ATTACHMENT

1. E-mail from Martin Becker to David Wingerd dated December 10, 2003.

2. Request for Correction (RFC). The RFC that is attached is marked draft in order that the Corps could have the opportunity to review the proposed RFC. The discussions with the Corps did cause the necessity to make any changes to the draft. Therefore, this version of the RFC should now be considered the final version.

3. Three e-mails from David Wingerd to Martin Becker dated January 5, 2004.

4. E-mail from Martin Becker to David Wingerd dated January 9, 2004.

5. E-mails between Martin Becker and David Wingerd on January 13, 2004.

6. E-mail from David Wingerd to Martin Becker dated January 16, 2004.

7. E-mail from Martin Becker to David Wingerd dated January 23, 2004.

8. E-mail from David Wingerd to Martin Becker dated January 27, 2004.

9. E-mail from Martin Becker to David Wingerd dated January 27, 2004.

10. E-mail from David Wingerd to Martin Becker dated February 5, 2004.

11. E-mail from Martin Becker to David Wingerd dated February 11, 2004.

12. E-mail from David Wingerd to Martin Becker dated February 11, 2004.

13. E-mail from Martin Becker to David Wingerd dated February 12, 2004.

#1

martin becker

From: martin becker [martin_becker@prodigy.net]
Sent: Wednesday, December 10, 2003 3:55 PM
To: 'david.b.wingerd@usace.army.mil'
Cc: Jery Stedinger; 'Douglas Hamilton'
Subject: National Data Quality Act "draft"

2-10-03_Bulletin-jrs3.doc (56...

Dave,

I am attaching a copy of the "draft" for a Request for Correction using the National Data Quality Act of the 100 year flow computation for Day Creek in San Bernardino County, California. As I discussed with you, the basis of the request is that the Corps' computation appears to inadvertently use a skew coefficient that is not in accord with Bulletin 17B. The draft addresses this issue, and attaches a computation that conforms with 17B. Please note that since the corrected computation results in a 100 year flow of 6,664 cfs instead of the 3,396 cfs that was computed by the Corps, the use of an incorrect skew coefficient is significant.

At this point, we plan to formally submit the request in a couple of weeks. However, we appreciate you taking a look at the draft to determine if it provides a basis for a resolution without formality. If the Corps has any questions or comments, please address them to me. My contact information is shown below.

Thanks,

Martin Becker
600 Peachtree Street
Suite 3740
Atlanta, Georgia 30308-2214
v - 404/876-3900
f - 404/876-6725

communication in error, please notify me immediately.

#2

REQUEST FOR CORRECTION OF THE 100-YEAR FLOOD IN THE NOVEMBER, 1999 REPORT ON DEER CREEK PREPARED BY THE LOS ANGELES DISTRICT, U.S. ARMY CORPS OF ENGINEERS

Martin Becker
600 Peachtree Street, Suite 3740
Atlanta, Georgia 30308-2214
TEL - 404/876-3900; FAX - 404/876-6725
e-mail: martin_becker@prodigy.net

and

Jery R. Stedinger, Ph.D.
School of Civil and Environmental Engineering
Hollister Hall, Cornell University
Ithaca, NY 14853-3501
TEL: 607-255-2351 FAX: 607-255-9004
e-mail: jrs5@cornell.edu

Request:
Recompute the 100-year flow for Day Creek that was computed in the Corps of Engineers' 1999 Report using correctly the 17B Guidelines for skew coefficient computation. With the 1928-1972 record used by the USACE Los Angles District, the recomputation with skew weighting in accordance with the Bulletin 17B guidelines will result in a 100-year flood flow of 6,664 cfs instead of 3,396 cfs.

Background
A concern in Southern California is computation of the risk of large floods in the *Deer Creek* Basin where large floods are a particular concern. Because Deer Creek does not have a systematic gaged flood flow record, the computation is based on the adjacent Day Creek record. Day Creek is a 4.56 square-mile watershed that has a U.S. Geological Survey (USGS) stream gage record for peak flood flow data from 1928 to 1972 In their November 29, 1999 report entitled *Review of Debris Production and Level-of-Protection Deer Creek Debris Basin*, the Los Angeles District of the U.S. Army Corps of Engineers (The District) presented the results of a statistical analysis of the Day Creek stream gage data. The report states that they used the following statistical methodology:

> "Discharge-frequency analyses were performed on both of these stream gages using the Hydrologic Engineering Center's Flood Frequency Analysis (FFA) computer program. The FFA program is based on the "Guidelines for Determining Flood Flow Frequency, Bulletin 17B", by the Hydrology Subcommittee, revised September 1981. The techniques presented in Bulletin 17B have been adopted for all Federal planning water and related land resources. FFA results for Day Creek are presented in Exhibit 1".

Bulletin 17B Guidelines were not Followed

The District did not follow the guidelines in Bulletin 17B that were adopted by Federal Agencies in two respects: the computation of the weighted skew, and the adopted regional skew. The Bulletin 17B procedure is to weight the at-site and regional estimators of the skewness coefficients by the reciprocal of estimates of their mean square errors. (See IACWD, 1981, reproduced in Attachment 1.) Instead the District input a user-specified skew of –0.2 without any weighting with the at-site station skewness coefficient (See Attachment 2). No justification for this user-specified regional skew was provided in the November 29, 1999 report. Given that the District's specified regional skew was negative (-0.2), and the at-site skewness estimator was very positive (+0.70; see Attachment 2 at the line entitled "SYSTEMATIC RECORD", under the column heading "SKEW"), the result is a much smaller computed value of the 100-year flood than would be obtained were the Bulletin 17B guidelines respected (+0.44; see Attachment 3 at the line entitled "BULLETIN 17B ESTIMATE" under the column heading "SKEW").

Specifying a negative skew coefficient in this manner deviates from the guidelines in Bulletin 17B which the District claims to have followed in their report. Therefore, a computed 100-year flood value of 3,396 cfs for Day Creek is not correct based on the Bulletin 17B Guidelines.

Based on the latitude and longitude of the Day Creek stream gage, the USGS computer program PEAKFQ reports that the actual value of regional skew at this location is –0.013 (See Attachment 3 at the lined entitled "Generalized Skew"), which would round off to a value of 0.0. There is no documentation provided in the District's report that supports adopting a regional skewness value of -0.2 as employed by the District in this case.

