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URBAN FLOOD FREQUENCY CHARACTERISTICS[a]

Discussion by Leonard J. Lane[3] and Herbert B. Osborn,[4] M. ASCE

The authors are to be congratulated for their efforts to predict floods from urban watersheds. However, the writers believe that several points in the analyses were not adequately explained or could be misleading. Moreover, there are questions as to the efficacy of the testing procedures for hypothesized influences of urbanization upon peak discharge.

On p. 282, the authors state: "An analysis of the rainfall records for the two periods indicates relatively similar rainfall conditions. This indicates that the differences between the two flood frequency curves are not a result of differing rainfall conditions." What criteria were used in judging similarity? Were formal comparisons made, or is this speculation based upon experience? The reader is unable to test this auxiliary hypothesis or to assume that the authors have tested it. As the first assertion is untested, the second assertion of other reasons for the differences in peak discharge remains unsupported. While the assertion may be true, as previous studies would suggest, the reader is unable to make any independent tests that would tend to verify or refute the hypothesis.

The emphasis in the Introduction conveys the authors' premises that the influence of urbanization upon peak discharge should become less significant with larger peak discharges. The point is reemphasized in the conclusion even though Figs. 4 and 5 do not support this premise. The question is "why?" and the authors have left this most interesting question to others.

The writers suggest one possible answer, based on the uncertainty of such extrapolations. In their test of the prediction equation, the authors stated that "Extrapolating to the 50-year flood is questionable because of the relatively short period of record." However, the authors used 12-yr periods of record for two watershed conditions to estimate the 100-yr flood for both conditions.

[a]February, 1974, by William H. Espey and David E. Winslow (Proc. Paper 10352).

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They used these estimates as evidence to negate the assumption that the relative effect of urbanization always decreases with increasing flood peaks. However, uncertainties associated with large less frequent storms are such that values extrapolated from short periods of record are of little value. Therefore, the writers feel that Fig. 4 should not be used as an example in the way in which it was.

In discussing why I and Φ were not significant for the East Coast watersheds, the authors state that "The data range of Φ was small because of a lack of data for these watersheds; thus, this could explain why it does not occur in the equation." However, there were 26 stations on the East Coast compared to 27 in Texas, and if anything, the periods of record listed in Tables 1 and 3 would suggest more data on the East Coast watersheds. The lack of data statement appears as an ad hock hypothesis. A table showing sample means, variances, and correlation coefficients for the "independent" variables might help support their statement and would help the reader decide on the range and degree of intercorrelation of the independent variables.

Finally, the authors properly state that "variation in the climate factor should also be investigated with regards to duration of rainfall and frequency of occurrence." Possible climatic differences, including rainfall intensity, could lead to considerable error in an equation based on records from watersheds in different parts of the country, particularly in the prediction of less frequent events.