

Annual Peak-Flow Frequency Analysis

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

Streamgauge number and name:

05079000 Red Lake River at Crookston, Minn.

Peak-flow information:

Number of systematic peak flows in record	110
Systematic period begins	1897
Systematic period ends	2011
Length of systematic record	115
Years without information	5
Number of historical peak flows in record	1 1897, 1902

Frequency analysis options:

Method	Expected moments algorithm (EMA)
Skew option	Weighted
Generalized skew	-0.45
Standard error of generalized skew	0.4266
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
3.8752	0.3346	-0.578

Low-outlier information:

Number of low outliers	0
Low-outlier threshold	916

Final analysis results:

Moments of the common logarithms of the peak flows:

	Standard	
Mean	deviation	Skewness
3.8752	0.3346	-0.542

Annual frequency curve at selected exceedance probabilities:

Exceedance probability	Peak estimate	Lower-95 level	Upper-95 level
0.9950	700	277	1,100
0.9900	927	430	1,360
0.9500	1,900	1,230	2,460
0.9000	2,700	1,980	3,350
0.8000	4,040	3,240	4,820
0.6667	5,720	4,790	6,720
0.5000	8,040	6,870	9,350
0.4292	9,190	7,890	10,700
0.2000	14,500	12,600	16,800
0.1000	19,000	16,500	22,500
0.0400	24,800	21,000	30,900
0.0200	29,000	23,700	37,800
0.0100	33,000	26,000	45,300
0.0050	36,900	27,900	53,400
0.0020	42,000	29,800	65,300

Peak-flow data used in the analysis:

Explanation of symbols and codes

-- none

H Historic, outside of systematic record

Water	Peak	Peak-flow	Water	Peak	Peak-flow
year	flow	code	year	flow	code
1897	18,900	H	1937	3,750	--
			1938	5,910	--
1902	5,170	H	1939	3,050	--
1903	4,360	--	1940	6,000	--
1904	13,700	--	1941	6,190	--
1905	8,730	--	1942	7,090	--
1906	14,600	--	1943	9,420	--
1907	6,330	--	1944	5,770	--
1908	10,700	--	1945	9,130	--
1909	3,680	--	1946	9,020	--
1910	7,920	--	1947	12,400	--
1911	3,620	--	1948	9,520	--
1912	2,120	--	1949	10,700	--
1913	7,170	--	1950	27,400	--
1914	2,630	--	1951	12,600	--
1915	7,860	--	1952	6,320	--
1916	15,900	--	1953	2,560	--
1917	5,480	--	1954	5,330	--
1918	1,950	--	1955	12,400	--
1919	14,900	--	1956	14,000	--
1920	9,520	--	1957	11,800	--
1921	2,900	--	1958	3,370	--
1922	6,910	--	1959	5,630	--
1923	5,820	--	1960	5,520	--
1924	1,140	--	1961	1,450	--
1925	7,300	--	1962	16,700	--
1926	6,500	--	1963	6,820	--
1927	7,700	--	1964	5,550	--
1928	3,910	--	1965	19,400	--
1929	7,620	--	1966	21,500	--
1930	4,770	--	1967	19,300	--
1931	1,030	--	1968	11,100	--
1932	4,390	--	1969	28,400	--
1933	1,440	--	1970	13,300	--
1934	1,490	--	1971	15,300	--
1935	2,490	--	1972	14,700	--
1936	4,540	--	1973	4,960	--

Water year	Peak flow	Peak-flow code
1974	16,400	--
1975	15,600	--
1976	12,500	--
1977	3,440	--
1978	18,100	--
1979	21,900	--
1980	6,600	--
1981	7,120	--
1982	9,320	--
1983	7,330	--
1984	14,400	--
1985	9,580	--
1986	11,500	--
1987	5,360	--
1988	5,090	--
1989	8,800	--
1990	916	--
1991	2,200	--
1992	2,460	--
1993	7,400	--
1994	13,600	--
1995	10,300	--
1996	21,700	--
1997	28,000	--
1998	11,700	--
1999	18,800	--
2000	7,930	--
2001	20,000	--
2002	16,100	--
2003	4,230	--
2004	11,300	--
2005	10,300	--
2006	26,400	--
2007	9,970	--
2008	3,710	--
2009	25,000	--
2010	18,500	--

Water year	Peak flow	Peak-flow code
2011	17,100	--