Bulletin 17B page 11, (see IACWD, 1981, reproduced in Attachment 1) specifies that agencies may develop their own regional skewness estimators, with the provision that such estimates are based upon at least 40 stations within a 100-mile radius of the site, and all stations must have 25 or more years of record. We can find no evidence that such an analysis was performed. Thus the computation provided by the District would appear to be arbitrary and without appropriate support. Furthermore, because Day Creek has a small watershed area with extreme vertical relief, we might anticipate that the skew coefficient for such a location would be larger than a generalized regional average skew value, which in this case was essentially 0.0.

The statistical analysis for the Day Creek Stream Gage done by the Corps of Engineers in their November 1999 report is shown in Figure 1 below. The downward-curving solid line is the computed flow frequency curve and the diamond shapes are the actual measured peak flow data.

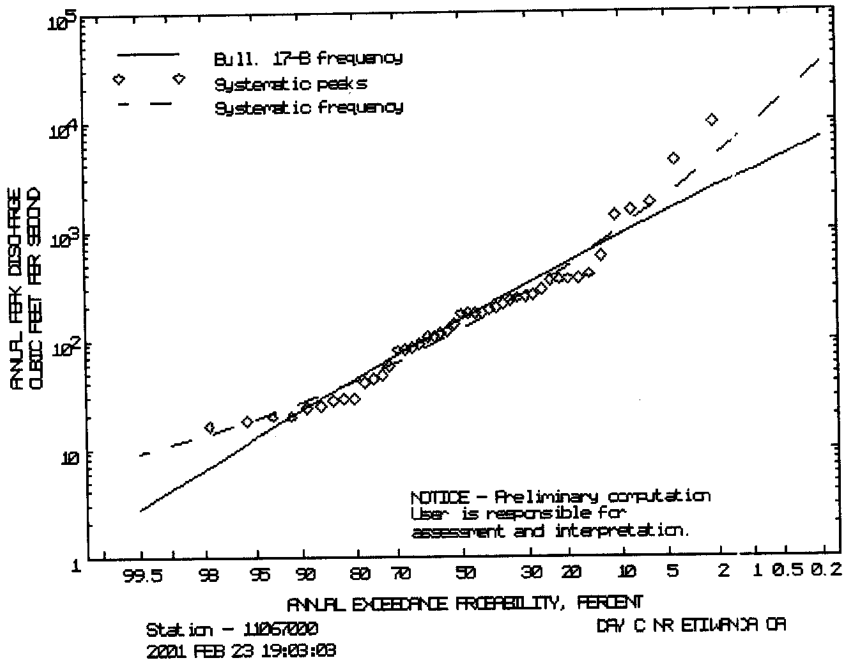

Figure 1 District's Computed Peak Flow Frequency Curve for Day Creek

The trend of the measured peak flow data clearly bends upward (positive skew) while the calculated line bends slightly downward (negative skew). The computed 100-year flow for Day Creek in Figure 1 is 3,396 cfs (See Attachment 2.)

<u>A Correct Application of Bulletin 17B</u>

Bulletin 17B recommends using a weighted skew coefficient, which combines regional and site-specific skew values. The USGS computer program PEAKFQ does this weighting automatically by entering the stream gage data along with the latitude and longitude of the gage. Re-computing the flood frequency data using the Bulletin 17B guidelines results in a peak flow frequency curve with a skew of +0.44 that is shown in Figure 2. This new distribution is more consistent with the trend of the measured data. This approach results in a 100-year peak discharge of 6,664 cfs (See Attachment 3), almost twice the value obtained when the skew value of –0.2 was adopted. And, the new curve still falls below the five largest observed peaks.

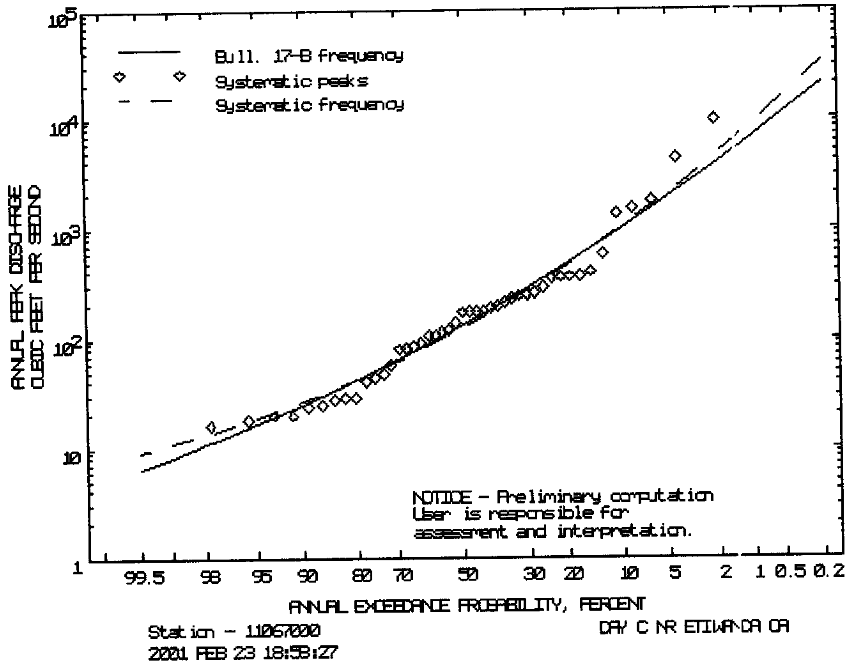

Figure 2 Flow Frequency Curve for Day Creek Using Bulletin 17B Skew.

Consequence of Not Correcting the 100-Year Flow for Day Creek

Since the 100-year flow for Day Creek was transposed to nearby Deer Creek to assess the sufficiency of the debris basin at Deer Creek, an almost 50% understatement of the 100-year flow for Day Creek endangers the fast growing population that believes the debris basin on Deer Creek provides the anticipated level of protection.

Summary

Our concerns with the District's computation are twofold. They are:

1. The District did not follow the guidelines agreed upon by Federal agencies in Bulletin 17B (IACWD, 1981) and followed for the last 25 years. The agreed upon procedure is to weight the at-site and regional skewness coefficients by the reciprocal of estimates of their mean square error. Instead the USACE used a regional skew that the USACE specified. Given that the specified USACE regional skew was negative (-0.20), and the at-site skewness estimator was very positive (+0.70), this resulted in a much smaller design flood that would be obtained were the agreed upon guidelines respected (Bulletin 17B skew of +0.44).

