

Annual Peak-Flow Frequency Analysis

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

**Streamgage number and name:**

05074500 Red Lake River near Red Lake, Minn.

**Peak-flow information:**

Number of systematic peak flows in record	74
Systematic period begins	1933
Systematic period ends	2011
Length of systematic record	79
Years without information	5
Number of historical peak flows in record	0

**Frequency analysis options:**

Method	Expected moments algorithm (EMA)
Skew option	Streamgage
Low-outlier method	Single Grubbs-Beck test

**EMA systematic record analysis results:**

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

	Standard		
Mean	deviation	Skewness	
2.8161	0.4425	-1.115	

**Low-outlier information:**

Number of low outliers	0
Low-outlier threshold	52

**Final analysis results:**

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

	Standard	
Mean	deviation	Skewness
2.8161	0.4425	-1.115

**Annual frequency curve at selected exceedance probabilities:**

Exceedance probability	Peak estimate	Lower-95 level	Upper-95 level
0.9950	16.9	0.74	43.6
0.9900	27.9	2.09	62.1
0.9500	94.8	24.00	155.0
0.9000	167.0	75.80	245.0
0.8000	307.0	197.00	421.0
0.6667	504.0	366.00	682.0
0.5000	788.0	605.00	1,050.0
0.4292	929.0	722.00	1,210.0
0.2000	1,550.0	1,240.00	1,860.0
0.1000	2,020.0	1,690.00	2,500.0
0.0400	2,510.0	1,810.00	3,280.0
0.0200	2,800.0	1,810.00	3,940.0
0.0100	3,040.0	1,810.00	4,690.0
0.0050	3,240.0	1,810.00	5,550.0
0.0020	3,440.0	1,810.00	6,940.0

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

Explanation of symbols and codes

> Greater than

K Peak affected by regulation

Water	Peak	Peak-flow	Water	Peak	Peak-flow
year	flow	code	year	flow	code
1933	>46	K	1971	889	K
1934	57	K	1972	1,220	K
1935	140	K	1973	808	K
1936	52	K	1974	1,440	K
1937	61	K	1975	1,680	K
1938	317	K	1976	1,560	K
1939	432	K	1977	252	K
1940	534	K	1978	996	K
1941	449	K	1979	1,260	K
1942	926	K	1980	930	K
1943	1,510	K	1981	461	K
1944	1,420	K	1982	1,170	K
1945	1,650	K	1983	961	K
1946	1,400	K	1984	1,100	K
1947	1,960	K	1985	1,200	K
1948	1,210	K	1986	1,470	K
1949	561	K	1987	940	K
1950	3,600	K	1988	108	K
1951	2,320	K	1989	72	K
1952	1,610	K	1990	72	K
1953	492	K	1991	76	K
1954	725	K	1992	225	K
1955	384	K	1993	955	K
1956	252	K	1994	1,040	K
1957	1,870	K	Gap in systematic record		
1958	1,360	K	2000	1,990	K
1959	68	K	2001	1,300	K
1960	162	K	2002	1,500	K
1961	240	K	2003	858	K
1962	1,260	K	2004	393	K
1963	1,250	K	2005	1,030	K
1964	1,030	K	2006	1,030	K
1965	848	K	2007	412	K
1966	1,480	K	2008	280	K
1967	1,240	K	2009	741	K
1968	705	K	2010	741	K
1969	1,200	K	2011	1,130	K
1970	1,190	K			