

Annual Peak-Flow Frequency Analysis

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

Streamgauge number and name:

05087500 Middle River at Argyle, Minn.

Peak-flow information:

| | |
|---|------|
| Number of systematic peak flows in record | 62 |
| Systematic period begins | 1950 |
| Systematic period ends | 2011 |
| Length of systematic record | 62 |
| Years without information | 0 |
| Number of historical peak flows in record | 0 |

Frequency analysis options:

| | |
|------------------------------------|-------------------------------|
| Method | Bulletin 17B |
| Skew option | Weighted |
| Generalized skew | -0.48 |
| Standard error of generalized skew | 0.427 |
| 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 |
| 2.9168 | 0.4948 | -1.000 |

Outlier criteria and number of peak flows exceeding:

| | | |
|------|---------|---|
| Low | 32.2 | 1 |
| High | 17410.9 | 0 |

Bulletin 17B Final analysis results:

Moments of the common logarithms of the peak flows:

| | Standard | | |
|--------|-----------|----------|--|
| Mean | deviation | Skewness | |
| 2.9184 | 0.4906 | -0.761 | |

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 | 105 | 35 | 176 | -- | -- | -- |
| 0.9000 | 183 | 86 | 281 | -- | -- | -- |
| 0.8000 | 342 | 207 | 486 | -- | -- | -- |
| 0.6667 | 580 | 398 | 791 | -- | -- | -- |
| 0.5000 | 955 | 697 | 1,270 | 942 | 723 | 1,230 |
| 0.4292 | 1,160 | 857 | 1,530 | -- | -- | -- |
| 0.2000 | 2,180 | 1,670 | 2,870 | 2,130 | 1,680 | 2,710 |
| 0.1000 | 3,120 | 2,400 | 4,270 | 3,040 | 2,360 | 3,920 |
| 0.0400 | 4,330 | 3,240 | 6,520 | 4,220 | 3,100 | 5,760 |
| 0.0200 | 5,220 | 3,700 | 8,500 | 5,090 | 3,530 | 7,340 |
| 0.0100 | 6,060 | 4,030 | 10,800 | 5,940 | 3,890 | 9,100 |
| 0.0050 | 6,860 | 4,260 | 13,400 | -- | -- | -- |
| 0.0020 | 7,850 | 4,480 | 17,500 | 7,890 | 4,520 | 13,800 |

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 |
| 1950 | 2,790 | -- | 1981 | 107 | -- |
| 1951 | 1,220 | -- | 1982 | 711 | -- |
| 1952 | 612 | -- | 1983 | 1,020 | -- |
| 1953 | 112 | -- | 1984 | 513 | -- |
| 1954 | 128 | -- | 1985 | 939 | -- |
| 1955 | 527 | -- | 1986 | 1,040 | -- |
| 1956 | 1,390 | -- | 1987 | 550 | -- |
| 1957 | 734 | -- | 1988 | 357 | -- |
| 1958 | 846 | -- | 1989 | 1,550 | -- |
| 1959 | 570 | -- | 1990 | 60 | -- |
| 1960 | 903 | -- | 1991 | 87 | -- |
| 1961 | 135 | -- | 1992 | 350 | -- |
| 1962 | 1,620 | -- | 1993 | 1,180 | -- |
| 1963 | 825 | -- | 1994 | 707 | -- |
| 1964 | 900 | -- | 1995 | 1,300 | -- |
| 1965 | 2,590 | -- | 1996 | 5,020 | -- |
| 1966 | 1,820 | -- | 1997 | 4,330 | -- |
| 1967 | 1,320 | -- | 1998 | 1,300 | -- |
| 1968 | 1,120 | -- | 1999 | 2,370 | -- |
| 1969 | 2,530 | -- | 2000 | 935 | -- |
| 1970 | 2,200 | -- | 2001 | 2,290 | -- |
| 1971 | 773 | -- | 2002 | 2,730 | -- |
| 1972 | 729 | -- | 2003 | 327 | -- |
| 1973 | 93 | -- | 2004 | 2,090 | -- |
| 1974 | 2,070 | -- | 2005 | 2,500 | -- |
| 1975 | 4,260 | -- | 2006 | 3,500 | -- |
| 1976 | 631 | -- | 2007 | 587 | -- |
| 1977 | 24 | * | 2008 | 144 | -- |
| 1978 | 1,320 | -- | 2009 | 1,880 | -- |
| 1979 | 2,140 | -- | 2010 | 1,620 | -- |
| 1980 | 357 | -- | 2011 | 1,580 | -- |