2. There is no documentation to support the regional skewness value of -0.2 specified by the USACE in this case. The regional skew estimate provided by the USGS program for this basin is 0.0, which is a larger value. Thus the computation provided by the USACE appears to be without appropriate support.

References

Cohn, T.A., W.L. Lane, W.G. Baier, An algorithm for computing moments-based flood quantile estimates when historical flood information is available, *Water Resource. Res., 33*(9), 2089-96, 1997.

Interagency Advisory Committee on Water Data, *Guidelines for Determining Flood Flow Frequency,* Bulletin #17B, U.S. Department of the Interior, U.S. Geological Survey, Office of Water Data Coordination, Reston, Virginia, September 1981.

Stedinger, J.R., Flood Frequency Analysis and Statistical Estimation of Flood Risk, Chapter 12, *Inland Flood Hazards: Human, Riparian and Aquatic Communities,* E.E. Wohl (ed.), Cambridge University Press, Stanford, United Kingdom, 2000.

U.S. Army Corps of Engineers, "Review of Debris Production and Level-of-Protection Deer Creek Debris Basin," Los Angeles District U.S. Army Corps of Engineers, Los Angles, California, November 29, 1999.

Attachment 1

Pages from Bulletin 17B

Guidelines For Determining

Flood Flow Frequency

Bulletin # 17B
of the
Hydrology Subcommittee

Revised September 198
Editorial Corrections March 1982

INTERAGENCY ADVISORY COMMITTEE
ON WATER DATA

U.S. Department of the Interior
Geological Survey
Office of Water Data Coordination
Reston, Virginia 22092

*Guidelines on weighting station and generalized skew are provided in the next section of this bulletin.

The recommended procedure for developing generalized skew coefficients requires the use of at least 40 stations, or all stations within a 100-mile radius. The stations used should have 25 or more years of record. It is recognized that in some locations a relaxation of these criteria may be necessary. The actual procedure includes analysis by three methods: 1) skew isolines drawn on a map; 2) skew prediction equation; and 3) the mean of the station skew values. Each of the methods are discussed separately.

To develop the isoline map, plot each station skew value at the centroid of its drainage basin and examine the plotted data for any geographic or topographic trends. If a pattern is evident, then isolines are drawn and the average of the squared differences between observed and isoline values, mean-square error (MSE), is computed. The MSE will be used in appraising the accuracy of the isoline map. If no pattern is evident, then an isoline map cannot be drawn and is therefore, not further considered.

A prediction equation should be developed that would relate either the station skew coefficients or the differences from the isoline map to predictor variables that affect the skew coefficient of the station record. These would include watershed and climatologic variables. The prediction equation should preferably be used for estimating the skew coefficient at stations with variables that are within the range of data used to calibrate the equation. The MSE (standard error of estimate squared) will be used to evaluate the accuracy of the preciction equation.

Determine the arithmetic mean and variance of the skew coefficients for all stations. In some cases the variability of the runoff regime may be so large as to preclude obtaining 40 stations with reasonably homogeneous hydrology. In these situations, the arithmetic mean and variance of about 20 stations may be used to estimate the generalized skew coefficient. The drainage areas and meteorologic, topographic, and geologic characteristics should be representative of the region around the station of interest.

Select the method that provides the most accurate skew coefficient *

* Application of equation 6 and table 1 to stations with absolute skew values (logs) greater than 2 and long periods of record gives relatively little weight to the station value. Application of equation 5 may also give improper weight to the generalized skew if the generalized and station skews differ by more than 0.5. In these situations, an examination of the data and the flood-producing characteristics of the watershed should be made and possibly greater weight given to the station skew. *

5. Broken Record--Annual peaks for certain years may be missing because of conditions not related to flood magnitude, such as gage removal. In this case, the different record segments are analyzed as a continuous record with length equal to the sum of both records, unless there is some physical change in the watershed between segments which may make the total record nonhomogeneous.

6. Incomplete Record--An incomplete record refers to a streamflow record in which some peak flows are missing because they were too low or too high to record, or the gage was out of operation for a short period because of flooding. Missing high and low data require different treatment.

When one or more high annual peaks during the period of systematic record have not been recorded, there is usually information available from which the peak discharge can be estimated. In most instances the data collecting agency routinely provides such estimates. If not, and such an estimate is made as part of the flood frequency analysis, it should be documented and the data collection agency advised.

At some crest gage sites the bottom of the gage is not reached *in some years. For this situation use of the conditional probability adjustment is recommended as described in Appendix 5. *

7. Zero Flood Years--Some streams in arid regions have no flow for the entire year. Thus, the annual flood series for these streams will have one or more zero flood values. This precludes the normal statistical analysis of the data using the recommended log-Pearson Type III *distribution because the logarithm of zero is minus infinity. The conditional probability adjustment is recommended for determining frequency curves for records with zero flood years as described in Appendix 5. *

Attachment 2

Day Creek Peak Flow Frequency Calculations Using Specified Skew of –0.2

```
1
                    U. S. GEOLOGICAL SURVEY
             ANNUAL PEAK FLOW FREQUENCY ANALYSIS
              Following Bulletin 17-B Guidelines
                        Program peakfq
                (Version 4.0, December, 2000)


               --- PROCESSING DATE/TIME ---

                   2003 NOV  9 13:30:55

                --- 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

1
                    U. S. GEOLOGICAL SURVEY
             ANNUAL PEAK FLOW FREQUENCY ANALYSIS
              Following Bulletin 17-B Guidelines
                        Program peakfq
                (Version 4.0, December, 2000)


          Station - 11067000  DAY C NR ETIWANDA CA
                    2003 NOV  9 13:30:55


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

      Number of peaks in record              =        45
      Peaks not used in analysis             =         0
      Systematic peaks in analysis           =        45
      Historic peaks in analysis             =         0
      Years of historic record               =         0
      Generalized skew                       =    -0.200
      Standard error of generalized skew     =     0.550
      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
   WCF162I-SYSTEMATIC PEAKS EXCEEDED HIGH-OUTLIER CRITERION.   1      7491.9
   WCF195I-NO LOW OUTLIERS WERE DETECTED BELOW CRITERION.                2.9
```

