Annual Peak-Flow Frequency Analysis
For more information on the contents of this documentation, see Kessler and others (2013).

Streamgage number and name:

05355200 Cannon River at Welch, Minn.

Peak-flow information:

Number of systematic peak flows in record	80
Systematic period begins	1911
Systematic period ends	2011
Length of systematic record	101
Years without information	21
Number of historical peak flows in record	0

Frequency analysis options:

Method	Expected moments algorithm (EMA)
Skew option	Weighted
Generalized skew	-0.21
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
3.7836	0.2989	-0.259

Low-outlier information:

Number of low outliers	1
Low-outlier threshold	1,190

Final analysis results:

Moments of the common logarithms of the peak flows:

Mean	Standard deviation	Skewness
3.7836	0.2988	-0.242

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	884	401	1,290	––	––	––
0.9900	1,090	561	1,510	––	––	––
0.9500	1,870	1,270	2,370	––	––	––
0.9000	2,480	1,860	3,030	––	––	––
0.8000	3,440	2,780	4,100	––	––	––
0.6667	4,620	3,860	5,450	––	––	––
0.5000	6,250	5,300	7,330	6,130	5,240	7,180
0.4292	7,050	6,010	8,280	––	––	––
0.2000	10,900	9,290	13,000	10,700	9,090	12,500
0.1000	14,400	12,100	17,800	14,000	11,700	16,800
0.0400	19,100	15,700	25,600	18,500	14,800	23,100
0.0200	22,800	18,200	32,600	22,100	17,000	28,700
0.0100	26,600	20,500	40,700	25,700	19,000	34,800
0.0050	30,600	22,600	50,200	––	––	––
0.0020	36,000	25,200	65,000	34,900	23,200	52,500

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
1911	701	∗	1964	1,660	−−
1912	5,300	−−	1965	36,100	−−
1913	3,120	−−	1966	20,800	−−
Gap in systematic record			1967	10,000	−−
1931	1,190	−−	1968	3,380	−−
1932	4,270	−−	1969	9,370	−−
1933	10,500	−−	1970	6,480	−−
1934	3,980	−−	1971	6,700	−−
1935	4,290	−−	1972	3,490	−−
1936	11,300	−−	1973	10,500	−−
1937	2,690	−−	1974	3,390	−−
1938	5,940	−−	1975	7,000	−−
1939	10,800	−−	1976	3,780	−−
1940	2,330	−−	1977	1,590	−−
1941	5,510	−−	1978	10,600	−−
1942	8,230	−−	1979	7,700	−−
1943	6,240	−−	1980	9,350	−−
1944	9,980	−−	1981	4,000	−−
1945	8,840	−−	1982	3,980	−−
1946	4,470	−−	1983	7,800	−−
1947	6,090	−−	1984	5,740	−−
1948	9,050	−−	1985	6,500	−−
1949	5,230	−−	1986	19,000	−−
1950	9,200	−−	1987	4,200	−−
1951	14,600	−−	Gap in systematic record		
1952	15,800	−−	1992	3,950	−−
1953	4,200	−−	1993	17,200	−−
1954	13,200	−−	1994	2,870	−−
1955	8,150	−−	1995	2,340	−−
1956	4,800	−−	1996	4,700	−−
1957	5,840	−−	1997	8,670	−−
1958	4,780	−−	1998	23,500	−−
1959	4,220	−−	1999	6,920	−−
1960	9,420	−−	2000	5,970	−−
1961	5,020	−−	2001	11,900	−−
1962	6,900	−−	2002	6,120	−−
1963	1,780	−−	2003	5,410	−−

Water year	Peak flow	Peak-flow code
2004	10,100	−−
2005	5,160	−−
2006	5,100	−−
2007	8,940	−−
2008	5,850	−−
2009	1,460	−−
2010	20,500	−−
2011	10,600	−−