

Annual Peak-Flow Frequency Analysis

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

Streamgauge number and name:

05221020 Willow River below Palisade, Minn.

Peak-flow information:

Number of systematic peak flows in record	40
Systematic period begins	1972
Systematic period ends	2011
Length of systematic record	40
Years without information	0
Number of historical peak flows in record	0

Frequency analysis options:

Method	Expected moments algorithm (EMA)
Skew option	Weighted
Generalized skew	-0.25
Standard error of generalized skew	0.4266
Low-outlier method	Multiple Grubbs-Beck test

EMA systematic record analysis results:

Moments of the common logarithms of the peak flows:

	Standard	
Mean	deviation	Skewness
3.1922	0.2179	-0.195

Low-outlier information:

Number of low outliers	0
Low-outlier threshold	Not determined

Final analysis results:

Moments of the common logarithms of the peak flows:

	Standard	
Mean	deviation	Skewness
3.1921	0.2180	-0.221

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	385	164	545	--	--	--
0.9900	446	218	608	--	--	--
0.9500	661	434	830	--	--	--
0.9000	809	591	988	--	--	--
0.8000	1,030	814	1,230	--	--	--
0.6667	1,270	1,050	1,500	--	--	--
0.5000	1,590	1,340	1,870	1,610	1,380	1,880
0.4292	1,730	1,470	2,050	--	--	--
0.2000	2,390	2,020	2,890	2,420	2,050	2,860
0.1000	2,920	2,450	3,720	2,980	2,480	3,600
0.0400	3,600	2,960	5,000	3,710	2,960	4,660
0.0200	4,110	3,290	6,130	4,260	3,280	5,530
0.0100	4,610	3,590	7,420	4,820	3,570	6,510
0.0050	5,110	3,860	8,870	--	--	--
0.0020	5,770	4,160	11,100	6,170	4,160	9,160

Peak-flow data used in the analysis:

Explanation of symbols and codes

< Less than

-- none

Water	Peak	Peak-flow	Water	Peak	Peak-flow
year	flow	code	year	flow	code
1972	2,340	--	1992	838	--
1973	1,180	--	1993	2,770	--
1974	2,870	--	1994	1,520	--
1975	3,700	--	1995	1,470	--
1976	1,790	--	1996	2,920	--
1977	500	--	1997	3,020	--
1978	1,820	--	1998	1,540	--
1979	3,730	--	1999	2,650	--
1980	1,060	--	2000	920	--
1981	718	--	2001	3,060	--
1982	3,180	--	2002	1,140	--
1983	866	--	2003	<673	--
1984	1,550	--	2004	1,190	--
1985	1,960	--	2005	1,680	--
1986	1,870	--	2006	1,280	--
1987	1,130	--	2007	1,070	--
1988	1,400	--	2008	1,700	--
1989	2,160	--	2009	1,800	--
1990	1,160	--	2010	1,070	--
1991	1,180	--	2011	1,720	--