*WCF151I-17B WEIGHTED SKEW REPLACED BY USER OPTION. 0.376 -0.200

1

1

Station - 11067000 DAY C NR ETIWANDA CA
2003 NOV 9 13:30:55

ANNUAL FREQUENCY CURVE PARAMETERS -- LOG-PEARSON TYPE III

	FLOOD BASE		LOGARITHMIC		
	DISCHARGE	EXCEEDANCE PROBABILITY	MEAN	STANDARD DEVIATION	SKEW
SYSTEMATIC RECORD	0.0	1.0000	2.1667	0.6263	0.700
BULL.17B ESTIMATE	0.0	1.0000	2.1667	0.6263	-0.200

ANNUAL FREQUENCY CURVE -- DISCHARGES AT SELECTED EXCEEDANCE PROBABILITIES

ANNUAL EXCEEDANCE PROBABILITY	BULL.17B ESTIMATE	SYSTEMATIC RECORD	'EXPECTED PROBABILITY' ESTIMATE	95-PCT CONFIDENCE LIMITS FOR BULL. 17B ESTIMATES LOWER	UPPER
0.9950	2.7	9.1	2.1	1.1	5.4
0.9900	4.2	10.8	3.4	1.8	7.8
0.9500	12.7	18.8	11.6	6.6	20.7
0.9000	22.5	26.6	21.3	12.9	34.7
0.8000	44.3	42.7	43.2	28.0	64.9
0.5000	154.0	124.2	154.0	107.7	220.9
0.2000	500.0	458.7	511.7	340.8	792.9
0.1000	901.0	1003.0	942.1	586.6	1553.0
0.0400	1655.0	2502.0	1790.0	1014.0	3151.0
0.0200	2426.0	4719.0	2701.0	1424.0	4938.0
0.0100	3396.0	8608.0	3906.0	1915.0	7351.0
0.0050	4595.0	15310.0	5470.0	2497.0	10520.0
0.0020	6577.0	31780.0	8241.0	3415.0	16130.0
0.6667	82.1	(1.50-year flood)			
0.4292	199.3	(2.33-year flood)			

1

Station - 11067000 DAY C NR ETIWANDA CA
2003 NOV 9 13:30:55

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

WATER YEAR	DISCHARGE	CODES	WATER YEAR	DISCHARGE	CODES
1928	29.0		1951	47.0	
1929	90.0		1952	214.0	
1930	29.0		1953	28.0	

1931	118.0	1954	242.0
1932	105.0	1955	57.0
1933	20.0	1956	195.0
1934	84.0	1957	176.0
1935	172.0	1958	355.0
1936	192.0	1959	367.0
1937	80.0	1960	41.0
1938	4200.0	1961	44.0
1939	261.0	1962	174.0
1940	286.0	1963	114.0
1941	175.0	1964	16.0
1942	20.0	1965	18.0
1943	1500.0	1966	1740.0
1944	139.0	1967	1330.0
1945	400.0	1968	346.0
1946	250.0	1969	9450.0
1947	232.0	1970	25.0
1948	81.0	1971	358.0
1949	24.0	1972	105.0
1950	580.0		

Explanation of peak discharge qualification codes

PEAKFQ CODE	WATSTORE 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

1

Station - 11067000 DAY C NR ETIWANDA CA
2003 NOV 9 13:30:55

EMPIRICAL FREQUENCY CURVES -- WEIBULL PLOTTING POSITIONS

WATER YEAR	RANKED DISCHARGE	SYSTEMATIC RECORD	BULL.17B ESTIMATE
1969	9450.0	0.0217	0.0217
1938	4200.0	0.0435	0.0435
1966	1740.0	0.0652	0.0652
1943	1500.0	0.0870	0.0870
1967	1330.0	0.1087	0.1087
1950	580.0	0.1304	0.1304
1945	400.0		

Attachment 3

Day Creek Peak Flow Frequency Calculations Using Bulletin 17B Weighted Skew

1

U. S. GEOLOGICAL SURVEY
ANNUAL PEAK FLOW FREQUENCY ANALYSIS
Following Bulletin 17-B Guidelines
Program peakfq
(Version 4.0, December, 2000)

--- PROCESSING DATE/TIME ---

2003 NOV 9 13:30:06

--- 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

1

U. S. GEOLOGICAL SURVEY
ANNUAL PEAK FLOW FREQUENCY ANALYSIS
Following Bulletin 17-B Guidelines
Program peakfq
(Version 4.0, December, 2000)

Station - 11067000 DAY C NR ETIWANDA CA
2003 NOV 9 13:30:06

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

Number of peaks in record	=	45
Peaks not used in analysis	=	0
Systematic peaks in analysis	=	45
Historic peaks in analysis	=	0
Years of historic record	=	0
Generalized skew	=	-0.013
Standard error of generalized skew	=	0.550
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
WCF162I-SYSTEMATIC PEAKS EXCEEDED HIGH-OUTLIER CRITERION.	1	7491.9
WCF195I-NO LOW OUTLIERS WERE DETECTED BELOW CRITERION.		2.9

1

Station - 11067000 DAY C NR ETIWANDA CA
2003 NOV 9 13:30:06

ANNUAL FREQUENCY CURVE PARAMETERS -- LOG-PEARSON TYPE III

	FLOOD BASE		LOGARITHMIC		
	DISCHARGE	EXCEEDANCE PROBABILITY	MEAN	STANDARD DEVIATION	SKEW
SYSTEMATIC RECORD	0.0	1.0000	2.1667	0.6263	0.700
BULL.17B ESTIMATE	0.0	1.0000	2.1667	0.6263	0.443

