



Cattle grazing and fire severity in the Australian Alps

Recent bushfire disasters demand a rethink of fire management strategies, including the use of cattle to reduce the amount of combustible material.

We analysed satellite images to determine the effect of grazing cattle on fire severity in eucalypt forests and woodlands following large fires in the Victorian Alps during the summers of 2002/2003 and 2006/2007.

We found no evidence that grazing had reduced fire severity. Instead, we found that vegetation type had the strongest influence on the severity of the fires.

Research findings

Grazing does not reduce fire severity in the woodlands and forests of the Australian Alps. Rather, we found some evidence that grazing could increase fire severity by increasing the amount of woody vegetation.

Fire severity was most closely linked to vegetation type and is likely to be highest in dry eucalypt forests, followed by wet eucalypt forests and then woodlands.

The Australian Alps are vulnerable to severe fires

More than 90% of the Australian Alps has been burnt since 2003, creating large areas of vulnerable regenerating forests. Reducing fire severity is critical to protect life and infrastructure, and sustain the rich diversity of vegetation.

The alpine landscape has grasslands, woodlands, and wet and dry eucalypt forests. Fires in eucalypt forests are important to study because of their extreme intensity. They are driven by high amounts of combustible material ('fuel loads') on the forest floor and dense forest structure. When carried by the highly flammable leaves, fast-moving fires can occur in the upper canopy. Such fires are nearly impossible to control.

Grazing cattle to reduce fire severity is controversial

Cattle grazing ended in Kosciuszko National Park in the 1960s and in Victoria in 2005. Recent controversy about the potential for cattle to reduce fuel loads in the Australian Alps has pitted pastoralists against environmentalists and scientists against scientists. It has also raised questions about the acceptable uses of land in national parks. While the link between large grazing animals and reduced fire severity is strong, especially where grass is the main source of fuel, many conservation biologists consider cattle grazing to be as much a threat to the environment as controlled fires.

90%

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Recently burnt alpine ash forest

What did we do?

Our objective was to determine whether fire severity in eucalypt forests in the alps and woodlands is reduced in areas grazed by cattle.

We also wanted to find out if areas that had been previously grazed by cattle were less or more vulnerable to severe fires compared to areas that had never been grazed.

How did we do it?

We focused on the lower-altitude eucalypt forests and woodlands of the Victorian section of the Australian Alps bioregion. This area is mostly within the Alpine National Park and was largely grazed by cattle until 2005.

We analysed satellite images and used vegetation maps to identify vegetation types, comparing the satellite imagery before and after the fires. Almost all (99%) of the area covered by grazing licences had been burnt at least once since the year 2000.

We overlaid maps of 'crown scorch' from large bushfires in 2002/2003 and 2006/2007 with the location of grazing licences. Crown scorch occurs when the flames reach the forest canopy; it is a measure of fire intensity and can be detected in satellite images.

We used a geographic information system to create pairs of circles of four-kilometre diameter on grazed and ungrazed areas. We then compared thousands of random sample points between the grazed and ungrazed circles for the 2002/2003 and the 2006/2007 fires, looking at fire severity, vegetation type, slope and aspect.

What did the results tell us?

Vegetation type has the strongest influence on fire severity

We found that vegetation type had the strongest influence on the probability of high-severity fires. For both the 2002/2003 and 2006/2007 fires, dry forests were the most likely to suffer from severe fires, followed by wet forests and then woodlands.

Grazing does not reduce fire severity

The probability of a high-severity fire during 2002/2003 was significantly higher in the grazed areas compared to the ungrazed areas. This could be due to the fact that grasslands are less flammable than woodlands, and sustained grazing can sometimes increase shrub cover at the expense of grass cover.

For the 2006/2007 fires, the grazed areas were slightly less likely to have a high-severity fire than the ungrazed areas, but this difference was not significant.

Where to from here?

We have shown that for the alpine forests and woodlands, grazing is likely to have a negligible effect on fire severity. Overgrazing may actually increase fire severity, with more woody shrubs and less grassland.

In other landscapes, such as northern Australia's savannas, the effect of grazing on fire severity may be different. Fire managers need to take a whole-of-landscape view in assessing methods for controlling fires.

We have demonstrated that the combination of a well-designed field survey and landscape-scale comparisons using remote-sensing can offer critical insights to inform conservation policy and practice.

Unburnt alpine ash forest



Who are the researchers?

Professor David Bowman



David is Professor of Environmental Change Biology at the School of Plant Science, University of Tasmania. His research is focused on the ecology, evolution, biogeography and management of Australian forested landscapes.

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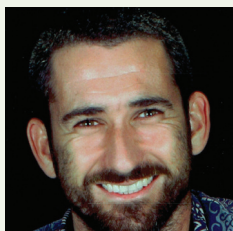
Dr Grant Williamson



Grant is a landscape ecologist and spatial scientist with the University of Tasmania. He works in the Vegetation and Fire Project team to examine how fire activity varies in Tasmania and the Australian Alps according to landscape, vegetation type, land tenure and management history.

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Brett is a fire and vegetation ecologist at the University of Melbourne. He collaborated with the hub's Vegetation and Fire Project, focusing on the Australian Alps and the processes that have shaped alpine vegetation.

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Further reading

- Williamson GJ, Murphy BP & Bowman DMJS (2014) Cattle grazing does not reduce fire severity in eucalypt forests and woodlands of the Australian Alps. *Austral Ecology*, vol 39, pp 462-68.
[doi: 10.1111/aec.12104](https://doi.org/10.1111/aec.12104)
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About the NERP Landscapes and Policy Hub

The Landscapes and Policy Hub is one of five research hubs funded by the National Environmental Research Program (NERP) for four years (2011–2014) to study biodiversity conservation.

We integrate ecology and social science to provide guidance for policymakers on planning and managing biodiversity at a regional scale. We develop tools, techniques and policy options to integrate biodiversity into regional-scale planning.

The University of Tasmania hosts the hub.

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