Research Brief for Resource Managers

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Pyrodiversity Doesn't Always Increase Biodiversity: An Example from Australia

Taylor, R.S., S.J. Watson, D.G. Nimmo, L.T. Kelly, A.F. Bennett, and M.F. Clarke. 2012. Landscape-scale effects of fire on bird assemblages: does pyrodiversity beget biodiversity? Diversity and Distributions 18: 519-529. [DOI: 10.1111/j.1472-4642.2011.00842.x](https://doi.org/10.1111/j.1472-4642.2011.00842.x)

Management Implications

- Vegetation treatments 'creating' postfire age class heterogeneity threatens Australian mallee bird biodiversity.
- It's important for all land managers to realize adhering to the 'pyrodiversity begets biodiversity' rule-of-thumb may not increase species richness at the landscape scale.
- Given the results of this study, it is recommended that similar studies be conducted in Californian ecosystems to see how pyrodiversity affects species at landscape scales.

Most researchers know that plant and animal responses to patterns and processes are scale-dependent, but most studies use a site-scale perspective. This is problematic in that site-scale perspectives could be very misleading, particularly in geographically heterogenous, biodiversity hotpots such as many arid ecosystems. To solve this problem, these authors use a novel landscape-scale methodology to assess the truth in a popular land management 'truism': pyrodiversity begets biodiversity. How valid is this ecological management mantra? At least in the case of arid Australia avifauna, it's quite wrong. While this study was conducted in Australia, it highlights the importance of using landscape scale perspectives to examine commonly-stated assumptions.

In the Murray Mallee region of south-eastern Australia, 26 4-km study landscapes were chosen to reflect several key landscape properties (e.g., a fire-mediated heterogeneity gradient, Fig. 2a; a proportion of older vegetation gradient, Fig. 2b; and the proportion of triodia mallee vegetation in a landscape, Fig. 3c), as well as the scale used for local fire management. Within each of the 26 study landscapes, 20 sets of point-count bird surveys (both general and targeted surveys by two observers each) were conducted in four rounds through the spring and autumn seasons of 2006/07 and 2007/08. Of the 64 species of birds observed through all those surveys, 20 were threatened and 24 were rare. The relationships between avian species richness and landscape properties were then modeled (Fig. 3).

Overall, model fit was highest for total species richness (r^2=0.67; Fig. 3), then rare species richness (r^2=0.57), and lastly, for threatened species richness (r^2=0.52). While the proportion of older vegetation was important to avian richness (Fig. 3b), the postfire age-class diversity was not (Fig. 3a). Total and rare species richness responded to the amount of triode mallee in the landscape, while threatened species did not (Fig. 3c).

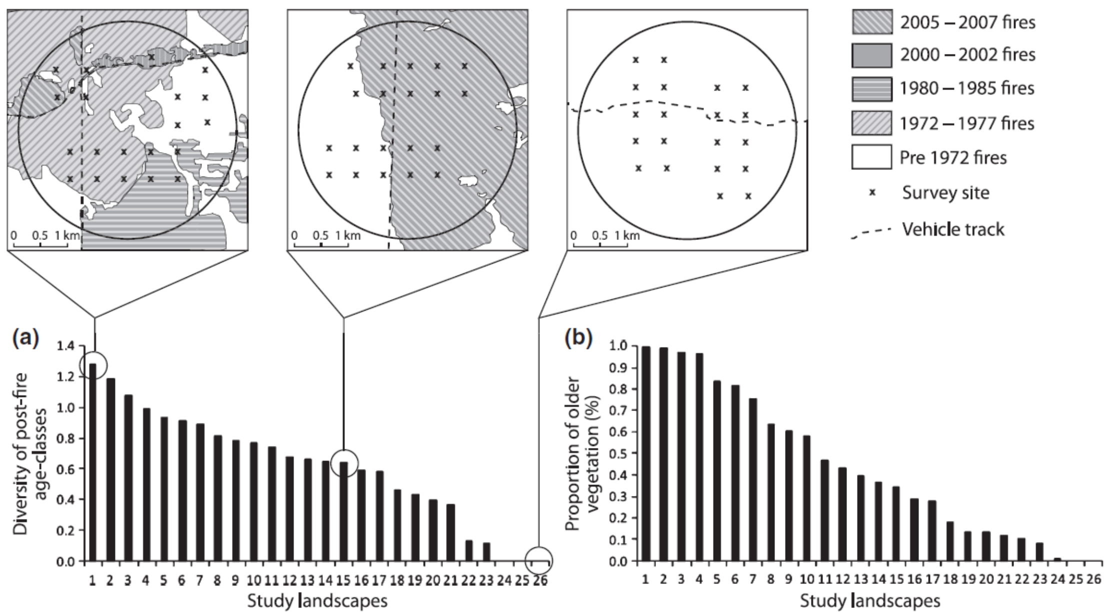

Figure 2 Depiction of (a) the diversity of post-fire age classes (Shannon's diversity index) and (b) the proportion of older vegetation (i.e. > 35 years since fire) in the 26 study landscapes. Examples of three study landscapes with differing diversities of fire age classes are shown.

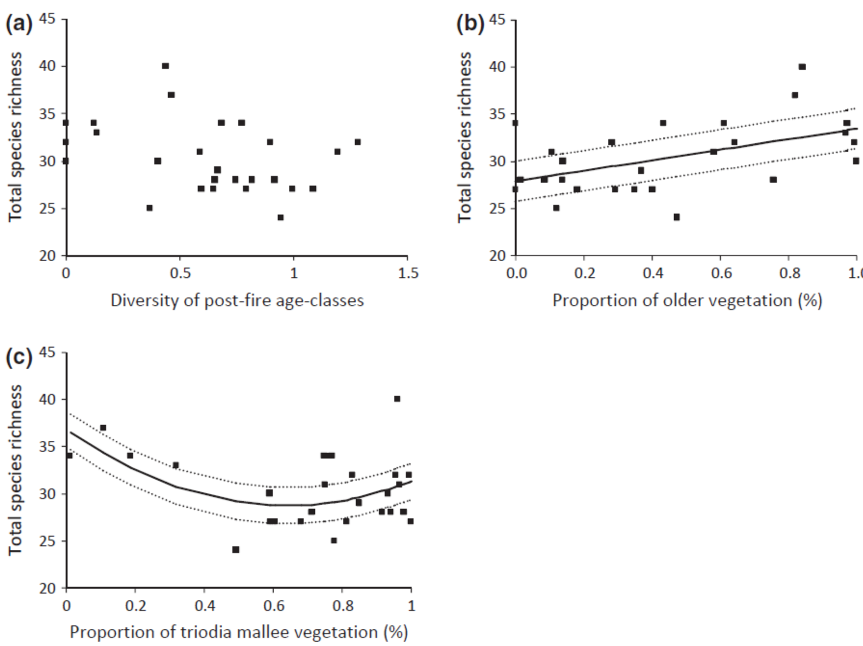

Figure 3 Examples of relationships between total species richness in landscapes and (a) the diversity of post-fire age classes, (b) the proportion of older vegetation (> 35 years since fire) and (c) the proportion of triodia mallee vegetation. Predicted trends and 95% confidence intervals (broken lines) are depicted for important predictor variables (i.e. those for which the 95% confidence intervals of model-averaged coefficients did not include zero). Squares represent raw data.