ANNUAL FREQUENCY CURVE -- DISCHARGES AT SELECTED EXCEEDANCE PROBABILITIES

ANNUAL EXCEEDANCE PROBABILITY	BULL.17B ESTIMATE	SYSTEMATIC RECORD	'EXPECTED PROBABILITY' ESTIMATE	95-PCT CONFIDENCE LIMITS FOR BULL. 17B ESTIMATES LOWER	UPPER
0.9950	6.5	9.1	5.7	3.0	11.5
0.9900	8.2	10.8	7.4	4.0	14.2
0.9500	16.6	18.8	15.7	9.1	26.5
0.9000	25.1	26.6	24.1	14.7	38.4
0.8000	42.7	42.7	41.8	26.9	62.7
0.5000	132.0	124.2	132.0	91.8	188.5
0.2000	474.1	458.7	487.9	324.2	746.8
0.1000	984.3	1003.0	1045.0	635.7	1720.0
0.0400	2252.0	2502.0	2524.0	1333.0	4523.0
0.0200	3948.0	4719.0	4666.0	2186.0	8787.0
0.0100	6664.0	8608.0	8376.0	3454.0	16380.0
0.0050	10930.0	15310.0	14770.0	5309.0	29570.0
0.0020	20300.0	31780.0	30550.0	9073.0	62080.0
0.6667	72.9	(1.50-year flood)			
0.4292	169.7	(2.33-year flood)			

1

Station - 11067000 DAY C NR ETIWANDA CA
2003 NOV 9 13:30:06

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

WATER YEAR	DISCHARGE	CODES	WATER YEAR	DISCHARGE	CODES
1928	29.0		1951	47.0	
1929	90.0		1952	214.0	
1930	29.0		1953	28.0	
1931	118.0		1954	242.0	
1932	105.0		1955	57.0	
1933	20.0		1956	195.0	

1934	84.0	1957	176.0
1935	172.0	1958	355.0
1936	192.0	1959	367.0
1937	80.0	1960	41.0
1938	4200.0	1961	44.0
1939	261.0	1962	174.0
1940	286.0	1963	114.0
1941	175.0	1964	16.0
1942	20.0	1965	18.0
1943	1500.0	1966	1740.0
1944	139.0	1967	1330.0
1945	400.0	1968	346.0
1946	250.0	1969	9450.0
1947	232.0	1970	25.0
1948	81.0	1971	358.0
1949	24.0	1972	105.0
1950	580.0		

Explanation of peak discharge qualification codes

PEAKFQ CODE	WATSTORE 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

1

Station - 11067000 DAY C NR ETIWANDA CA
2003 NOV 9 13:30:06

EMPIRICAL FREQUENCY CURVES -- WEIBULL PLOTTING POSITIONS

WATER YEAR	RANKED DISCHARGE	SYSTEMATIC RECORD	BULL.17B ESTIMATE
1969	9450.0	0.0217	0.0217
1938	4200.0	0.0435	0.0435
1966	1740.0	0.0652	0.0652
1943	1500.0	0.0870	0.0870
1967	1330.0	0.1087	0.1087
1950	580.0	0.1304	0.1304
1945	400.0	0.1522	0.1522
1959	367.0	0.1739	0.1739
1971	358.0	0.1957	0.1957
1958	355.0	0.2174	0.2174
1968	346.0	0.2391	0.2391
1940	286.0	0.2609	0.2609
1939	261.0	0.2826	0.2826
1946	250.0	0.3043	0.3043

1954	242.0	0.3261	0.3261
1947	232.0	0.3478	0.3478
1952	214.0	0.3696	0.3696
1956	195.0	0.3913	0.3913
1936	192.0	0.4130	0.4130
1957	176.0	0.4348	0.4348
1941	175.0	0.4565	0.4565
1962	174.0	0.4783	0.4783
1935	172.0	0.5000	0.5000
1944	139.0	0.5217	0.5217
1931	118.0	0.5435	0.5435
1963	114.0	0.5652	0.5652
1932	105.0	0.5870	0.5870
1972	105.0	0.6087	0.6087
1929	90.0	0.6304	0.6304
1934	84.0	0.6522	0.6522
1948	81.0	0.6739	0.6739
1937	80.0	0.6957	0.6957
1955	57.0	0.7174	0.7174
1951	47.0	0.7391	0.7391
1961	44.0	0.7609	0.7609
1960	41.0	0.7826	0.7826
1928	29.0	0.8043	0.8043
1930	29.0	0.8261	0.8261
1953	28.0	0.8478	0.8478
1970	25.0	0.8696	0.8696
1949	24.0	0.8913	0.8913
1933	20.0	0.9130	0.9130
1942	20.0	0.9348	0.9348
1965	18.0	0.9565	0.9565
1964	16.0	0.9783	0.9783

1

U. S. GEOLOGICAL SURVEY
ANNUAL PEAK FLOW FREQUENCY ANALYSIS
Following Bulletin 17-B Guidelines
Program peakfq
(Version 4.0, December, 2000)

End PEAKFQ analysis.
Stations processed : 1
Number of errors : 0
Stations skipped : 0
Station years : 45

#3

martin becker

From: David.B.Wingerd@HQ02.USACE.ARMY.MIL
Sent: Monday, January 05, 2004 2:35 PM
To: martin_becker@prodigy.net
Subject: FW: 11/4/03: Flood Control After Fires

David Wingerd
David Wingerd, P.E.
Senior Hydraulic Engineer
202-761-1802

-----Original Message-----
From: Wingerd, David B HQ02
Sent: Monday, January 05, 2004 2:17 PM
To: 'martin becker'
Subject: FW: 11/4/03: Flood Control After Fires

David Wingerd
David Wingerd, P.E.
Senior Hydraulic Engineer
202-761-1802

-----Original Message-----
From: Wingerd, David B HQ02
Sent: Monday, January 05, 2004 7:30 AM
To: 'martin becker'
Subject: FW: 11/4/03: Flood Control After Fires

Martin,
Attached is the info you requested on Deer Creek.

Please note that the last attachment is the original Deer Creek analysis LAD performed **before** the Corps knew that the USGS had removed the Day Creek flood of record from the official peak flow file.

I am very busy this week on a GAO report and prefer not to discuss this week.

Happy New Year.

