

Annual Peak-Flow Frequency Analysis

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

Streamgauge number and name:

05030500 Otter Tail River near Elizabeth, Minn.

Peak-flow information:

Number of systematic peak flows in record	34
Systematic period begins	1904
Systematic period ends	2011
Length of systematic record	108
Years without information	74
Number of historical peak flows in record	0

Frequency analysis options:

Method	Expected moments algorithm (EMA)
Skew option	Weighted
Generalized skew	-0.15
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:

	Standard	
Mean	deviation	Skewness
2.8880	0.1673	-1.190

Low-outlier information:

Number of low outliers	1
Low-outlier threshold	335

Final analysis results:

Moments of the common logarithms of the peak flows:

	Standard	
Mean	deviation	Skewness
2.8891	0.1634	-0.548

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	243	89.5	334	--	--	--
0.9900	278	117.0	369	--	--	--
0.9500	396	239.0	485	--	--	--
0.9000	470	331.0	560	--	--	--
0.8000	572	454.0	664	--	--	--
0.6667	679	571.0	777	--	--	--
0.5000	802	694.0	912	815	717	926
0.4292	856	746.0	973	--	--	--
0.2000	1,070	943.0	1,230	1,090	961	1,230
0.1000	1,220	1,080.0	1,440	1,250	1,090	1,430
0.0400	1,390	1,210.0	1,730	1,430	1,220	1,680
0.0200	1,500	1,290.0	1,950	1,560	1,300	1,880
0.0100	1,590	1,340.0	2,180	1,690	1,360	2,090
0.0050	1,680	1,390.0	2,410	--	--	--
0.0020	1,790	1,430.0	2,730	1,960	1,480	2,610

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
1904	1,080	--
1905	855	--
1906	1,020	--
1907	855	--
1908	921	--
1909	580	--
1910	449	--
1911	274	*
1912	402	--
1913	758	--
1914	584	--
1915	837	--
1916	982	--
1917	613	--

Gap in systematic record

1992	335	--
1993	842	--
1994	788	--
1995	714	--
1996	961	--
1997	994	--
1998	1,010	--
1999	1,040	--
2000	656	--
2001	1,170	--
2002	663	--
2003	611	--
2004	505	--
2005	976	--
2006	947	--
2007	954	--
2008	790	--
2009	1,330	--
2010	1,140	--
2011	1,360	--