Research Project: ***SP309B4D***
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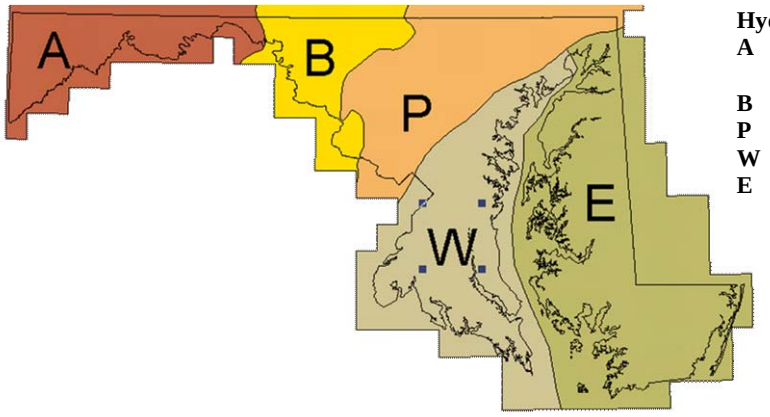
RESEARCH SUMMARY

REGRESSION EQUATIONS FOR ESTIMATING FLOOD DISCHARGES FOR THE PIEDMONT, BLUE RIDGE, AND APPALACHIAN PLATEAU REGIONS IN WESTERN MARYLAND

Problem

Regression equations for estimating flood discharges are needed in Maryland for the design of bridges and culverts and estimation of bridge scour. These equations are updated whenever additional data are available to improve the existing equations. For the three hydrologic regions in western Maryland, there are now 13 additional years of annual peak data at gaging stations in these regions and an additional 26 gaging stations with 10 or more years of record. Many of the additional gaging stations were on urban streams and the updated regression equations provide more accurate estimates of flood discharges for urban streams.



Hydrologic Regions
A Appalachian Plateau and Allegheny Ridge
B Blue Ridge and Great Valley
P Piedmont
W Western Coastal Plain
E Eastern Coastal Plain

Objective

The objective of the study was to develop updated regression equations for estimating the 1.25-, 1.50-, 2-, 5-, 10-, 25-, 50-, 100-, 200- and 500-year flood discharges for the Piedmont, Blue Ridge and Appalachian Plateau Regions in western Maryland. The updated regression equations are based on additional data that improve the applicability of the equations.

Description

Flood discharges were updated for 133 gaging stations in western Maryland using Bulletin 17B, Guidelines for Determining Flood Flow Frequency. A regional skew analysis was performed and a regional mean skew of 0.43 with a standard error of 0.42

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was determined to be applicable for rural watersheds in the study area. The station and regional skew were weighted to provide the final estimates of flood discharges at the gaging stations. Regression equations were developed using the Statistical Analysis System (SAS) regression procedures.

Results

The regression equations for estimating the T-year flood discharges applicable to the Piedmont and Blue Ridge Region were based on data from 96 stations (64 rural and 32 urban stations) and drainage area, in square miles; impervious area, in percent of the watershed; limestone, in percent of the watershed; and forest cover, in percent of the watershed. The regression equations for estimating the T-year flood discharges applicable to the Appalachian Plateau Region were based on data from 24 rural stations and drainage area, in square miles and land slope, in feet per foot. The updated regression equations will be used by the Maryland State Highway Administration in the design of bridges and culverts. These equations will also be included in the Fourth Edition of the Maryland Hydrology Panel report entitled "Application of Hydrologic Methods in Maryland" that provides guidance on estimating flood discharges in Maryland.

Report Information

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Link to Report

http://www.roads.maryland.gov/OPR_Research/MD-16-SP309B4D_Regression-Equations_Report.pdf