

# Technical Guidance for Regional Curves for Bankfull Width for Ohio

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This guidance is intended to inform anyone using fluvial geomorphology methods—studying and/or designing stream channel restoration projects—that a new Investigations Report (2005-5153) from the USGS has been published, and is now available at the following web site: <http://pubs.usgs.gov/sir/2005/5153/>. This report has two graphs, figure 8, regional curves for bankfull width for Ohio, and figure 9, regional curves for bankfull mean depth for Ohio that will be very helpful in comparing the stream you are working on to statewide averages.

## Title

Bankfull Characteristics of Ohio Streams and Their Relation to Peak Streamflows

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## Abstract

Regional curves, simple-regression equations, and multiple-regression equations were developed to estimate bankfull width, bankfull mean depth, bankfull cross-sectional area, and bankfull discharge of rural, unregulated streams in Ohio. The methods are based on geomorphic, basin, and flood-frequency data collected at 50 study sites on unregulated natural alluvial streams in Ohio, of which 40 sites are near streamflow-gaging stations. The regional curves and simple-regression equations relate the bankfull characteristics to drainage area. The multiple-regression equations relate the bankfull characteristics to drainage area, main-channel slope, main-channel elevation index, median bed-material particle size, bankfull cross-sectional area, and local-channel slope. Average standard errors of prediction for bankfull width equations range from 20.6 to 24.8 percent; for bankfull mean depth, 18.8 to 20.6 percent; for bankfull cross-sectional area, 25.4 to 30.6 percent; and for bankfull discharge, 27.0 to 78.7 percent. The simple-regression (drainage-area only) equations have the highest average standard errors of prediction. The multiple-regression equations in which the explanatory variables included drainage area, main-channel slope, main-channel elevation index, median bed-material particle size, bankfull cross-sectional area, and local-channel slope have the lowest average standard errors of prediction.

Field surveys were done at each of the 50 study sites to collect the geomorphic data. Bankfull indicators were identified and evaluated, cross-section and longitudinal profiles were surveyed, and bed- and bank-material were sampled. Field data were analyzed to determine various geomorphic characteristics such as bankfull width, bankfull mean depth, bankfull cross-sectional area, bankfull discharge, streambed slope, and bed- and bank-material particle-size distribution. The various geomorphic characteristics were analyzed by means of a combination of graphical and statistical techniques.

The logarithms of the annual peak discharges for the 40 gaged study sites were fit by a Pearson Type III frequency distribution to develop flood-peak discharges associated with recurrence intervals of 2, 5, 10, 25, 50, and 100 years. The peak-frequency data were related to geomorphic, basin, and climatic variables by multiple-regression analysis. Simple-regression equations were developed to estimate 2-, 5-, 10-, 25-, 50-, and 100-year flood-peak discharges of rural, unregulated streams in Ohio from bankfull channel cross-sectional area. The average standard errors of prediction are 31.6, 32.6, 35.9, 41.5, 46.2, and 51.2 percent, respectively.

The study and methods developed are intended to improve understanding of the relations between geomorphic, basin, and flood characteristics of streams in Ohio and to aid in the design of hydraulic structures, such as culverts and bridges, where stability of the stream and structure is an important element of the design criteria. The study was done in cooperation with the Ohio Department of Transportation and the U.S. Department of Transportation, Federal Highway Administration.