



Research Brief for Resource Managers

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Chaparral Bird Communities Harmed by Shrub Removal

Newman, E., J.B. Potts, M.W. Tingley, C. Vaughn, and S.L. Stephens. 2018. Chaparral bird community responses to prescribed fire and shrub removal in three management seasons. *Journal of Applied Ecology* 00:00. 11pp. DOI: 10.1111/1365-2664.13099

Much is known about the response of California chaparral plant communities to fire and mastication, but much less is known about how these fuel removal techniques affect wildlife, including birds. To help managers make science-based decisions that incorporate wildlife information, this study experimentally compared the effects of two pre-fire vegetation reduction treatments (prescribed burning and shrub mastication; Fig.1) on the chaparral bird community.

Using the Fire and Fire Surrogates experimental design, this study was conducted in Mendocino County, CA, from 2001 to 2005 at the Hopland Research and Extension Center (HREC, UC Berkeley), at Red Mountain & Cow Mountain Recreation Areas (BLM), and in collaboration with the California Department of Forestry and Fire Protection (CAL FIRE). Pre-treatment point-count monitoring occurred in 2001. Prescription fire and mastication treatments were carried out from 2002- 2003 and post-treatment point-count monitoring was conducted from 2002-2005, about 4-7 times per year and in all seasons. Overall, 49 bird species were counted, with a total of 2,529

Management Implications

- Masticated plots had altered functional groups, or guilds, of birds, reduced bird species biodiversity, and reduced bird abundance for all five years of this study. #1
- In contrast, bird communities in the plots recovered exposed to one-time use of prescribed fire recovered similar guild structure, abundances, and species diversity compared to the control plots within three to four years. Burning at short intervals would likely not recover in a similar way, due to altered vegetation structure.
- For California chaparral birds, prescribed fire and mastication are not interchangeable management techniques.

individual detections across 24, 2-ha experimental units. Differences in species richness and abundances were determined for each treatment-season combination and compared to controls.

The results show that fire and mastication treatment are not interchangeable for birds, and that one-time use of prescribed burning is much less harmful than mastication. While the bird communities on fire-treated plots could recover in three or four years, the masticated plots continued to have lower species richness (Fig.2) and abundance for

the duration of the study (4 years), with low recovery rates suggesting a permanent transition to an altered community. Further, mastication significantly changed the avian guild structure by favoring seed-eating birds (granivores) and excluding insect-eating birds (foliage gleaners). All five functional guilds examined (i.e., diet, preferred substrate, resident status, breeding status, and nesting substrate) were greatly altered by mastication (Fig. 3). The authors conclude that mastication treatments should not be applied to chaparral where avian conservation is a goal. Repeated use of fire that permanently reduces chaparral vegetation would likely also harm native bird communities.

