

FOOTHILLS FIRE AND BIOTA PROJECT: UNDERSTANDING THE EFFECTS OF FIRE AND ENVIRONMENT ON BIOTA



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Introduction

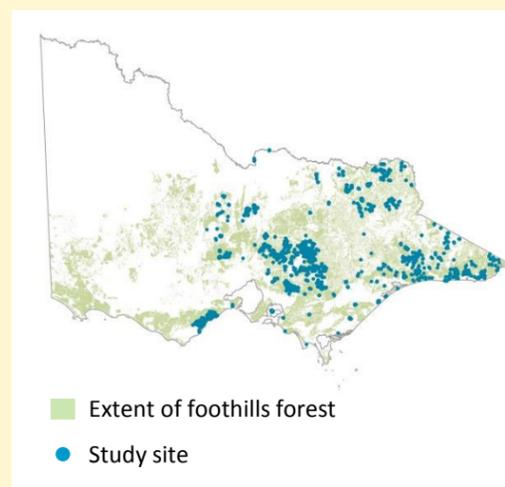
The Foothills Fire and Biota project aims to enhance understanding of the relationships between fire and biodiversity in the foothills forests to inform fire management. Large, intense fires occur periodically in this system, while less-severe/smaller prescribed burns occur more frequently.

In these analyses, we examined the relative effect of fire and on fauna and habitat, compared to the influence of environmental attributes – such as rainfall, topography, vegetation – which also cause considerable variation within foothills forests.

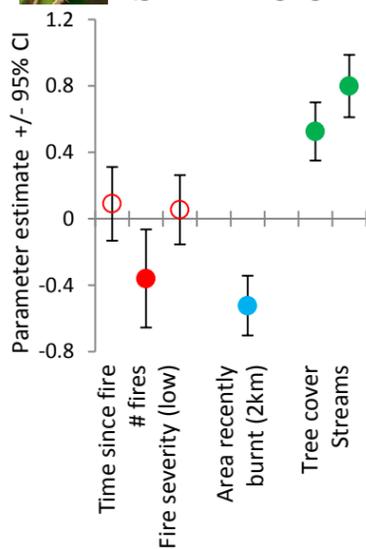
Methods

We compiled empirical data from six different projects undertaken by our organisations. The combined dataset provided comprehensive geographic coverage of this system (see map).

Here, we focus on data relating to birds, mammals and habitat structure. We used linear mixed models to investigate the relationship between these measures of biodiversity, and fire and environmental attributes. The influence of fire was examined at both local and broader 'landscape' scales.

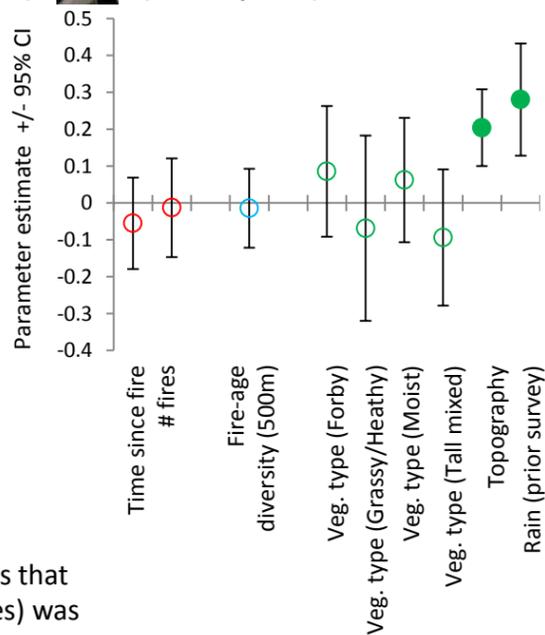


BIRD ABUNDANCE (ground foraging insectivores)



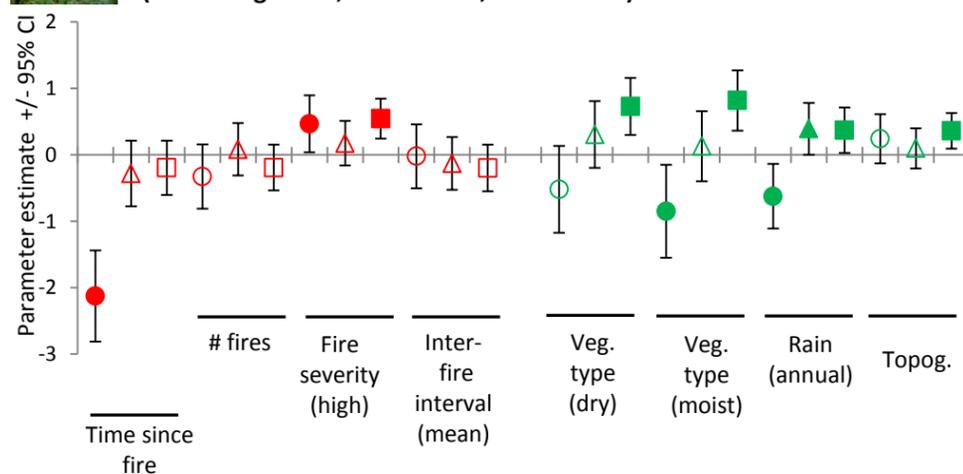
The abundance of insectivorous birds that forage on damp ground (n=10 species) was affected by fire, at local (red symbols: solid=P<0.05) and landscape (blue) scales, and environment (green). Abundance decreased with increased fire frequency and surrounding cover of recently burnt vegetation, and increased with tree cover and stream presence.

MAMMAL RICHNESS (native species)



Native mammal richness (n=21 species) was influenced only by environmental attributes. More native mammals were recorded at topographically higher sites, and when rainfall in the year preceding surveys was increased.

HABITAT COVER IN DIFFERENT HEIGHT STRATA (O = bare ground; Δ = 0-0.5m; □ = 0.5-1m)



Habitat cover below 1m was influenced by both fire and environment. The cover of bare ground decreased with time-since-fire; was increased after severe fires (relative to less severe fires); and decreased in moist vegetation and as annual rainfall increased. Low vegetation cover (0-0.5m) only showed a significant, positive relationship with annual rainfall. Mid vegetation cover (0.5-1m) was affected by all environmental variables and fire severity (being increased following severe fires, relative to less severe fires).

Discussion and implications

Environmental attributes often had a stronger effect on biodiversity measures than fire. Fire did not influence native mammal richness, however fire frequency and time-since-fire affected the abundance of insectivorous birds. Increased fire frequency, and cover of recently burnt vegetation in the landscape, reduced the abundance of these species. Habitat cover in some strata was affected by fire, with time since fire and fire severity being of strongest influence. Therefore, while results show an often-weak direct effect of fire on fauna in foothills forests, fire may indirectly affect animal occurrence by altering the availability of key habitat attributes. This study will assist fire management to consider the impact of planned fires on biota.

