONS-   633 HAPPY VALLEY DRAIN AT RICE ROAD
 ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÑÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
 º      EVENTS ANALYZED     ³         ORDERED EVENTS          º
 º                  FLOW    ³        WATER      FLOW   WEIBULL  º
 º MON DAY  YEAR     CFS    ³   RANK  YEAR      CFS    PLOT POS º
 ÇÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÅÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ¶
 º  12   4  1974       431. ³     1   2005      1050.     3.13  º
 º   9  29  1976       355. ³     2   1995       886.     6.25  º
 º   1   2  1977       206. ³     3   1993       727.     9.38  º
 º   1  16  1978       692. ³     4   1978       692.    12.50  º
 º   3  27  1979       206. ³     5   1980       591.    15.63  º
 º   2  16  1980       591. ³     6   1998       591.    18.75  º
 º   1  27  1981       194. ³     7   1983       568.    21.88  º
 º   1   5  1982        77. ³     8   1986       478.    25.00  º
 º   2  27  1983       568. ³     9   1992       478.    28.13  º
 º  12  25  1983       194. ³    10   2001       431.    31.25  º
 º  12  19  1984        85. ³    11   1975       431.    34.38  º
```

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º   2  14  1986      478.  ³    12   2003       425.    37.50  º
º  11  17  1986       85.  ³    13   1997       406.    40.63  º
º   2  29  1988      245.  ³    14   1996       385.    43.75  º
º  12  20  1988       94.  ³    15   1976       355.    46.88  º
º   1  13  1990      180.  ³    16   2004       350.    50.00  º
º   3  19  1991      227.  ³    17   1988       245.    53.13  º
º   2  15  1992      478.  ³    18   1991       227.    56.25  º
º   1  17  1993      727.  ³    19   2000       214.    59.38  º
º   2  20  1994      209.  ³    20   1994       209.    62.50  º
º   3  20  1995      886.  ³    21   1979       206.    65.63  º
º   2  20  1996      385.  ³    22   1977       206.    68.75  º
º   1  26  1997      406.  ³    23   1981       194.    71.88  º
º   2   3  1998      591.  ³    24   1984       194.    75.00  º
º   1  31  1999       76.  ³    25   1990       180.    78.13  º
º   2  23  2000      214.  ³    26   2002       114.    81.25  º
º   3   6  2001      431.  ³    27   1989        94.    84.38  º
º  11  24  2001      114.  ³    28   1987        85.    87.50  º
º   3  15  2003      425.  ³    29   1985        85.    90.63  º
º   2  25  2004      350.  ³    30   1982        77.    93.75  º
º   1  10  2005     1050.  ³    31   1999        76.    96.88  º
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÏÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼


-OUTLIER TESTS  -
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
LOW OUTLIER TEST
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ


BASED ON  31 EVENTS, 10 PERCENT OUTLIER TEST VALUE K(N) = 2.577

       0 LOW OUTLIER(S) IDENTIFIED BELOW TEST VALUE OF     40.8


ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
HIGH OUTLIER TEST
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ


BASED ON  31 EVENTS, 10 PERCENT OUTLIER TEST VALUE K(N) = 2.577

      0 HIGH OUTLIER(S) IDENTIFIED ABOVE TEST VALUE OF    1967.
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ


-SKEW WEIGHTING -
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
BASED ON  31 EVENTS, MEAN-SQUARE ERROR OF STATION SKEW =   .185
DEFAULT OR INPUT MEAN-SQUARE ERROR OF GENERALIZED SKEW =   .302
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ



FINAL RESULTS

-FREQUENCY CURVE-   633 HAPPY VALLEY DRAIN AT RICE ROAD
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÑÍÍÍÍÍÍÍÍÍÍÍÍÍÑÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
º  COMPUTED   EXPECTED   ³   PERCENT   ³    CONFIDENCE LIMITS  º
º   CURVE   PROBABILITY  ³    CHANCE   ³      .05        .95   º
º      FLOW IN CFS       ³  EXCEEDANCE ³      FLOW IN CFS      º
ÇÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÅÄÄÄÄÄÄÄÄÄÄÄÄÄÅÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ¶
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º     1880.      2200.   ³       .2    ³      3320.      1270.  º
º     1590.      1800.   ³       .5    ³      2690.      1100.  º
º     1380.      1520.   ³      1.0    ³      2260.       977.  º
º     1170.      1270.   ³      2.0    ³      1850.       850.  º
º      912.       959.   ³      5.0    ³      1360.       683.  º
º      723.       746.   ³     10.0    ³      1030.       555.  º
º      538.       547.   ³     20.0    ³       725.       424.  º
º      294.       294.   ³     50.0    ³       370.       235.  º
º      153.       149.   ³     80.0    ³       193.       114.  º
º      106.       101.   ³     90.0    ³       139.        74.  º
º       77.        72.   ³     95.0    ³       105.        50.  º
º       42.        36.   ³     99.0    ³        62.        24.  º
ÌÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¹
º                       SYSTEMATIC STATISTICS                    º
ÇÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ¶
º LOG TRANSFORM: FLOW, CFS       ³       NUMBER OF EVENTS        º
ÇÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ¶
º  MEAN                 2.4523  ³  HISTORIC EVENTS         0   º
º  STANDARD DEV          .3265  ³  HIGH OUTLIERS       0        º
º  COMPUTED SKEW        -.2858  ³  LOW OUTLIERS        0        º
º  REGIONAL SKEW        -.3000  ³  ZERO OR MISSING     0        º
º  ADOPTED SKEW         -.3000  ³  SYSTEMATIC EVENTS      31   º
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
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+++++++++++++++++++++++++
+ END OF RUN            +
+ NORMAL STOP IN FFA    +
+++++++++++++++++++++++++
```

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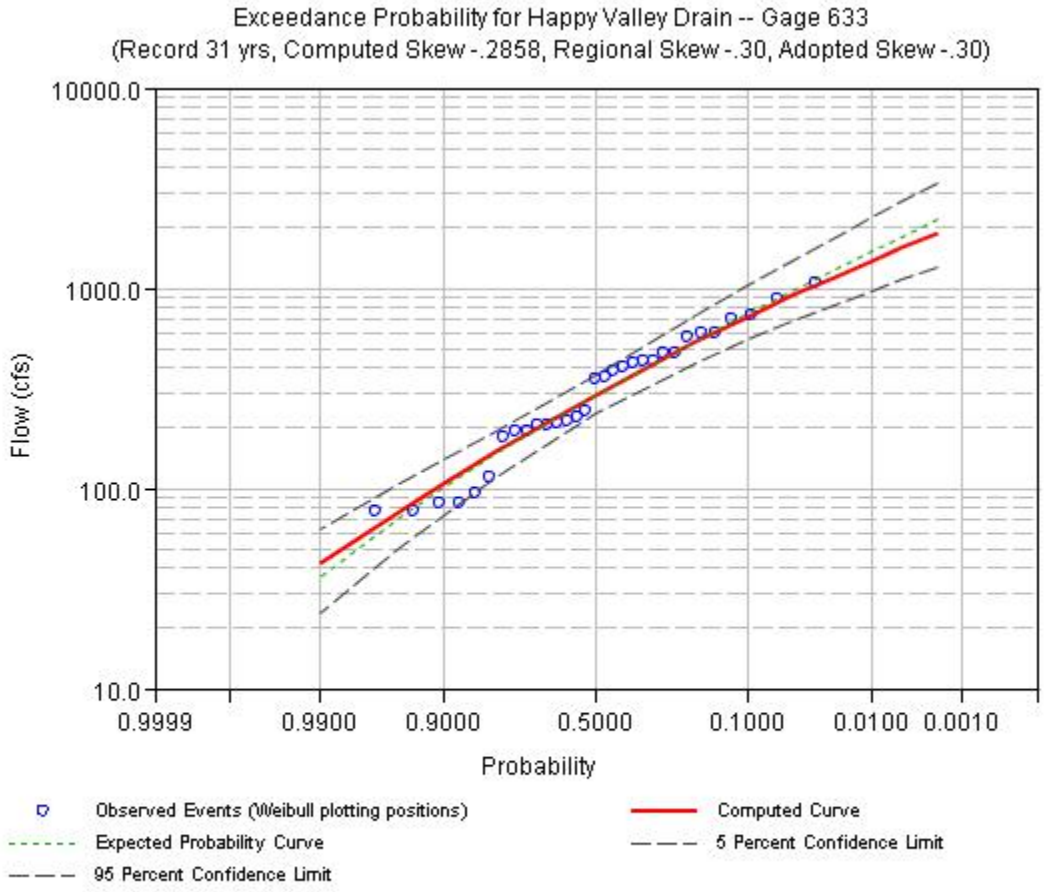
Exceedance Probability for Happy Valley Drain -- Gage 633
(Record 31 yrs, Computed Skew -.2858, Regional Skew -.30, Adopted Skew -.30)
10000.0
1000.0
100.0
10.0
Flow (cfs)
0.9999
0.9900
0.9000
0.5000
0.1000
0.0100
0.0010
Probability
Observed Events (Weibull plotting positions)
Computed Curve
Expected Probability Curve
5 Percent Confidence Limit
95 Percent Confidence Limit

GAGE 631 – FOX CANYON DRAIN BELOW OJAI AVENUE

```
1
 *********************************        ************************************
 *            HECWRC             *        *                                  *
 * FLOOD FLOW FREQUENCY ANALYSIS *        *   U.S. ARMY CORPS OF ENGINEERS   *
 * PROGRAM DATE:    1 APRIL 1978 *        * THE HYDROLOGIC ENGINEERING CENTER *
 * VERSION DATE:    1 APRIL 1987 *        *         609 SECOND STREET        *
 * RUN  DATE     AND     TIME:   *        *      DAVIS, CALIFORNIA 95616     *
 *     5/ 9/**          8:59:48  *        * (916) 551-1748 OR (FTS) 460-1748 *
 *********************************        ************************************



  INPUT FILE NAME: 631.dat
 OUTPUT FILE NAME: 631.out



 **TITLE CARD(S)**
 TT    FLOOD FLOW FREQUENCY PROGRAM FOX CANYON DRAIN BEL OJAI AVE 631 SEASONAL PEAK
 TT   REGIONAL SKEW -.3 TO DUPLICATE C.O.E. RESULTS ON OTHER PROJECTS IN VENTURA CO

 **STATION IDENTIFICATION**
 ID     631 FOX CANYON DRAIN BELOW OJAI AVENUE      DA= 1.9SQMI REC BEGAN1970TYPEBR

 **GENERALIZED SKEW**
      ISTN   GGMSE    SKEW
 GS    631    .000    -.30

 **SYSTEMATIC EVENTS**
      35 EVENTS TO BE ANALYZED

 **END OF INPUT DATA**
 ED ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++



  FINAL RESULTS
 -PLOTTING POSITIONS-   631 FOX CANYON DRAIN BELOW OJAI AVENUE
 ************************************************************
 *.....EVENTS ANALYZED......*...........ORDERED EVENTS.........*
 *                          *         WATER             WEIBULL  *
 * MON DAY  YEAR  FLOW,CFS  *   RANK  YEAR   FLOW,CFS  PLOT POS *
 *--------------------------*-----------------------------------*
 *  12  21  1970     128.   *     1   2005      679.    .0278   *
 *  12  27  1971      68.   *     2   1978      574.    .0556   *
 *   1  18  1973     507.   *     3   1998      574.    .0833   *
 *  11  17  1973      68.   *     4   1993      567.    .1111   *
 *  12   4  1974     211.   *     5   1995      524.    .1389   *
 *   9  29  1976     186.   *     6   1980      507.    .1667   *
 *   1   2  1977     117.   *     7   1983      507.    .1944   *
 *   1  16  1978     574.   *     8   1973      507.    .2222   *
 *   3  28  1979     150.   *     9   1992      478.    .2500   *
 *   2  16  1980     507.   *    10   1986      264.    .2778   *
```

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```
*   1  27  1981     186.   *    11   1975      211.    .3056   *
*   3  16  1982      68.   *    12   2001      206.    .3333   *
*   2  27  1983     507.   *    13   1996      199.    .3611   *
*  12   3  1983     100.   *    14   1987      198.    .3889   *
*  12  19  1984      86.   *    15   1976      186.    .4167   *
*   2  14  1986     264.   *    16   1981      186.    .4444   *
*  11  17  1986     198.   *    17   2003      155.    .4722   *
*   2  29  1988      96.   *    18   1979      150.    .5000   *
*  12  20  1989      77.   *    19   1990      146.    .5278   *
*   1  13  1990     146.   *    20   1991      130.    .5556   *
*   3  18  1991     130.   *    21   1971      128.    .5833   *
*   2  15  1992     478.   *    22   1977      117.    .6111   *
*   1   7  1993     567.   *    23   2002      113.    .6389   *
*   2   7  1994      81.   *    24   2000      107.    .6667   *
*   1  10  1995     524.   *    25   1984      100.    .6944   *
*   2  20  1996     199.   *    26   2004       98.    .7222   *
*   1  26  1997      94.   *    27   1988       96.    .7500   *
*   2   3  1998     574.   *    28   1997       94.    .7778   *
*   1  31  1999      60.   *    29   1985       86.    .8056   *
*   2  23  2000     107.   *    30   1994       81.    .8333   *
*   3   6  2001     206.   *    31   1990       77.    .8611   *
*  11  24  2001     113.   *    32   1974       68.    .8889   *
*   3  15  2003     155.   *    33   1972       68.    .9167   *
*   2  25  2004      98.   *    34   1982       68.    .9444   *
*   1  10  2005     679.   *    35   1999       60.    .9722   *
*****************************************************************


-OUTLIER TESTS  -
-----------------------------------------------------------------
LOW OUTLIER TEST
----------------

BASED ON  35 EVENTS, 10 PERCENT OUTLIER TEST VALUE K(N) = 2.628

       0 LOW OUTLIER(S) IDENTIFIED BELOW TEST VALUE OF     23.8


-----------------
HIGH OUTLIER TEST
-----------------

BASED ON  35 EVENTS, 10 PERCENT OUTLIER TEST VALUE K(N) = 2.628

      0 HIGH OUTLIER(S) IDENTIFIED ABOVE TEST VALUE OF    1311.

-----------------------------------------------------------------


-SKEW WEIGHTING -
-----------------------------------------------------------------
BASED ON  35 EVENTS, MEAN-SQUARE ERROR OF STATION SKEW =   .182
DEFAULT OR INPUT MEAN-SQUARE ERROR OF GENERALIZED SKEW =   .302
-----------------------------------------------------------------


 FINAL RESULTS
-FREQUENCY CURVE-   631 FOX CANYON DRAIN BELOW OJAI AVENUE
*****************************************************************
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FLOW,CFS			CONFIDENCE LIMITS	
COMPUTED	EXPECTED PROBABILITY	EXCEEDANCE PROBABILITY	.05 LIMIT	.95 LIMIT
1910.	2410.	.002	3620.	1230.
1450.	1730.	.005	2580.	974.
1160.	1330.	.010	1970.	805.
917.	1010.	.020	1470.	655.
646.	686.	.050	963.	483.
477.	495.	.100	670.	369.
333.	339.	.200	440.	265.
172.	172.	.500	214.	139.
93.	91.	.800	116.	70.
68.	66.	.900	87.	49.
53.	50.	.950	70.	36.
34.	31.	.990	47.	21.

