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WHOLE-OF-AUSTRALIAN ALPS IMPACTS

A WHOLE-OF-ALPS BIOREGIONAL APPROACH TO MANAGING FERAL HORSES IN KOSCIUSZKO NATIONAL PARK

Dr Luciana Porfirio[1] and Professor Brendan Mackey[2]

[1]Agriculture and Food Business Unit, CSIRO, and Fenner School of Environment and Society, The Australian National University, Canberra; [2]Climate Change Response Program, Gold Coast Campus, Griffith University, Southport

Park management in complex landscapes spanning jurisdictions is often limited by conflicting policies, disjointed management priorities and no common spatial information system. Kosciuszko National Park lies at the heart of the 1.6 million ha Australian Alps national parks network, which comprises 11 protected areas across Victoria, NSW and the ACT. The Alps network has a co-operative management program and the parks are listed as National Heritage, but there is no common geographic information system (GIS) on natural and built assets—or the threats to them, such as from feral horses—to underpin strategic systematic conservation planning.

We generated a GIS database of key environmental variables, assimilating data and information from across the three jurisdictions, to provide a common information system in support of systematic conservation planning for the Alps network (Mackey et al. 2016). Critically, this approach enabled the assessment of threats to the environment and biodiversity across state and territory borders, providing the basis for shared management strategies and actions reflecting the geographic distribution and impacts of feral animals, weeds and bushfires. This kind of landscape-wide approach provides a pathway for identifying cross-jurisdictional park management decision-making around priority actions, and more effective resource allocation and harmonisation of management strategies and tactics.

Until our 2015 publication (Mackey et al. 2015), there was not even a common vegetation classification system and map available for the Alps network at a scale suitable for management. This new classification used existing state vegetation classes and mapping to produce a common system of vegetation mapping. Expert knowledge was used to match vegetation groups and classes. Building upon this new dataset, our Alps network GIS brought together additional data on the major threats residing in the three jurisdictions. Examples of threatening processes include invasive plant and animal species, recreation and tourism activities, infrastructure development, climate change, and altered fire regimes. Drawing upon the new GIS database, we were able to identify seven iconic landscapes that characterise the biodiversity and natural heritage values of the Alps network and that represent landscape-level foci for prioritising threat management and strategic management responses (Table 1). For the Alps network, our research found that the worst threats at a landscape level were identified as (1) feral horses and (2) the invasive plants hawkweeds, willows and Oxeye daisy.

Table 1. Brief description of the natural icons of the Australian Alps network.

Alpine Peaks	The Alpine Peaks are the distinctive, lofty treeless peaks and high ridges prominent in the landscape, characterised by steep slopes positioned above the tree line.
Treeless High Plains and Frost Hollows	The High Plains are expansive and treeless flat to undulating features at higher elevations, snow covered in winter and spring. The undulating nature of the topography leads to associated frost hollows where cold air drains, leading to conditions too cold for tree growth.
Alpine Wetlands	The Alpine Wetlands describe the bogs and peatlands that occur in high-altitude wetlands and waterways at the tops of the extensive water catchments.
Snow Gum Woodlands	Snow Gums cover extensive areas at the highest elevations that trees can grow and embody much of what people recognise as typifying the Alps landscape.
Tall Wet Forests	The Tall Wet Forests are dominated by Alpine Ash (*Eucalyptus delegatensis*) and Mountain Ash (*E. regnans*) canopy species.
Rain Shadow Woodlands	The Rain Shadow Woodlands are a distinctive landscape feature occurring in the upper Snowy River Valley.
Heritage Rivers	The mighty river systems draining to both sides of the Great Dividing Range. The best known is the Snowy River; rich in folklore, it feeds water from the summit of Mt Kosciuszko to the ocean.

