Thinning Impacts on the Resilience of Wildlife Habitat Quality under Climate Change in Coniferous Forests of Western Oregon

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Poster Abstract

To understand the impacts of overstory density reductions on resilience of forest ecosystems (i.e., the capacity of an ecosystem to maintain desired ecosystem functions in a fluctuating environment), we examined overstory basal area and understory vegetation cover and richness collected 6 years after thinning in seven 40- to 60-year-old forests dominated by Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco) in the Oregon Coast Range and Cascade Range of western Oregon. Each site contained an unthinned control (240–1,540 trees·ha^{-1} [tph]) and three thinning treatment units (high-density = 300 tph; moderate-density = 200 tph; and variable-density with a combination of 300 tph, 200 tph, and 100 tph).

We used a mechanistic, trait based approach to quantify impacts of overstory density on understory vegetation components that contribute to wildlife habitat. Vascular plant species that produce fleshy fruits, a major food source for wildlife, were grouped as a functional group. We quantified the resilience of this function as the likelihood of being maintained under increased environmental stress related to climate change; e.g., drought duration and severity. To accomplish this, fleshy-fruit-producing species were categorized in terms of their response types based on traits that assume their ability to tolerate drought conditions.

High variability of overstory densities within and among treatments created an overstory density gradient at each site that ranged from 0–87 m^2·ha^{-1} in basal area. Average cumulative cover and species richness of species that produce fleshy fruits increased with decreasing overstory density, suggesting that thinning will increase the potential food sources for wildlife. Similarly, cumulative cover and species richness of drought-tolerant species that produce fleshy fruits also increased at lower overstory densities, suggesting that thinning will increase the likelihood that the food source for wildlife will be maintained under more droughty conditions. Changes in Pielou's evenness of species cover on a plot along the overstory density gradient were not significant for either species group, suggesting that changes are due to general increases in species abundance and richness, rather than by increases of dominant or rare species.

Keywords: stand density, plant species richness, functional diversity, vegetation response types, habitat quality.

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