FREQUENCY CURVE STATISTICS		STATISTICS BASED ON	
MEAN LOGARITHM	2.2476	HISTORIC EVENTS	0
STANDARD DEVIATION	.3311	HIGH OUTLIERS	0
COMPUTED SKEW	.4635	LOW OUTLIERS	0
GENERALIZED SKEW	-.3000	ZERO OR MISSING	0
ADOPTED SKEW	.2000	SYSTEMATIC EVENTS	35

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+++++++++++++++++++++++++
+ END OF RUN            +
+ NORMAL STOP IN HECWRC +
+++++++++++++++++++++++++
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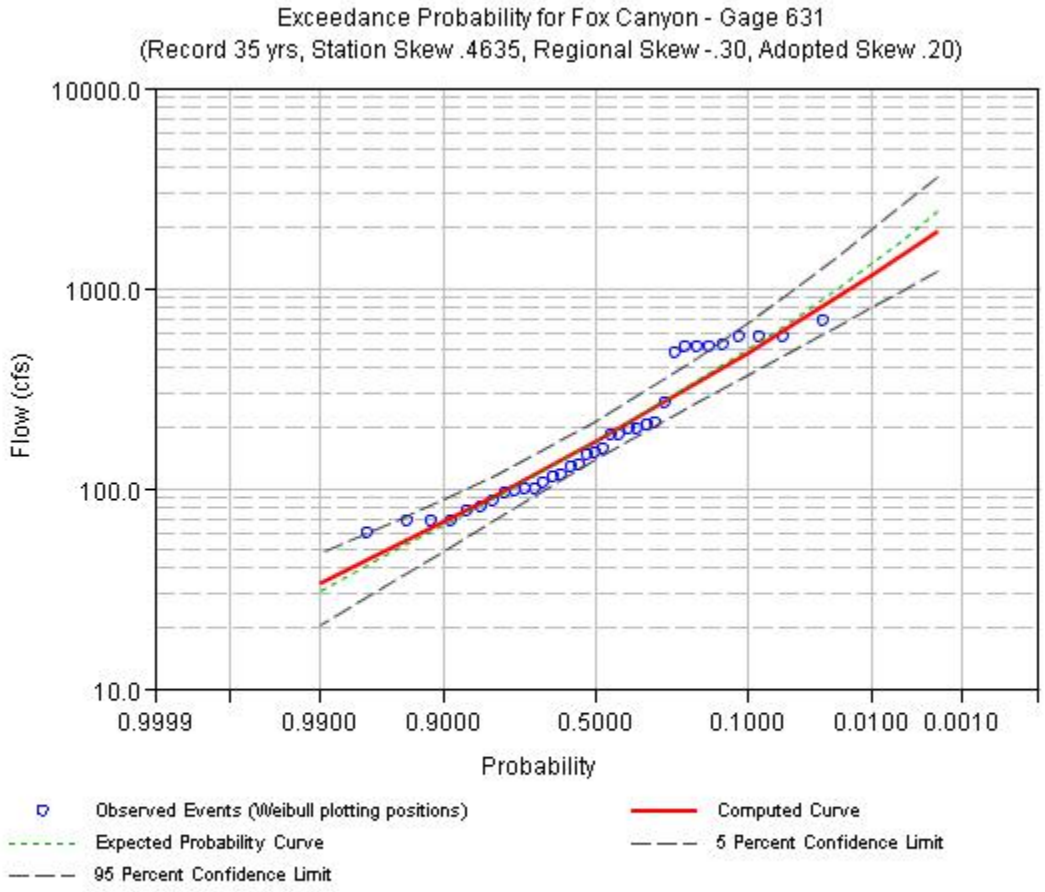
Exceedance Probability for Fox Canyon - Gage 631
(Record 35 yrs, Station Skew .4635, Regional Skew -.30, Adopted Skew .20)
10000.0
1000.0
100.0
10.0
Flow (cfs)
0.9999
0.9900
0.9000
0.5000
0.1000
0.0100
0.0010
Probability
Observed Events (Weibull plotting positions)
Computed Curve
Expected Probability Curve
5 Percent Confidence Limit
95 Percent Confidence Limit

GAGE 630 – CANADA LARGA AT VENTURA AVENUE

```
************************************        *************************************
 *              FFA                  *       *                                   *
 *     FLOOD FREQUENCY ANALYSIS      *       *   U.S. ARMY CORPS OF ENGINEERS    *
 *     PROGRAM DATE:  FEB 1995       *       * THE HYDROLOGIC ENGINEERING CENTER *
 *          VERSION:  3.1            *       *         609 SECOND STREET         *
 *     RUN  DATE   AND   TIME:       *       *      DAVIS, CALIFORNIA 95616      *
 *        30 OCT 06    12:44:35      *       *          (916) 756-1104           *
 *                                   *       *                                   *
 ************************************        *************************************




  INPUT FILE NAME: 630.dat
 OUTPUT FILE NAME: 630.ffo




 **TITLE RECORD(S)**
 TT    FLOOD FLOW FREQUENCY PROGRAM CANADA LARGA AT VENTURA AVENUR 630 SEASONAL PEA
 TT   REGIONAL SKEW -.3 TO DUPLICATE C.O.E. RESULTS ON OTHER PROJECTS IN VENTURA CO

 **STATION IDENTIFICATION**
 ID      630 CANADA LARGA AT VENTURA AVENUE          DA= 19 SQMI REC BEGAN1970TYPEBR

 **GENERALIZED SKEW**
      ISTN   GGMSE    SKEW
 GS    630    .000    -.30

 **SYSTEMATIC EVENTS**
      31 EVENTS TO BE ANALYZED

 **END OF INPUT DATA**
 ED ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++



 ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄPRELIMINARY RESULTS ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ


 -SKEW WEIGHTING -
 ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
 BASED ON  31 EVENTS, MEAN-SQUARE ERROR OF STATION SKEW =   .223
 DEFAULT OR INPUT MEAN-SQUARE ERROR OF GENERALIZED SKEW =   .302
 ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ


  PRELIMINARY RESULTS

 -FREQUENCY CURVE-   630 CANADA LARGA AT VENTURA AVENUE
 ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÑÍÍÍÍÍÍÍÍÍÍÍÍÍÑÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
 º  COMPUTED   EXPECTED   ³   PERCENT   ³    CONFIDENCE LIMITS  º
 º   CURVE   PROBABILITY  ³    CHANCE   ³      .05         .95   º
 º      FLOW IN CFS       ³  EXCEEDANCE ³      FLOW IN CFS       º
 ÇÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÅÄÄÄÄÄÄÄÄÄÄÄÄÄÅÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ¶
 º    42100.     54600.   ³       .2    ³   135000.     18800.  º
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31400.	38800.	.5	94300.	14600.	
24300.	29000.	1.0	68700.	11700.	
18100.	20800.	2.0	47800.	9060.	
11200.	12300.	5.0	26700.	5960.	
7080.	7540.	10.0	15400.	3960.	
3880.	4020.	20.0	7550.	2290.	
1070.	1070.	50.0	1780.	647.	
241.	229.	80.0	406.	125.	
102.	92.	90.0	186.	45.	
48.	40.	95.0	96.	18.	
10.	7.	99.0	26.	3.	

SYSTEMATIC STATISTICS

LOG TRANSFORM: FLOW, CFS		NUMBER OF EVENTS	
MEAN	2.9678	HISTORIC EVENTS	0
STANDARD DEV	.7256	HIGH OUTLIERS	0
COMPUTED SKEW	-.6789	LOW OUTLIERS	0
REGIONAL SKEW	-.3000	ZERO OR MISSING	0
ADOPTED SKEW	-.5000	SYSTEMATIC EVENTS	31

FINAL RESULTS

-PLOTTING POSITIONS- 630 CANADA LARGA AT VENTURA AVENUE

EVENTS ANALYZED				ORDERED EVENTS			
			FLOW		WATER	FLOW	WEIBULL
MON	DAY	YEAR	CFS	RANK	YEAR	CFS	PLOT POS
12	18	1970	1000.	1	2005	14000.	3.13
12	27	1971	415.	2	1980	11500.	6.25
2	10	1973	1480.	3	1998	6650.	9.38
1	7	1974	440.	4	1995	5940.	12.50
3	8	1975	565.	5	2001	4960.	15.63
9	29	1976	320.	6	1983	4560.	18.75
1	2	1977	565.	7	1992	4510.	21.88
3	4	1978	2000.	8	2004	2940.	25.00
3	27	1979	1500.	9	2000	2840.	28.13
2	16	1980	11500.	10	1993	2800.	31.25
3	1	1981	875.	11	1978	2000.	34.38
3	17	1982	158.	12	2003	1670.	37.50
3	1	1983	4560.	13	1979	1500.	40.63
12	25	1983	261.	14	1973	1480.	43.75
12	19	1984	100.	15	1997	1260.	46.88
2	14	1986	1015.	16	1991	1100.	50.00
11	17	1986	50.	17	1986	1015.	53.13
1	17	1988	78.	18	1971	1000.	56.25
2	17	1990	10.	19	1981	875.	59.38
3	19	1991	1100.	20	1977	565.	62.50
2	12	1992	4510.	21	1975	565.	65.63
2	8	1993	2800.	22	1974	440.	68.75
2	20	1994	241.	23	1972	415.	71.88
3	10	1995	5940.	24	1976	320.	75.00
1	26	1997	1260.	25	1984	261.	78.13
2	3	1998	6650.	26	1994	241.	81.25
2	23	2000	2840.	27	1982	158.	84.38
3	4	2001	4960.	28	1985	100.	87.50

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º   3  15  2003     1670.  ³    29   1988        78.    90.63  º
º   2  25  2004     2940.  ³    30   1987        50.    93.75  º
º   1  10  2005    14000.  ³    31   1990        10.    96.88  º
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÏÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼


-OUTLIER TESTS  -
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
LOW OUTLIER TEST
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ


BASED ON  31 EVENTS, 10 PERCENT OUTLIER TEST VALUE K(N) = 2.577

       1 LOW OUTLIER(S) IDENTIFIED BELOW TEST VALUE OF     12.5

STATISTICS AND FREQUENCY CURVE ADJUSTED FOR  1 LOW OUTLIER(S)


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HIGH OUTLIER TEST
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BASED ON  30 EVENTS, 10 PERCENT OUTLIER TEST VALUE K(N) = 2.563

      0 HIGH OUTLIER(S) IDENTIFIED ABOVE TEST VALUE OF   46529.
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ


-SKEW WEIGHTING -
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
BASED ON  31 EVENTS, MEAN-SQUARE ERROR OF STATION SKEW =   .184
DEFAULT OR INPUT MEAN-SQUARE ERROR OF GENERALIZED SKEW =   .302
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ



FINAL RESULTS

-FREQUENCY CURVE-   630 CANADA LARGA AT VENTURA AVENUE
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÑÍÍÍÍÍÍÍÍÍÍÍÍÍÑÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
º  COMPUTED   EXPECTED   ³   PERCENT   ³    CONFIDENCE LIMITS  º
º   CURVE   PROBABILITY  ³    CHANCE   ³       .05        .95   º
º      FLOW IN CFS       ³ EXCEEDANCE ³      FLOW IN CFS       º
ÇÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÅÄÄÄÄÄÄÄÄÄÄÄÄÄÅÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ¶
º    42500.     57600.   ³       .2    ³   130000.     19700.  º
º    30500.     38700.   ³       .5    ³    86300.     14900.  º
º    23000.     27900.   ³      1.0    ³    60900.     11700.  º
º    16700.     19400.   ³      2.0    ³    41200.      8880.  º
º    10200.     11300.   ³      5.0    ³    22500.      5760.  º
º     6450.      6860.   ³     10.0    ³    12900.      3830.  º
º     3600.      3730.   ³     20.0    ³     6490.      2250.  º
º     1100.      1100.   ³     50.0    ³     1720.       703.  º
º      300.       288.   ³     80.0    ³      479.       168.  º
º      146.       134.   ³     90.0    ³      249.        72.  º
º       79.        69.   ³     95.0    ³      144.        34.  º
º       24.        17.   ³     99.0    ³       51.         8.  º
ÌÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÏÍÍÍÍÍÍÍÍÍÍÍÍÍÏÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¹
º                        SYNTHETIC STATISTICS                   º
ÇÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÂÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ¶
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º LOG TRANSFORM: FLOW, CFS       ³       NUMBER OF EVENTS      º
ÇÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÅÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ¶
º  MEAN                  3.0078  ³  HISTORIC EVENTS         0  º
º  STANDARD DEV           .6436  ³  HIGH OUTLIERS       0      º
º  COMPUTED SKEW         -.2693  ³  LOW OUTLIERS        1      º
º  REGIONAL SKEW         -.3000  ³  ZERO OR MISSING     0      º
º  ADOPTED SKEW          -.3000  ³  SYSTEMATIC EVENTS      31  º
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÏÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
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```
++++++++++++++++++++++++++
+ END OF RUN             +
+ NORMAL STOP IN FFA     +
++++++++++++++++++++++++++
```

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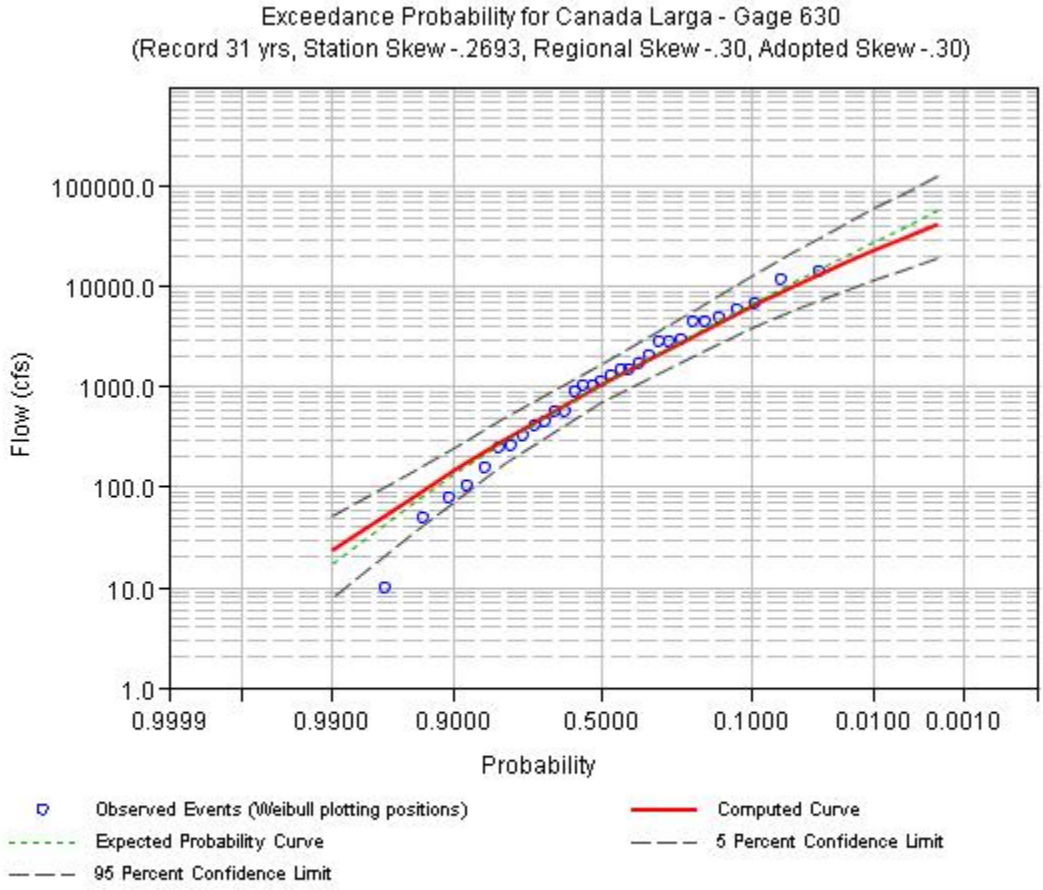
Exceedance Probability for Canada Larga - Gage 630
(Record 31 yrs, Station Skew -.2693, Regional Skew -.30, Adopted Skew -.30)
Flow (cfs)
100000.0
10000.0
1000.0
100.0
10.0
1.0
0.9999
0.9900
0.9000
0.5000
0.1000
0.0100
0.0010
Probability
Observed Events (Weibull plotting positions)
Computed Curve
Expected Probability Curve
5 Percent Confidence Limit
95 Percent Confidence Limit

GAGE 605 – SAN ANTONIO CREEK AT CASITAS SPRINGS

```
************************************      *************************************
 *              FFA                  *      *                                   *
 *     FLOOD FREQUENCY ANALYSIS      *      *   U.S. ARMY CORPS OF ENGINEERS    *
 *     PROGRAM DATE:  FEB 1995       *      * THE HYDROLOGIC ENGINEERING CENTER *
 *          VERSION:  3.1            *      *          609 SECOND STREET        *
 *     RUN  DATE   AND   TIME:       *      *      DAVIS, CALIFORNIA 95616      *
 *        20 OCT 06    08:48:02      *      *          (916) 756-1104           *
 *                                   *      *                                   *
 ************************************      *************************************



  INPUT FILE NAME: 605.dat
 OUTPUT FILE NAME: 605.out



 **TITLE RECORD(S)**
 TT   FLOOD FLOW FREQUENCY PROGRAM TEST 2-SAN ANTONIO CREEK AT CASITAS SPRINGS
 TT   REGIONAL SKEW -.3 TO DUPLICATE C.O.E. RESULTS ON OTHER PROJECTS IN VENTURA CO

 **STATION IDENTIFICATION**
 ID    1175 SAN ANTONIO CREEK AT CASITAS SPRINGS (VC #605) DA=51.2SQMI REC BEGAN:19

 **GENERALIZED SKEW**
      ISTN   GGMSE    SKEW
 GS   1175    .000    -.30

 **SYSTEMATIC EVENTS**
      55 EVENTS TO BE ANALYZED

 **END OF INPUT DATA**
 ED ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++



 ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ   FINAL RESULTS    ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ

 -PLOTTING POSITIONS-  1175 SAN ANTONIO CREEK AT CASITAS SPRINGS (
```