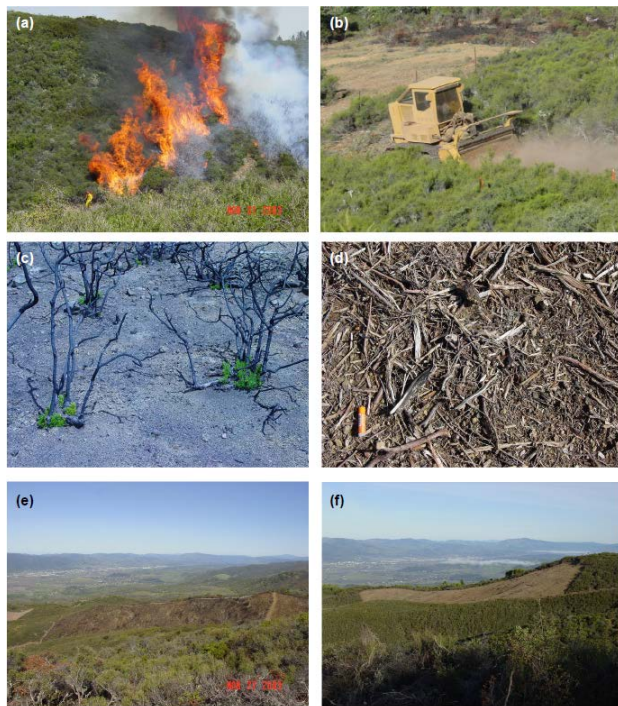


FIGURE 1 (above) Prescribed fire (a) and mastication (b) treatments were carried out within 2 years. Above-ground vegetation biomass was reduced by 95% in both types of treatments. Remaining fuel beds were characterized by dead plant “skeletons” for prescribed fire (c) and ≤ 5 cm length shredded, woody debris for mastication treatments (d). A representative postmanagement experimental unit for prescribed fire (e) and mastication (f) are shown.

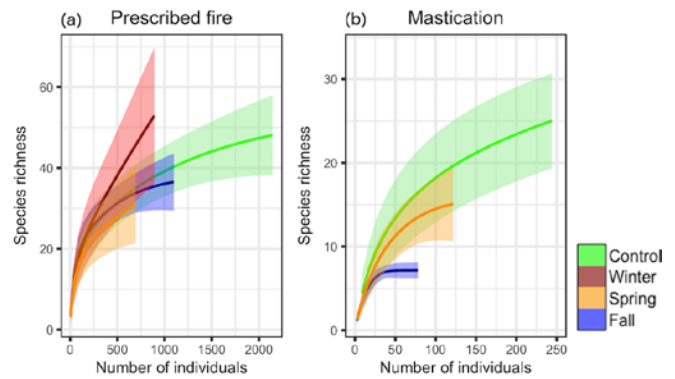


FIGURE 2 (above) Species richness compared between controls and (a) prescribed fire and (b) mastication in all seasons. Prescribed fire treatments recovered to or exceeded control-like levels of species richness post-treatment, whereas masticated treatment areas always had lower species richness. Rarefaction was extrapolated to twice the number of surveys for all treatments and rescaled to number of individuals to account for sample density. Shaded areas represent 95% confidence intervals around estimated species richness (solid lines).

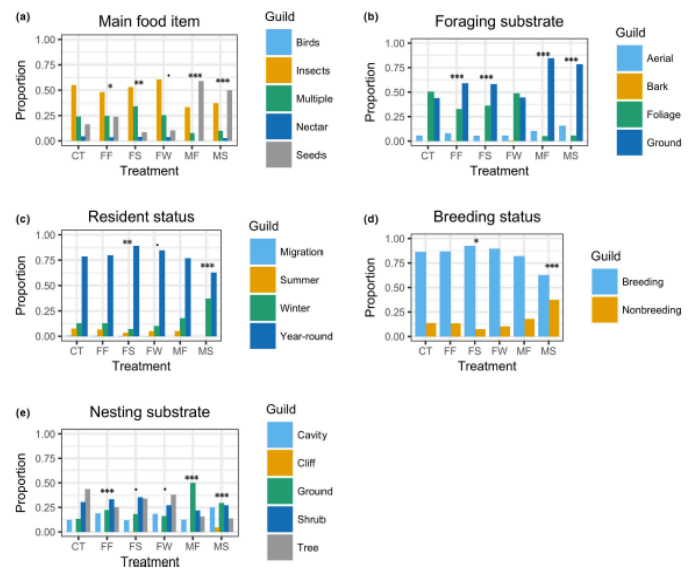


FIGURE 3 (above) Proportions of birds in each guild by the following categories: (a) main food item, (b) foraging substrate, (c) resident status, (d) breeding status (whether or not a species breeds in the region) and (e) nesting substrate. Controls (CT) and treatments are prescribed fire in the fall, winter and spring (FF, FW and FS respectively) and mastication in the fall and spring (MF, MS). Chi-squared tests for significance were performed on each group of proportions. Significance level codes are: ≤ 0.0001 “***”; ≤ 0.01 “**”; ≤ 0.01 “*”; ≤ 0.05 “.”

