

**Effects of Wildfire in Mountainous Terrain
(Empirical Formulas to Estimate from 1-Year through 10-Year Peak
Discharge from Small Post-Burn Watersheds)**

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In the desert southwest of the United States, wildfire alters the hydrologic response of watersheds greatly increasing the magnitudes and frequency of flash floods. The NOAA National Weather Service is tasked with the issuance of flash flood warnings to save life and property. Tools that allow the weather forecast offices to quickly access the peak flow magnitude and flood potential from burned areas is highly desirable. The application of readily available topographic and burn severity data make this possible through a series of empirical equations. This paper describes the development of several empirical equations to predict the post-burn peak flows. These equations work reasonably well (adjusted R-square values ranging from 0.88 to 0.96) for the documented watersheds. Their predictive usefulness is tied to what the authors refer to as the multivariate runoff index. The index incorporates four easily determined factors; the sum of high and moderate burn severity (the hyper-effective drainage area), the average basin elevation, the modified channel relief ratio, and the return interval of forecasted rainfall.

Additional keywords: Arizona; Post-Burn Hydrology; Forest Hydrology; Southwest Hydrometeorology; Wildfire; Peak Flows; Flash Floods; Modified Channel Relief Ratio; Hyper-Effective Drainage Area; Multivariate Runoff Index.

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