David Wingerd
David Wingerd, P.E.
Senior Hydraulic Engineer
202-761-1802

-----Original Message-----
From: Evelyn, Joseph B SPL
Sent: Wednesday, December 31, 2003 12:09 AM

To: Wingerd, David B HQ02
Subject: RE: 11/4/03: Flood Control After Fires

Dave,
As we discussed our approach to the discharge frequency analysis for the Deer Creek Debris Basin watershed had to consider the fact that the peak discharge values in the USGS peak flow file for the Day Creek streamgage were heavy influenced by debris flow phenomena. I've attached several files with background information that should be useful in understanding the Deer Creek discharge frequency analysis performed by the LA District.
Joe

Joseph B. Evelyn, P.E.
Chief, Hydrology and Hydraulics Branch
U.S. Army Corps of Engineers, Los Angeles District
P.O. Box 532711
Los Angeles, CA 90053-2325
Phone# 213-452-3525
FAX# 213-452-4202
joseph.b.evelyn@usace.army.mil

-----Original Message-----
From: Wingerd, David B HQ02
Sent: Friday, November 14, 2003 8:10 AM
To: Evelyn, Joseph B SPL
Subject: FW: 11/4/03: Flood Control After Fires

Joe,
This is the latest info from Martin Becker, the guy that I talked to you about.

David Wingerd

From: martin becker [mailto:martin_becker@prodigy.net]
Sent: Thursday, November 13, 2003 3:57 PM
To: kgorton@amfor.org; EASPE@aol.com; Eric_B_Janes@blm.gov; Rdurrans@coe.eng.ua.edu; 'Robert Swain'; William.Merkel@ea.nrcs.usda.gov; price.myra@epa.gov; wells.david@epa.gov; dew7718@erols.com; kevin.long@fema.gov; kenneth.fearon@ferc.fed.us; ShyangChin.Lin@ferc.gov; Joseph.Krolak@fhwa.dot.gov; cknopp@fs.fed.us; sglasser@fs.fed.us; wrawls@hydrolab.arsusda.gov; bparrish@mbakercorp.com; WTHOMAS@mbakercorp.com; glenn.austin@noaa.gov; ldjames@nsf.gov; snelson@nsf.gov; martin_becker@prodigy.net; jfogg@sc.blm.gov; kstewart@udfcd.org; Wingerd, David B; Jon.Werner@USDA.gov; rrmason@usgs.gov; sfblanch@usgs.gov; tjzembrz@usgs.gov; 'Donald Frevert'
Subject: 11/4/03: Flood Control After Fires

At the August, 2003, meeting of our committee, I expressed the following concern as indicated in the minutes of the meeting:

> " ... Becker feels that the censoring of peak flow data of record is going to increase the likelihood of devastation to people living in areas like Southern California that should be characterized as flood plains but are not because USGS has eliminated the

data to make the proper determination.

Martin expressed concern that the USGS approach is "too much like a science fair project" and not oriented enough towards the national flood insurance program which defines debris flows as floods. ..."

I am enclosing, below, a newspaper article from the LA Times dated 11/4/03. It discusses potential aftermaths that may result from the recent fires in Southern California. Certainly, debris floods are one of the possibilities. To the extent that the USGS continues to say a debris flood is not a flood even though FEMA defines it as a flood in accordance with the National Flood Insurance Act, potential devastation to property and the potential loss of life in Southern California is almost certain. The reason is that the USGS which we all know is the water data depository for Federal Government will have censored the debris flows from its data bank of annual peak flows.

When you read the article, below, you will note a discussion regarding Deer Creek. One of the reasons that the area below the the Deer Creek debris basin has become populated is because the USGS expunged the flow of record from its data bank because it was a debris flow. Therefore, the event of record was not be fully considered in the analysis of potential flooding.

The issue of major flooding events in Southern California being expunged from the record because a federal agency does not use FEMA's definition of flood is a major issue. For that reason, I request that the issue of a universal definition of flood in the federal community (if we do not already have one) be an agenda item for our January meeting. Time is of the essence since we appear to have a potential disaster at hand. This is real life!

Thanks,

Martin Becker
600 Peachtree Street
Suite 3740
Atlanta, Georgia 30308-2214
v - 404/876-3900
f - 404/876-6725

November 4, 2003

Top of the News: Fire Aftermath

Fires Bring Hazard of Landslides
Los Angeles Times - 11/4/03
By Miguel Bustillo, staff writer

Flood control experts fear that wildfires have created potentially catastrophic landslide hazards in charred areas throughout Southern California - especially in San Bernardino County, where as many as 50 catch basins built to block falling boulders, mud and trees may not be adequate.

Debris flows, as the deadliest form of the slides are known, can be ferocious, crashing down mountain slopes, overwhelming barricades and dropping tons of rubble on unsuspecting communities during heavy rains.

The San Gabriel and San Bernardino mountains are dotted with catch basins - government's response to a long and violent history of sudden landslides. The basins are typically engineered to capture the muddy fallout from a 100-year flood - a heavy rainstorm whose likelihood of happening in any given year is only 1%.

But in areas damaged by wildfires, the volume and velocity of material washing down can be 10 times greater than usual - and exceptionally heavy even four to five years after a blaze.

As a result, many basins in fire-ravaged San Bernardino County could now be strained by a major storm, putting thousands of homes, schools and other buildings in harm's way, according to county flood control officials and other hydrologists.

"Most of these basins, if they get hit within a year or two of a good fire, they will not be big enough," said Pat Mead, an assistant public works director for San Bernardino County.

"In a normal fire year, we get maybe one or two canyons with watersheds in them burning. By the looks of things, these fires have burned every watershed in the north part of our county."

Last week, San Bernardino County officials said they would seek federal money to clear out and expand the basins, warn nearby residents about landslide dangers and erect walls of sandbags to minimize the threat.

Meanwhile, the U.S. Forest Service, which controls many of the wilderness areas hit hardest by the fires, has begun assembling a team to determine damage and look for ways to diminish erosion.

"We don't want to scare people because we don't think a disaster is about to happen, but they need to know that this is not normal," said Ted Golondzinier, another assistant county public works director. "We do think there are areas that are going to be getting some mud flows, and we're trying to figure out where those are most likely to happen."

Fire-scarred parts of Los Angeles, Ventura and San Diego counties - including areas not typically prone to landslides - also may face an increased chance of landslides because of the scope of this year's fires, among the worst in modern California history.

"Regionally, this is one of the worst potential flooding situations since this became a civilized place," said Douglas Hamilton, a flood control expert with Exponent Inc., an environmental consulting firm. "Everybody knows the San Gabriel and San Bernardino mountains have problems with debris flows. But even in San Diego, where debris has not been as big of a problem, you could now have a problem because of these fires."

