Research Brief for Resource Managers

Mountain quail: the lucky beneficiaries of high-severity fire

Brunk, Kristin M., R. J. Gutiérrez, M. Zachariah Peery, C. Alina Cansler, Stefan Kahl, and Connor M. Wood. 2023. "Quail on Fire: Changing Fire Regimes May Benefit Mountain Quail in Fire-Adapted Forests." Fire Ecology 19 (1): 19. https://doi.org/10.1186/s42408-023-00180-9.

This study characterizes the habitat of mountain quail (*Oreortyx pictus*) on the west slope of the California Sierra Nevada, evaluating land cover characteristics, fire history, and fire effects.

The researchers used a widespread network of microphones to conduct passive acoustic surveys, essentially recording sounds in the morning and evening over several weeks known to be part of the breeding season. They used a regionally-tuned version of the BirdNET algorithm (Kahl et al. 2021) to identify sites where mountain quail were audible on at least 2 separate days; these sites were considered "occupied". They then built statistical models to identify habitat characteristics and fire history characteristics that were associated with quail occupancy.

The habitat model revealed that mountain quail tend to be present in sites with higher shrub cover, lower canopy cover, and lower canopy base height – all of which imply a preference for a dense understory (either through shrubs or trees with low branches). These vegetation structure characteristics were more important for characterizing quail habitat than the amount of forest cover per se.

The fire model revealed a strong connection between mountain quail occupancy and the proportion of the area surrounding the

Management Implications

- High-severity fire is associated with the presence of mountain quail.
- This pattern holds for recent burns as well as older (up to 35-year-old) burns, suggesting that older high-severity patches continue to be valuable habitat for this species.
- Bioacoustic monitoring is a valuable technique and can be deployed across widespread species ranges.

bioacoustics recorder that had burned at high severity. This was true in areas that had recently burned as well as areas that burned 6-35 years previously. By contrast, the proportion burning at low severity was not a strong predictor of occupancy, implying that high severity fire effects are specifically preferred by this species.

Together, the habitat and fire models suggest that high severity wildfires may promote vegetation structures (e.g., shrubs) that are beneficial for mountain quail. In an ecosystem with relatively few "winners" from high severity fire effects, this is a case where a wildlife species may be able to take advantage of it – and for decades.

Also referenced:
Kahl, S., C.M. Wood, M. Eibl, and H. Klinck. 2021. BirdNET: A deep learning solution for avian diversity monitoring. Ecological Informatics 61: 101236.
https://doi.org/10.1016/j.ecoinf.2021.101236.