MON	DAY	YEAR	FLOW CFS	RANK	WATER YEAR	FLOW CFS	WEIBULL PLOT POS
2	6	1950	1200.	1	2005	24000.	1.79
1	15	1952	3800.	2	1969	16200.	3.57
11	15	1952	283.	3	1995	14400.	5.36
2	13	1954	381.	4	1978	13890.	7.14
1	18	1955	130.	5	1998	13700.	8.93
1	26	1956	690.	6	1993	10050.	10.71
2	23	1957	570.	7	1983	8730.	12.50
4	3	1958	5240.	8	1992	8700.	14.29
2	16	1959	356.	9	1980	7380.	16.07
2	4	1960	196.	10	1967	7280.	17.86
11	5	1960	217.	11	1966	6800.	19.64

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2	10	1962	2260.	12	1973	6514.	21.43
2	9	1963	1150.	13	1958	5240.	23.21
11	20	1963	155.	14	2001	4920.	25.00
4	9	1965	710.	15	1986	4640.	26.79
11	24	1965	6800.	16	1952	3800.	28.57
12	6	1966	7280.	17	1991	3514.	30.36
3	8	1968	388.	18	1997	3200.	32.14
1	25	1969	16200.	19	1996	2340.	33.93
3	1	1970	1044.	20	1962	2260.	35.71
12	18	1970	2150.	21	2003	2230.	37.50
12	27	1971	1148.	22	1971	2150.	39.29
1	18	1973	6514.	23	2004	2100.	41.07
1	7	1974	1230.	24	1976	1900.	42.86
12	4	1975	1900.	25	1979	1880.	44.64
9	29	1976	1040.	26	2000	1820.	46.43
1	2	1977	660.	27	1988	1360.	48.21
2	10	1978	13890.	28	1974	1230.	50.00
3	28	1979	1880.	29	1950	1200.	51.79
2	16	1980	7380.	30	1963	1150.	53.57
3	3	1981	828.	31	1972	1148.	55.36
4	1	1982	672.	32	1970	1044.	57.14
3	1	1983	8730.	33	1976	1040.	58.93
12	3	1983	402.	34	1981	828.	60.71
12	19	1984	448.	35	1965	710.	62.50
2	14	1986	4640.	36	1956	690.	64.29
11	17	1986	320.	37	1982	672.	66.07
2	29	1988	1360.	38	1977	660.	67.86
2	29	1988	408.	39	1994	652.	69.64
1	13	1990	422.	40	1957	570.	71.43
3	19	1991	3514.	41	1985	448.	73.21
2	12	1992	8700.	42	1990	422.	75.00
1	18	1993	10050.	43	1988	408.	76.79
2	20	1994	652.	44	1984	402.	78.57
1	10	1995	14400.	45	1968	388.	80.36
2	20	1996	2340.	46	1954	381.	82.14
1	26	1997	3200.	47	1959	356.	83.93
2	23	1998	13700.	48	1987	320.	85.71
4	11	1999	143.	49	1953	283.	87.50
2	23	2000	1820.	50	2002	243.	89.29
3	6	2001	4920.	51	1961	217.	91.07
11	24	2001	243.	52	1960	196.	92.86
3	15	2003	2230.	53	1964	155.	94.64
2	25	2004	2100.	54	1999	143.	96.43
1	10	2005	24000.	55	1955	130.	98.21

-OUTLIER TESTS -

LOW OUTLIER TEST

BASED ON 55 EVENTS, 10 PERCENT OUTLIER TEST VALUE K(N) = 2.804

0 LOW OUTLIER(S) IDENTIFIED BELOW TEST VALUE OF 29.7

HIGH OUTLIER TEST

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BASED ON 55 EVENTS, 10 PERCENT OUTLIER TEST VALUE K(N) = 2.804

0 HIGH OUTLIER(S) IDENTIFIED ABOVE TEST VALUE OF 74399.

-SKEW WEIGHTING -

BASED ON 55 EVENTS, MEAN-SQUARE ERROR OF STATION SKEW = .104
DEFAULT OR INPUT MEAN-SQUARE ERROR OF GENERALIZED SKEW = .302

FINAL RESULTS

-FREQUENCY CURVE- 1175 SAN ANTONIO CREEK AT CASITAS SPRINGS (

COMPUTED CURVE FLOW IN CFS	EXPECTED PROBABILITY FLOW IN CFS	PERCENT CHANCE EXCEEDANCE	CONFIDENCE LIMITS .05 FLOW IN CFS	CONFIDENCE LIMITS .95 FLOW IN CFS
82500.	103000.	.2	189000.	44400.
54100.	63800.	.5	115000.	30600.
38200.	43500.	1.0	76700.	22500.
26100.	28800.	2.0	49300.	16000.
14800.	15700.	5.0	25500.	9620.
8890.	9240.	10.0	14300.	6070.
4810.	4910.	20.0	7160.	3430.
1490.	1490.	50.0	2030.	1090.
459.	450.	80.0	643.	309.
248.	239.	90.0	364.	155.
150.	141.	95.0	230.	87.
58.	51.	99.0	98.	29.

SYSTEMATIC STATISTICS

LOG TRANSFORM: FLOW, CFS		NUMBER OF EVENTS	
MEAN	3.1720	HISTORIC EVENTS	0
STANDARD DEV	.6061	HIGH OUTLIERS	0
COMPUTED SKEW	.1510	LOW OUTLIERS	0
REGIONAL SKEW	-.3000	ZERO OR MISSING	0
ADOPTED SKEW	.0000	SYSTEMATIC EVENTS	55

+++++++++++++++++++++++++
+ END OF RUN   +
+ NORMAL STOP IN FFA   +
+++++++++++++++++++++++++

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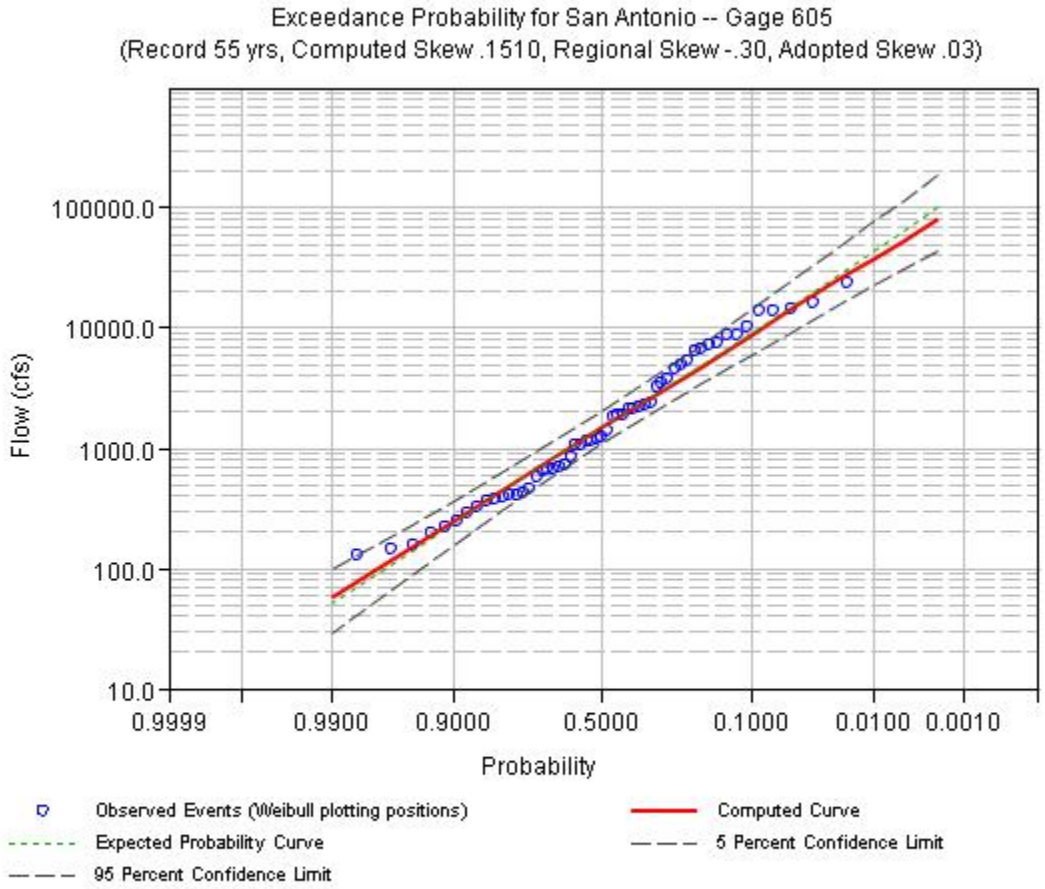
Exceedance Probability for San Antonio -- Gage 605
(Record 55 yrs, Computed Skew .1510, Regional Skew -.30, Adopted Skew .03)
Flow (cfs)
100000.0
10000.0
1000.0
100.0
10.0
0.9999
0.9900
0.9000
0.5000
0.1000
0.0100
0.0010
Probability
Observed Events (Weibull plotting positions)
Computed Curve
Expected Probability Curve
5 Percent Confidence Limit
95 Percent Confidence Limit

APPENDIX A2 – USBR LOG PEARSON TYPE III ANALYSIS

Table 2
Peak flows for Ventura River Nr. Ventura, CA

Gauge Number	Date	Peak (cfs)
11118500	1/19/1933	13000
11118500	12/31/1933	23000
11118500	1/5/1935	6010
11118500	2/12/1936	3330
11118500	2/14/1937	13900
11118500	3/2/1938	39200
11118500	3/9/1939	2840
11118500	2/25/1940	4330
11118500	3/1/1941	15200
11118500	12/28/1941	1190
11118500	1/22/1943	35000
11118500	2/22/1944	20000
11118500	2/2/1945	17000
11118500	3/30/1946	8000
11118500	11/20/1946	2400
11118500	3/24/1948	2.4
11118500	3/11/1949	35
11118500	2/6/1950	2000
11118500	3/1/1951	0.3
11118500	1/15/1952	29500
11118500	12/20/1952	1040
11118500	2/13/1954	3030
11118500	1/18/1955	203
11118500	1/26/1956	4050
11118500	1/13/1957	936
11118500	4/3/1958	18700
11118500	2/16/1959	3220
11118500	2/1/1960	966
11118500	11/6/1960	308
11118500	2/10/1962	12400
11118500	2/9/1963	1060
11118500	11/20/1963	132
11118500	4/9/1965	744
11118500	11/24/1965	11200
11118500	12/6/1966	9900
11118500	3/8/1968	665
11118500	1/25/1969	58000
11118500	3/4/1970	1930
11118500	12/21/1970	3120
11118500	12/27/1971	2090
11118500	2/11/1973	15700
11118500	1/7/1974	2540
11118500	3/8/1975	5150
11118500	9/29/1976	1990
11118500	1/2/1977	856
11118500	2/10/1978	63600
11118500	3/28/1979	4280
11118500	2/16/1980	37900
11118500	3/1/1981	1210
11118500	4/1/1982	834
11118500	3/1/1983	27000
11118500	12/25/1983	1500
11118500	12/19/1984	412
11118500	2/14/1986	22100
11118500	3/6/1987	174
11118500	2/29/1988	4000
11118500	12/21/1988	236
11118500	2/17/1990	516
11118500	3/19/1991	11300
11118500	2/12/1992	45800
11118500	1/18/1993	12500
11118500	2/20/1994	1820
11118500	1/10/1995	43700
11118500	2/20/1996	3660
11118500	1/26/1997	4960
11118500	2/23/1998	38800
11118500	1/31/1999	106
11118500	2/23/2000	3280

Table 3

(Results of this LPIII analysis are not the final results recommended in the study)

Ventura River at Ventura, CA 2 low outliers, Reg SK -0.3

Mean of Logs	Std.Dev	Data Skew	Reg.Skew	Final Skew
3.5295	0.7751	-0.4205	-0.3000	-0.3899

RANK	PlotPos	YEAR	Q	EXCEED.	FREQ.Q	LOW	HIGH
1	0.01449	1978	63600.0	0.99000	32	14	63
2	0.02899	1969	58000.0	0.98000	60	28	110
3	0.04348	1992	45800.0	0.97500	75	36	133
4	0.05797	1995	43700.0	0.96000	119	61	203
5	0.07246	1938	39200.0	0.95000	150	79	250
6	0.08696	1998	38800.0	0.90000	323	188	505
7	0.10145	1980	37900.0	0.80000	787	503	1160
8	0.11594	1943	35000.0	0.70000	1453	977	2088
9	0.13043	1952	29500.0	0.60000	2407	1663	3437
10	0.14493	1983	27000.0	0.57040	2765	1919	3950
11	0.15942	1933	23000.0	0.50000	3799	2657	5459
12	0.17391	1986	22100.0	0.42960	5183	3630	7531
13	0.18841	1944	20000.0	0.40000	5907	4133	8639
14	0.20290	1958	18700.0	0.30000	9320	6453	14034
15	0.21739	1945	17000.0	0.20000	15560	10526	24494
16	0.23188	1973	15700.0	0.10000	30532	19754	51669
17	0.24638	1941	15200.0	0.05000	51616	31997	93161
18	0.26087	1937	13900.0	0.04000	59831	36611	110068
19	0.27536	1933	13000.0	0.02500	79574	47440	152030
20	0.28986	1993	12500.0	0.02000	90154	53118	175181
21	0.30435	1962	12400.0	0.01000	128274	73031	261724
22	0.31884	1991	11300.0	0.00500	174822	96476	372724
23	0.33333	1965	11200.0	0.00200	250253	133062	562006
24	0.34783	1966	9900.0				
25	0.36232	1946	8000.0				
26	0.37681	1935	6010.0				
27	0.39130	1975	5150.0				
28	0.40580	1997	4960.0				
29	0.42029	1940	4330.0				
30	0.43478	1979	4280.0				
31	0.44928	1956	4050.0				
32	0.46377	1988	4000.0				
33	0.47826	1996	3660.0				
34	0.49275	1936	3330.0				
35	0.50725	2000	3280.0				
36	0.52174	1959	3220.0				
37	0.53623	1970	3120.0				
38	0.55072	1954	3030.0				
39	0.56522	1939	2840.0				
40	0.57971	1974	2540.0				
41	0.59420	1946	2400.0				
42	0.60870	1971	2090.0				
43	0.62319	1950	2000.0				
44	0.63768	1976	1990.0				
45	0.65217	1970	1930.0				
46	0.66667	1994	1820.0				
47	0.68116	1983	1500.0				
48	0.69565	1981	1210.0				

49	0.71014	1941	1190.0
50	0.72464	1963	1060.0
51	0.73913	1952	1040.0
52	0.75362	1960	966.0
53	0.76812	1957	936.0
54	0.78261	1977	856.0
55	0.79710	1982	834.0
56	0.81159	1965	744.0
57	0.82609	1968	665.0
58	0.84058	1990	516.0
59	0.85507	1984	412.0
60	0.86957	1960	308.0
61	0.88406	1988	236.0
62	0.89855	1955	203.0
63	0.91304	1987	174.0
64	0.92754	1963	132.0
65	0.94203	1999	106.0
66	0.95652	1949	35.0
67	0.97101	1948	2.4
68	0.98551	1951	0.3

Table 1

Peak flows for combined gauges at Matilija Reservoir

(Gauge 1114500 Matilija River abv. Reservoir used between 1949 and 1969)

(Gauge 1115500 Matilija River at Matilija Hot Springs used for all other years)

Gauge Number	Date	Peak (cfs)
11115500	1/19/1933	4460
11115500	12/31/1933	7000
11115500	1/15/1935	2050
11115500	2/2/1936	1430
11115500	2/14/1937	2180
11115500	3/2/1938	15900
11115500	3/9/1939	1040
11115500	2/25/1940	1320
11115500	3/4/1941	4290
11115500	12/28/1941	780
11115500	1/22/1943	15000
11115500	2/22/1944	4900
11115500	2/2/1945	2800
11115500	3/30/1946	4500
11115500	11/20/1946	3500
11115500	4/14/1948	12
11114500	3/11/1949	60
11114500	2/6/1950	155
11114500	4/28/1951	6
11114500	1/15/1952	8800
11114500	12/20/1952	235
11114500	2/13/1954	582
11114500	1/18/1955	66
11114500	1/26/1956	1040
11114500	1/13/1957	1820
11114500	4/3/1958	5440
11114500	2/16/1959	2500
11114500	1/10/1960	73
11114500	1/26/1961	42
11114500	2/9/1962	6570
11114500	2/9/1963	863
11114500	4/1/1964	344
11114500	4/9/1965	328
11114500	12/29/1965	5540
11114500	12/6/1966	5190
11114500	3/8/1968	149
11114500	1/25/1969	19600
11115500	3/2/1970	496
11115500	12/1/1970	520
11115500	12/29/1971	380
11115500	2/11/1973	6810
11115500	1/9/1974	465
11115500	3/8/1975	1820
11115500	2/10/1976	529
11115500	1/9/1977	80
11115500	3/4/1978	16500
11115500	3/28/1979	966
11115500	2/16/1980	10600
11115500	4/22/1981	323
11115500	4/1/1982	271
11115500	3/1/1983	12200
11115500	12/25/1983	1250
11115500	1/29/1985	240
11115500	2/14/1986	9730
11115500	3/4/1987	165
11115500	2/29/1988	2050
11115500	3/18/1991	5400
11115500	2/12/1992	11450
11115500	1/13/1993	5180
11115500	3/10/1995	10360
11115500	2/20/1996	570
11115500	2/23/1998	14000