Debris flows have caused dozens of disasters in Southern California over the last century, including a 20-foot-high avalanche of rocks and mud that swept over La Crescenta and Montrose just after midnight on New Year's Day in 1934, killing 49 people. A wildfire preceded the disaster. No debris dams were there at the time.

The dangers of debris flows were highlighted in the 1989 book "The Control of Nature" by John McPhee. One passage recounts the horrifying experience of the Genofile family, which nearly perished when a 6-foot wall of muck suddenly struck their home in Shields Canyon above Glendale in 1978 after a particularly intense rain.

"The house became buried to the eaves. Boulders sat on the roof. Thirteen automobiles were packed around the building, including five in the pool. A din of rock kept banging against them. The stuck horn of a buried car was blaring," McPhee wrote. "The family in the darkness in their fixed tableaux watched one another by the light of a directional signal, endlessly blinking. The house had filled up in six minutes, and the mud stopped rising near the children's chins."

If wildfires precede heavy rains, the threat of debris flows is exponentially greater, experts say. The fires consume the vegetation that coats hillsides and binds soils together, greatly exposing the areas to erosion. That erosion can deposit huge amounts of sediment downstream from burned areas during rainstorms in a matter of minutes.

"Wildfires remove the canopy that intercepts rainfall, the leaves and needles that are on the ground. And once you've removed that, the water is just going to run downhill, taking a lot of other things with it," said Susan H.

Cannon, a researcher with the U.S. Geological Survey's landslide hazards program, which has been studying the link between fire and debris flows for years.

Furthermore, in chaparral-coated Southern California, burning of the brush has been shown to harden surface soils, making the ground more water repellent than usual. That significantly increases the speed with which rainfall rushes down slopes, increasing its destructive power.

"It's an amazing amount of water that can come out of those mountains when it rains," said Chris Wills, a supervising geologist with the California Geological Survey, who vividly remembers his father taking him to see raging mountain waters that filled the Los Angeles River during floods in 1969.

One potential flashpoint is Deer Creek near Rancho Cucamonga. There, the capacity of a large debris basin below mountains that rise to nearly 9,000 feet was the subject of bitter controversy, long before last week's wildfires. The stadium-sized basin lies in the mouth of a canyon at the foot of the San Gabriel Mountains in an alluvial fan molded over time by thousands of floods. Before the area was developed, the rushing mountain waters that spewed from the canyon during the short but strong seasonal rains traveled along a wide swath of the San Bernardino Valley and into the Santa Ana River.

Now that thousands of people live on the valley floor, the waters are corralled by a network of flood channels, and urbanization has been creeping ever closer to the foot of the mountains. The basin, built in 1983, was augmented by a levee that had long existed in the area, but a developer secured approval several years ago to breach the levee to build more homes above it, despite neighbors' concerns that the debris basin alone could not withstand the torrent of muck the creek was capable of discharging.

John Cassidy, an engineering expert working for nearby Ontario International Airport, and Hamilton, of Exponent, who was hired by a citizens group, concluded that the basin, built by the U.S. Army Corps of Engineers, was too small to handle a 100-year flood.

"As constructed, the Army Corps' debris basin would hold only a fraction of the debris that would come out of the watershed during a 100-year flood," Cassidy, a former engineer for Bechtel Corp., said in a deposition. "Required storage would be deficient by 500 acre-feet or more. Five hundred acre-feet would be equivalent ... to some 20,000 truckloads of debris."

Despite the experts' criticisms, the Corps of Engineers has stood by the Deer Creek basin, and public elementary and high schools have since been built below it.

Joseph Evelyn, the supervisory hydraulic engineer *for the corps*' Southern

California office, said the basin had been built to withstand the largest debris flows the corps expects, and took into account that the flows could be made much worse by fires.

But last week, he stopped short of saying it could withstand anything rainwater could wash down. The reality of such structures, he said, is that they are built to reasonably minimize the risk of damage, within economic and even aesthetic constraints.

"It can happen, and has happened," he said when asked if similar debris basins have been known to fail. "But the degree of damage has been within acceptable tolerance. We haven't had an outcry from people asking for fewer teachers and police officers to build bigger debris basins.

"If you are going to assume the worst - a huge storm situation after a huge fire - you would have to build huge structures that would cost a tremendous amount and would not be very good to look at."

Malissa McKeith, an attorney who lives just below the old levee and has spent tens of thousands of dollars of her own money in fighting to shore up the protections at Deer Creek, said she hoped the fires would lead local officials to reassess the flooding dangers.

"Everyone has known there was a problem; they just hoped it did not occur on their watch," McKeith said. "Well, now the problem's here. At this point, I'm just hoping that someone will take a look at these schools. It's not too late to do something to protect them."#

---

martin becker

From: Wingerd, David B HQ02 [David.B.Wingerd@HQ02.USACE.ARMY.MIL]
Sent: Monday, January 05, 2004 2:37 PM
To: 'martin becker'
Subject: FW: 11/4/03: Flood Control After Fires

2 of 3

David Wingerd
David Wingerd, P.E.
Senior Hydraulic Engineer
202-761-1802

-----Original Message-----
From: Wingerd, David B HQ02
Sent: Monday, January 05, 2004 2:17 PM
To: 'martin becker'
Subject: FW: 11/4/03: Flood Control After Fires

David Wingerd
David Wingerd, P.E.
Senior Hydraulic Engineer
202-761-1802

-----Original Message-----
From: Wingerd, David B HQ02
Sent: Monday, January 05, 2004 7:30 AM
To: 'martin becker'
Subject: FW: 11/4/03: Flood Control After Fires

Martin,
Attached is the info you requested on Deer Creek.

Please note that the last attachment is the original Deer Creek analysis LAD performed **before** the Corps knew that the USGS had removed the Day Creek flood of record from the official peak flow file.

I am very busy this week on a GAO report and prefer not to discuss this week.

Happy New Year.

David Wingerd
David Wingerd, P.E.
Senior Hydraulic Engineer
202-761-1802

-----Original Message-----
From: Evelyn, Joseph B SPL
Sent: Wednesday, December 31, 2003 12:09 AM
To: Wingerd, David B HQ02

Subject: RE: 11/4/03: Flood Control After Fires

Dave,

As we discussed our approach to the discharge frequency analysis for the Deer Creek Debris Basin watershed had to consider the fact that the peak discharge values in the USGS peak flow file for the Day Creek streamgage were heavy influenced by debris flow phenomena. I've attached several files with background information that should be useful in understanding the Deer Creek discharge frequency analysis performed by the LA District.

