Mapping Juniper Mortality on the Navajo Nation

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There has been a notable increase in severe droughts and heat waves worldwide, exemplified by the prolonged megadrought that has affected the western United States since the year 2000. In recent years, severe and extreme drought conditions were witnessed across the southwestern US. In particular, 2021 saw 75% of the region experiencing severe and extreme drought levels, often exhibiting a correlation with extensive tree mortality and canopy dieback, as seen in a 2000 drought that resulted in over a million ha of Pinus edulis mortality in the US southwest. The regional extent of the mortality remains unknown. Still, it is expected to increase due to the multi-year persistence of the regional drought and because regional droughts are expected to become hotter, drier, more frequent, and more severe. Quantifying the cumulative impacts of persistent droughts or frequent regional drought events is crucial for preparing for future droughts because they significantly affect ecosystem services and functions, including water budgets, carbon budgets, and land-atmosphere interactions. Here, we hope to estimate a regional drought-induced tree mortality event in 2021 across the Colorado Plateau spanning Arizona, southern Utah, and eastern New Mexico, focusing on the Navajo Nation. Through ground-truthing, we can determine if reported tree mortality is accurate or true through satellite estimates (?) compared to direct observation. Estimating and mapping regional tree mortality can improve climate models and projections and offer valuable insights into the complex interplay between megadrought, ecosystem management, and the resilience of pinyon-juniper woodlands in the face of evolving climatic challenges.

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