

Annual Peak-Flow Frequency Analysis

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

**Streamgauge number and name:**

04011990 Cascade River at Forest Road 45 near Grand Marais, Minn.

**Peak-flow information:**

Number of systematic peak flows in record	27
Systematic period begins	1985
Systematic period ends	2011
Length of systematic record	27
Years without information	0
Number of historical peak flows in record	0

**Frequency analysis options:**

Method	Bulletin 17B
Skew option	Weighted
Generalized skew	0.5
Standard error of generalized skew	0.426
Low-outlier method	Bulletin 17B Grubbs-Beck test

**Bulletin 17B systematic record analysis results:**

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

	Mean	Standard deviation	Skewness
	2.8729	0.2195	-0.459

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

Low	209.0	0
High	2665.4	0

**Bulletin 17B Final analysis results:**

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

	Standard		
Mean	deviation	Skewness	
2.8729	0.2195	0.072	

**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	210	139	277	--	--	--
0.9900	237	161	306	--	--	--
0.9500	328	243	406	--	--	--
0.9000	392	302	474	--	--	--
0.8000	487	392	577	--	--	--
0.6667	597	496	702	--	--	--
0.5000	742	629	874	751	620	909
0.4292	812	691	963	--	--	--
0.2000	1,140	962	1,420	1,160	928	1,440
0.1000	1,430	1,180	1,860	1,460	1,130	1,880
0.0400	1,830	1,470	2,520	1,880	1,370	2,570
0.0200	2,150	1,680	3,080	2,220	1,550	3,190
0.0100	2,480	1,900	3,700	2,590	1,720	3,910
0.0050	2,840	2,130	4,380	--	--	--
0.0020	3,340	2,440	5,390	3,570	2,110	6,040

**Peak-flow data used in the analysis:**

Explanation of symbols and codes

-- none

Water	Peak	Peak-flow
year	flow	code
1985	500	--
1986	1,110	--
1987	621	--
1988	760	--
1989	660	--
1990	1,210	--
1991	844	--
1992	954	--
1993	752	--
1994	535	--
1995	442	--
1996	1,350	--
1997	1,200	--
1998	579	--
1999	696	--
2000	368	--
2001	1,810	--
2002	343	--
2003	705	--
2004	1,340	--
2005	853	--
2006	883	--
2007	340	--
2008	1,480	--
2009	1,040	--
2010	230	--
2011	969	--