The Effects of Mixed-Severity Wildfires on Fisher Population Dynamics

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Objective - Identify how mixed-severity wildfires affect fishers

Introduction

Scant information exists about how wildfires affect carnivores. Forest carnivores that rely on mature forests, like fishers (*Pekania pennanti*), represent a tradeoff between wildfire prevention activities and naturally occurring wildfires. Two wildfires occurred in 2014 at the study site of a long-term fisher monitoring program.

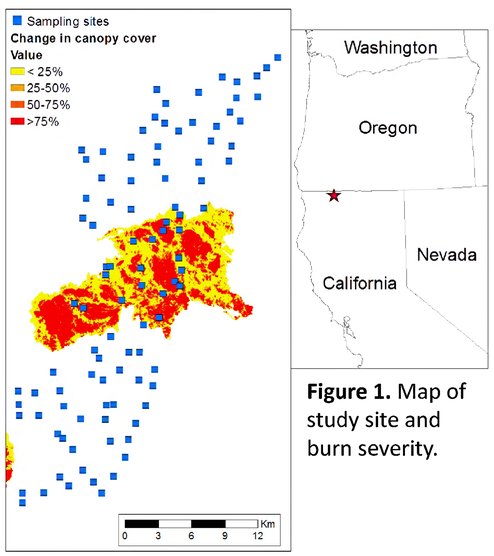

Figure 1. Map of study site and burn severity.

Methods

We collected fisher DNA using non-invasive sampling techniques at 100 locations from 2013 to 2015 in the fall (Figure 1). In the summer of 2014, 30% of our study site was burned by the Beaver Creek and Happy Camp Complex fires (Figure 1). We used spatial capture-recapture (Royle et al. 2014) to determine the effects of these fires on fishers.

Result 1. Fisher population declined after wildfires

Figure 2. Estimated median and 95% Credible Intervals of the number of fishers and their sexes at our study site the year before the fires (2013), the year during the fires (2014), and the first year after the fires (2015).

Result 2. Fisher densities declined in the burned areas

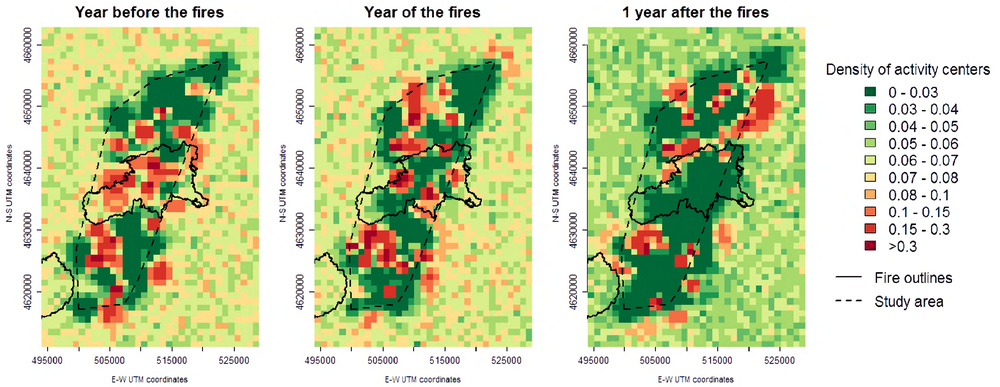

Figure 3. Estimated distribution of fisher activity centers on the landscape the year before the fires (2013), the year of the fires (2014), and 1 year after the fires (2015).

Result 3. Fisher density affected most by >50% change in canopy

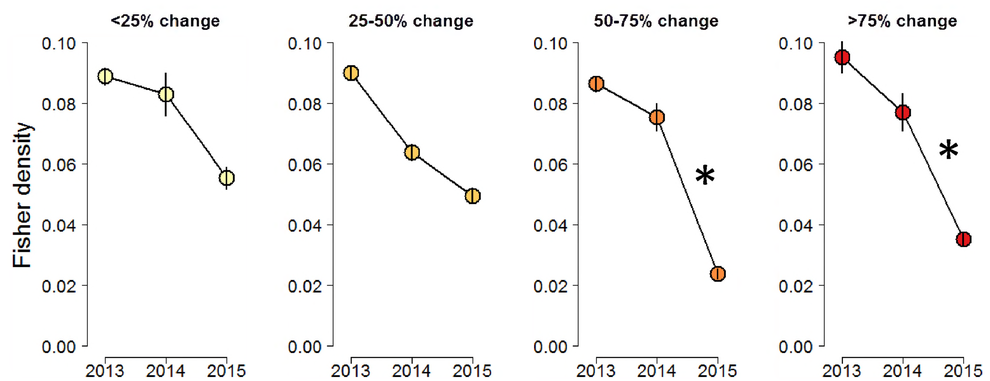

Figure 4. Mean ± SE density of fishers per km^2 over time in grid cells located within the Beaver Creek Fire. The proportion of grid cells with >50% change in canopy cover had a significant negative effect on fisher density after the fire in 2014.

Conclusions

Mixed-severity wildfires had a significant negative effect on fisher populations the year immediately following the fires. There was a greater effect on males. This could be due in part to their larger home ranges and abilities to establish themselves in areas of their territories that were not burned.

Fisher densities declined in locations of all fire severities, although fisher densities declined the most in regions with more than a 50% change in canopy cover. Thus, wildfires where canopy declines by more than 50% will have the largest, negative effect on fishers.

Future directions

- Determine the effects of fire prevention activities on fishers
- Investigate how post-fire salvage logging influences fishers
- Study how these fires affected interspecific interactions with other mesopredators (e.g., gray foxes, ringtails)

Acknowledgments

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Reference Royle, J.A., Chandler, R.B., Sollmann, R. & Gardner, B. (2014) *Spatial Capture-Recapture*. Academic Press, Waltham, Massachusetts, USA. 577 pp.