

Estimates of the Magnitude and Frequency of Flood Flows in the Connecticut River in Connecticut

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In cooperation with the Federal Emergency Management Agency

Open-File 2005-1369

**U.S. Department of the Interior
U.S. Geological Survey**

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Conversion Factors and Datums

Multiply	By	To obtain
	Length	
foot (ft)	0.3048	meter
mile (mi)	1.609	kilometer
	Area	
square mile (mi ²)	2.590	square kilometer (km ²)
	Flow rate	
cubic foot per second (ft ³ /s)	0.02832	cubic meter per second (m ³ /s)

Vertical coordinate information is referenced to the North American Vertical Datum of 1988 (NAVD 88).

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAVD 83).

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Abstract

Annual peak-flow data from three U.S. Geological Survey (USGS) gaging stations on the Connecticut River at Thompsonville, Conn. (USGS station 01184000), at Hartford, Conn. (USGS station 01190070), and near Middletown, Conn. (USGS station 01193000) were used to estimate flood flows for annual exceedance probabilities of 0.1, 0.04, 0.02, 0.01, and 0.002 (10-, 25-, 50-, 100-, and 500-year recurrence intervals, respectively). Flood flows range from 198,000 cubic feet per second (ft^3/s) at Thompsonville to 211,000 ft^3/s at Middletown at the 100-year recurrence interval.

Flood-frequency analysis of annual peak flow through September 30, 2004 was performed using the procedures described in the publication *Guidelines for Determining Flood-Flow Frequency*, commonly referred to as *Bulletin 17B*, published by the Interagency Advisory Committee on Water Data in 1982. The 100-year flood estimates at all three stations have large uncertainties, as represented by the 90-percent confidence interval (about 50,000 ft^3/s). Long-term records (1929-2004) at the three stations represent relatively constant watershed conditions based on results of statistical trend tests and analysis of frequency curves in hydrologically similar basins. Further study is needed to estimate the effects of flood-plain storage, channel storage, and flow regulation by dams on peak flows in the Connecticut River.

Introduction

The U.S. Geological Survey (USGS) collects and interprets flood data for the Nation. Estimates of the magnitude of floods for selected recurrence intervals (such as the 100-year recurrence interval) are needed by federal, state, and local officials for effective flood-plain management. This report, prepared by the USGS, in cooperation with the Federal Emergency Management Agency (FEMA), updates the flood flows for the 10-, 25-, 50-, 100-, and 500-year recurrence intervals for the Connecticut River in Connecticut from long-term data (tens of years) collected at three gaging stations: Thompsonville (USGS

station 01184000), Hartford (USGS station 01190070), and Middletown (USGS station 01193000) (fig. 1). Standard procedures for performing statistical flood-frequency analysis of annual peak flow, as described in *Bulletin 17B* (Interagency Advisory Committee on Water Data, 1982), were used to compute the magnitude and frequency of the floods at the three gaging stations. Information about the annual peak-flow data and assumptions of frequency analysis is included in the report. The report provides the flood-frequency estimates, frequency curves, and relevant information used in the analyses.

Data Used to Determine the Magnitude and Frequency of Flood Flows

The annual peak-flow data from the three gaging stations were analyzed to provide flood-frequency estimates to be used in updating the Flood Insurance Study (FIS) for the Connecticut River. The computer program PEAKFQ (Thomas and others, 1998) was used for the statistical flood-frequency analyses. PEAKFQ automates many of the analysis procedures recommended in *Bulletin 17B*, including identifying outliers, adjusting for historical periods, weighting skew coefficients, and fitting a log-Pearson Type III distribution to the streamflow data. The parameters of the Pearson Type III frequency curve are estimated by the logarithmic sample moments (mean, standard deviation, and skew coefficient), with adjustments for low outliers, high outliers, and historic peaks. The following sections discuss the annual peak-flow records used in the analyses, high-flow measurements used to verify the stage-discharge relations, and the results of the frequency analyses for the three stations.

Annual Peak-Flow Records

A 76-year record (1929-2004) at Thompsonville, a 162-year record (1843-2004) at Hartford, and a 58-year record (1947-2004) at Middletown (fig. 1) are available for flood-frequency analysis. Historic flood data for unusually large flood events on the Connecticut River at Hartford date back to 1683.

