

## Annual Peak-Flow Frequency Analysis

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

### Streamgauge number and name:

05104500 Roseau River below South Fork near Malung, Minn.

### Peak-flow information:

Number of systematic peak flows in record	82
Systematic period begins	1929
Systematic period ends	2011
Length of systematic record	83
Years without information	1
Number of historical peak flows in record	0

### Frequency analysis options:

Method	Expected moments algorithm (EMA)
Skew option	Weighted
Generalized skew	-0.504
Standard error of generalized skew	0.426
Low-outlier method	Bulletin 17B Grubbs-Beck test

### Bulletin 17B systematic record analysis results:

#### Moments of the common logarithms of the peak flows:

	Mean	Standard deviation	Skewness
	3.1986	0.4340	-0.692

#### Outlier criteria and number of peak flows exceeding:

Low	82.9	1
High	26661.0	0

**Expected moments algorithm (EMA) Final analysis results:**

**Moments of the common logarithms of the peak flows:**

	Standard	
Mean	deviation	Skewness
3.1973	0.4383	-0.675

**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	253	119	377
0.9000	411	242	571
0.8000	708	493	931
0.6667	1,130	851	1,440
0.5000	1,760	1,380	2,210
0.4292	2,100	1,660	2,620
0.2000	3,740	3,030	4,650
0.1000	5,220	4,240	6,700
0.0400	7,150	5,630	9,900
0.0200	8,560	6,440	12,700
0.0100	9,940	7,060	15,800
0.0050	11,300	7,540	19,300
0.0020	12,900	8,000	24,600

**Peak-flow data used in the analysis:**

Explanation of symbols and codes

-- none

\* Less than low-outlier threshold

Water	Peak	Peak-flow	Water	Peak	Peak-flow
year	flow	code	year	flow	code
1929	765	--	1966	5,050	--
1930	823	--	1967	3,410	--
1931	109	--	1968	5,750	--
1932	1,010	--	1969	5,110	--
1933	490	--	1970	3,010	--
1934	113	--	1971	1,670	--
1935	367	--	1972	1,710	--
1936	1,110	--	1973	564	--
1937	740	--	1974	3,100	--
1938	2,690	--	1975	4,180	--
Gap in systematic record			1976	720	--
1940	813	--	1977	181	--
1941	3,270	--	1978	2,550	--
1942	2,940	--	1979	5,480	--
1943	1,920	--	1980	2,950	--
1944	1,480	--	1981	506	--
1945	1,590	--	1982	1,880	--
1946	1,600	--	1983	912	--
1947	3,190	--	1984	1,250	--
1948	3,940	--	1985	5,170	--
1949	1,860	--	1986	3,450	--
1950	4,750	--	1987	1,080	--
1951	3,240	--	1988	700	--
1952	500	--	1989	1,700	--
1953	395	--	1990	78	*
1954	798	--	1991	898	--
1955	887	--	1992	1,800	--
1956	2,410	--	1993	2,220	--
1957	2,590	--	1994	2,630	--
1958	668	--	1995	1,550	--
1959	1,200	--	1996	7,310	--
1960	984	--	1997	4,300	--
1961	610	--	1998	1,460	--
1962	3,330	--	1999	3,300	--
1963	1,470	--	2000	1,260	--
1964	1,890	--	2001	4,090	--
1965	4,660	--	2002	16,000	--

Water year	Peak flow	Peak-flow code
2003	329	--
2004	7,280	--
2005	1,970	--
2006	4,350	--
2007	704	--
2008	726	--
2009	4,600	--
2010	2,070	--
2011	2,770	--