

Annual Peak-Flow Frequency Analysis

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

Streamgauge number and name:

05075000 Red Lake River at High Landing near Goodridge, Minn.

Peak-flow information:

Number of systematic peak flows in record	81
Systematic period begins	1930
Systematic period ends	2011
Length of systematic record	82
Years without information	1
Number of historical peak flows in record	0

Frequency analysis options:

Method	Expected moments algorithm (EMA)
Skew option	STATION SKEW
Low-outlier method	Bulletin 17B Grubbs-Beck test

Bulletin 17B systematic record analysis results:

Moments of the common logarithms of the peak flows:

	Standard		
Mean	deviation	Skewness	
3.0952	0.4084	-1.399	

Outlier criteria and number of peak flows exceeding:

Low	78.1	1
High	17211.1	0

Expected moments algorithm (EMA) Final analysis results:

Moments of the common logarithms of the peak flows:

	Standard	
Mean	deviation	Skewness
3.0931	0.4169	-1.410

Annual frequency curve at selected exceedance probabilities:

Exceedance probability	Peak estimate	Lower-95 level	Upper-95 level
0.9950	NA	NA	NA
0.9900	NA	NA	NA
0.9500	192	45.2	312
0.9000	344	155.0	496
0.8000	630	413.0	852
0.6667	1,020	759.0	1,370
0.5000	1,540	1,210.0	2,010
0.4292	1,780	1,420.0	2,260
0.2000	2,750	2,270.0	3,170
0.1000	3,360	2,860.0	3,940
0.0400	3,900	2,860.0	4,880
0.0200	4,170	2,860.0	5,690
0.0100	4,360	2,860.0	6,600
0.0050	4,500	2,860.0	7,700
0.0020	4,620	2,860.0	9,590

Peak-flow data used in the analysis:

Explanation of symbols and codes

K Peak affected by regulation

* Less than low-outlier threshold

Water	Peak	Peak-flow	Water	Peak	Peak-flow
year	flow	code	year	flow	code
1930	912	K	1967	2,480	K
1931	254	K	1968	2,770	K
1932	241	K	1969	2,320	K
1933	85	K	1970	2,120	K
1934	58	K *	1971	1,610	K
1935	111	K	1972	1,580	K
1936	248	K	1973	1,290	K
1937	285	K	1974	2,670	K
1938	1,460	K	1975	4,060	K
1939	1,300	K	1976	1,890	K
1940	1,300	K	1977	667	K
1941	912	K	1978	2,440	K
1942	1,800	K	1979	3,660	K
1943	2,010	K	1980	1,500	K
1944	1,320	K	1981	577	K
1945	2,540	K	1982	1,800	K
1946	2,310	K	1983	1,510	K
1947	2,660	K	1984	2,210	K
1948	3,390	K	1985	2,490	K
1949	1,360	K	1986	2,470	K
1950	3,720	K	1987	961	K
1951	2,170	K	1988	600	K
1952	1,730	K	1989	600	K
1953	670	K	1990	150	K
1954	742	K	1991	154	K
1955	1,240	K	1992	390	K
1956	1,330	K	1993	1,860	K
1957	1,960	K	1994	2,020	K
1958	1,520	K	1995	2,720	K
1959	326	K	1996	3,100	K
1960	530	K	1997	2,200	K
1961	282	K	1998	2,610	K
1962	3,060	K	1999	2,390	K
1963	1,600	K	2000	2,210	K
1964	1,170	K	2001	2,590	K
1965	2,740	K	Gap in systematic record		
1966	3,340	K	2003	1,020	K

Water year	Peak flow	Peak-flow code
2004	1,220	K
2005	1,740	K
2006	2,460	K
2007	2,240	K
2008	858	K
2009	2,190	K
2010	2,100	K
2011	2,220	K