Joe

Joseph B. Evelyn, P.E.
Chief, Hydrology and Hydraulics Branch
U.S. Army Corps of Engineers, Los Angeles District
P.O. Box 532711
Los Angeles, CA 90053-2325
Phone# 213-452-3525
FAX# 213-452-4202
joseph.b.evelyn@usace.army.mil

-----Original Message-----
From: Wingerd, David B HQ02
Sent: Friday, November 14, 2003 8:10 AM
To: Evelyn, Joseph B SPL
Subject: FW: 11/4/03: Flood Control After Fires

Joe,

This is the latest info from Martin Becker, the guy that I talked to you about.

David Wingerd

From: martin becker [mailto:martin_becker@prodigy.net]
Sent: Thursday, November 13, 2003 3:57 PM
To: kgorton@amfor.org; EASPE@aol.com; Eric_B_Janes@blm.gov; Rdurrans@coe.eng.ua.edu; 'Robert Swain'; William.Merkel@ea.nrcs.usda.gov; price.myra@epa.gov; wells.david@epa.gov; dew7718@erols.com; kevin.long@fema.gov; kenneth.fearon@ferc.fed.us; ShyangChin.Lin@ferc.gov; Joseph.Krolak@fhwa.dot.gov; cknopp@fs.fed.us; sglasser@fs.fed.us; wrawls@hydrolab.arsusda.gov; bparrish@mbakercorp.com; WTHOMAS@mbakercorp.com; glenn.austin@noaa.gov; ldjames@nsf.gov; snelson@nsf.gov; martin_becker@prodigy.net; jfogg@sc.blm.gov; kstewart@udfcd.org; Wingerd, David B; Jon.Werner@USDA.gov; rrmason@usgs.gov; sfblanch@usgs.gov; tjzembrz@usgs.gov; 'Donald Frevert'
Subject: 11/4/03: Flood Control After Fires

At the August, 2003, meeting of our committee, I expressed the following concern as indicated in the minutes of the meeting:

> " ... Becker feels that the censoring of peak flow data of record is going to increase the likelihood of devastation to people living in areas like Southern California that should be characterized as flood plains but are not because USGS has eliminated the data to make the proper determination.

martin becker

From: David.B.Wingerd@HQ02.USACE.ARMY.MIL
Sent: Monday, January 05, 2004 2:38 PM
To: martin_becker@prodigy.net
Subject: FW: 11/4/03: Flood Control After Fires

3 of 3

David Wingerd
David Wingerd, P.E.
Senior Hydraulic Engineer
202-761-1802

-----Original Message-----
From: Wingerd, David B HQ02
Sent: Monday, January 05, 2004 2:17 PM
To: 'martin becker'
Subject: FW: 11/4/03: Flood Control After Fires

David Wingerd
David Wingerd, P.E.
Senior Hydraulic Engineer
202-761-1802

-----Original Message-----
From: Wingerd, David B HQ02
Sent: Monday, January 05, 2004 7:30 AM
To: 'martin becker'
Subject: FW: 11/4/03: Flood Control After Fires

Martin,
Attached is the info you requested on Deer Creek.

Please note that the last attachment is the original Deer Creek analysis LAD performed **before** the Corps knew that the USGS had removed the Day Creek flood of record from the official peak flow file.

I am very busy this week on a GAO report and prefer not to discuss this week.

Happy New Year.

David Wingerd
David Wingerd, P.E.
Senior Hydraulic Engineer
202-761-1802

-----Original Message-----
From: Evelyn, Joseph B SPL
Sent: Wednesday, December 31, 2003 12:09 AM
To: Wingerd, David B HQ02

Subject: RE: 11/4/03: Flood Control After Fires

Dave,

As we discussed our approach to the discharge frequency analysis for the Deer Creek Debris Basin watershed had to consider the fact that the peak discharge values in the USGS peak flow file for the Day Creek streamgage were heavy influenced by debris flow phenomena. I've attached several files with background information that should be useful in understanding the Deer Creek discharge frequency analysis performed by the LA District.

Joe

Joseph B. Evelyn, P.E.
Chief, Hydrology and Hydraulics Branch
U.S. Army Corps of Engineers, Los Angeles District
P.O. Box 532711
Los Angeles, CA 90053-2325
Phone# 213-452-3525
FAX# 213-452-4202
joseph.b.evelyn@usace.army.mil

-----Original Message-----
From: Wingerd, David B HQ02
Sent: Friday, November 14, 2003 8:10 AM
To: Evelyn, Joseph B SPL
Subject: FW: 11/4/03: Flood Control After Fires

Joe,

This is the latest info from Martin Becker, the guy that I talked to you about.

David Wingerd

From: martin becker [mailto:martin_becker@prodigy.net]
Sent: Thursday, November 13, 2003 3:57 PM
To: kgorton@amfor.org; EASPE@aol.com; Eric_B_Janes@blm.gov; Rdurrans@coe.eng.ua.edu; 'Robert Swain'; William.Merkel@ea.nrcs.usda.gov; price.myra@epa.gov; wells.david@epa.gov; dew7718@erols.com; kevin.long@fema.gov; kenneth.fearon@ferc.fed.us; ShyangChin.Lin@ferc.gov; Joseph.Krolak@fhwa.dot.gov; cknopp@fs.fed.us; sglasser@fs.fed.us; wrawls@hydrolab.arsusda.gov; bparrish@mbakercorp.com; WTHOMAS@mbakercorp.com; glenn.austin@noaa.gov; ldjames@nsf.gov; snelson@nsf.gov; martin_becker@prodigy.net; jfogg@sc.blm.gov; kstewart@udfcd.org; Wingerd, David B; Jon.Werner@USDA.gov; rrmason@usgs.gov; sfblanch@usgs.gov; tjzembrz@usgs.gov; 'Donald Frevert'
Subject: 11/4/03: Flood Control After Fires

At the August, 2003, meeting of our committee, I expressed the following concern as indicated in the minutes of the meeting:

> " ... Becker feels that the censoring of peak flow data of record is going to increase the likelihood of devastation to people living in areas like Southern California that should be characterized as flood plains but are not because USGS has eliminated the data to make the proper determination.