Modeling the Effects of Climate Change and Potential Management Interventions on Pinyon Juniper Woodland Distribution Using Aerial Imagery

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The piñon-juniper woodlands of the semiarid southwest have been in a rapid decline in mortality due to droughts intensified by climate change. These woodlands have historically been identified as being a drought hardy ecosystem. Under climate change, they have approached a threshold where drought induced mortality is occurring. The loss of these ecosystems can be an area of concern for many Native American tribes within the Southwest as the pinyon pine is a cultural keystone species. Specifically, it is of great importance to the identity of the Diné and for the advancement of biocultural conservation efforts within their communities. A way to help mitigate and monitor the change of these woodlands is by analyzing aerial imagery provided by the National Agricultural Imagery Program, the Federal Inventory Analysis National Program, and other data sets. This data will be used to develop large scale maps displaying the species distribution of areas where stands of pinyon juniper woodlands have recently died back by combining remote sensing data calibrated with FIA overflight data to estimate pinyon mortality using ArcGIS Pro software. The data will be analyzed to potentially gain more detailed information to provide a 'why' for trees that are dying in specific geographic ranges that can involve soil types and bedrock or identify why they are thriving. This project has the potential to be used to develop models and maps depicting areas of potential future mortality and/or recruitment for conservation, restoration, and general forest management purposes.

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