

Annual Peak-Flow Frequency Analysis

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

Streamgauge number and name:

05301000 Minnesota River near Lac qui Parle, Minn.

Peak-flow information:

| | |
|---|--------|
| Number of systematic peak flows in record | 65 |
| Systematic period begins | 1943 |
| Systematic period ends | 2011 |
| Length of systematic record | 69 |
| Years without information | 4 |
| Number of historical peak flows in record | 1 1997 |

Frequency analysis options:

| | |
|--------------------|----------------------------------|
| Method | Expected moments algorithm (EMA) |
| Skew option | Streamgauge |
| 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 | |
| 3.6121 | 0.4309 | 0.385 | |

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 |
| 3.6121 | 0.4309 | 0.385 |

Annual frequency curve at selected exceedance probabilities:

| Exceedance probability | Peak estimate | Lower-95 level | Upper-95 level |
|------------------------|---------------|----------------|----------------|
| 0.9950 | 455 | 215 | 787 |
| 0.9900 | 540 | 282 | 848 |
| 0.9500 | 898 | 582 | 1,190 |
| 0.9000 | 1,200 | 861 | 1,560 |
| 0.8000 | 1,750 | 1,340 | 2,260 |
| 0.6667 | 2,540 | 1,960 | 3,290 |
| 0.5000 | 3,840 | 2,930 | 5,020 |
| 0.4292 | 4,590 | 3,490 | 6,060 |
| 0.2000 | 9,210 | 6,900 | 13,200 |
| 0.1000 | 15,100 | 10,800 | 25,300 |
| 0.0400 | 26,300 | 17,400 | 62,900 |
| 0.0200 | 38,300 | 23,500 | 130,000 |
| 0.0100 | 54,200 | 30,800 | 275,000 |
| 0.0050 | 75,300 | 39,200 | 547,000 |
| 0.0020 | 113,000 | 52,300 | 1,240,000 |

Peak-flow data used in the analysis:

Explanation of symbols and codes

> Greater than

H Historic, outside of systematic record

K Peak affected by regulation

| Water year | Peak flow | Peak-flow code | Water year | Peak flow | Peak-flow code |
|---------------|--------------|-------------------|--------------------------|--------------|-------------------|
| 1943 | 7,950 | K | 1977 | 1,690 | K |
| 1944 | 3,680 | K | 1978 | 7,650 | K |
| 1945 | 1,620 | K | 1979 | 10,600 | K |
| 1946 | 5,440 | K | 1980 | 1,590 | K |
| 1947 | 7,400 | K | 1981 | 1,480 | K |
| 1948 | 6,960 | K | 1982 | 3,360 | K |
| 1949 | 2,010 | K | 1983 | 1,670 | K |
| 1950 | 3,280 | K | 1984 | 7,750 | K |
| 1951 | 9,760 | K | 1985 | 9,360 | K |
| 1952 | 19,700 | -- | 1986 | 13,200 | K |
| 1953 | 7,800 | K | 1987 | 3,440 | K |
| 1954 | 1,960 | K | 1988 | 1,040 | K |
| 1955 | 1,290 | K | 1989 | 3,720 | K |
| 1956 | 1,440 | K | 1990 | 1,230 | K |
| 1957 | 3,800 | K | 1991 | 5,040 | K |
| 1958 | 2,750 | K | 1992 | 8,010 | K |
| 1959 | 600 | K | 1993 | 10,200 | K |
| 1960 | 5,230 | K | 1994 | 10,100 | K |
| 1961 | 950 | K | Gap in systematic record | | |
| 1962 | 4,610 | K | 1997 | >43,000 | H |
| 1963 | 1,480 | K | Gap in systematic record | | |
| 1964 | 1,480 | K | 1999 | 2,800 | K |
| 1965 | 10,700 | K | 2000 | 1,440 | K |
| 1966 | 5,770 | K | 2001 | 30,100 | -- |
| 1967 | 3,090 | K | 2002 | 3,190 | K |
| 1968 | 590 | K | 2003 | 2,040 | K |
| 1969 | 29,400 | -- | 2004 | 2,370 | K |
| 1970 | 2,120 | K | 2005 | 3,610 | K |
| 1971 | 3,400 | K | 2006 | 5,920 | K |
| 1972 | 8,510 | K | 2007 | 6,130 | K |
| 1973 | 4,650 | K | 2008 | 3,980 | K |
| 1974 | 1,020 | K | 2009 | 15,800 | K |
| 1975 | 2,080 | K | 2010 | 21,200 | -- |
| 1976 | 1,830 | K | 2011 | 19,700 | K |