

Fire, Landscape Pattern and Biodiversity

Research Fact Sheet

The Department of Land, Water and Planning's (DELWP) Forests, Fire and Regions Group invests in an Integrated Forest Ecosystem Research Agreement (IFER) with the University of Melbourne (UM), that delivers critical science projects that provide evidence to support policy and operational practices. IFER includes five core themes of research- biodiversity, carbon, vulnerability, hazards and water. This fact sheet provides an overview of the 'Fire, Landscape Pattern and Biodiversity Project', as the core project within the biodiversity theme. The project commenced in July 2009 and is due to be completed by June 2019.

The Project

In 2008, DELWP introduced a landscape-scale mosaic burning program in Victoria. This type of burning creates a patchwork of vegetation types of varying post-fire ages. This is referred to as spatial heterogeneity.

In conjunction with this approach DELWP wanted to understand if spatial heterogeneity in post-fire ages and vegetation types benefits biodiversity. To test this UM established a research project in the Great Otway National Park in southern Victoria. The project has been undertaken in three phases.

In Phase 1 (2009-2015) UM examined how birds, ground-dwelling mammals, and vascular plants responded to spatial heterogeneity in post-fire ages and vegetation types across the landscape. The 100 ha sampling units, 'land mosaics', represented different combinations of post-fire ages and vegetation types.

In Phase 2 (2011-2014) UM examined the effects of single planned burns on bird and mammal population size. The movements of invasive predators, like foxes,

which prey on native animals, particularly after fires, when plant cover has been reduced and native animals are more vulnerable, was also examined.

In Phase 3 (2016-2019) UM are resampling the 'land mosaics'. Continued planned burning since 2015 has changed the nature of the spatial patterns in the landscape. Resampling will give the researchers the confidence to separate the effects of burning from vegetation type.



Figure 1: Woodland regenerating after planned burning in the Otway Ranges (Photo: Alan York)

Policy and Operational Implications

DELWP has two primary objectives for Bushfire Management of Public Land:

1. to protect life and property and;
2. to maintain or improve the resilience of natural ecosystems and their ability to deliver services such as biodiversity, water, carbon storage and forest products.

This project is specifically targeted at the latter.

The project will provide DELWP with an understanding of the effects of the current fuel management strategy on biodiversity and support decision making about fire regimes with evidence about the impact of alternative

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regimes on biodiversity values and ecosystem resilience.

The Research Team

This research is being conducted by the Fire Ecology and Biodiversity Group at UM, in partnership with DELWP and Parks Victoria.

The project is coordinated by Matthew Swan assisted by Alan York, Julian Di Stefano and Holly Sitters (all University of Melbourne).

Project Outputs

The project will provide DELWP and its land management partners with:

- information on whether fire-mediated spatial heterogeneity benefits biodiversity and contributes to ecosystem resilience
- information on how individual species are affected by different post-fire ages
- information on the effects of fire on key habitat features such as logs and ground cover, and
- data to help answer strategic monitoring and evaluation questions of relevance to the Barwon Otway Bushfire Risk Landscape.

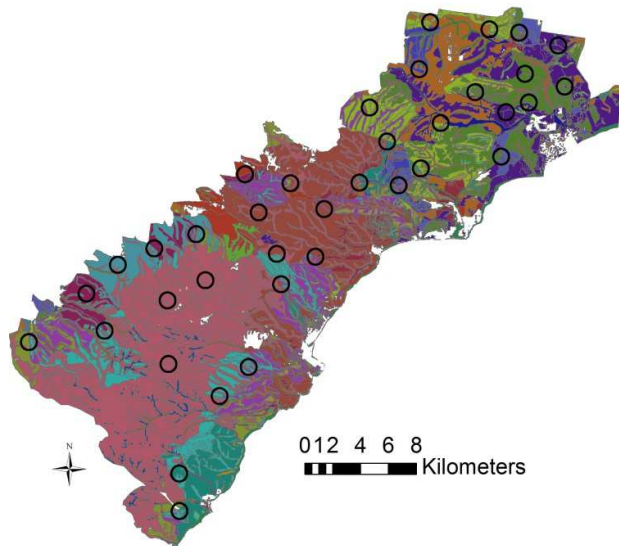


Figure 2: The study area in the Otway Ranges showing circular 'land mosaics'. Different colours on the map represent different vegetation types and post-fire growth stages, highlighting the heterogeneous nature of this landscape.



Figure 3: Rufous Fantail *Rhipidura rufifrons* (Photo: Holly Sitters)

Project Status (June 2017)

Phases 1 and 2 of the project have been completed and have resulted in an extensive range of scientific publications and DELWP Fire and Adaptive Management Reports (link provided below).

Phase 3 of the project has recently commenced and three new students have joined the team. Annalie Dorph (PhD) and Ellen Rochelmeyer (Masters) will undertake projects focussing on ground-dwelling mammals. Sandra Penman (PhD) will undertake a project focussing on microbats.

To date, existing sites have been re-marked and new sites have been established in parts of the landscape, where fire has dramatically changed spatial patterns. Remote cameras targeting ground-dwelling mammals have been deployed at all sites during autumn and vegetation structure has been measured. Data analysis is currently underway.

For further information, please visit the project website:

<http://fireecologyandbiodiversity.com/fire-landscape-pattern-and-biodiversity.html>

DELWP Fire and Adaptive Management Reports can be accessed at:

<https://www.ffm.vic.gov.au/research-and-publications/fire-research-and-adaptive-management-publications>