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MODELLING MANAGEMENT APPROACHES

MODELLING FERAL HORSE MANAGEMENT IN THE AUSTRALIAN ALPS NATIONAL PARKS

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Feral horses in the Australian Alps national parks are currently managed by trapping, with no options for culling being considered. While trapping has been so far unsuccessful (Office of Environment and Heritage 2016), evaluating the effectiveness of alternative approaches is difficult. Information regarding ecology and distribution of horses, and the cost and effectiveness of management strategies, is often unknown or uncertain. Addressing these issues requires an objective approach with the flexibility to incorporate different potential scenarios.

We used a spatially explicit population model (SPADE) (Beeton et al. 2015) to simulate and compare the potential effects of two different management strategies to reduce populations of horses in the Alps: culling (shooting) from helicopters versus a combination of on-ground trapping and mustering. Aerial culling has proved controversial and difficult to implement in the Alps for political reasons, despite it being recognised as a humane method by the RSPCA and being used elsewhere in Australia (GNRBA 2014; Northern Territory Government 2018; Queensland Government 2018; ACT Parks, Conservation and Land 2007). Trapping and mustering is the preferred approach of current governments, but it has been unsuccessful previously in the Alps (ACT Parks, Conservation and Land 2007).

We used the results of aerial population surveys conducted in 2014, vegetation data and cost estimates to inform our modelling. We then provided an estimate of the effect of each strategy on population size across the Alps, and their corresponding costs, compared to no management. To account for uncertainties, we simulated different scenarios for horse population densities, dispersal rates and population growth rates.

The results were highly dependent on the growth and dispersal rates of horses. At higher rates, effective population reduction proved impossible under any modelled management plan, though population maintenance was more feasible. Management using aerial culling was three to six times cheaper than mustering, depending on the growth and dispersal scenario. Despite the lower cost, it was also more effective in every scenario modelled. Though aerial culling was slightly more effective within its control region, as mustering is necessarily restricted by road access, this translated to a substantial improvement in population control, especially where growth and dispersal rates were high.

Our results unequivocally suggest aerial culling as the most cost-effective strategy to effectively control horses within the range of currently realistic scenarios that we modelled (Figures 7 and 8). Population control via culling at high growth and dispersal rates may require more intensive control; however, given the relatively low costs predicted this may be feasible—especially if control is targeted to priority areas.

References

ACT Parks, Conservation and Land (2007). *Namadgi National Park Feral Horse Management Plan 2007*. ACT Government, Canberra. https://www.environment.act.gov.au/data/assets/pdf_file/0004/901957/NNP-Feral-Horse-Mgt-Plan-2007.pdf (accessed 11 October 2018).

Beeton, N. J., McMahon, C. R., Williamson, G. J., Potts, J., Bloomer, J., Marthán, N. B., Forbes, L. K. and Johnson, C. N. (2015) Using the Spatial Population Abundance Dynamics Engine for Conservation Management. *Methods in Ecology and Evolution* 6(12): 1407–1416. https://doi.org/10.1111/2041-210X.12434

GNRBA (Goldfield Nullarbor Rangelands Biosecurity Association) (2014) *Large Feral Herbivore (LFH) Management Plan 2014–2019*. Goldfield Mullarbor Rangelands Biosecurity Association, Kalgoorlie. http://www.gnrba.com.au/assets/gnrba-lfh-management-plan-2014-16-v3.pdf (accessed 11 October 2018).

Northern Territory Government (2018) *Feral Horse*. https://nt.gov.au/environment/animals/feral-animals/feral-horse (accessed 11 October 2018).

Office of Environment and Heritage (2016) *Review of the 2008 Horse Management Plan and Wild Horse Management Program, Kosciuszko National Park: A Companion Document to the 2016 Kosciuszko National Park Draft Wild Horse Management Plan*. NSW National Parks and Wildlife Service, Sydney. https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Pests-and-weeds/Kosciuszko-wild-horses/kosciuszko-national-park-2008-horse-management-plan-wild-horse-management-program-review-160272.pdf (accessed 11 October 2018).

Queensland Government (2018) *Feral Horse*. https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/land-management/health-pests-weeds-diseases/pests/invasive-animals/other/feral-horse (accessed 11 October 2018).

