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Will Brewer

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Remote Sensing of Pinon-Juniper Communities in New Mexico

Key Terms: remote sensing, piñon-juniper, land cover change, climate change

Piñon pine communities exist on mid-elevation mountain ranges throughout the southwestern United States. Drought adapted, this species has lived with climatic stochasticity in the Southwest since the end of the Pleistocene. However, increasing temperatures and drought within the last decade have stressed this community beyond its adaptive limits across much of its range. Widespread piñon die-off occurred from extreme drought in northern New Mexico between 2002-2004. Piñon mortality was lower in areas of central New Mexico during this period. However, recent drought during 2010-2013 has led to increased piñon mortality throughout central New Mexico. This study aims to quantify the extent of that mortality by performing spectral mixture analysis on five Landsat images from 2009 through 2014. Mortality will then be compared to the local drought index for correlation between drought severity and rate of die-off. We expect results to indicate that piñon communities will have experienced noticeable die-off within the temporal range of the study with most significant die-off rates occurring several months to a year behind the highest drought index. Results from this study will help inform land managers of the effects of drought-induced piñon mortality as climate change continues to intensify throughout the Southwest.