

Variation in Fire Response Traits in Mountainous Plant Communities

Lyndsey Vivian¹, Geoffrey Cary¹, Ross Bradstock², Emlyn Williams³, Dick Williams⁴ and Malcolm Gill¹

¹The Fenner School of Environment and Society, The Australian National University, ACT

²Centre for Environmental Risk Management of Bushfires, University of Wollongong, NSW

³Statistical Consulting Unit, The Australian National University, ACT

⁴Tropical Ecosystems Research Centre, CSIRO, NT



Which Traits?

Critical traits for plant species to persist in fire-prone ecosystems include:

- the ability to resprout
- fire-stimulated seedling recruitment
- seed bank formation



Research Questions

- How and why does the proportion of species with different traits vary across a landscape?
- Why are there more obligate seeding species found on rocky outcrops?
- What is the relative importance of the fire regime and the site productivity in determining this variation?
- What are the underlying mechanisms?

Study Area

An altitudinal gradient across the Australian Alps, from Burrinjuck (NSW) to the Brindabellas (ACT), Kosciuszko and Merambego (VIC/NSW border).

A Unique Analysis: The 2003 Fires

Using site-specific data

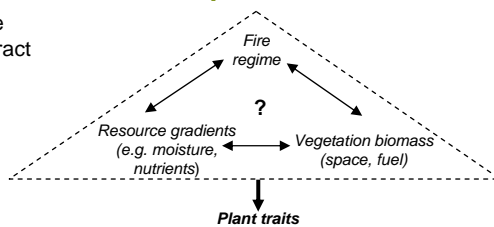
The extensive wildfires of January 2003 provide a unique opportunity to study the effects of a landscape level fire. Following the fires, several research teams¹ surveyed the response of **814 species** at **284 sites** across Australia's mountainous region. Site-specific data provides detailed information on how plant species are responding to fire in different parts of the landscape.

This project brings these surveys together in a comprehensive meta-analysis.

Understanding interactions is important

How does the fire regime and site productivity interact in the study area?

These interactions vary between landscapes, making generalisations difficult.



¹Data collaborators

Michael Doherty, CSIRO Sustainable Ecosystems
Keith McDougall, NSW Department of Environment and Conservation
Nic Gellie and Isobel Crawford, Australian Botanical Surveys
Margaret Kitchin, Environment ACT
Members of the Australian Alps Liaison Committee

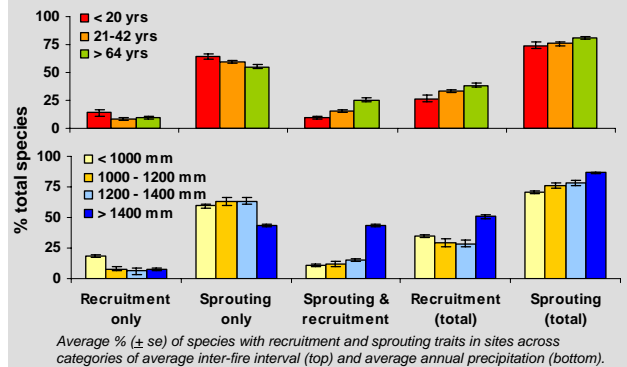
Acknowledgements

Clive Hilliker, The ANU, for assistance with poster design



Preliminary Results

Preliminary investigation suggests that the proportion of species with different traits varies in response to variables associated with both the fire regime and site productivity.



- species which recruit from seed only are in higher proportions where fire intervals are short and annual precipitation is low
- species which resprout only are in lower proportions where annual precipitation is low
- species which recruit and resprout are in higher proportions where annual precipitation is high and fire intervals are long

Next steps

Generalised linear models will be used to assess the relative importance of variables and their interactions in explaining the variation in traits.

The processes behind these relationships will be investigated by testing several models explaining associations between traits, the fire regime and site productivity.

Project Outcomes

- Knowledge of the relative importance of fire versus other environmental factors in influencing the distribution of different types of plant species, and a greater understanding of the mechanisms underlying these relationships
- Improved guidelines for managing these factors for different types of plant species
- Prediction of potential impacts of land use change and global change on the distribution of different types of plant species