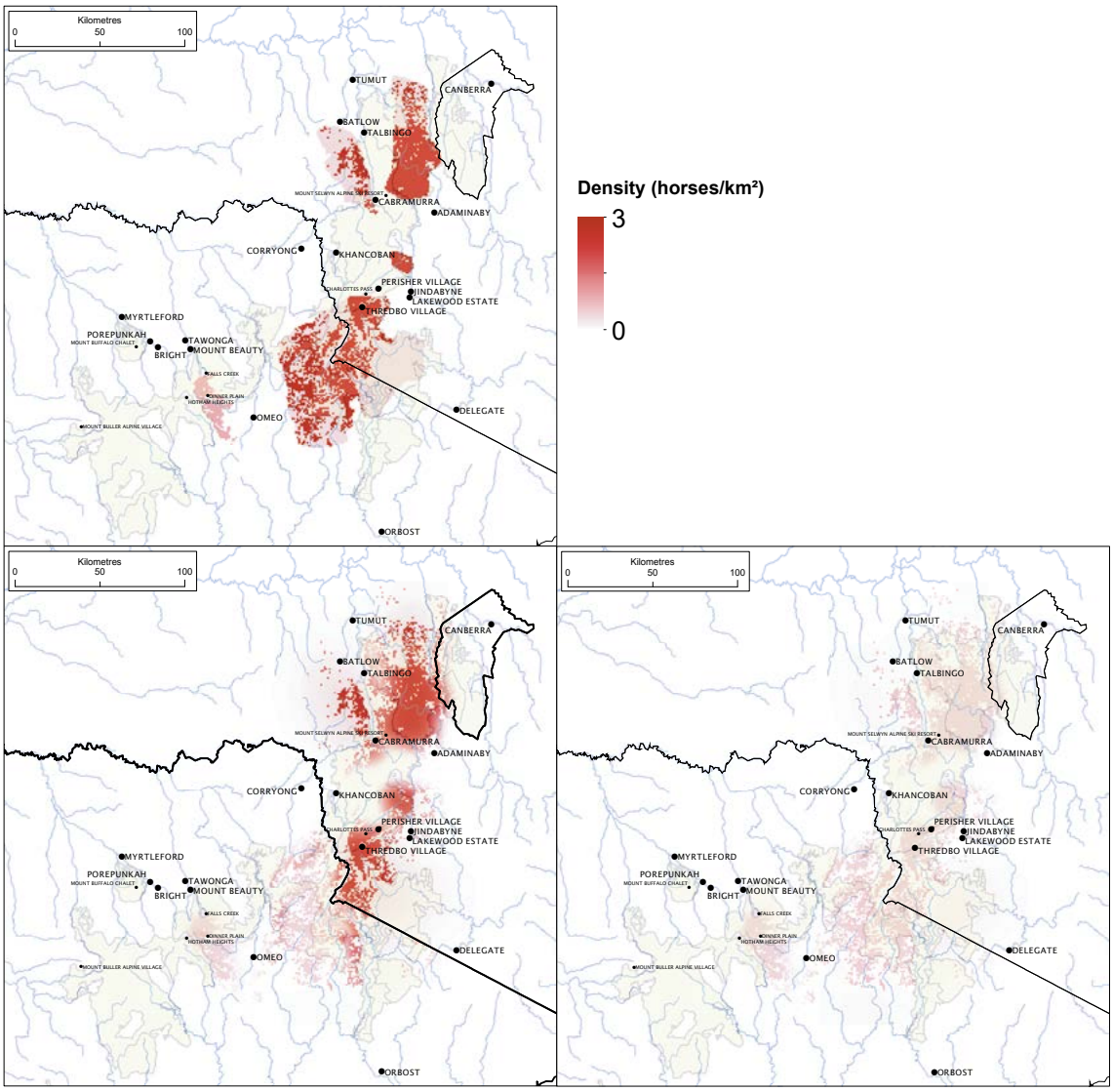

Figure 7. Predicted horse population density before any management (top), after 10 years of trapping and mustering in Victoria (bottom left) and aerial culling across the Australian Alps (bottom right).

Predictions are given for low growth and dispersal rates only. State and territory boundaries are given by black lines, major rivers by blue lines, and national parks are denoted by the yellow shaded regions.

Source: N. Beeton.

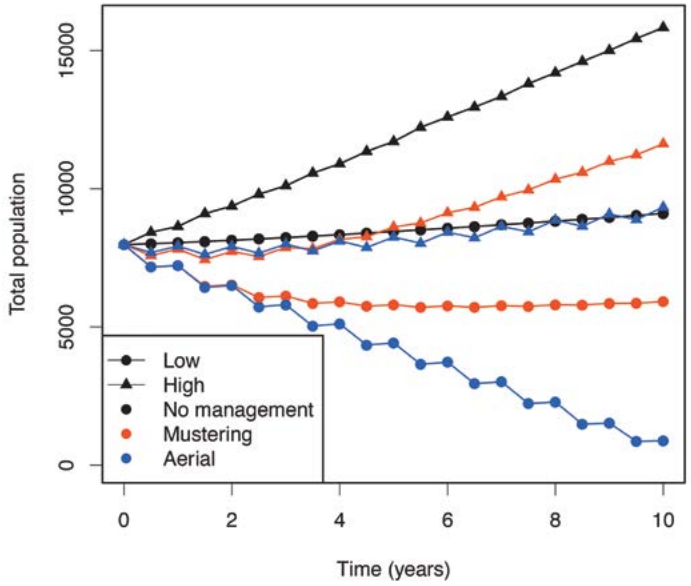

Figure 8. Predicted total horse population during the 10 years of a simulated management program.

None (black); trapping and mustering near Victorian roads (red); and aerial culling across the Australian Alps (blue). Predictions are given for both low (circles) and high (triangles) growth and dispersal rates.

Source: N. Beeton.

Feral horses, Tantangara Reservoir, Kosciuszko National Park.
Source: Martin Schulz.