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**Updated Abstract**

Annual post-wildfire flooding events have fatigued land management teams in the Southwest United States as the seasonal runoff events increase in intensity and frequency across the region. This study investigates the relationship between the vegetation regrowth process and flooding following wildfire events in Tucson, Arizona within the Lower Colorado River Basin. Extensive studies have been conducted on post-burnout rainfall-run-off relationships or post-burnout vegetation regeneration, but few establish a relationship between both processes. In this study, MODIS-NDVI Earth Observations were first used to create a surface indicating vegetation regrowth rate on a per-pixel basis following historical wildfire events. Next, historical flood events were identified in the NOAA CMORPH precipitation Climate Data Records to establish return intervals associated with increased post-wildfire flooding risk. The relationships between recurrence intervals, time since the fire, burn severity, vegetation regrowth, and elevation were then used to enhance the post-fire warning systems of local management. By utilizing remotely sensed vegetation and precipitation data in a study area with limited in-situ data, this analysis provides an additional long-term predictive tool for managing future post-fire hazards.