



PROPOSAL

# **Environmental Impact of Feral Horses in the Australian Alps**

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## Background

Management of feral horses and in fact any potentially overabundant species not only requires measurement of negative impact but also positive impact. There can be unexpected adverse consequences of reduction in the number of feral horses (Dobbie et al. 1993). Management of brumbies in the Alpine National Park should aim to minimise any negative impact caused by feral horses and maximise any positive impact. To do this the relationship between impact and feral horse density must be determined (Dobbie et al. 1993).

The first measurement of the impact of feral horses in the Australian Alps was conducted during a Masters research project (Dyring 1990). This work showed that feral horses have impact on soil and vegetation along the paths that they create. However, the area influenced was only very small (5.8 km of horse tracks per square km), less than 0.2% of the area. Or in other words at least 99.8% of the area was not significantly impacted by feral horses. Feral horse populations in the Australian Alps have increased and expanded since this first work was done.

In 1992 a workshop "Feral Horses in the Alps" at Howmans Gap recommended that research was required to assess the degree of vegetation change and soil disturbance with respect to brumby density (Walters et al. 1993). The importance of this as an essential step in management of feral horses had been demonstrated in central Australia (Berman 1993) and was a key recommendation in the national guidelines for managing feral horses, discussed at the workshop (Dobbie et al. 1993). This was also a recommendation of a more recent report discussing the environmental impact of feral horses in the Australian Alps (Dawson 2009).

Unfortunately, work to measure the impact of feral horses in relation to their density has still not been done. Since the workshop in 1992 work was conducted using exclusion fencing in areas with relatively high densities of horses. Fencing horses and other large herbivores out changed the structure of the pasture. Inside the fence, where there were no horses, deer or pigs the pasture became tall and dense. The tall dense, "rank" vegetation inside the enclosure crowded out other pasture species reducing the plant species diversity (Wild and Poll 2012; Williams et al. 2014). There was no work conducted to see how representative these sites were of the total area used by feral horses. There were no detailed studies to measure the impact on native animals caused by this dramatic change in vegetation structure and diversity.

Prompted by increases in feral horse numbers and the apparent overpopulation there has been an increase in research activity. A study was conducted attempting to quantify the impact of feral horses across the treeless drainage lines of the entire Australian Alps (Robertson et al. 2015). However, this work does not measure the relationship between severity of horse impacts and horse density. It compares places with or without sign of horses. These places range from heavily used to virtually untouched. Measurement of impact was conducted by ranking various attributes of sites using categories ranked from "bad to good" condition. This approach increases the potential for biased classification of a site as "bad" when there is sign of horses present. Essentially the study confirms that where there are horses there is sign of horses and condition is recorded as bad. However, in this study there is no way of attributing impact to horses alone because none of the "degradations" measured are horse specific, they could be caused by many other factors. To improve this work there should have been actual measurements of stream bank steepness, stream width, sedimentation, slope, flow rate, catchment size, erodibility and other

factors independent of the assumption that it is “bad or good” condition. Activity of horses also needed to be measured using a continuous variable such as dung density (this was apparently done but the results were not reported and were not used in the analysis). Other potential causes of degradation such as deer, feral pigs, rabbits, bush walkers and horseback riders should have also been quantified and included in an analysis to see how horse activity compared. Even with these improvements the study is still only correlative and can not conclusively attribute degradation to horses.

Plots were not randomly assigned to different treatments (i.e. horses or no horses). Horses may be selecting certain habitats and these habitats may differ from those where horses are not found. Differences between sites with or without horses may be due to factors other than horses. Data were not available from before and after imposition of the treatment (introducing horses) for both control (horses absent) and experimental (horses present) plots. Therefore, it is not possible to attribute observed differences unequivocally to the effect of the treatment (horses) (Beever and Brussard 2000). A controlled, manipulative experiment is difficult to run but it is essential in the Alps to attempt this in order to reduce the conflict between strongly opposed interest groups. This conflict has and will continue to reduce the effectiveness of management.

Parks Victoria plan to remove all horses from the Bogong High Plains. Their justification is based on an assessment of the impact of brumbies in the Bogong High Plains (Tolsma and Shannon 2018). This study was modelled on Robertson et al. (2015) and suffers from the same design faults along with the use of a confusing non-random selection of sites. There are sites from previous studies selected for other purposes as well as a new set of sites that targeted areas heavily used by horses. Brumby advocate groups believe the Bogong brumbies and other Alps brumbies have special heritage and genetic attributes worth protecting in identified, sustainable, managed numbers. There are also most likely unknown positive environmental impacts of feral horses in some areas, where their densities are managed. These areas, the positive impacts and the optimum densities need to be identified to prevent unexpected undesirable consequences of removal of too many or too few feral horses.

Design of improved experiments to measure the relationship between feral horse density and environmental impact requires improved understanding of the movement patterns and habitat use of feral horses in the Australian Alps. Studies using modern radio-telemetry devices are required for this purpose.

Here we propose a world-wide literature review and research in the Australian Alps to develop an improved research design to measure the positive and negative impact of feral horses and the benefits of various management options. This work is preparation for future controlled, manipulative experimentation which should be conducted with all agencies and community interest groups involved so that the results are more likely to be accepted and result in real improvements in the management of the environmental impact of feral horses in the Australian Alps.

## Project Summary

- 1. Literature review**
- 2. Improve broad scale impact assessment.** Visit a sample of sites used by Robertson et al. (2015) and Tolsma and Shannon (2018) in the Bogong High Plains, the eastern

Victorian Alps and Kosciuszko National Park to assess the value of these sites and then methods used for future work. Visit other parts of the Australian Alps with a view to designing an improved natural experiment to assess the broad scale impact of feral horses in the Australian Alps. This work will also help refine methods for future work planned to measure the environmental impact in treated and untreated sites during a controlled experiment where the density of horses is manipulated by management.

3. **Design study of feral horse movement patterns.**
4. **Design manipulative experiment** to measure the relationship between environmental impact of feral horses and feral horse density in the Australian Alps.

Milestone	Due date	Description
1	1 September 2019	Commence contract. Commence literature review. Scientific permits to work on National Parks, drone licence and permit to fly a drone in National Parks applied for.
3	1 Oct 2019	Prepare broad scale impact assessment survey.
4	1 Nov 2019	Commence broad scale impact assessment.
5	1 April 2020	Analyse broad scale impact study data and prepare paper for publication.
6	1 June 2020	Submit papers for publication.
7	1 July 2020	Complete preparation for study of movement patterns and manipulative experiment. Contracts, permits and animal ethics approvals.
8	18 August 2020	Complete final report.

## Outcomes

1. Improved broad scale assessment of feral horse environmental impact across Australian Alps.
2. Project designed and preparation completed for a study to measure the movement patterns of feral horses in the Australian Alps.
3. Project designed and preparation completed for manipulative experiment to measure the relationship between feral horse impact and feral horse density in the Australian Alps.
4. Broad scale environmental impact assessment paper published.
5. World-wide review of feral horse environmental impact science.

FUNDING SUMMARY	2019	2020	
	Year 1	Year 2	Total
<b>Australian Brumby Alliance</b>	\$63,045	\$83,286	\$146,331
<b>USQ contribution (in-kind)</b>	\$59,892	\$79,121	\$139,013
<b>Total</b>	\$122,937	\$162,407	\$285,344

## References

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