Table 4

(Results of this LPIII analysis are not the final results recommended in the study)

Matilija Dam Peak Inflows with Regional Skew = -0.3
Two low outliers detected and treated

Mean of Logs	Std.Dev	Data Skew	Reg.Skew	Final Skew
3.0981	0.8185	-0.6584	-0.3000	-0.5506

RANK	PlotPos	YEAR	Q	EXCEED.	FREQ.Q	LOW	HIGH
1	0.01587	1969	19600.0	0.99000	7.4	2.8	15.9
2	0.03175	1978	16500.0	0.98000	15	6	30
3	0.04762	1938	15900.0	0.97500	20	8	38
4	0.06349	1943	15000.0	0.96000	33	16	61
5	0.07937	1998	14000.0	0.95000	43	21	77
6	0.09524	1983	12200.0	0.90000	103	56	169
7	0.11111	1992	11450.0	0.80000	276	168	422
8	0.12698	1980	10600.0	0.70000	536	346	799
9	0.14286	1995	10360.0	0.60000	920	612	1364
10	0.15873	1986	9730.0	0.57040	1065	712	1582
11	0.17460	1952	8800.0	0.50000	1489	1003	2227
12	0.19048	1933	7000.0	0.42960	2058	1388	3121
13	0.20635	1973	6810.0	0.40000	2357	1587	3601
14	0.22222	1962	6570.0	0.30000	3761	2503	5938
15	0.23810	1965	5540.0	0.20000	6300	4093	10436
16	0.25397	1958	5440.0	0.10000	12214	7586	21807
17	0.26984	1991	5400.0	0.05000	20163	12011	38392
18	0.28571	1966	5190.0	0.04000	23158	13626	44928
19	0.30159	1993	5180.0	0.02500	30160	17315	60687
20	0.31746	1944	4900.0	0.02000	33809	19199	69137
21	0.33333	1946	4500.0	0.01000	46459	25567	99456
22	0.34921	1933	4460.0	0.00500	61027	32661	136010
23	0.36508	1941	4290.0	0.00200	83013	43013	193780
24	0.38095	1946	3500.0				
25	0.39683	1945	2800.0				
26	0.41270	1959	2500.0				
27	0.42857	1937	2180.0				
28	0.44444	1988	2050.0				
29	0.46032	1935	2050.0				
30	0.47619	1957	1820.0				
31	0.49206	1975	1820.0				
32	0.50794	1936	1430.0				
33	0.52381	1940	1320.0				
34	0.53968	1983	1250.0				
35	0.55556	1956	1040.0				
36	0.57143	1939	1040.0				
37	0.58730	1979	966.0				
38	0.60317	1963	863.0				
39	0.61905	1941	780.0				
40	0.63492	1954	582.0				
41	0.65079	1996	570.0				
42	0.66667	1976	529.0				
43	0.68254	1970	520.0				
44	0.69841	1970	496.0				
45	0.71429	1974	465.0				
46	0.73016	1971	380.0				
47	0.74603	1964	344.0				
48	0.76190	1965	328.0				

49	0.77778	1981	323.0
50	0.79365	1982	271.0
51	0.80952	1985	240.0
52	0.82540	1952	235.0
53	0.84127	1987	165.0
54	0.85714	1950	155.0
55	0.87302	1968	149.0
56	0.88889	1977	80.0
57	0.90476	1960	73.0
58	0.92063	1955	66.0
59	0.93651	1949	60.0
60	0.95238	1961	42.0
61	0.96825	1948	12.0
62	0.98413	1951	6.0

APPENDIX A3 – HDR LOG PEARSON TYPE III ANALYSIS

1
Program PeakFq U. S. GEOLOGICAL SURVEY Seq.000.000
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/02/2009 18:30

--- PROCESSING OPTIONS ---

Plot option = None
Basin char output = None
Print option = Yes
Debug print = No
Input peaks listing = Long
Input peaks format = WATSTORE peak file

Input files used:
peaks (ascii) - C:\DOCUMENTS AND SETTINGS\JRAMEY\DESKTOP\ATTACHMENTS\11118500.TXT
specifications - PKFQWPSF.TMP
Output file(s):
main - C:\DOCUMENTS AND SETTINGS\JRAMEY\DESKTOP\ATTACHMENTS\11118500.PRT

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.001
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/02/2009 18:30

Station - 11118500 VENTURA R NR VENTURA

I N P U T D A T A S U M M A R Y

Number of peaks in record = 68
Peaks not used in analysis = 0
Systematic peaks in analysis = 68
Historic peaks in analysis = 0
Years of historic record = 0
Generalized skew = -0.300
Standard error = 0.550
Mean Square error = 0.303
Skew option = WEIGHTED
Gage base discharge = 0.0
User supplied high outlier threshold = --
User supplied low outlier criterion = 3.0
Plotting position parameter = 0.00

********* NOTICE -- Preliminary machine computations. *********
********* User responsible for assessment and interpretation. *********

WCF134I-NO SYSTEMATIC PEAKS WERE BELOW GAGE BASE. 0.0

*WCF191I-USER LOW-OUTLIER CRITERION SUPERSEDES 17B. 3.0 4.6
WCF198I-LOW OUTLIERS BELOW FLOOD BASE WERE DROPPED. 2 3.0
WCF163I-NO HIGH OUTLIERS OR HISTORIC PEAKS EXCEEDED HHBASE. 529201.3
1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.002
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/02/2009 18:30

Station - 11118500 VENTURA R NR VENTURA

ANNUAL FREQUENCY CURVE PARAMETERS -- LOG-PEARSON TYPE III

	FLOOD BASE		LOGARITHMIC		
	EXCEEDANCE		STANDARD		
	DISCHARGE	PROBABILITY	MEAN	DEVIATION	SKEW
SYSTEMATIC RECORD	0.0	1.0000	3.4570	0.9685	-1.538
BULL.17B ESTIMATE	3.0	0.9706	3.5319	0.7693	-0.385

ANNUAL FREQUENCY CURVE -- DISCHARGES AT SELECTED EXCEEDANCE PROBABILITIES

ANNUAL EXCEEDANCE PROBABILITY	BULL.17B ESTIMATE	'EXPECTED SYSTEMATIC RECORD	68-PCT CONFIDENCE LIMITS PROBABILITY' FOR BULL. 17B ESTIMATES		
				LOWER	UPPER
0.9950	--	0.4	--	--	--
0.9900	--	1.6	--	--	--
0.9500	154.2	36.6	142.8	130.7	180.2
0.9000	331.0	147.0	316.0	287.3	378.4
0.8000	799.8	622.0	782.1	710.3	896.3
0.6667	1749.0	1907.0	1734.0	1575.0	1939.0
0.5000	3812.0	4951.0	3812.0	3448.0	4216.0
0.4292	5198.0	6909.0	5212.0	4697.0	5759.0
0.2000	15470.0	17920.0	15750.0	13790.0	17440.0
0.1000	30240.0	27180.0	31260.0	26550.0	34700.0
0.0400	59100.0	36480.0	62470.0	50950.0	69190.0
0.0200	88920.0	41360.0	95770.0	75730.0	105500.0
0.0100	126400.0	44800.0	138800.0	106500.0	151800.0
0.0050	172100.0	47160.0	193100.0	143600.0	209000.0
0.0020	246300.0	49170.0	284200.0	203000.0	302900.0

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.003
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/02/2009 18:30

Station - 11118500 VENTURA R NR VENTURA

I N P U T D A T A L I S T I N G

WATER YEAR	DISCHARGE	CODES	WATER YEAR	DISCHARGE	CODES
1933	13000.0		1967	9900.0	K
1934	23000.0		1968	665.0	K
1935	6010.0		1969	58000.0	K
1936	3330.0		1970	1930.0	K
1937	13900.0		1971	3120.0	K
1938	39200.0		1972	2090.0	K
1939	2840.0		1973	15700.0	K
1940	4330.0		1974	2540.0	K
1941	15200.0		1975	5150.0	K
1942	1190.0		1976	1990.0	K
1943	35000.0		1977	856.0	K
1944	20000.0		1978	63600.0	K
1945	17000.0		1979	4280.0	K
1946	8000.0		1980	37900.0	K
1947	2400.0		1981	1210.0	K
1948	2.4		1982	834.0	K
1949	35.0		1983	27000.0	K
1950	2000.0		1984	1500.0	K
1951	0.3		1985	412.0	K
1952	29500.0		1986	22100.0	K
1953	1040.0		1987	174.0	K
1954	3030.0		1988	4000.0	K
1955	203.0		1989	236.0	K
1956	4050.0		1990	574.0	K
1957	936.0		1991	11300.0	K
1958	18700.0		1992	45800.0	K
1959	3220.0		1993	12500.0	K
1960	966.0	K	1994	1820.0	K
1961	308.0	K	1995	43700.0	K
1962	12400.0	K	1996	3660.0	K
1963	1060.0	K	1997	4960.0	K
1964	132.0	K	1998	38800.0	K
1965	744.0	K	1999	106.0	K
1966	11200.0	K	2000	3280.0	K

Explanation of peak discharge qualification codes

PEAKFQ CODE	NWIS CODE	DEFINITION
D	3	Dam failure, non-recurrent flow anomaly
G	8	Discharge greater than stated value
X	3+8	Both of the above
L	4	Discharge less than stated value
K	6 OR C	Known effect of regulation or urbanization
H	7	Historic peak

- Minus-flagged discharge -- Not used in computation
  -8888.0 -- No discharge value given
- Minus-flagged water year -- Historic peak used in computation

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.004
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/02/2009 18:30

Station - 11118500 VENTURA R NR VENTURA

EMPIRICAL FREQUENCY CURVES -- WEIBULL PLOTTING POSITIONS

WATER YEAR	RANKED DISCHARGE	SYSTEMATIC RECORD	BULL.17B ESTIMATE
1978	63600.0	0.0145	0.0145
1969	58000.0	0.0290	0.0290
1992	45800.0	0.0435	0.0435
1995	43700.0	0.0580	0.0580
1938	39200.0	0.0725	0.0725
1998	38800.0	0.0870	0.0870
1980	37900.0	0.1014	0.1014
1943	35000.0	0.1159	0.1159
1952	29500.0	0.1304	0.1304
1983	27000.0	0.1449	0.1449
1934	23000.0	0.1594	0.1594
1986	22100.0	0.1739	0.1739
1944	20000.0	0.1884	0.1884
1958	18700.0	0.2029	0.2029
1945	17000.0	0.2174	0.2174
1973	15700.0	0.2319	0.2319
1941	15200.0	0.2464	0.2464
1937	13900.0	0.2609	0.2609
1933	13000.0	0.2754	0.2754
1993	12500.0	0.2899	0.2899
1962	12400.0	0.3043	0.3043
1991	11300.0	0.3188	0.3188
1966	11200.0	0.3333	0.3333
1967	9900.0	0.3478	0.3478
1946	8000.0	0.3623	0.3623
1935	6010.0	0.3768	0.3768
1975	5150.0	0.3913	0.3913
1997	4960.0	0.4058	0.4058
1940	4330.0	0.4203	0.4203
1979	4280.0	0.4348	0.4348
1956	4050.0	0.4493	0.4493
1988	4000.0	0.4638	0.4638

1996	3660.0	0.4783	0.4783
1936	3330.0	0.4928	0.4928
2000	3280.0	0.5072	0.5072
1959	3220.0	0.5217	0.5217
1971	3120.0	0.5362	0.5362
1954	3030.0	0.5507	0.5507
1939	2840.0	0.5652	0.5652
1974	2540.0	0.5797	0.5797
1947	2400.0	0.5942	0.5942
1972	2090.0	0.6087	0.6087
1950	2000.0	0.6232	0.6232
1976	1990.0	0.6377	0.6377
1970	1930.0	0.6522	0.6522
1994	1820.0	0.6667	0.6667
1984	1500.0	0.6812	0.6812
1981	1210.0	0.6957	0.6957
1942	1190.0	0.7101	0.7101
1963	1060.0	0.7246	0.7246
1953	1040.0	0.7391	0.7391
1960	966.0	0.7536	0.7536
1957	936.0	0.7681	0.7681
1977	856.0	0.7826	0.7826
1982	834.0	0.7971	0.7971
1965	744.0	0.8116	0.8116
1968	665.0	0.8261	0.8261
1990	574.0	0.8406	0.8406
1985	412.0	0.8551	0.8551
1961	308.0	0.8696	0.8696
1989	236.0	0.8841	0.8841
1955	203.0	0.8986	0.8986
1987	174.0	0.9130	0.9130
1964	132.0	0.9275	0.9275
1999	106.0	0.9420	0.9420
1949	35.0	0.9565	0.9565
1948	2.4	0.9710	0.9710
1951	0.3	0.9855	0.9855

1

End PEAKFQ analysis.
Stations processed : 1
Number of errors : 0
Stations skipped : 0
Station years : 68

Data records may have been ignored for the stations listed below.
(Card type must be Y, Z, N, H, I, 2, 3, 4, or *.)
(2, 4, and * records are ignored.)

For the station below, the following records were ignored:

FINISHED PROCESSING STATION: 11118500 USGS VENTURA R NR VENTURA

For the station below, the following records were ignored:

FINISHED PROCESSING STATION:

1
Program PeakFq U. S. GEOLOGICAL SURVEY Seq.000.000
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 08:09

--- PROCESSING OPTIONS ---

Plot option = None
Basin char output = None
Print option = Yes
Debug print = No
Input peaks listing = Long
Input peaks format = WATSTORE peak file

Input files used:
peaks (ascii) - C:\DOCUMENTS AND SETTINGS\JRAMEY\DESKTOP\ATTACHMENTS\604.TXT
specifications - PKFQWPSF.TMP
Output file(s):
main - C:\DOCUMENTS AND SETTINGS\JRAMEY\DESKTOP\ATTACHMENTS\604.PRT

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.001
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 08:09

Station - 00000604 N.F. MATILIJA CR AT M.H. SPRINGS

I N P U T D A T A S U M M A R Y

Number of peaks in record = 67
Peaks not used in analysis = 0
Systematic peaks in analysis = 67
Historic peaks in analysis = 0
Years of historic record = 0
Generalized skew = -0.300
Standard error = 0.302
Mean Square error = 0.091
Skew option = WEIGHTED
Gage base discharge = 0.0
User supplied high outlier threshold = --
User supplied low outlier criterion = 5.8
Plotting position parameter = 0.00

********* NOTICE -- Preliminary machine computations. *********
********* User responsible for assessment and interpretation. *********

WCF134I-NO SYSTEMATIC PEAKS WERE BELOW GAGE BASE. 0.0
*WCF191I-USER LOW-OUTLIER CRITERION SUPERSEDES 17B. 5.8 6.7

WCF198I-LOW OUTLIERS BELOW FLOOD BASE WERE DROPPED. 1 5.8
WCF163I-NO HIGH OUTLIERS OR HISTORIC PEAKS EXCEEDED HHBASE. 39075.6
1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.002
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 08:09

Station - 00000604 N.F. MATILIJA CR AT M.H. SPRINGS

ANNUAL FREQUENCY CURVE PARAMETERS -- LOG-PEARSON TYPE III

	FLOOD BASE	LOGARITHMIC		
	EXCEEDANCE DISCHARGE	PROBABILITY	STANDARD MEAN	DEVIATION SKEW
SYSTEMATIC RECORD	0.0	1.0000	2.7671	0.6751 -0.503
BULL.17B ESTIMATE	5.8	0.9851	2.7872	0.6291 -0.225

ANNUAL FREQUENCY CURVE -- DISCHARGES AT SELECTED EXCEEDANCE PROBABILITIES

ANNUAL EXCEEDANCE PROBABILITY	BULL.17B ESTIMATE	SYSTEMATIC RECORD	'EXPECTED PROBABILITY' BULL.17B ESTIMATE	68-PCT CONFIDENCE LIMITS FOR BULL. 17B ESTIMATES LOWER	UPPER
0.9950	--	5.2	--	--	--
0.9900	--	9.0	--	--	--
0.9500	51.7	37.1	48.8	45.2	58.7
0.9000	92.7	74.8	89.4	82.6	103.5
0.8000	184.4	166.5	181.1	167.1	202.6
0.6667	343.5	335.4	341.1	314.9	374.1
0.5000	646.8	665.9	646.8	595.4	702.7
0.4292	835.6	872.2	837.6	768.8	909.0
0.2000	2101.0	2215.0	2134.0	1911.0	2319.0
0.1000	3774.0	3871.0	3887.0	3387.0	4230.0
0.0400	6892.0	6677.0	7256.0	6084.0	7870.0
0.0200	10050.0	9244.0	10780.0	8768.0	11620.0
0.0100	13990.0	12170.0	15320.0	12080.0	16370.0
0.0050	18820.0	15440.0	21080.0	16090.0	22260.0
0.0020	26730.0	20250.0	30890.0	22590.0	32030.0

