

Annual Peak-Flow Frequency Analysis

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

Streamgauge number and name:

05124480 Kawishiwi River near Ely, Minn.

Peak-flow information:

| | |
|---|------|
| Number of systematic peak flows in record | 45 |
| Systematic period begins | 1967 |
| Systematic period ends | 2011 |
| Length of systematic record | 45 |
| Years without information | 0 |
| Number of historical peak flows in record | 0 |

Frequency analysis options:

| | |
|------------------------------------|-------------------------------|
| Method | Bulletin 17B |
| Skew option | Weighted |
| Generalized skew | 0.164 |
| 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:

| | Standard | |
|--------|-----------|----------|
| Mean | deviation | Skewness |
| 2.9067 | 0.2477 | -1.317 |

Outlier criteria and number of peak flows exceeding:

| | | |
|------|--------|---|
| Low | 170.3 | 1 |
| High | 3125.9 | 0 |

Bulletin 17B Final analysis results:

Moments of the common logarithms of the peak flows:

| | Standard | |
|--------|-----------|----------|
| Mean | deviation | Skewness |
| 2.9204 | 0.2129 | -0.256 |

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 | NA | NA | NA | -- | -- | -- |
| 0.9900 | NA | NA | NA | -- | -- | -- |
| 0.9500 | 359 | 288 | 425 | -- | -- | -- |
| 0.9000 | 439 | 364 | 509 | -- | -- | -- |
| 0.8000 | 555 | 475 | 632 | -- | -- | -- |
| 0.6667 | 686 | 600 | 774 | -- | -- | -- |
| 0.5000 | 850 | 753 | 961 | 865 | 741 | 1,010 |
| 0.4292 | 927 | 822 | 1,050 | -- | -- | -- |
| 0.2000 | 1,260 | 1,110 | 1,480 | 1,300 | 1,110 | 1,530 |
| 0.1000 | 1,540 | 1,330 | 1,850 | 1,600 | 1,340 | 1,900 |
| 0.0400 | 1,880 | 1,590 | 2,330 | 1,970 | 1,600 | 2,440 |
| 0.0200 | 2,130 | 1,780 | 2,700 | 2,250 | 1,760 | 2,880 |
| 0.0100 | 2,370 | 1,960 | 3,070 | 2,540 | 1,910 | 3,370 |
| 0.0050 | 2,620 | 2,130 | 3,450 | -- | -- | -- |
| 0.0020 | 2,930 | 2,360 | 3,950 | 3,220 | 2,200 | 4,690 |

Peak-flow data used in the analysis:

Explanation of symbols and codes

-- none

* Less than low-outlier threshold

| Water | Peak | Peak-flow | Water | Peak | Peak-flow |
|-------|-------|-----------|-------|-------|-----------|
| year | flow | code | year | flow | code |
| 1967 | 1,090 | -- | 1990 | 1,260 | -- |
| 1968 | 1,200 | -- | 1991 | 512 | -- |
| 1969 | 1,540 | -- | 1992 | 1,020 | -- |
| 1970 | 1,470 | -- | 1993 | 585 | -- |
| 1971 | 1,520 | -- | 1994 | 1,020 | -- |
| 1972 | 1,380 | -- | 1995 | 400 | -- |
| 1973 | 690 | -- | 1996 | 1,330 | -- |
| 1974 | 890 | -- | 1997 | 738 | -- |
| 1975 | 1,050 | -- | 1998 | 461 | -- |
| 1976 | 1,720 | -- | 1999 | 658 | -- |
| 1977 | 1,000 | -- | 2000 | 461 | -- |
| 1978 | 829 | -- | 2001 | 1,870 | -- |
| 1979 | 1,340 | -- | 2002 | 280 | -- |
| 1980 | 782 | -- | 2003 | 270 | -- |
| 1981 | 1,220 | -- | 2004 | 801 | -- |
| 1982 | 1,110 | -- | 2005 | 665 | -- |
| 1983 | 620 | -- | 2006 | 724 | -- |
| 1984 | 960 | -- | 2007 | 313 | -- |
| 1985 | 669 | -- | 2008 | 1,150 | -- |
| 1986 | 876 | -- | 2009 | 980 | -- |
| 1987 | 573 | -- | 2010 | 102 | * |
| 1988 | 1,540 | -- | 2011 | 556 | -- |
| 1989 | 1,080 | -- | | | |