Annual Peak-Flow Frequency Analysis

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

Streamgage number and name:
05270500 Sauk River near St. Cloud, Minn.

Peak-flow information:

Number of systematic peak flows in record	76
Systematic period begins	1910
Systematic period ends	2011
Length of systematic record	102
Years without information	26
Number of historical peak flows in record	0

Frequency analysis options:

Method	Expected moments algorithm (EMA)
Skew option	Weighted
Generalized skew	-0.18
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:

Mean	Standard deviation	Skewness
3.1799	0.3141	-0.208

Low-outlier information:

Number of low outliers	1
Low-outlier threshold	275

Final analysis results:

Moments of the common logarithms of the peak flows:

Mean	Standard deviation	Skewness
3.1799	0.3141	-0.199

Annual frequency curve at selected exceedance probabilities:

[WIE, Weighted independent estimate; −−, not computed]

Exceedance probability	Peak estimate	Lower-95 level	Upper 95 level	WIE estimate	Lower-95 WIE level	Upper 95 WIE level
0.9950	205	90.6	305	−−	−−	−−
0.9900	253	128.0	358	−−	−−	−−
0.9500	443	296.0	567	−−	−−	−−
0.9000	591	437.0	731	−−	−−	−−
0.8000	830	662.0	1,000	−−	−−	−−
0.6667	1,130	933.0	1,350	−−	−−	−−
0.5000	1,550	1,300.0	1,840	1,580	1,340	1,870
0.4292	1,760	1,480.0	2,100	−−	−−	−−
0.2000	2,800	2,350.0	3,400	2,830	2,380	3,370
0.1000	3,760	3,120.0	4,770	3,820	3,140	4,640
0.0400	5,100	4,100.0	7,060	5,190	4,080	6,600
0.0200	6,180	4,820.0	9,210	6,280	4,740	8,330
0.0100	7,320	5,490.0	11,800	7,450	5,380	10,300
0.0050	8,510	6,130.0	14,800	−−	−−	−−
0.0020	10,200	6,910.0	19,800	10,400	6,720	16,000

Peak-flow data used in the analysis:

Explanation of symbols and codes

−− none

∗ Less than low-outlier threshold

Water year	Peak flow	Peak-flow code	Water year	Peak flow	Peak-flow code
1910	1,030	−−	1963	910	−−
1911	475	−−	1964	1,350	−−
1912	1,700	−−	1965	9,100	−−
Gap in systematic record			1966	2,610	−−
1930	914	−−	1967	2,360	−−
1931	678	−−	1968	443	−−
1932	546	−−	1969	5,300	−−
1933	284	−−	1970	910	−−
1934	62	∗	1971	1,940	−−
1935	708	−−	1972	1,800	−−
1936	1,950	−−	1973	2,000	−−
1937	840	−−	1974	885	−−
1938	909	−−	1975	3,410	−−
1939	1,710	−−	1976	2,140	−−
1940	1,080	−−	1977	1,100	−−
1941	2,610	−−	1978	1,820	−−
1942	968	−−	1979	3,000	−−
1943	4,700	−−	1980	935	−−
1944	1,720	−−	1981	750	−−
1945	1,730	−−	Gap in systematic record		
1946	1,910	−−	1991	1,300	−−
1947	2,050	−−	1992	1,410	−−
1948	1,900	−−	1993	1,970	−−
1949	1,380	−−	1994	1,800	−−
1950	2,940	−−	1995	2,140	−−
1951	5,580	−−	1996	1,710	−−
1952	5,410	−−	1997	5,150	−−
1953	2,740	−−	1998	992	−−
1954	1,460	−−	1999	1,600	−−
1955	790	−−	2000	509	−−
1956	2,010	−−	2001	4,570	−−
1957	2,920	−−	2002	1,620	−−
1958	1,060	−−	2003	1,490	−−
1959	973	−−	2004	787	−−
1960	1,480	−−	2005	1,130	−−
1961	275	−−	2006	1,190	−−
1962	1,990	−−	2007	1,720	−−

Water year	Peak flow	Peak-flow code
2008	1,180	––
2009	4,600	––
2010	3,360	––
2011	2,920	––