Research Article

Landscape Models to Predict the Influence of Forest Structure on Tassel-Eared Squirrel Populations

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Abstract

*The tassel-eared squirrel (*Sciurus aberti*) is often used as an indicator species in southwestern ponderosa pine (*Pinus ponderosa*) forests. Because of more than a century of fire suppression, grazing, and timber harvest, these forests have become increasingly prone to catastrophic wildfire, resulting in pressure to implement large-scale treatments to reduce fire threat and restore ecosystem function. However, such treatments could have dramatic effects on tassel-eared squirrels and other wildlife. Because of emerging plans for thinning southwestern forests to reduce fire threat, we undertook a modeling effort to produce spatial data to examine the results of proposed management actions on squirrel habitat. We used squirrel density and recruitment data from 9 study areas located in the Flagstaff region of northern Arizona, USA, linked with spatial data on forest structure developed from remote-sensing imagery. We used a multiscale approach to analyze relationships between forest structure and squirrel density and recruitment. We then used an information-theoretic approach to identify the most parsimonious models for both squirrel density and recruitment. The most strongly supported models of squirrel density included local-scale basal area and $>60\%$ canopy cover at the 65-ha spatial scale. For squirrel recruitment, 4 different models that included both local-scale basal area (m^2/ha) and variations of canopy cover over extents of approximately 160–305 ha were strongly supported. Using the most parsimonious models, we created spatial data layers representing both squirrel density and recruitment across an 800,000-ha landscape in northern Arizona. Our approach resulted in spatially explicit models that can be used in efforts to predict the effects of forest management on squirrel populations.*
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