

Annual Peak-Flow Frequency Analysis

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

**Streamgauge number and name:**

04010530 Reservation River near Hovland, Minn.

**Peak-flow information:**

|   |      |
|---|------|
| Number of systematic peak flows in record | 14   |
| Systematic period begins                  | 1991 |
| Systematic period ends                    | 2011 |
| Length of systematic record               | 21   |
| Years without information                 | 7    |
| Number of historical peak flows in record | 0    |

**Frequency analysis options:**

|                                    |                                  |
|------------------------------------|----------------------------------|
| Method                             | Expected moments algorithm (EMA) |
| Skew option                        | Weighted                         |
| Generalized skew                   | 0.5                              |
| 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 |
| 2.7069 | 0.3886    | 0.296    |

**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 |
| 2.7102 | 0.3960    | 0.463    |

**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                 | 72.7          | 14.0           | 138            | --           | --                 | --                 |
| 0.9900                 | 84.2          | 20.0           | 152            | --           | --                 | --                 |
| 0.9500                 | 130.0         | 49.8           | 215            | --           | --                 | --                 |
| 0.9000                 | 168.0         | 77.9           | 272            | --           | --                 | --                 |
| 0.8000                 | 235.0         | 128.0          | 381            | --           | --                 | --                 |
| 0.6667                 | 328.0         | 194.0          | 549            | --           | --                 | --                 |
| 0.5000                 | 478.0         | 294.0          | 862            | 410          | 268                | 627                |
| 0.4292                 | 563.0         | 346.0          | 1,070          | --           | --                 | --                 |
| 0.2000                 | 1,080.0       | 630.0          | 2,910          | 791          | 470                | 1,330              |
| 0.1000                 | 1,710.0       | 932.0          | 7,480          | 1,090        | 593                | 2,010              |
| 0.0400                 | 2,900.0       | 1,410.0        | 25,800         | 1,480        | 721                | 3,020              |
| 0.0200                 | 4,150.0       | 1,850.0        | 53,100         | 1,800        | 812                | 3,970              |
| 0.0100                 | 5,800.0       | 2,350.0        | 107,000        | 2,130        | 896                | 5,060              |
| 0.0050                 | 7,960.0       | 2,920.0        | 215,000        | --           | --                 | --                 |
| 0.0020                 | 11,800.0      | 3,810.0        | 527,000        | 3,080        | 1,100              | 8,630              |

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

Explanation of symbols and codes

> Greater than

-- none

| Water                    | Peak   | Peak-flow |
|--------------------------|--------|-----------|
| year                     | flow   | code      |
| 1991                     | 281    | --        |
| 1992                     | 386    | --        |
| Gap in systematic record |        |           |
| 2000                     | 370    | --        |
| 2001                     | 928    | --        |
| 2002                     | 349    | --        |
| 2003                     | 251    | --        |
| 2004                     | 702    | --        |
| 2005                     | 1,100  | --        |
| 2006                     | 337    | --        |
| 2007                     | 100    | --        |
| 2008                     | >1,350 | --        |
| 2009                     | 770    | --        |
| 2010                     | 232    | --        |
| 2011                     | >1,350 | --        |