Predicting the Extent of Late Seasonal Wildfires in Washington Using the Correlation Between the Standardized Precipitation Index and Burned Area Data

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The amount of land burned every year in Washington has increased about ten times over the last half century making the need for improved detection and identification of trends linked to wildfires increasingly important. This project used the Standardized Precipitation Indices (SPIs) which identify periods of extreme dryness and wetness, and a Pearson Correlation test to correlate SPIs with burned area data in Washington. Monthly precipitation data in millimeters for Washington was gathered from 1948-2019 and RStudio was used to calculate r correlation values between transformed wildfire burned area data and 5 SPI indices from 1 month to 24-month time intervals formulated using the raw precipitation data. The Pearson correlation test between the two variables showed a significant correlation with $p<0.05$ for 18 monthly SPI indices out of the 60 total monthly indices. The strongest correlation before the month of August was found in July for the SPI12 index with p value of 0.01012 and r value of -0.5121854. The correlation is a significant negative association because a lower SPI value corresponds to extreme periods of dryness which in turn causes increased spread of fires and acres burned. The following equation was made for a spread coefficient to predict the extent of late seasonal wildfires using the SPI12July and wind speed; S = -0.9149 * SPI12July + 0.0105 * WS + 4.7803. The coefficient can be computed using real time data to help predict the extent of late large seasonal wildfires, such as the Pearl Hill or Okanagan Complex fires.

Awards Won:
American Meteorological Society: Second Award of $1,000