

Hydrology - SCWRC Report 166

Magnitude and Frequency of Low Streamflows in South Carolina

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SUMMARY

This report contains the most comprehensive study of low streamflow distribution undertaken in South Carolina to date. Presented are low-flow estimates for 104 South Carolina streamflow gaging stations, updated through the 1987 climatic year using a method that statistically determines which of 13 solutions to nine distribution functions best represent the observed low-flow distributions for 1, 3, 7, 14, 30, 60, 90, 120, and 183 consecutive days. This technique differs from past studies that have applied fewer distributions and graphical analysis to lesser numbers of gaging stations.

The present method has a number of advantages over previously used techniques. First, the model resides at the South Carolina Water Resources Commission and additional low-flow analysis can be accommodated. Second, the model runs on a 80286 processor and fits on two floppy disks, making it easily transportable. Third, the development costs have been incurred and thus, the only additional costs are for operation. Fourth, the model provides a systematic method for generating reproducible low flow estimates which do not require the construction of hand drawn curves. Fifth, the model structure allows for comparisons between distributions and solution techniques. These comparisons can yield greater insight into the stochastic behavior of consecutive-day period low flows.

The low-flow estimates produced by this technique are not significantly different from estimates made by using graphical analysis at stations having identical data sets. This finding reinforces the assertion that the technique does not "trade off" precision for reproducibility and ease of use. The finding that no single low-flow estimation technique accounted for more than 30 percent of the total, further indicates that flows for each gaging station and, perhaps each consecutive-day period at each gaging station, have a unique population of low flows which are best represented by statistically selecting the most appropriate distribution for each station from the full range of available distributions.

The information provided in this report should prove beneficial to Federal and State planning and regulating agencies. The low-flow estimates at long term gaging sites appear stable and the information can be used with a high level of confidence. At short term stations, the low flows experienced during the 1980's have probably skewed the distributions toward the low end, and periodic updates of this report will be essential.

Copies of this report are available in the SCDNR's Columbia office.