

Science You Can Use *in 5 minutes*

Roosts and Woodrats: Forest restoration can provide both nesting habitat and food for spotted owls in the Sierra Nevada

Introduction

Mature forest cover for nesting and roosting currently plays a starring role in California spotted owl (*Strix occidentalis occidentalis*) habitat management, but spotted owls also depend on access to nearby mixed-age forest stands that support one of their main food sources, the dusky-footed woodrat (*Neotoma fuscipes*).

A new study shows that at low elevations, these adjacent patches of nesting, roosting, and foraging habitats could be achieved by implementing a mixture of forest treatments across broad areas in the Sierra Nevada. Past forest compositions

and frequent fire supported a landscape more diverse than it is today. Historical fires including Indigenous burning supported interwoven mixed-age and open forests.

“Historically, frequent fire burned in these forests and maintained a wide variety of forest ages and stages across the landscape,” said Gavin Jones, a Research Ecologist with the USDA Forest Service Rocky Mountain Research Station. “This created a constantly shifting mosaic of forest conditions, where you always had a mixture of young and older trees together at the landscape scale.” In contrast, recent fire exclusion has created more homogenous forests that are less resilient to fire.

The “Bed and Breakfast” Effect

Supporting the spotted owl’s food supply is key to restoration management. “To thrive, spotted owls need their nesting habitat to be nearby their hunting habitat,” said Jones. “Think of it as a ‘bed and breakfast’ effect or living in a neighborhood with a corner grocery store. This spatial juxtaposition of resources means that owls don’t need to spend as much energy to meet their needs.”



Examples of “bed and breakfast” (intermixed) habitats at larger (a) and smaller (b) scales in the Eldorado National Forest. Both photos (a) and (b) show open conditions that tend to support woodrats in the foreground; closed-canopy habitat is in the background. The photo in (a) was taken at the location indicated by the pink square in (c). The photo in (b) was taken at the blue square located in (d), which was a small forest gap (several meters wide) surrounded by continuous forest cover, but near open forest. Courtesy photo (a) and (b) by Corbin Kuntze, used with permission. Images (c) and (d) USDA National Agriculture Imagery Program.

Past studies showed that owls with access to more woodrat prey are less likely to abandon their territories; the owls also raise more and healthier young. Spotted owl territories with mixed vegetation types (the woodrat's preferred habitat) support approximately 2.5 times greater woodrat abundance than owl territories dominated by mature forest.

Setting Up the Study

The research area spans National Forest System and private timber land in the central Sierra Nevada. In this area, multiple organizations are [partnering](#) on forest restoration projects intended to increase wildfire resilience.

In the study, [Jones](#) and his coauthors studied the impacts of future wildfire, forest treatment, and climate scenarios on available nesting, roosting, and foraging habitat for California spotted owls. They used [specialized software](#) to project future vegetation cover out to the year 2050. They compared a “minimal” treatment scenario (timber harvest on private land every 25–40 years) to an “accelerated” treatment scenario (a mixture of clear cuts, mechanical thinning, and hand thinning with prescribed fire every 20–40 years on a broad suite of land ownership types over a larger area).

The team considered owl territory sizes and created threshold selections for 400-hectare territories with at least 20 percent nesting/roosting habitat and 20 percent foraging habitat within the treatment models. The models included tree cover types that will age into mature size classes suitable for roosting habitat over the study period.

Project Lead

[Gavin Jones](#) is a Research Ecologist in the Wildlife Ecology program, USDA Forest Service, Rocky Mountain Research Station in Albuquerque, New Mexico.

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Management Considerations

- At low elevations, a combination of forest treatments (clear cuts, thinning, and prescribed fire) across large areas created more woodrat habitat and opportunities for interspersed nesting, roosting, and foraging for spotted owls compared to timber harvests across smaller areas.
- There weren't considerable differences in the outcomes from minimal and accelerated treatment scenarios in terms of changes to available nesting and roosting habitat; both scenarios saw considerable increases of this favorable forest condition into the future.
- This study provides rationale for incorporating forest treatments into spotted owl recovery, showing that forest restoration focused on improving fire resilience can be compatible with spotted owl habitat management in the Sierra Nevada.

Further Reading

Jones, G.M.; Stanley, C.K.; Peery, M.Z.; Maxwell, C.; Wilson, K.N. 2024. [Accelerated forest restoration may benefit spotted owls through landscape complementation](#). Animal Conservation. <https://doi.org/10.1111/acv.12976>

Jones, G.M.; Shirk, A.J.; Yang, Z.; Davis, R.J.; [et al.]. 2022. [Spatial and temporal dynamics of Mexican spotted owl habitat in the southwestern US](#). Landscape Ecology. 38: 23–37.

Jones, G.M.; Clément, M.A.; Latimer, C.E.; Wright, M.E.; [et al.]. [Frequent burning and limited stand replacing fire supports Mexican spotted owl pair occupancy](#). Fire Ecology. 20: 51.



Researchers studied the impacts of future wildfire, forest treatment, and climate scenarios on available nesting, roosting, and foraging habitat for California spotted owls. US Fish and Wildlife Service photo by Rick Kuyper.



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