# Regional variability of controls on post-fire watershed system flow response

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**Abstract.** This research investigates the impact of wildfires on watershed flow regimes throughout the continental United States, specifically focusing on evaluation of national fire events within specified subregions and determination of the impact of climate and geophysical variables in post-fire flow response. Fire events were collected through federal and state-level databases and streamflow data were collected from U.S. Geological Survey stream gages. 428 watersheds were identified with at least 10 years of continuous pre-fire daily streamflow records and 5 years of continuous post-fire daily flow records. For each watershed, percent changes in annual seven day low-flows (7Q2) and annual seven day high-flows (7Q10) were calculated from pre- to post-fire. 12 independent variables were identified for each watershed and fire event, including topographic, land cover, and soils data. The national watersheds were divided into eight regions and a lasso linear regression model, applying the Leave-One-Out calibration method, was calculated for each region. Nash-Sutcliffe Efficiency (NSE) was used to determine the accuracy of the resulting models. Moran's I and Localized Indicators of Spatial Autocorrelation (LISAs) were calculated for all model residuals to test for spatial autocorrelation. The South East Coast Plains, Eastern Highlands, and Western Plains regions produced the most accurate linear models and displayed no spatial autocorrelation. The Western Mountain and Central Plains region models produced spatially autocorrelated residuals, indicating that the regions need to be further subdivided. Results of linear regression modeling showed varying importance of watershed and fire event variables, with conflicting correlation between land cover types and soil types by region. Addition of further independent variables, such as burn severity and further subdivision of land cover types, is ongoing and should allow for more accurate linear regression modeling.