



## Research Brief for Resource Managers

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## Wildlife Responses to California Shrubland Wildfire

*van Mantgem, E.F., J. E. Keeley, and M. Witter. 2015. Faunal responses to fire in chaparral and sage scrub in California, USA. Fire Ecology 11(3):128-148.*

Decades of postfire California shrubland studies have identified the main themes in plant community recovery. However, there exists a gap in our understanding of wildlife responses. This paper attempts to close the gap by providing an in-depth synthesis of animal responses to fires in these shrubland systems.

First, the existing literature is summarized by taxa, illustrating where more study might be needed. The taxonomic groups summarized include: arthropods, reptiles and amphibians, birds, small mammals, and large mammals. The majority of these shrubland studies are postfire studies observing wildlife in a fire altered habitat for one to several years. The results of these studies differ greatly depending on study design factors such as time and space, or study target species and behavioral traits. Because of this, the California studies are further compared to landscape-scale and longer-term chronosequence studies from other Mediterranean Type Climate (MTC) regions.

### Management Implications:

- Changes in fire regime characteristics have different effects on different wildlife functional types.
- For larger animals that are forced to flee, a high rate of spread from wind driven fires can have devastating impacts whereas rapid fire spread may reduce fire intensity and smoke production and benefit animals that shelter in place.
- Fire size may have substantial impacts on those animals that must recolonize but little impact on the animals that remain in place.
- Shrubland fragmentation and increased fire frequency will disrupt the habitat's landscape connectivity and vertical structure, affecting the animal groups differently with succession over time.

By sorting the observed, scenario-specific animal responses into three functional groups the authors provide a useful conceptual framework for understanding the diversity of animal responses to fire and how functional types are affected by different fire regime characteristics. These three groups are 1) endogenous survival, 2) sheltering in refugia, and 3) fleeing & recolonizing (see Table 2).

For example, plants have long been understood to recover endogenously after fire

from local seeds or resprouts. As a consequence, large landscape fires have little impact on plant recovery. While this is true of some animal groups that are able to survive as dormant stages or safely hidden in place, it most definitely is not true for the faunal groups that must flee and recolonize.

Using this simple model of how different animal groups are expected to respond to different fire parameters should help land managers prioritize local shrubland community conservation planning strategies

where there is a lack of knowledge. Animals, unlike plants, are mobile and therefore harder to study. They are also more vulnerable to complex landscape-scale meta-population dynamics like refugia connectivity. In other MTC regions, old-growth fire refugia disproportionately protect wildlife populations' survival and persistence through fire disturbance. More study of the functional role of California's fire refugia and old growth shrublands is needed.

**Table 2.** Fire regime characteristics that are significant to plant and animal survival and recovery.

Fire regime parameter	Plants	Animals		
		Endogenous diapause	Shelter in refugia	Flee and recolonize
Frequency	X			
Size or patchiness			X	X
Rate of spread			X	X
Intensity		X	X	
Season	X	X	X	X