We then examined in more detail the ecological damage caused by feral horses and explored the use of satellite data to monitor their impacts (Porfirio et al. 2017). We used field observations of vegetation condition at a network of sites in the Alps where feral horses have been observed as being present or absent (Figure 4). These data were then analysed using satellite data from the NASA MODIS sensor. We used an index of vegetation health called 'fPAR' (fraction of photosynthetically active radiation), which is sensitive to the health of the vegetation cover. The ecological condition of the vegetation was assessed in the field by rangers using a modified version of the Landscape Function Analysis (LFA) index. We found significant differences in the LFA index between sites where horses were present or absent. We also found that sites where horses were present have 10% lower fPAR values than sites where horses were absent. The results also revealed a significant correlation between LFA and fPAR. This means the extent of the ecological damage caused by the feral horses—whose impacts include soil compaction and increased runoff, reduced vegetation abundance, increase in bare soil and the trampling of new plant growth—can be detected from space. Our analyses therefore provide further support for the well-established fact that feral horses have a negative impact on the condition of Australian alpine vegetation and demonstrate that satellite data can be used in conjunction with field surveys to monitor the impacts of feral horses in the Alps network, including Kosciuszko National Park. This approach may also be relevant to evaluating the damaging impacts of feral deer and pigs. The approaches, data and results presented here can be used to support improved collaborative decision-making by the Australian, NSW, Victorian and ACT governments, and more coherent, conjoined management interventions for the Alps network.

References

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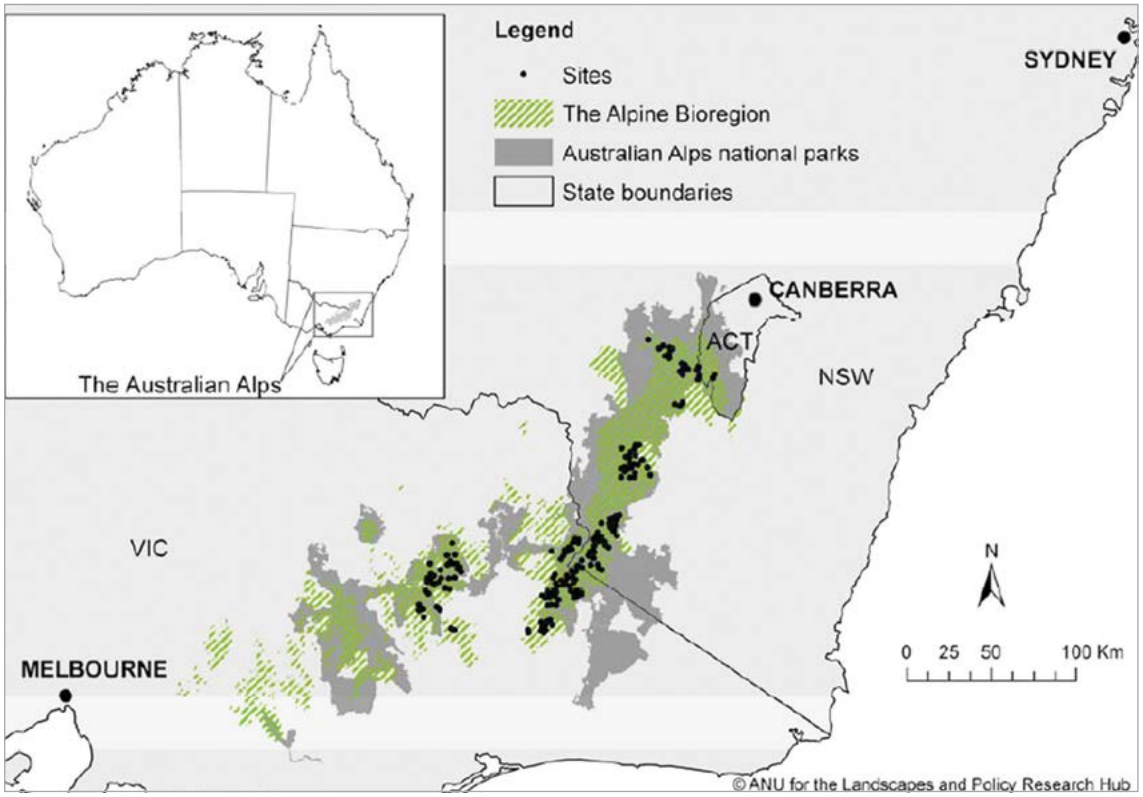

Figure 4. The Australian Alps national parks and the sites where the Landscape Function Analysis index was assessed.

Alps national parks – grey; Australian alpine bioregion – hatched.

Feral horse damage to Sphagnum, Tin Mines area, Pilot Wilderness, Kosciuszko National Park, 2013.

Source: Graeme L. Worboys.