

***NATIONAL WEATHER SERVICE  
PRODUCT/SERVICE DESCRIPTION DOCUMENT (PDD)  
TYPE: Experimental Product  
DATE: November 13, 2003***

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PRECIPITATION FREQUENCY DATA SERVER

**Part 1 - Mission Connection**

**1. Product/Service Description:**

The rainfall frequency atlases and technical papers published by the National Oceanic and Atmospheric Administrations (NOAA) National Weather Service (NWS) serve as de-facto national standards for rainfall intensity at specified frequencies and durations in the United States. They are provided in accordance with NOAAs Strategic Plan Mission Goal 2; “Understand climate variability and change to enhance societys ability to plan and respond.”

**2. Purpose/Intended Use:**

Civil Engineers use probabilistic estimates of rainfall intensities for particular durations and locations for the design of a wide range of structures from urban storm water drainage systems to dams and spillways. More recently their use has extended beyond the realm of civil engineering to include a broad array of environmental management and analysis concerns including the Federal Emergency Management Administrations flood plain mapping program and the Environmental Protection Agencys pollution discharge regulations. In 1953 NWS began publishing general rainfall-intensity-frequency-duration values or precipitation frequency estimates (Weather Bureau Technical Paper 24, 1953). These estimates have been produced by the NWS at the request of other Federal, state and local agencies because NWS is an independent agency which does not regulate or design based on the estimates, and because the NWS is the primary Federal agency with the required meteorological and hydrometeorological expertise required to develop the estimates. The values have become de-facto national standards by inclusion or reference in design and planning standards of a wide variety of agencies at Federal, state, and local levels.

NWS precipitation frequency estimates have traditionally been delivered in the form of Weather Bureau Technical Papers and Memoranda as well as NOAA Atlases, all hard copy documents. With the advent of the World Wide Web, these documents have been scanned and made available via web pages. The National Weather Service specifically developed the Precipitation Frequency Data Server as the primary web portal to precipitation frequency estimates and associated information (Parzybok and Yekta, 2003). Recent updates to NWS precipitation frequency are being delivered entirely in digital rather than hard copy form in order to make the estimates more widely available to the public and to provide the data in a broader and more accessible range of formats.

**3. Audience:**

While the primary audience for precipitation frequency estimates consists of civil engineers, agriculture interests, environmental planners, and flood plain managers, the general public also maintains a general interest in the estimates.

#### 4. **Presentation Format:**

The presentation formats accessible through the Precipitation Frequency Data Server include:

- a) the Atlases and associated documentation of the underlying development methodology, including tables and maps, in Portable Document Format (PDF),
- b) downloadable tables and graphs of precipitation frequency estimates at any user-selected location, and
- c) grids in a variety of formats including Federally mandated GIS formats.

#### 5. **Feedback Method:**

Feedback is welcomed at:

Precipitation Frequency Data Server Customer Satisfaction Survey:

<http://weather.gov/survey/web-survey.php?code=nwsohd-pfds>

or email - [HDSCQuestions@noaa.gov](mailto:HDSCQuestions@noaa.gov)

or U.S. Mail -

Hydrometeorological Design Studies Center

W/OHD

1325 East West Highway

Silver Spring, MD 20910

## Part 2 - Technical

### 1. **Format and Science Basis:**

Detailed technical descriptions of the development methodology is included in the various Atlases and Technical Papers/Memoranda themselves. A users guide for the Precipitation Frequency Data Server is also accessible directly from the Server.

### 2. **Availability:**

Precipitation frequency estimates have been developed by using statistical hydrometeorological techniques that have evolved over time and which have been the subject of extensive research and discussion in formal, peer reviewed, scientific literature. The general approach is to examine time series of annual maximum (or partial duration) values and determine appropriate underlying probability distribution functions that can be used to interpolate or extrapolate estimates at a variety of frequencies and durations. An excellent reference for this technique is Hosking and Wallis, 1997. The resulting point estimates are then spatially interpolated to regular grids from which cartographic quality maps are derived.

### 3. **Additional Information:**

References:

Hosking, J. R. M., and Wallis, J. R., 1997: Regional frequency analysis, an approach based on L-moments. Cambridge University Press, Cambridge

Parzybok, T. W. And Yekta, M., 2003: NOAA/NWS Precipitation Frequency Data Server, 19th International Conference on Interactive Information Processing Systems for Meteorology, Oceanography, and Hydrology, Long Beach, February 2003

U.S. Weather Bureau, 1953: Rainfall intensities for local drainage design in the United States. For durations of 5 to 240 minutes and 2-, 5-, and 10-year return periods. Part 1: West of the 115th meridian. Weather Bureau Technical Paper No. 24, U.S. Weather Bureau, Washington D.C.