

Annual Peak-Flow Frequency Analysis

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

**Streamgauge number and name:**

05127000 Kawishiwi River near Winton, Minn.

**Peak-flow information:**

Number of systematic peak flows in record	97
Systematic period begins	1906
Systematic period ends	2011
Length of systematic record	106
Years without information	9
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	
3.6514	0.2205	-0.610	

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

Low	974.4	2
High	18247.3	0

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

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

	Standard	
Mean	deviation	Skewness
3.6535	0.2147	-0.457

**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	1,880	1,370	2,230
0.9000	2,340	1,890	2,700
0.8000	3,010	2,600	3,400
0.6667	3,760	3,330	4,210
0.5000	4,680	4,190	5,220
0.4292	5,100	4,580	5,680
0.2000	6,880	6,210	7,630
0.1000	8,240	7,430	9,340
0.0400	9,850	8,740	11,700
0.0200	11,000	9,470	13,500
0.0100	12,000	10,000	15,400
0.0050	13,000	10,400	17,400
0.0020	14,300	10,800	20,100

**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
1906	3,330	K	1950	16,000	K
1907	5,250	K	1951	8,010	K
Gap in systematic record			1952	4,530	K
1913	3,380	K	1953	4,160	K
1914	4,480	K	1954	10,100	K
1915	3,760	K	1955	2,640	K
1916	3,920	K	1956	7,730	K
1917	2,440	K	1957	8,520	K
1918	2,890	K	1958	1,830	K
1919	2,290	K	1959	2,900	K
Gap in systematic record			1960	5,780	K
1924	916	K *	1961	4,300	K
1925	2,430	K	1962	4,620	K
1926	3,010	K	1963	1,950	K
1927	6,030	K	1964	5,330	K
1928	4,240	K	1965	5,800	K
1929	1,680	K	1966	7,600	K
1930	3,860	K	1967	4,240	K
1931	2,940	K	1968	8,030	K
1932	3,100	K	1969	8,620	K
1933	2,410	K	1970	6,780	K
1934	7,210	K	1971	8,500	K
1935	4,330	K	1972	8,260	K
1936	7,350	K	1973	4,340	K
1937	5,860	K	1974	5,480	K
1938	8,010	K	1975	5,350	K
1939	5,690	K	1976	8,740	K
1940	4,260	K	1977	4,230	K
1941	6,030	K	1978	4,880	K
1942	4,320	K	1979	6,530	K
1943	5,300	K	1980	4,830	K
1944	7,680	K	1981	6,040	K
1945	5,740	K	1982	5,630	K
1946	3,740	K	1983	4,690	K
1947	6,840	K	1984	4,530	K
1948	11,200	K	1985	3,760	K
1949	4,280	K	1986	4,820	K

Water year	Peak flow	Peak-flow code
1987	4,820	K
1988	7,640	K
1989	4,760	K
1990	6,660	K
1991	2,880	K
1992	4,880	K
1993	3,430	K
1994	6,080	K
1995	2,140	K
1996	8,430	K
1997	3,680	K
1998	3,040	K
1999	5,720	K
2000	3,580	K
2001	8,940	K
2002	1,830	K
2003	1,490	K
2004	3,180	K
2005	2,970	K
2006	5,380	K
2007	3,480	K
2008	5,640	K
2009	4,300	K
2010	926	K *
2011	2,400	K