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.003
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 08:09

Station - 00000604 N.F. MATILIJA CR AT M.H. SPRINGS

I N P U T D A T A L I S T I N G

WATER YEAR	DISCHARGE	CODES	WATER YEAR	DISCHARGE	CODES
1934	2770.0		1968	68.0	
1935	1160.0		1969	9440.0	
1936	460.0		1970	516.0	
1937	920.0		1971	2060.0	
1938	5580.0		1972	600.0	
1939	154.0		1973	4110.0	
1940	349.0		1974	544.0	
1941	1100.0		1975	745.0	
1942	276.0		1976	375.0	
1943	2700.0		1977	54.0	
1944	1380.0		1978	5780.0	
1945	557.0		1979	504.0	
1946	750.0		1980	3720.0	
1947	415.0		1981	322.0	
1948	18.0		1982	506.0	
1949	91.0		1983	2660.0	
1950	157.0		1984	454.0	
1951	4.0		1985	259.0	
1952	2820.0		1986	3610.0	
1953	268.0		1987	264.0	
1954	280.0		1988	800.0	
1955	31.0		1989	109.0	
1956	340.0		1990	130.0	
1957	795.0		1991	647.0	
1958	4530.0		1992	7860.0	
1959	915.0		1993	2599.0	
1960	62.0		1994	328.0	
1961	74.0		1995	5040.0	
1962	1940.0		1996	287.0	
1963	730.0		1997	735.0	
1964	563.0		1998	7230.0	
1965	205.0		1999	80.0	
1966	2900.0		2000	429.0	
1967	2000.0				

Explanation of peak discharge qualification codes

PEAKFQ CODE	NWIS CODE	DEFINITION
D	3	Dam failure, non-recurrent flow anomaly
G	8	Discharge greater than stated value
X	3+8	Both of the above
L	4	Discharge less than stated value
K	6 OR C	Known effect of regulation or urbanization
H	7	Historic peak

- Minus-flagged discharge -- Not used in computation
  -8888.0 -- No discharge value given
- Minus-flagged water year -- Historic peak used in computation

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.004
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 08:09

Station - 00000604 N.F. MATILIJA CR AT M.H. SPRINGS

EMPIRICAL FREQUENCY CURVES -- WEIBULL PLOTTING POSITIONS

WATER YEAR	RANKED DISCHARGE	SYSTEMATIC RECORD	BULL.17B ESTIMATE
1969	9440.0	0.0147	0.0147
1992	7860.0	0.0294	0.0294
1998	7230.0	0.0441	0.0441
1978	5780.0	0.0588	0.0588
1938	5580.0	0.0735	0.0735
1995	5040.0	0.0882	0.0882
1958	4530.0	0.1029	0.1029
1973	4110.0	0.1176	0.1176
1980	3720.0	0.1324	0.1324
1986	3610.0	0.1471	0.1471
1966	2900.0	0.1618	0.1618
1952	2820.0	0.1765	0.1765
1934	2770.0	0.1912	0.1912
1943	2700.0	0.2059	0.2059
1983	2660.0	0.2206	0.2206
1993	2599.0	0.2353	0.2353
1971	2060.0	0.2500	0.2500
1967	2000.0	0.2647	0.2647
1962	1940.0	0.2794	0.2794
1944	1380.0	0.2941	0.2941
1935	1160.0	0.3088	0.3088
1941	1100.0	0.3235	0.3235
1937	920.0	0.3382	0.3382
1959	915.0	0.3529	0.3529
1988	800.0	0.3676	0.3676
1957	795.0	0.3824	0.3824
1946	750.0	0.3971	0.3971
1975	745.0	0.4118	0.4118
1997	735.0	0.4265	0.4265
1963	730.0	0.4412	0.4412
1991	647.0	0.4559	0.4559
1972	600.0	0.4706	0.4706
1964	563.0	0.4853	0.4853

1945	557.0	0.5000	0.5000
1974	544.0	0.5147	0.5147
1970	516.0	0.5294	0.5294
1982	506.0	0.5441	0.5441
1979	504.0	0.5588	0.5588
1936	460.0	0.5735	0.5735
1984	454.0	0.5882	0.5882
2000	429.0	0.6029	0.6029
1947	415.0	0.6176	0.6176
1976	375.0	0.6324	0.6324
1940	349.0	0.6471	0.6471
1956	340.0	0.6618	0.6618
1994	328.0	0.6765	0.6765
1981	322.0	0.6912	0.6912
1996	287.0	0.7059	0.7059
1954	280.0	0.7206	0.7206
1942	276.0	0.7353	0.7353
1953	268.0	0.7500	0.7500
1987	264.0	0.7647	0.7647
1985	259.0	0.7794	0.7794
1965	205.0	0.7941	0.7941
1950	157.0	0.8088	0.8088
1939	154.0	0.8235	0.8235
1990	130.0	0.8382	0.8382
1989	109.0	0.8529	0.8529
1949	91.0	0.8676	0.8676
1999	80.0	0.8824	0.8824
1961	74.0	0.8971	0.8971
1968	68.0	0.9118	0.9118
1960	62.0	0.9265	0.9265
1977	54.0	0.9412	0.9412
1955	31.0	0.9559	0.9559
1948	18.0	0.9706	0.9706
1951	4.0	0.9853	0.9853

1

Insufficient data to process, only 1 peaks for station 00000604 200103

1

Insufficient data to process, only 1 peaks for station 00000604 200103

1

Insufficient data to process, only 1 peaks for station 00000604 200103

1

Insufficient data to process, only 1 peaks for station 00000604 200103

1

End PEAKFQ analysis.
Stations processed : 1
Number of errors : 0
Stations skipped : 0
Station years : 67

Data records may have been ignored for the stations listed below.
(Card type must be Y, Z, N, H, I, 2, 3, 4, or *.)
(2, 4, and * records are ignored.)

For the station below, the following records were ignored:

FINISHED PROCESSING STATION: 00000604 VC N.F. MATILIJA CR AT M.H. SPRI

For the station below, the following records were ignored:

FINISHED PROCESSING STATION: 00000604 200103

1
Program PeakFq U. S. GEOLOGICAL SURVEY Seq.000.000
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 08:17

--- PROCESSING OPTIONS ---

Plot option = None
Basin char output = None
Print option = Yes
Debug print = No
Input peaks listing = Long
Input peaks format = WATSTORE peak file

Input files used:
peaks (ascii) - C:\DOCUMENTS AND SETTINGS\JRAMEY\DESKTOP\ATTACHMENTS\605.TXT
specifications - PKFQWPSF.TMP
Output file(s):
main - C:\DOCUMENTS AND SETTINGS\JRAMEY\DESKTOP\ATTACHMENTS\605.PRT

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.001
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 08:17

Station - 00000605 SAN ANTONIO CREEK AT CASITAS SPR

I N P U T D A T A S U M M A R Y

Number of peaks in record = 55
Peaks not used in analysis = 0
Systematic peaks in analysis = 55
Historic peaks in analysis = 0
Years of historic record = 0
Generalized skew = -0.300
Standard error = 0.550
Mean Square error = 0.303
Skew option = WEIGHTED
Gage base discharge = 0.0
User supplied high outlier threshold = --
User supplied low outlier criterion = --
Plotting position parameter = 0.00

********* NOTICE -- Preliminary machine computations. *********
********* User responsible for assessment and interpretation. *********

WCF134I-NO SYSTEMATIC PEAKS WERE BELOW GAGE BASE. 0.0
WCF195I-NO LOW OUTLIERS WERE DETECTED BELOW CRITERION. 29.7

WCF163I-NO HIGH OUTLIERS OR HISTORIC PEAKS EXCEEDED HHBASE. 74400.5
1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.002
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 08:17

Station - 00000605 SAN ANTONIO CREEK AT CASITAS SPR

ANNUAL FREQUENCY CURVE PARAMETERS -- LOG-PEARSON TYPE III

	FLOOD BASE	LOGARITHMIC		
	EXCEEDANCE		STANDARD	
	DISCHARGE	PROBABILITY	MEAN	DEVIATION	SKEW
SYSTEMATIC RECORD	0.0	1.0000	3.1720	0.6061	0.151
BULL.17B ESTIMATE	0.0	1.0000	3.1720	0.6061	0.036

ANNUAL FREQUENCY CURVE -- DISCHARGES AT SELECTED EXCEEDANCE PROBABILITIES

ANNUAL EXCEEDANCE PROBABILITY	BULL.17B ESTIMATE	SYSTEMATIC RECORD	'EXPECTED PROBABILITY' ESTIMATE	68-PCT CONFIDENCE LIMITS FOR BULL. 17B ESTIMATES LOWER	UPPER
0.9950	42.8	49.8	36.4	35.4	51.0
0.9900	60.0	67.6	52.9	50.3	70.6
0.9500	151.8	159.1	142.9	132.0	173.0
0.9000	249.8	254.5	240.5	220.9	280.4
0.8000	458.0	455.0	449.1	412.3	506.3
0.6667	809.0	792.1	802.4	736.8	886.0
0.5000	1474.0	1435.0	1474.0	1349.0	1609.0
0.4292	1891.0	1842.0	1896.0	1731.0	2067.0
0.2000	4798.0	4755.0	4895.0	4340.0	5329.0
0.1000	8935.0	9077.0	9294.0	7957.0	10110.0
0.0400	17400.0	18360.0	18690.0	15180.0	20150.0
0.0200	26820.0	29200.0	29660.0	23050.0	31580.0
0.0100	39640.0	44570.0	45310.0	33590.0	47400.0
0.0050	56730.0	65940.0	67310.0	47440.0	68840.0
0.0020	87710.0	106700.0	110000.0	72140.0	108400.0

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.003
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 08:17

Station - 00000605 SAN ANTONIO CREEK AT CASITAS SPR

I N P U T D A T A L I S T I N G

WATER YEAR	DISCHARGE	CODES	WATER YEAR	DISCHARGE	CODES
1950	1200.0		1979	1880.0	
1952	3800.0		1980	7380.0	
1953	283.0		1981	828.0	
1954	381.0		1982	672.0	
1955	130.0		1983	8730.0	
1955	690.0		1984	402.0	
1957	570.0		1985	448.0	
1958	5240.0		1986	4640.0	
1959	356.0		1987	320.0	
1960	196.0		1988	1360.0	
1961	217.0		1989	408.0	
1962	2260.0		1990	422.0	
1963	1150.0		1991	3514.0	
1964	155.0		1992	8700.0	
1965	710.0		1993	10050.0	
1966	6800.0		1994	652.0	
1967	7280.0		1995	14400.0	
1968	388.0		1996	2340.0	
1969	16200.0		1997	3200.0	
1970	1040.0		1998	13700.0	
1971	2150.0		1999	143.0	
1972	1150.0		2000	1820.0	
1973	6510.0		2001	4920.0	
1974	1230.0		2002	243.0	
1975	1900.0		2003	2230.0	
1976	1040.0		2004	2100.0	
1977	660.0		2005	24000.0	
1978	13900.0				

Explanation of peak discharge qualification codes

PEAKFQ CODE	NWIS CODE	DEFINITION
D	3	Dam failure, non-recurrent flow anomaly
G	8	Discharge greater than stated value
X	3+8	Both of the above
L	4	Discharge less than stated value
K	6 OR C	Known effect of regulation or urbanization
H	7	Historic peak

- Minus-flagged discharge -- Not used in computation
  -8888.0 -- No discharge value given
- Minus-flagged water year -- Historic peak used in computation

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.004
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 08:17

Station - 00000605 SAN ANTONIO CREEK AT CASITAS SPR

EMPIRICAL FREQUENCY CURVES -- WEIBULL PLOTTING POSITIONS

WATER YEAR	RANKED DISCHARGE	SYSTEMATIC RECORD	BULL.17B ESTIMATE
2005	24000.0	0.0179	0.0179
1969	16200.0	0.0357	0.0357
1995	14400.0	0.0536	0.0536
1978	13900.0	0.0714	0.0714
1998	13700.0	0.0893	0.0893
1993	10050.0	0.1071	0.1071
1983	8730.0	0.1250	0.1250
1992	8700.0	0.1429	0.1429
1980	7380.0	0.1607	0.1607
1967	7280.0	0.1786	0.1786
1966	6800.0	0.1964	0.1964
1973	6510.0	0.2143	0.2143
1958	5240.0	0.2321	0.2321
2001	4920.0	0.2500	0.2500
1986	4640.0	0.2679	0.2679
1952	3800.0	0.2857	0.2857
1991	3514.0	0.3036	0.3036
1997	3200.0	0.3214	0.3214
1996	2340.0	0.3393	0.3393
1962	2260.0	0.3571	0.3571
2003	2230.0	0.3750	0.3750
1971	2150.0	0.3929	0.3929
2004	2100.0	0.4107	0.4107
1975	1900.0	0.4286	0.4286
1979	1880.0	0.4464	0.4464
2000	1820.0	0.4643	0.4643
1988	1360.0	0.4821	0.4821
1974	1230.0	0.5000	0.5000
1950	1200.0	0.5179	0.5179
1963	1150.0	0.5357	0.5357
1972	1150.0	0.5536	0.5536
1970	1040.0	0.5714	0.5714
1976	1040.0	0.5893	0.5893
1981	828.0	0.6071	0.6071
1965	710.0	0.6250	0.6250
1955	690.0	0.6429	0.6429
1982	672.0	0.6607	0.6607
1977	660.0	0.6786	0.6786
1994	652.0	0.6964	0.6964
1957	570.0	0.7143	0.7143

1985	448.0	0.7321	0.7321
1990	422.0	0.7500	0.7500
1989	408.0	0.7679	0.7679
1984	402.0	0.7857	0.7857
1968	388.0	0.8036	0.8036
1954	381.0	0.8214	0.8214
1959	356.0	0.8393	0.8393
1987	320.0	0.8571	0.8571
1953	283.0	0.8750	0.8750
2002	243.0	0.8929	0.8929
1961	217.0	0.9107	0.9107
1960	196.0	0.9286	0.9286
1964	155.0	0.9464	0.9464
1999	143.0	0.9643	0.9643
1955	130.0	0.9821	0.9821

1

End PEAKFQ analysis.
Stations processed : 1
Number of errors : 0
Stations skipped : 0
Station years : 55

Data records may have been ignored for the stations listed below.
(Card type must be Y, Z, N, H, I, 2, 3, 4, or *.)
(2, 4, and * records are ignored.)

