

Annual Peak-Flow Frequency Analysis

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

Streamgauge number and name:

05211000 Mississippi River at Grand Rapids, Minn.

Peak-flow information:

Number of systematic peak flows in record	69
Systematic period begins	1942
Systematic period ends	2011
Length of systematic record	70
Years without information	1
Peak flows not used in analysis	1
Number of historical peak flows in record	0

Frequency analysis options:

Method	Bulletin 17B
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	
3.4283	0.1220	-0.402	

Outlier criteria and number of peak flows exceeding:

Low	1191.5	0
High	6034.0	1

Bulletin 17B Final analysis results:

Moments of the common logarithms of the peak flows:

	Standard	
Mean	deviation	Skewness
3.4283	0.1220	-0.402

Annual frequency curve at selected exceedance probabilities:

Exceedance probability	Peak estimate	Lower-95 level	Upper-95 level
0.9950	1,170	1,010	1,310
0.9900	1,290	1,120	1,430
0.9500	1,640	1,480	1,780
0.9000	1,850	1,700	1,990
0.8000	2,130	1,990	2,260
0.6667	2,420	2,270	2,550
0.5000	2,730	2,580	2,890
0.4292	2,870	2,710	3,040
0.2000	3,410	3,210	3,660
0.1000	3,790	3,540	4,110
0.0400	4,210	3,900	4,630
0.0200	4,490	4,130	4,980
0.0100	4,740	4,340	5,300
0.0050	4,970	4,530	5,590
0.0020	5,260	4,760	5,960

Peak-flow data used in the analysis:

Explanation of symbols and codes

K Peak affected by regulation

D Peak result of dam break

Water	Peak	Peak-flow	Water	Peak	Peak-flow
year	flow	code	year	flow	code
1942	1,880	K	1977	1,300	K
1943	1,980	K	1978	3,600	K
1944	1,880	K	1979	3,490	K
1945	4,070	K	1980	2,380	K
1946	2,260	K	1981	2,760	K
1947	2,220	K	1982	3,620	K
1948	12,500	D K	1983	3,180	K
1949	2,190	K	1984	2,530	K
1950	4,320	K	1985	3,080	K
1951	3,870	K	1986	3,040	K
1952	3,320	K	1987	2,720	K
1953	3,390	K	1988	2,180	K
1954	3,170	K	1989	2,610	K
1955	2,280	K	1990	2,040	K
1956	1,840	K	1991	1,900	K
1957	3,250	K	1992	2,200	K
1958	2,490	K	1993	3,030	K
1959	1,840	K	1994	3,490	K
1960	1,860	K	1995	2,820	K
1961	1,340	K	1996	3,480	K
1962	3,620	K	1997	3,360	K
1963	2,290	K	1998	2,740	K
1964	3,120	K	1999	4,060	K
1965	2,710	K	2000	3,310	K
1966	3,590	K	2001	3,390	K
1967	2,950	K	2002	2,470	K
1968	1,880	K	2003	1,830	K
1969	4,610	K	2004	2,260	K
1970	3,120	K	2005	2,830	K
1971	3,710	K	2006	2,290	K
1972	2,800	K	2007	1,670	K
1973	2,010	K	2008	2,510	K
1974	3,200	K	2009	3,210	K
1975	3,860	K	2010	1,820	K
1976	2,820	K	2011	3,110	K