

## Annual Peak-Flow Frequency Analysis

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

### Streamgauge number and name:

05345900 Vermillion River tributary near Hastings, Minn.

### Peak-flow information:

Number of systematic peak flows in record	13
Systematic period begins	1960
Systematic period ends	1977
Length of systematic record	18
Years without information	5
Number of historical peak flows in record	0

### Frequency analysis options:

Method	Expected moments algorithm (EMA)
Skew option	Weighted
Generalized skew	-0.19
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
1.4494	0.7772	0.027

#### 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
1.4494	0.7772	-0.121

**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	0.23	0.00	1.26	--	--	--
0.9900	0.37	0.00	1.77	--	--	--
0.9500	1.40	0.06	4.87	--	--	--
0.9000	2.78	0.27	8.69	--	--	--
0.8000	6.31	1.16	18.10	--	--	--
0.6667	13.40	3.55	37.40	--	--	--
0.5000	29.20	9.46	85.00	109	56	212
0.4292	40.10	13.60	122.00	--	--	--
0.2000	128.00	45.80	563.00	393	207	746
0.1000	272.00	92.90	1,930.00	720	372	1,400
0.0400	599.00	184.00	9,240.00	1,270	625	2,570
0.0200	988.00	275.00	29,100.00	1,750	814	3,750
0.0100	1,540.00	384.00	90,200.00	2,320	1,030	5,190
0.0050	2,310.00	510.00	225,000.00	--	--	--
0.0020	3,740.00	698.00	661,000.00	3,850	1,500	9,890

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

Explanation of symbols and codes

-- none

H Historic, outside of systematic record

Water	Peak	Peak-flow
year	flow	code
1960	8.0	--
1961	20.0	--
1962	37.0	--
1963	15.0	--
1964	6.2	--
1965	544.0	--
1966	310.0	--
1967	228.0	--
1968	1.0	--
1969	44.0	--
1970	5.0	--
1971	23.0	--
1972	65.0	--
Gap in systematic record		
1977	6.0	H