For the station below, the following records were ignored:

FINISHED PROCESSING STATION: 00000605 VC SAN ANTONIO CREEK AT CASITAS

For the station below, the following records were ignored:

FINISHED PROCESSING STATION:

1
Program PeakFq U. S. GEOLOGICAL SURVEY Seq.000.000
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 08:25

--- PROCESSING OPTIONS ---

Plot option = None
Basin char output = None
Print option = Yes
Debug print = No
Input peaks listing = Long
Input peaks format = WATSTORE peak file

Input files used:
peaks (ascii) - C:\DOCUMENTS AND SETTINGS\JRAMEY\DESKTOP\ATTACHMENTS\630.TXT
specifications - PKFQWPSF.TMP
Output file(s):
main - C:\DOCUMENTS AND SETTINGS\JRAMEY\DESKTOP\ATTACHMENTS\630.PRT

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.001
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 08:25

Station - 00000630 CANADA LARGA AT VENTURA AVE

I N P U T D A T A S U M M A R Y

Number of peaks in record = 31
Peaks not used in analysis = 0
Systematic peaks in analysis = 31
Historic peaks in analysis = 0
Years of historic record = 0
Generalized skew = -0.300
Standard error = --
Mean Square error =
Skew option = WEIGHTED
Gage base discharge = 0.0
User supplied high outlier threshold = --
User supplied low outlier criterion = 12.5
Plotting position parameter = 0.00

********* NOTICE -- Preliminary machine computations. *********
********* User responsible for assessment and interpretation. *********

WCF134I-NO SYSTEMATIC PEAKS WERE BELOW GAGE BASE. 0.0
*WCF191I-USER LOW-OUTLIER CRITERION SUPERSEDES 17B. 12.5 12.5

WCF198I-LOW OUTLIERS BELOW FLOOD BASE WERE DROPPED. 1 12.5
WCF163I-NO HIGH OUTLIERS OR HISTORIC PEAKS EXCEEDED HHBASE. 46529.3
1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.002
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 08:25

Station - 00000630 CANADA LARGA AT VENTURA AVE

ANNUAL FREQUENCY CURVE PARAMETERS -- LOG-PEARSON TYPE III

	FLOOD BASE		LOGARITHMIC		
	EXCEEDANCE DISCHARGE	PROBABILITY	MEAN	STANDARD DEVIATION	SKEW
SYSTEMATIC RECORD	0.0	1.0000	2.9678	0.7256	-0.679
BULL.17B ESTIMATE	12.5	0.9677	3.0036	0.6529	-0.303

ANNUAL FREQUENCY CURVE -- DISCHARGES AT SELECTED EXCEEDANCE PROBABILITIES

ANNUAL EXCEEDANCE PROBABILITY	BULL.17B ESTIMATE	SYSTEMATIC RECORD	'EXPECTED PROBABILITY' ESTIMATE	68-PCT CONFIDENCE LIMITS FOR BULL. 17B ESTIMATES LOWER	UPPER
0.9950	--	4.4	--	--	--
0.9900	--	8.5	--	--	--
0.9500	75.2	44.8	65.4	60.9	91.2
0.9000	140.8	100.3	129.3	117.5	166.3
0.8000	292.4	247.2	280.4	251.3	337.1
0.6667	562.9	535.0	553.5	492.6	640.5
0.5000	1088.0	1120.0	1088.0	958.9	1235.0
0.4292	1417.0	1490.0	1426.0	1249.0	1613.0
0.2000	3635.0	3888.0	3765.0	3149.0	4236.0
0.1000	6550.0	6746.0	6991.0	5566.0	7815.0
0.0400	11900.0	11320.0	13310.0	9876.0	14610.0
0.0200	17220.0	15250.0	20050.0	14060.0	21540.0
0.0100	23750.0	19480.0	28890.0	19100.0	30210.0
0.0050	31580.0	23920.0	40260.0	25060.0	40810.0
0.0020	44110.0	30000.0	60080.0	34440.0	58080.0

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.003
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 08:25

Station - 00000630 CANADA LARGA AT VENTURA AVE

I N P U T D A T A L I S T I N G

WATER YEAR	DISCHARGE	CODES	WATER YEAR	DISCHARGE	CODES
1971	1000.0		1987	50.0	
1972	415.0		1988	78.0	
1973	1480.0		1990	10.0	
1974	440.0		1991	1100.0	
1975	565.0		1992	4510.0	
1976	320.0		1993	2800.0	
1977	565.0		1994	241.0	
1978	2000.0		1995	5940.0	
1979	1500.0		1997	1260.0	
1980	11500.0		1998	6650.0	
1981	875.0		2000	2840.0	
1982	158.0		2001	4960.0	
1983	4560.0		2003	1670.0	
1984	261.0		2004	2940.0	
1985	100.0		2005	14000.0	
1986	1015.0				

Explanation of peak discharge qualification codes

PEAKFQ CODE	NWIS CODE	DEFINITION
D	3	Dam failure, non-recurrent flow anomaly
G	8	Discharge greater than stated value
X	3+8	Both of the above
L	4	Discharge less than stated value
K	6 OR C	Known effect of regulation or urbanization
H	7	Historic peak

- Minus-flagged discharge -- Not used in computation
  -8888.0 -- No discharge value given
- Minus-flagged water year -- Historic peak used in computation

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.004
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 08:25

Station - 00000630 CANADA LARGA AT VENTURA AVE

EMPIRICAL FREQUENCY CURVES -- WEIBULL PLOTTING POSITIONS

WATER YEAR	RANKED DISCHARGE	SYSTEMATIC RECORD	BULL.17B ESTIMATE
2005	14000.0	0.0313	0.0313
1980	11500.0	0.0625	0.0625
1998	6650.0	0.0938	0.0938
1995	5940.0	0.1250	0.1250
2001	4960.0	0.1563	0.1563
1983	4560.0	0.1875	0.1875
1992	4510.0	0.2188	0.2188
2004	2940.0	0.2500	0.2500
2000	2840.0	0.2813	0.2813
1993	2800.0	0.3125	0.3125
1978	2000.0	0.3438	0.3438
2003	1670.0	0.3750	0.3750
1979	1500.0	0.4063	0.4063
1973	1480.0	0.4375	0.4375
1997	1260.0	0.4688	0.4688
1991	1100.0	0.5000	0.5000
1986	1015.0	0.5313	0.5313
1971	1000.0	0.5625	0.5625
1981	875.0	0.5938	0.5938
1975	565.0	0.6250	0.6250
1977	565.0	0.6563	0.6563
1974	440.0	0.6875	0.6875
1972	415.0	0.7188	0.7188
1976	320.0	0.7500	0.7500
1984	261.0	0.7813	0.7813
1994	241.0	0.8125	0.8125
1982	158.0	0.8438	0.8438
1985	100.0	0.8750	0.8750
1988	78.0	0.9063	0.9063
1987	50.0	0.9375	0.9375
1990	10.0	0.9688	0.9688

1

End PEAKFQ analysis.
Stations processed : 1
Number of errors : 0
Stations skipped : 0
Station years : 31

Data records may have been ignored for the stations listed below.
(Card type must be Y, Z, N, H, I, 2, 3, 4, or *.)
(2, 4, and * records are ignored.)

For the station below, the following records were ignored:

FINISHED PROCESSING STATION: 00000630 VC CANADA LARGA AT VENTURA AVE

For the station below, the following records were ignored:

FINISHED PROCESSING STATION:

1
Program PeakFq U. S. GEOLOGICAL SURVEY Seq.000.000
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 09:14

--- PROCESSING OPTIONS ---

Plot option = None
Basin char output = None
Print option = Yes
Debug print = No
Input peaks listing = Long
Input peaks format = WATSTORE peak file

Input files used:
peaks (ascii) - C:\DOCUMENTS AND SETTINGS\JRAMEY\DESKTOP\ATTACHMENTS\631.TXT
specifications - PKFQWPSF.TMP
Output file(s):
main - C:\DOCUMENTS AND SETTINGS\JRAMEY\DESKTOP\ATTACHMENTS\631.PRT

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.001
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 09:14

Station - 00000631 FOX CANYON DRAIN BELOW OJAI AVE

I N P U T D A T A S U M M A R Y

Number of peaks in record = 35
Peaks not used in analysis = 0
Systematic peaks in analysis = 35
Historic peaks in analysis = 0
Years of historic record = 0
Generalized skew = -0.300
Standard error = 0.550
Mean Square error = 0.303
Skew option = WEIGHTED
Gage base discharge = 0.0
User supplied high outlier threshold = --
User supplied low outlier criterion = --
Plotting position parameter = 0.00

********* NOTICE -- Preliminary machine computations. *********
********* User responsible for assessment and interpretation. *********

WCF134I-NO SYSTEMATIC PEAKS WERE BELOW GAGE BASE. 0.0
WCF163I-NO HIGH OUTLIERS OR HISTORIC PEAKS EXCEEDED HHBASE. 1311.4

WCF195I-NO LOW OUTLIERS WERE DETECTED BELOW CRITERION. 23.8
1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.002
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 09:14

Station - 00000631 FOX CANYON DRAIN BELOW OJAI AVE

ANNUAL FREQUENCY CURVE PARAMETERS -- LOG-PEARSON TYPE III

	FLOOD BASE	LOGARITHMIC		
	EXCEEDANCE		STANDARD	
	DISCHARGE	PROBABILITY	MEAN	DEVIATION	SKEW
SYSTEMATIC RECORD	0.0	1.0000	2.2476	0.3311	0.463
BULL.17B ESTIMATE	0.0	1.0000	2.2476	0.3311	0.176

ANNUAL FREQUENCY CURVE -- DISCHARGES AT SELECTED EXCEEDANCE PROBABILITIES

ANNUAL EXCEEDANCE PROBABILITY	BULL.17B ESTIMATE	SYSTEMATIC RECORD	'EXPECTED ESTIMATE	68-PCT CONFIDENCE LIMITS FOR BULL. 17B ESTIMATES' LOWER	UPPER
0.9950	28.2	34.5	24.9	24.8	31.6
0.9900	33.1	39.0	30.0	29.5	36.9
0.9500	52.5	56.2	50.0	47.7	57.3
0.9000	67.6	69.7	65.5	62.1	73.1
0.8000	92.6	92.1	91.1	86.1	99.1
0.6667	125.1	121.8	124.2	117.3	133.1
0.5000	172.9	166.8	172.9	162.8	183.7
0.4292	198.2	191.1	198.8	186.6	210.7
0.2000	333.5	328.3	339.6	311.5	358.5
0.1000	476.1	484.1	493.6	439.8	518.7
0.0400	702.8	752.5	751.8	639.4	779.4
0.0200	908.8	1016.0	1001.0	817.7	1021.0
0.0100	1149.0	1344.0	1310.0	1023.0	1307.0
0.0050	1429.0	1751.0	1694.0	1260.0	1644.0
0.0020	1869.0	2441.0	2348.0	1626.0	2181.0

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.003
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 09:14

Station - 00000631 FOX CANYON DRAIN BELOW OJAI AVE

I N P U T D A T A L I S T I N G

WATER YEAR	DISCHARGE	CODES	WATER YEAR	DISCHARGE	CODES
1971	128.0		1989	77.0	
1972	68.0		1990	146.0	
1973	507.0		1991	130.0	
1974	68.0		1992	478.0	
1975	211.0		1993	567.0	
1976	186.0		1994	81.0	
1977	117.0		1995	524.0	
1978	574.0		1996	199.0	
1979	150.0		1997	94.0	
1980	507.0		1998	574.0	
1981	186.0		1999	60.0	
1982	68.0		2000	107.0	
1983	507.0		2001	206.0	
1984	100.0		2002	113.0	
1985	86.0		2003	155.0	
1986	264.0		2004	98.0	
1987	198.0		2005	679.0	
1988	96.0				

Explanation of peak discharge qualification codes

PEAKFQ CODE	NWIS CODE	DEFINITION
D	3	Dam failure, non-recurrent flow anomaly
G	8	Discharge greater than stated value
X	3+8	Both of the above
L	4	Discharge less than stated value
K	6 OR C	Known effect of regulation or urbanization
H	7	Historic peak

- Minus-flagged discharge -- Not used in computation
  -8888.0 -- No discharge value given
- Minus-flagged water year -- Historic peak used in computation

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.004
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 09:14

Station - 00000631 FOX CANYON DRAIN BELOW OJAI AVE

EMPIRICAL FREQUENCY CURVES -- WEIBULL PLOTTING POSITIONS

WATER YEAR	RANKED DISCHARGE	SYSTEMATIC RECORD	BULL.17B ESTIMATE
2005	679.0	0.0278	0.0278
1978	574.0	0.0556	0.0556
1998	574.0	0.0833	0.0833
1993	567.0	0.1111	0.1111
1995	524.0	0.1389	0.1389
1973	507.0	0.1667	0.1667
1980	507.0	0.1944	0.1944
1983	507.0	0.2222	0.2222
1992	478.0	0.2500	0.2500
1986	264.0	0.2778	0.2778
1975	211.0	0.3056	0.3056
2001	206.0	0.3333	0.3333
1996	199.0	0.3611	0.3611
1987	198.0	0.3889	0.3889
1976	186.0	0.4167	0.4167
1981	186.0	0.4444	0.4444
2003	155.0	0.4722	0.4722
1979	150.0	0.5000	0.5000
1990	146.0	0.5278	0.5278
1991	130.0	0.5556	0.5556
1971	128.0	0.5833	0.5833
1977	117.0	0.6111	0.6111
2002	113.0	0.6389	0.6389
2000	107.0	0.6667	0.6667
1984	100.0	0.6944	0.6944
2004	98.0	0.7222	0.7222
1988	96.0	0.7500	0.7500
1997	94.0	0.7778	0.7778
1985	86.0	0.8056	0.8056
1994	81.0	0.8333	0.8333
1989	77.0	0.8611	0.8611
1972	68.0	0.8889	0.8889
1974	68.0	0.9167	0.9167
1982	68.0	0.9444	0.9444
1999	60.0	0.9722	0.9722

1

End PEAKFQ analysis.
Stations processed : 1
Number of errors : 0
Stations skipped : 0
Station years : 35

Data records may have been ignored for the stations listed below.
(Card type must be Y, Z, N, H, I, 2, 3, 4, or *.)
(2, 4, and * records are ignored.)

For the station below, the following records were ignored:

FINISHED PROCESSING STATION: 00000631 VC FOX CANYON DRAIN BELOW OJAI A

For the station below, the following records were ignored:

FINISHED PROCESSING STATION:

1
Program PeakFq U. S. GEOLOGICAL SURVEY Seq.000.000
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 09:15

--- PROCESSING OPTIONS ---

Plot option = None
Basin char output = None
Print option = Yes
Debug print = No
Input peaks listing = Long
Input peaks format = WATSTORE peak file

Input files used:
peaks (ascii) - C:\DOCUMENTS AND SETTINGS\JRAMEY\DESKTOP\ATTACHMENTS\633.TXT
specifications - PKFQWPSF.TMP
Output file(s):
main - C:\DOCUMENTS AND SETTINGS\JRAMEY\DESKTOP\ATTACHMENTS\633.PRT

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.001
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 09:15

Station - 00000633 HAPPY VALLEY DRAIN AT RICE RD

I N P U T D A T A S U M M A R Y

Number of peaks in record = 31
Peaks not used in analysis = 0
Systematic peaks in analysis = 31
Historic peaks in analysis = 0
Years of historic record = 0
Generalized skew = -0.300
Standard error = 0.550
Mean Square error = 0.303
Skew option = GENERALIZED
Gage base discharge = 0.0
User supplied high outlier threshold = --
User supplied low outlier criterion = --
Plotting position parameter = 0.00

********* NOTICE -- Preliminary machine computations. *********
********* User responsible for assessment and interpretation. *********

WCF134I-NO SYSTEMATIC PEAKS WERE BELOW GAGE BASE. 0.0
WCF195I-NO LOW OUTLIERS WERE DETECTED BELOW CRITERION. 40.8

WCF163I-NO HIGH OUTLIERS OR HISTORIC PEAKS EXCEEDED HHBASE. 1967.2
*WCF151I-17B WEIGHTED SKEW REPLACED BY USER OPTION. -0.291 -0.300 1
1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.002
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 09:15

Station - 00000633 HAPPY VALLEY DRAIN AT RICE RD

ANNUAL FREQUENCY CURVE PARAMETERS -- LOG-PEARSON TYPE III

	FLOOD BASE	LOGARITHMIC		
	EXCEEDANCE	STANDARD		
	DISCHARGE PROBABILITY	MEAN	DEVIATION	SKEW
SYSTEMATIC RECORD	0.0	1.0000	2.4523	0.3265	-0.286
BULL.17B ESTIMATE	0.0	1.0000	2.4523	0.3265	-0.300

ANNUAL FREQUENCY CURVE -- DISCHARGES AT SELECTED EXCEEDANCE PROBABILITIES

ANNUAL EXCEEDANCE PROBABILITY	BULL.17B ESTIMATE	SYSTEMATIC RECORD	'EXPECTED PROBABILITY' BULL.17B ESTIMATE	68-PCT CONFIDENCE LIMITS FOR BULL. 17B ESTIMATES LOWER	UPPER
0.9950	33.1	33.4	26.8	28.4	37.9
0.9900	41.8	42.2	35.6	36.4	47.4
0.9500	77.4	77.6	72.2	69.7	85.2
0.9000	105.9	106.0	101.5	96.7	115.1
0.8000	152.5	152.4	149.4	141.4	163.8
0.6667	211.6	211.3	209.8	198.0	225.7
0.5000	294.2	293.7	294.2	276.2	313.5
0.4292	335.8	335.3	336.8	315.2	358.3
0.2000	538.1	537.9	547.6	500.8	580.9
0.1000	722.7	723.7	746.7	666.1	789.4
0.0400	974.9	978.7	1031.0	887.9	1080.0
0.0200	1173.0	1180.0	1266.0	1060.0	1312.0
0.0100	1378.0	1389.0	1521.0	1236.0	1555.0
0.0050	1590.0	1606.0	1797.0	1417.0	1808.0
0.0020	1881.0	1905.0	2197.0	1662.0	2159.0

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.003
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 09:15

