

Annual Peak-Flow Frequency Analysis

For more information on the contents of this documentation, see Kessler and others (2013).

Streamgauge number and name:

05140000 Bulldog Run near Warroad, Minn.

Peak-flow information:

Number of systematic peak flows in record	23
Systematic period begins	1946
Systematic period ends	1983
Length of systematic record	38
Years without information	15
Number of historical peak flows in record	0

Frequency analysis options:

Method	Expected moments algorithm (EMA)
Skew option	Weighted
Generalized skew	-0.48
Standard error of generalized skew	0.4266
Low-outlier method	Fixed Threshold

EMA systematic record analysis results:

Moments of the common logarithms of the peak flows:

	Standard	
Mean	deviation	Skewness
2.0728	0.5395	-1.410

Low-outlier information:

Number of low outliers	2
Low-outlier threshold	19

Final analysis results:

Moments of the common logarithms of the peak flows:

	Standard	
Mean	deviation	Skewness
2.0829	0.5085	-0.799

Annual frequency curve at selected exceedance probabilities:

[WIE, Weighted independent estimate; --, not computed]

Exceedance probability	Peak estimate	Lower-95 level	Upper 95 level	WIE estimate	Lower-95 WIE level	Upper 95 WIE level
0.9950	2.51	0.02	8.84	--	--	--
0.9900	4.10	0.07	12.40	--	--	--
0.9500	14.00	0.94	30.40	--	--	--
0.9000	25.30	2.98	48.20	--	--	--
0.8000	48.60	10.20	83.30	--	--	--
0.6667	84.20	35.00	137.00	--	--	--
0.5000	141.00	78.10	225.00	127	87.3	185
0.4292	172.00	101.00	275.00	--	--	--
0.2000	330.00	209.00	563.00	299	210.0	426
0.1000	474.00	303.00	896.00	436	299.0	635
0.0400	660.00	416.00	1,490.00	621	402.0	958
0.0200	794.00	487.00	2,090.00	763	469.0	1,240
0.0100	921.00	544.00	2,820.00	912	531.0	1,570
0.0050	1,040.00	586.00	3,720.00	--	--	--
0.0020	1,190.00	625.00	5,300.00	1,270	655.0	2,480

Peak-flow data used in the analysis:

Explanation of symbols and codes

-- none

* Less than low-outlier threshold

Water Peak Peak-flow

year flow code

1946 32.0 --

1947 420.0 --

1948 204.0 --

1949 41.0 --

1950 292.0 --

1951 228.0 --

Gap in systematic record

1967 401.0 --

1968 171.0 --

1969 86.0 --

1970 198.0 --

1971 160.0 --

1972 110.0 --

1973 4.5 *

1974 343.0 --

1975 151.0 --

1976 156.0 --

1977 6.0 *

1978 248.0 --

1979 498.0 --

1980 173.0 --

1981 20.0 --

1982 265.0 --

1983 76.0 --