

Annual Peak-Flow Frequency Analysis

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

Streamgauge number and name:

05133500 Rainy River at Manitou Rapids, Minn.

Peak-flow information:

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

Frequency analysis options:

Method	Expected moments algorithm (EMA)
Skew option	STATION SKEW
Low-outlier method	Set by user

Bulletin 17B systematic record analysis results:

Moments of the common logarithms of the peak flows:

	Standard		
Mean	deviation	Skewness	
4.5424	0.1852	-0.759	

Outlier criteria and number of peak flows exceeding:

Low	9380.0	0
High	116378.6	0

Expected moments algorithm (EMA) Final analysis results:

Moments of the common logarithms of the peak flows:

	Standard	
Mean	deviation	Skewness
4.5424	0.1852	-0.759

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	16,000	10,800	19,000
0.9000	19,700	15,500	22,700
0.8000	25,000	21,400	28,100
0.6667	30,500	27,000	34,200
0.5000	36,800	33,200	41,100
0.4292	39,500	35,800	44,000
0.2000	50,200	45,800	54,700
0.1000	57,500	52,900	63,700
0.0400	65,100	57,400	73,900
0.0200	69,900	57,600	81,200
0.0100	74,000	57,600	88,400
0.0050	77,500	57,600	95,700
0.0020	81,600	57,600	106,000

Peak-flow data used in the analysis:

Explanation of symbols and codes

-- none

Water	Peak	Peak-flow	Water	Peak	Peak-flow
year	flow	code	year	flow	code
1929	30,400	--	1967	33,900	--
1930	19,700	--	1968	46,200	--
1931	12,200	--	1969	58,300	--
1932	15,400	--	1970	57,000	--
1933	33,900	--	1971	42,300	--
1934	26,500	--	1972	47,500	--
1935	30,500	--	1973	20,700	--
1936	23,200	--	1974	61,600	--
1937	41,400	--	1975	52,600	--
1938	65,400	--	1976	26,600	--
1939	17,800	--	1977	44,900	--
1940	30,700	--	1978	42,800	--
1941	39,200	--	1979	61,200	--
1942	49,000	--	1980	17,400	--
1943	47,600	--	1981	30,400	--
1944	47,600	--	1982	38,400	--
1945	37,800	--	1983	29,100	--
1946	27,300	--	1984	43,100	--
1947	54,200	--	1985	61,300	--
1948	44,400	--	1986	38,900	--
1949	35,200	--	1987	17,300	--
1950	71,600	--	1988	44,000	--
1951	49,000	--	1989	38,500	--
1952	30,400	--	1990	37,300	--
1953	32,600	--	1991	23,600	--
1954	41,300	--	1992	36,900	--
1955	24,500	--	1993	36,500	--
1956	35,700	--	1994	35,700	--
1957	45,100	--	1995	17,300	--
1958	14,200	--	1996	46,500	--
1959	17,900	--	1997	40,500	--
1960	22,800	--	1998	18,600	--
1961	25,400	--	1999	41,100	--
1962	55,000	--	2000	27,000	--
1963	29,500	--	2001	60,700	--
1964	47,600	--	2002	63,800	--
1965	37,900	--	2003	9,380	--
1966	53,500	--	2004	38,700	--

Water year	Peak flow	Peak-flow code
2005	56,200	--
2006	39,700	--
2007	20,100	--
2008	43,200	--
2009	44,300	--
2010	26,300	--
2011	56,700	--