Station - 00000633 HAPPY VALLEY DRAIN AT RICE RD

I N P U T D A T A L I S T I N G

WATER YEAR	DISCHARGE	CODES	WATER YEAR	DISCHARGE	CODES
1975	431.0		1991	227.0	
1976	355.0		1992	478.0	
1977	206.0		1993	727.0	
1978	692.0		1994	209.0	
1979	206.0		1995	886.0	
1980	591.0		1996	385.0	
1981	194.0		1997	406.0	
1982	77.0		1998	591.0	
1983	568.0		1999	76.0	
1984	194.0		2000	214.0	
1985	85.0		2001	431.0	
1986	478.0		2002	114.0	
1987	85.0		2003	425.0	
1988	245.0		2004	350.0	
1989	94.0		2005	1050.0	
1990	180.0				

Explanation of peak discharge qualification codes

PEAKFQ CODE	NWIS CODE	DEFINITION
D	3	Dam failure, non-recurrent flow anomaly
G	8	Discharge greater than stated value
X	3+8	Both of the above
L	4	Discharge less than stated value
K	6 OR C	Known effect of regulation or urbanization
H	7	Historic peak

- Minus-flagged discharge -- Not used in computation
  -8888.0 -- No discharge value given
- Minus-flagged water year -- Historic peak used in computation

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.004
Ver. 5.0 Beta 8 Annual peak flow frequency analysis Run Date / Time
05/06/2005 following Bulletin 17-B Guidelines 10/05/2009 09:15

Station - 00000633 HAPPY VALLEY DRAIN AT RICE RD

EMPIRICAL FREQUENCY CURVES -- WEIBULL PLOTTING POSITIONS

WATER YEAR	RANKED DISCHARGE	SYSTEMATIC RECORD	BULL.17B ESTIMATE
2005	1050.0	0.0313	0.0313
1995	886.0	0.0625	0.0625
1993	727.0	0.0938	0.0938
1978	692.0	0.1250	0.1250
1980	591.0	0.1563	0.1563
1998	591.0	0.1875	0.1875
1983	568.0	0.2188	0.2188
1986	478.0	0.2500	0.2500
1992	478.0	0.2813	0.2813
1975	431.0	0.3125	0.3125
2001	431.0	0.3438	0.3438
2003	425.0	0.3750	0.3750
1997	406.0	0.4063	0.4063
1996	385.0	0.4375	0.4375
1976	355.0	0.4688	0.4688
2004	350.0	0.5000	0.5000
1988	245.0	0.5313	0.5313
1991	227.0	0.5625	0.5625
2000	214.0	0.5938	0.5938
1994	209.0	0.6250	0.6250
1977	206.0	0.6563	0.6563
1979	206.0	0.6875	0.6875
1981	194.0	0.7188	0.7188
1984	194.0	0.7500	0.7500
1990	180.0	0.7813	0.7813
2002	114.0	0.8125	0.8125
1989	94.0	0.8438	0.8438
1985	85.0	0.8750	0.8750
1987	85.0	0.9063	0.9063
1982	77.0	0.9375	0.9375
1999	76.0	0.9688	0.9688

1

End PEAKFQ analysis.
Stations processed : 1
Number of errors : 0
Stations skipped : 0
Station years : 31

Data records may have been ignored for the stations listed below.
(Card type must be Y, Z, N, H, I, 2, 3, 4, or *.)
(2, 4, and * records are ignored.)

For the station below, the following records were ignored:

FINISHED PROCESSING STATION: 00000633 VC HAPPY VALLEY DRAIN AT RICE RD

For the station below, the following records were ignored:

FINISHED PROCESSING STATION:

1
Program PeakFq U. S. GEOLOGICAL SURVEY Seq.000.000
Ver. 5.2 Annual peak flow frequency analysis Run Date / Time
11/01/2007 following Bulletin 17-B Guidelines 12/09/2009 10:35

--- PROCESSING OPTIONS ---

Plot option = None
Basin char output = None
Print option = Yes
Debug print = No
Input peaks listing = Long
Input peaks format = WATSTORE peak file

Input files used:
peaks (ascii) - C:\DOCUMENTS AND SETTINGS\JRAMEY\DESKTOP\ATTACHMENTS__11115500.TXT
specifications - PKFQWPSF.TMP
Output file(s):
main - C:\DOCUMENTS AND SETTINGS\JRAMEY\DESKTOP\ATTACHMENTS__11115500.PRT

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.001
Ver. 5.2 Annual peak flow frequency analysis Run Date / Time
11/01/2007 following Bulletin 17-B Guidelines 12/09/2009 10:35

Station - 11115500 MATILIJA C A MATILIJA HOT SPRINGS

I N P U T D A T A S U M M A R Y

Number of peaks in record = 62
Peaks not used in analysis = 0
Systematic peaks in analysis = 62
Historic peaks in analysis = 0
Years of historic record = 0
Generalized skew = -0.300
Standard error = 0.550
Mean Square error = 0.303
Skew option = STATION SKEW
Gage base discharge = 0.0
User supplied high outlier threshold = --
User supplied low outlier criterion = 40.0
Plotting position parameter = 0.00

********* NOTICE -- Preliminary machine computations. *********
********* User responsible for assessment and interpretation. *********

WCF134I-NO SYSTEMATIC PEAKS WERE BELOW GAGE BASE. 0.0

*WCF191I-USER LOW-OUTLIER CRITERION SUPERSEDES 17B. 40.0 5.8
WCF198I-LOW OUTLIERS BELOW FLOOD BASE WERE DROPPED. 2 40.0
WCF163I-NO HIGH OUTLIERS OR HISTORIC PEAKS EXCEEDED HHBASE. 169753.0
*WCF151I-17B WEIGHTED SKEW REPLACED BY USER OPTION. -0.344 -0.360 -1
1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.002
Ver. 5.2 Annual peak flow frequency analysis Run Date / Time
11/01/2007 following Bulletin 17-B Guidelines 12/09/2009 10:35

Station - 11115500 MATILIJA C A MATILIJA HOT SPRINGS

ANNUAL FREQUENCY CURVE PARAMETERS -- LOG-PEARSON TYPE III

	FLOOD BASE	LOGARITHMIC		
	EXCEEDANCE	STANDARD		
DISCHARGE	PROBABILITY	MEAN	DEVIATION	SKEW
SYSTEMATIC RECORD	0.0	1.0000	3.0981	0.8185	-0.658
BULL.17B ESTIMATE	40.0	0.9677	3.1364	0.7437	-0.360

ANNUAL FREQUENCY CURVE -- DISCHARGES AT SELECTED EXCEEDANCE PROBABILITIES

ANNUAL		'EXPECTED	68-PCT CONFIDENCE LIMITS	
EXCEEDANCE	BULL.17B	SYSTEMATIC	PROBABILITY'	FOR BULL. 17B ESTIMATES
PROBABILITY	ESTIMATE	RECORD	ESTIMATE	LOWER	UPPER
0.9950	--	3.1	--	--	--
0.9900	--	6.5	--	--	--
0.9500	69.5	41.4	64.1	58.8	81.3
0.9000	144.3	102.0	137.5	125.0	165.2
0.8000	336.5	280.6	328.6	298.3	377.6
0.6667	714.8	668.8	708.3	642.6	793.3
0.5000	1517.0	1539.0	1517.0	1370.0	1680.0
0.4292	2048.0	2125.0	2054.0	1849.0	2272.0
0.2000	5912.0	6304.0	6027.0	5262.0	6678.0
0.1000	11390.0	11820.0	11800.0	9979.0	13090.0
0.0400	21980.0	21380.0	23340.0	18910.0	25810.0
0.0200	32890.0	30120.0	35650.0	27940.0	39160.0
0.0100	46580.0	39950.0	51600.0	39120.0	56160.0
0.0050	63290.0	50690.0	71760.0	52610.0	77200.0
0.0020	90430.0	65980.0	105900.0	74250.0	111800.0

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.003
Ver. 5.2 Annual peak flow frequency analysis Run Date / Time
11/01/2007 following Bulletin 17-B Guidelines 12/09/2009 10:35

Station - 11115500 MATILIJA C A MATILIJA HOT SPRINGS

I N P U T D A T A L I S T I N G

WATER YEAR	DISCHARGE	CODES	WATER YEAR	DISCHARGE	CODES
1933	4460.0		1964	344.0	
1934	7000.0		1965	328.0	
1935	2050.0		1966	5540.0	
1936	1430.0		1967	5190.0	
1937	2180.0		1968	149.0	
1938	15900.0		1969	19600.0	
1939	1040.0		1970	496.0	
1940	1320.0		1971	520.0	
1941	4290.0		1972	380.0	
1942	780.0		1973	6810.0	
1943	15000.0		1974	465.0	
1944	4900.0		1975	1820.0	
1945	2800.0		1976	529.0	
1946	4500.0		1977	80.0	
1947	3500.0		1978	16500.0	
1948	12.0		1979	966.0	
1949	60.0		1980	10600.0	
1950	155.0		1981	323.0	
1951	6.0		1982	271.0	
1952	8800.0		1983	12200.0	
1953	235.0		1984	1250.0	K
1954	582.0		1985	240.0	K
1955	66.0		1986	9730.0	K
1956	1040.0		1987	165.0	K
1957	1820.0		1988	2050.0	K
1958	5440.0		1991	5400.0	K
1959	2500.0		1992	11450.0	K
1960	73.0		1993	5180.0	K
1961	42.0		1995	10360.0	K
1962	6570.0		1996	570.0	K
1963	863.0		1998	14000.0	K

Explanation of peak discharge qualification codes

PeakFQ CODE	NWIS CODE	DEFINITION
D	3	Dam failure, non-recurrent flow anomaly
G	8	Discharge greater than stated value
X	3+8	Both of the above
L	4	Discharge less than stated value
K	6 OR C	Known effect of regulation or urbanization
H	7	Historic peak

- Minus-flagged discharge -- Not used in computation

-8888.0 -- No discharge value given
- Minus-flagged water year -- Historic peak used in computation

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.004
Ver. 5.2 Annual peak flow frequency analysis Run Date / Time
11/01/2007 following Bulletin 17-B Guidelines 12/09/2009 10:35

Station - 11115500 MATILIJA C A MATILIJA HOT SPRINGS

EMPIRICAL FREQUENCY CURVES -- WEIBULL PLOTTING POSITIONS

WATER YEAR	RANKED DISCHARGE	SYSTEMATIC RECORD	BULL.17B ESTIMATE
1969	19600.0	0.0159	0.0159
1978	16500.0	0.0317	0.0317
1938	15900.0	0.0476	0.0476
1943	15000.0	0.0635	0.0635
1998	14000.0	0.0794	0.0794
1983	12200.0	0.0952	0.0952
1992	11450.0	0.1111	0.1111
1980	10600.0	0.1270	0.1270
1995	10360.0	0.1429	0.1429
1986	9730.0	0.1587	0.1587
1952	8800.0	0.1746	0.1746
1934	7000.0	0.1905	0.1905
1973	6810.0	0.2063	0.2063
1962	6570.0	0.2222	0.2222
1966	5540.0	0.2381	0.2381
1958	5440.0	0.2540	0.2540
1991	5400.0	0.2698	0.2698
1967	5190.0	0.2857	0.2857
1993	5180.0	0.3016	0.3016
1944	4900.0	0.3175	0.3175
1946	4500.0	0.3333	0.3333
1933	4460.0	0.3492	0.3492
1941	4290.0	0.3651	0.3651
1947	3500.0	0.3810	0.3810
1945	2800.0	0.3968	0.3968
1959	2500.0	0.4127	0.4127
1937	2180.0	0.4286	0.4286
1935	2050.0	0.4444	0.4444
1988	2050.0	0.4603	0.4603
1957	1820.0	0.4762	0.4762
1975	1820.0	0.4921	0.4921
1936	1430.0	0.5079	0.5079
1940	1320.0	0.5238	0.5238
1984	1250.0	0.5397	0.5397

1939	1040.0	0.5556	0.5556
1956	1040.0	0.5714	0.5714
1979	966.0	0.5873	0.5873
1963	863.0	0.6032	0.6032
1942	780.0	0.6190	0.6190
1954	582.0	0.6349	0.6349
1996	570.0	0.6508	0.6508
1976	529.0	0.6667	0.6667
1971	520.0	0.6825	0.6825
1970	496.0	0.6984	0.6984
1974	465.0	0.7143	0.7143
1972	380.0	0.7302	0.7302
1964	344.0	0.7460	0.7460
1965	328.0	0.7619	0.7619
1981	323.0	0.7778	0.7778
1982	271.0	0.7937	0.7937
1985	240.0	0.8095	0.8095
1953	235.0	0.8254	0.8254
1987	165.0	0.8413	0.8413
1950	155.0	0.8571	0.8571
1968	149.0	0.8730	0.8730
1977	80.0	0.8889	0.8889
1960	73.0	0.9048	0.9048
1955	66.0	0.9206	0.9206
1949	60.0	0.9365	0.9365
1961	42.0	0.9524	0.9524
1948	12.0	0.9683	0.9683
1951	6.0	0.9841	0.9841

1

End PeakFQ analysis.
Stations processed : 1
Number of errors : 0
Stations skipped : 0
Station years : 62

Data records may have been ignored for the stations listed below.
(Card type must be Y, Z, N, H, I, 2, 3, 4, or *.)
(2, 4, and * records are ignored.)

For the station below, the following records were ignored:

FINISHED PROCESSING STATION: 11115500 USGS MATILIJA C A MATILIJA HOT SPR

For the station below, the following records were ignored:

FINISHED PROCESSING STATION:

Appendix B

Summary Table B1 – USBR Recommended Peak Discharges Compared to USBR Log Pearson Type III Peak Discharges

Stream	Gage	Node/ Location Number	USBR RECOMMENDED PEAK DISCHARGES (cubic feet per second)					USBR LOG PEARSON TYPE III PEAK DISCHARGES (cubic feet per second)					Percent Difference				
			Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance	Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance	Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance
Matilija Creek above Reservoir near Matilija Hot Springs/ Matilija Creek at Matilija Hot Springs	11114500 (USGS) 11115500 (USGS)	VTA1	54.3	12,500	18,800	21,600	27,900	54.6	12,214	33,809	46,459	83,013	-1%	2%	-80%	-115%	-198%
Ventura River near Ventura	11118500(USGS)	VTA6	188	36,400	59,700	69,700	93,100	184	30,532	90,154	128,274	250,253	2%	16%	-51%	-84%	-169%

Summary Table B2 – USBR Peak Discharges Compared to Regional Regression Peak Discharges

Flooding Source and Location	Ventura County Description	Node/ Location Number	Regional Regression Equation Peak Discharges (cubic feet per second)					USBR Peak Discharges (cubic feet per second)					Percent Difference				
			Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance	Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance	Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance
Ventura River																	
Upstream of Matilija Creek confluence with North Fork Matilija Creek	NA	VTA1	56.4	7,381	28,237	41,018	101,000	54.30	12,500	18,800	21,600	27,900	-4%	69%	-33%	-47%	-72%
Downstream of confluence with North Fork Matilija Creek	NA	912a	72.44	8,815	33,941	49,415	122,000	70.40	15,000	24,000	27,100	35,200	-3%	70%	-29%	-45%	-71%
At Baldwin Road/SR 150	NA	825a	82.95	9,232	35,567	51,817	127,000	81.00	16,000	24,800	28,300	36,700	-2%	73%	-30%	-45%	-71%
At Casitas Springs	NA	VTA4	143.91	11,423	44,178	64,553	158,000	143.00	35,200	56,600	66,600	89,000	-1%	208%	28%	3%	-44%
At Casitas Vista Road	NA	VTA6	187.78	13,489	52,454	76,811	189,000	188.00	36,400	59,700	69,700	93,100	0%	170%	14%	-9%	-51%
At Shell Chemical Plan	NA	875b	222.95	14,396	56,042	82,140	202,000	222.00	41,300	67,900	78,900	105,500	0%	187%	21%	-4%	-48%

Summary Table B3 – USBR Peak Discharges Compared to Current FEMA Effective Peak Discharges

Flooding Source and Location	Ventura County Description	Gage	Node/ Location Number	USBR Peak Discharges (cubic feet per second)					Current FEMA Effective Peak Discharges (cubic feet per second)					Percent Difference				
				Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance	Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance	Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance
Ventura River																		
Upstream of confluence with North Fork Matilija Creek	NA	11114500 (USGS) 11115500 (USGS)	VTA1	54.3	12,500	18,800	21,600	27,900	54.3	12,000	23,500	27,500	36,500	0%	4%	-20%	-21%	-24%
Downstream of confluence with North Fork Matilija Creek	NA	NA	912a	70.4	15,000	24,000	27,100	35,200	70.4	15,000	30,000	34,500	46,000	0%	0%	-20%	-21%	-23%
At Baldwin Road	NA	NA	825a	81	16,000	24,800	28,300	36,700	81	16,000	31,000	36,000	48,000	0%	0%	-20%	-21%	-24%
At Casitas Springs	NA	NA	VTA4	143	35,200	56,600	66,600	89,000	143	29,000	55,000	65,000	86,000	0%	21%	3%	2%	3%
At Casitas Road Bridge	NA	11118500(USGS)	VTA6	188	36,400	59,700	69,700	93,100	184	30,000	58,000	68,000	90,000	2%	21%	3%	3%	3%
At Shell Plant	NA	NA	875b	222	41,300	67,900	78,900	105,500	222	34,000	66,000	77,000	102,000	0%	21%	3%	2%	3%
At Pacific Ocean	NA	NA	876	NA	NA	NA	NA	NA	226	34,000	67,000	78,000	103,000	NA	NA	NA	NA	NA

[NA] Not Applicable

Appendix C

Summary Table C1 – Ventura County Peak Discharges Compared to Ventura County Log Pearson Type III Peak Discharges

Stream	Gage	Node/ Location Number	VENTURA COUNTY PEAK DISCHARGES (cubic feet per second)					VENTURA COUNTY LOG PEARSON TYPE III PEAK DISCHARGES (cubic feet per second)					Percent Difference				
			Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance	Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance	Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance
North Fork Matilija Creek	604(VC) 11116000(USGS)	682	16.04	3,960	10,740	15,100	29,480	15.6	3,900	10,100	13,900	25,600	3%	2%	6%	9%	15%
Canada Larga at Ventura Avenue	630(VC)	288	19.12	5,370	14,580	20,500	40,020	19.0	6,450	16,700	23,000	42,500	1%	-17%	-13%	-11%	-6%
San Antonio Creek At Casitas Springs	605(VC) 11117500(USGS)	371	51.1	9,960	27,020	38,000	74,180	51.2	8,890	26,100	38,200	82,500	0%	12%	4%	-1%	-10%
Fox Canyon Drain below Ojai Avenue	631(VC)	491	1.99	577	986	1,200	1,800	1.99	477	917	1,160	1,910	0%	21%	8%	3%	-6%
Happy Valley Drain at Rice Road	633(VC)	TRB2	1.51	640	1,130	1,370	2,060	1.6	723	1,170	1,380	1,880	-6%	-11%	-3%	-1%	10%

Summary Table C2 – Ventura County Peak Discharges Compared to Regional Regression Peak Discharges

Flooding Source and Location	Ventura County Description	HSPF Nodes	Regional Regression Equation Peak Discharges (cubic feet per second)					Ventura County Peak Discharges (cubic feet per second)					Percent Difference				
			Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance	Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance	Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance
Canada de San Joaquin																	
Upstream of confluence with Ventura River	Canada de San Joaquin above Ventura River	874	1.45	182	597	828	1,860	1.45	630	1,720	2,420	4,720	0%	245%	188%	192%	154%
Canada Larga																	
Upstream of confluence with Coche Creek	Canada Larga Abv Coche	284	8.68	807	2,798	3,956	9,140	8.68	3,350	9,100	12,800	24,990	0%	315%	225%	224%	173%
Downstream of confluence with Coche Creek	Canada Larga Blw Coche	CAN1	13.23	810	2,792	3,949	9,020	13.23	5,110	13,860	19,500	38,060	0%	531%	396%	394%	322%
Upstream of confluence with Ventura River	Canada Larga above Ventura River	288	19.12	1,344	4,744	6,751	15,700	19.12	5,370	14,580	20,500	40,020	0%	299%	207%	204%	155%
Coyote Creek																	
At Casitas Dam Spillway	Coyote Creek at Dam Spillway	998	38.46	3,446	12,694	18,273	43,700	38.46	120	370	2,590	3,750	0%	-97%	-97%	-86%	-91%
Upstream of confluence with Ventura River	Coyote Ck at Dam Spillway	251	41.1	3,572	13,174	18,972	45,300	41.10	680	1,980	3,410	4,830	0%	-81%	-85%	-82%	-89%
Cozy Dell Canyon																	
Upstream of confluence with Cozy Dell Canyon Tributary	Cozy Dell Canyon Trib.	911	2.09	351	1,185	1,657	3,810	2.09	590	1,610	2,262	4,420	0%	68%	36%	37%	16%
Upstream of confluence with McDonald Canyon Drain	Cozy Dell Canyon Above McDonald Canyon	TRB1	2.36	389	1,319	1,846	4,260	2.37	720	1,950	2,740	5,350	0%	85%	48%	48%	26%
Downstream of confluence with McDonald Canyon Drain	Cozy Dell Canyon below McDonald Canyon	913a	3.39	462	1,575	2,210	5,070	3.39	790	2,130	2,998	5,850	0%	71%	35%	36%	15%
Dent Drain																	
Upstream of confluence with Ventura River	Dent Drain above Ventura River	877	0.39	52	161	221	481	0.39	244	433	527	790	0%	370%	168%	139%	64%

Summary Table C2 – Ventura County Peak Discharges Compared to Regional Regression Peak Discharges

Flooding Source and Location	Ventura County Description	HSPF Nodes	Regional Regression Equation Peak Discharges (cubic feet per second)					Ventura County Peak Discharges (cubic feet per second)					Percent Difference				
			Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance	Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance	Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance
East Ojai Avenue Drain																	
Upstream of confluence with Fox Canyon Barranca	East Ojai Avenue Drain above Fox Canyon Barranc	some of area 904	0.142	31	96	130	280	0.14	36	65	79	118	-1%	15%	-32%	-39%	-58%
East Ojai Drain																	
At Grand Avenue	East Ojai Drain above San Antonio Creek	904	0.39	70	220	301	667	0.30	219	388	472	705	-23%	215%	76%	57%	6%
Fox Canyon Barranca																	
Upstream of confluence with Stewart Canyon with East Ojai Drain	Fox Drain above Stewart With East Ojai Drain	491	1.99	239	792	1,103	2,480	1.99	557	986	1,200	1,800	0%	133%	24%	9%	-27%
Happy Valley Drain																	
Upstream of confluence with McDonald Canyon Drain South	Happy Valley Drain above McDonald Canyon Drain South	422	1.34	183	598	830	1,860	1.34	610	1,080	1,310	1,970	0%	234%	80%	58%	6%
Downstream of confluence with McDonald Canyon Drain South	Happy Valley Drain below McDonald Canyon Drain South	TRB2	1.51	201	663	920	2,070	1.51	640	1,130	1,370	2,060	0%	218%	71%	49%	0%
Happy Valley Drain South																	
Approximately 0.41 mile downstream of confluence with Mira Monte Drain	Happy Valley Drain South above Mira Monte Drain	822	0.44	52	161	220	477	0.44	188	333	405	610	0%	263%	107%	84%	28%
At Baldwin Road/State Route 150	Happy Valley Drain South at Baldwin Road and Hwy 150	823+822	1.13	134	432	597	1,320	1.11	410	730	890	1,340	-2%	206%	69%	49%	2%
Manuel Canyon																	
Upstream of confluence with Ventura River	Manuel Canyon above Ventura River	873	1.04	120	384	530	1,180	1.04	520	1,400	1,970	3,850	0%	335%	265%	272%	226%
McDonald Canyon Drain																	
Upstream of confluence with Cozy Dell Canyon	McDonald Canyon above Cozy Dell Canyon; below dam	921	1.02	149	484	670	1,500	1.02	170	450	634	1,240	0%	14%	-7%	-5%	-17%
McDonald Canyon Drain South																	
Upstream of confluence with Happy Valley Drain	McDonald Canyon Drain South	421	0.18	26	77	105	225	0.18	67	119	145	218	0%	162%	54%	39%	-3%
Mira Monte Drain																	
Upstream of confluence with Happy Valley Drain South	Mira Monte Drain above Happy Valley Drain South	823	0.69	102	327	450	988	0.67	180	480	680	1,330	-3%	76%	47%	51%	35%
Mirror Lake Drain																	
Upstream of confluence with Ventura River	Mirror Lake Drain above Ventura River	826	0.39	70	220	301	667	0.39	120	320	452	880	0%	72%	45%	50%	32%
Oak View Drain																	
Upstream of confluence with Ventura River	Oak View Drain above Ventura River	312	0.92	116	372	514	1,140	0.92	430	760	919	1,380	0%	271%	104%	79%	21%

Summary Table C2 – Ventura County Peak Discharges Compared to Regional Regression Peak Discharges

Flooding Source and Location	Ventura County Description	HSPF Nodes	Regional Regression Equation Peak Discharges (cubic feet per second)					Ventura County Peak Discharges (cubic feet per second)					Percent Difference				
			Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance	Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance	Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance
San Antonio Creek																	
Downstream of confluence with McNell Creek	San Antonio Creek below McNell Creek	511	13.5	1,620	5,809	8,282	19,600	13.50	5,760	15,630	21,980	42,900	0%	255%	169%	165%	119%
Downstream of confluence with Thacher Creek	San Antonio Creek below Thacher confluence	SAN7	25.36	2,467	8,974	12,864	30,600	25.36	7,490	20,330	28,600	55,830	0%	204%	127%	122%	82%
Upstream of confluence with Stewart Canyon	San Antonio Creek above Stewart Canyon	512	26.49	2,516	9,157	13,129	34,800	26.49	7,620	20,690	29,100	56,800	0%	203%	126%	122%	63%
Downstream of confluence with Stewart Canyon	San Antonio Creek after Stewart Confluence	SAN9	31.3	2,787	10,177	14,611	34,800	31.30	8,590	23,320	32,800	64,030	0%	208%	129%	124%	84%
Upstream of confluence with Lion Canyon Creek	San Antonio Creek above Lion Confluence	882	33.8	2,868	10,477	15,047	35,800	33.80	7,760	21,050	29,600	57,780	0%	171%	101%	97%	61%
Downstream of confluence with Lion Canyon Creek	San Antonio Creek after Lion Canyon Confluence	SAN10	46.46	3,480	12,791	18,418	43,800	48.90	10,430	28,300	39,800	77,690	5%	200%	121%	116%	77%
Upstream of confluence with Ventura River	San Antonio Creek above Ventura River confluence	371	51.1	3,598	13,232	19,062	45,300	15.10	9,960	27,020	38,000	74,180	-70%	177%	104%	99%	64%
Skyline Drain																	
Upstream of confluence with Ventura River	Skyline Drain above Ventura River	824	0.99	131	422	583	1,300	0.99	399	707	860	1,290	0%	205%	67%	47%	-1%
Stewart Canyon																	
At Upstream Limit of Detailed Study	Stewart Canyon Upper	451	1.93	316	1,063	1,485	3,390	1.93	750	2,030	2,850	5,560	0%	137%	91%	92%	64%
Downstream of confluence with Fox Canyon Barranca	Stewart Canyon above Fox	881	2.83	375	1,265	1,771	4,050	2.83	780	2,130	2,990	5,840	0%	108%	68%	69%	44%
Upstream of confluence with San Antonio Creek	Stewart Canyon above San Antonio Creek with Fox Drain	SAN8	4.81	533	1,820	2,560	5,880	4.81	1,070	2,920	4,100	8,000	0%	101%	60%	60%	36%

Summary Table C3 – Ventura County Peak Discharges Compared to Current FEMA Effective Peak Discharges[1]

Flooding Source and Location	Ventura County Description	Gage	Node/ Location Number	Ventura County Peak Discharges (cubic feet per second)					Current FEMA Effective Peak Discharges (cubic feet per second)					Percent Difference				
				Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance	Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance	Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance
Coyote Creek																		
At Casitas Dam Spillway	Coyote Ck at Dam Spillway	NA	998	38.46	120	370	2,590	3,750	38.7	100	300	2,100	3,040	-1%	20%	23%	23%	23%

[1] Flow information shown only for comparable locations.

Summary Table C3 – Ventura County Peak Discharges Compared to Current FEMA Effective Peak Discharges[1]

Flooding Source and Location	Ventura County Description	Gage	Node/ Location Number	Ventura County Peak Discharges (cubic feet per second)					Current FEMA Effective Peak Discharges (cubic feet per second)					Percent Difference				
				Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance	Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance	Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance
Upstream of confluence with Ventura River	Coyote Creek above Ventura River	NA	251	41.07	680	1,980	3,410	4,830	41.3	500	1,450	2,500	3,540	-1%	36%	37%	36%	36%
Fox Canyon Barranca																		
Upstream of confluence with Stewart Canyon with East Ojai Drain	Fox Drain above Stewart With East Ojai Drain	631(VC)	491	1.99	557	986	1,200	1,800	2.3	1,400	2,300	2,800	4,000	-13%	-60%	-57%	-57%	-55%
Happy Valley Drain																		
Upstream of El Roblar Drive	NA2	NA	NA	NA	NA	NA	NA	NA	0.42	110	350	480	810	NA	NA	NA	NA	NA
Upstream of the diversion with Happy Valley Drain South	NA	NA	NA	NA	NA	NA	NA	NA	1.22	275	840	1,140	1,950	NA	NA	NA	NA	NA
Upstream of confluence with McDonald Canyon Drain South	Happy Valley Drain above McDonald Canyon Drain South	NA	422	1.34	610	1,080	1,310	1,970	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Downstream of confluence with McDonald Canyon Drain South	Happy Valley Drain below McDonald Canyon Drain South	633(VC)	TRB2	1.51	640	1,130	1,370	2,060	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Happy Valley Drain South																		
Approximately 0.41 mile downstream of confluence with Mira Monte Drain	Happy Valley Drain South above Mira Monte Drain	NA	822	0.44	188	333	405	610	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
At Cruzero Street	NA3	NA	NA	NA	NA	NA	NA	NA	0.59	130	240	360	510	NA	NA	NA	NA	NA
At Baldwin Road	Happy Valley Drain South at Baldwin Road and Hwy 150	NA	823+822	1.11	410	730	890	1,340	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mira Monte Drain		NA																
Upstream of confluence with Happy Valley Drain South	Mira Monte Drain above Happy Valley Drain South	NA	823	0.67	316	559	680	1,020	0.79	200	600	810	1,390	-15%	58%	-7%	-16%	-27%
San Antonio Creek		NA																
Downstream of confluence with McNell Creek	San Antonio Creek below McNell Creek	NA	511	13.5	5,760	15,630	21,980	42,900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Downstream of confluence with Thacher Creek	San Antonio Creek below Thacher confluence	NA	SAN7	25.36	7,490	20,330	28,600	55,830	15	2,500	5,600	7,000	11,000	69%	200%	263%	309%	408%
Upstream of confluence with Thacher Creek	NA	NA	NA	NA	NA	NA	NA	NA	24.9	4,200	9,600	12,000	18,000	NA	NA	NA	NA	NA
Upstream of confluence with Stewart Canyon	San Antonio Creek above Stewart Canyon	NA	512	26.49	7,620	20,690	29,100	56,800	26	4,200	9,500	12,000	18,000	2%	81%	118%	143%	216%
Below Stewart Canyon Confluence	San Antonio Creek after Stewart Confluence	NA	SAN9	31.3	8,590	23,320	32,800	64,030	31.5	4,900	11,000	14,000	21,000	-1%	75%	112%	134%	205%

[NA] Not Applicable

Summary Table C3 – Ventura County Peak Discharges Compared to Current FEMA Effective Peak Discharges[1]

Flooding Source and Location	Ventura County Description	Gage	Node/ Location Number	Ventura County Peak Discharges (cubic feet per second)					Current FEMA Effective Peak Discharges (cubic feet per second)					Percent Difference				
				Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance	Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance	Area (sq mi)	10-Percent Annual Chance	2-Percent Annual Chance	1-Percent Annual Chance	0.2-Percent Annual Chance
Upstream of confluence with Lion Confluence	San Antonio Creek above Lion Confluence	NA	882	33.8	7,760	21,050	29,600	57,780	34	5,200	11,700	14,800	22,300	-1%	49%	80%	100%	159%
Downstream of confluence with Lion Canyon Confluence	San Antonio Creek after Lion Canyon Confluence	NA	SAN10	46.8	10,430	28,300	39,800	77,690	46.7	6,400	14,400	18,200	27,400	0%	63%	97%	119%	184%
Upstream of confluence with Ventura River confluence	San Antonio Creek above Ventura River confluence	605(VC) 11117500(USGS)	371	51.1	9,960	27,020	38,000	74,180	51.2	7,000	15,700	19,900	30,000	0%	42%	72%	91%	147%
Stewart Canyon		NA																
At Upstream Limit of Detailed Study	Stewart Canyon Upper	NA	451	1.93	750	2,030	2,850	5,560	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Upstream of confluence with Fox Canyon Barranca	Stewart Canyon above Fox	NA	881	2.82	780	2,130	2,990	5,840	2.6	980	2,200	2,700	3,900	8%	-20%	-3%	11%	50%
Upstream of confluence with San Antonio Creek With Fox Canyon Barranca	Stewart Canyon above San Antonio Creek with Fox Drain	NA	SAN8	4.81	1,070	2,920	4,100	8,000	5	1,400	3,800	5,500	7,900	-4%	-24%	-23%	-25%	1%

[NA] Not Applicable