Horse counts in Kosciuszko National Park are attacked by those wanting to protect feral horses. But analysis of 20 years of large-scale horse counts of Kosciuszko National Park shows counts are plausible and horse numbers have increased massively over that time.

Horse abundance increased at 18% per year between the big bushfires in 2003 and 2020 and likely will continue at that rate until something changes.

The NSW Government trapping program that began in 2003 has had little, if any, population effect. The feral horse population increased tenfold during the life of the trapping program.

A NEW HORSE ESTIMATE

The latest large-scale survey of feral horses in the Australia Alps was conducted in November 2020 and released in January 2021. It concluded there were 14,380 horses in Kosciuszko National Park. But was that the actual number of horses?

This survey was called for by Deputy Premier John Barilaro who had cast doubt on the previous Alps survey conducted in the second quarter of 2019. Mr Barilaro also claimed that the bushfires had significantly reduced feral horses in the park. If horse numbers were far fewer, he argued, there was no reason to remove them. The 2019 survey had found about 19,000 horses in Kosciuszko National Park.

Mr Barilaro said: "...the numbers that they (the Minister for the Environment and the environment department) put up last year, that there were somehow 19,000 brumbies in Kosciuszko, was always a lie, an absolute lie, a hidden green agenda to see the destruction and decimation of that brumby population which has been in the bush for 200 plus years."1

Corroboree frogs that survived the January 2020 bushfires in Kosciuszko National Park. Photo: Department of Planning Industry and Environment

About the author and acknowledgements

Dr Don Fletcher is an ecologist experienced in managing animal populations, including programs to increase abundance of threatened species and reduce abundance of pest species. His PhD topic at the University of Canberra was ‘Population Dynamics of Eastern Grey Kangaroos in temperate grasslands’. Much of his subsequent working life in the ACT Government was consumed by the controversy around reducing abundance of kangaroos in conservation reserves to increase abundance of threatened native animal species. Less well-known fauna held his fascination, such as the eastern bettong. Don led the project to bring the first eastern bettongs to the Australian mainland from the wild in Tasmania and was later employed to assist the reintroduction of eastern quolls.

He has co-authored 19 published scientific papers.

Don is now best known for a citizen science project on the vulnerable Rosenberg’s goanna, which he is leading for the National Parks Association of the ACT, which funded the research.

He is grateful to Andrew Cox for encouraging him to prepare this report and for his helpful comments. He also thanks Jim Hone for important comments on an earlier draft.
THE BEST WAY TO ESTIMATE HORSE NUMBERS

It is very difficult to count all of the horses in Kosciuszko National Park. First, the area occupied by horses (more than 275,000 ha in Kosciuszko) is too large for ground-based counts (and the terrain is too rough). Only helicopter counts can cover the full extent of the affected area in a time scale of weeks, rather than years.

Second, you don’t see all of the animals in any wildlife survey, especially those further away from the observer. Science has shown again and again that in all wildlife counts, a proportion of animals are missed by observers (contrary to the sometimes passionate certainty of some individuals that they see every animal). It means that each wildlife count only ‘samples’ the population. So, the important question becomes how to estimate the number of animals not detected during each survey.

One solution, called ‘distance sampling’, has become the most widely used method in the world to count wildlife populations. It uses the fact that fewer animals are seen at greater distance. Marked booms jutting from the sides of the helicopter are used to help observers estimate the distance to each group of horses seen while flying straight line transects across Kosciuszko at constant height above the ground (usually 60 m). A critical element of the survey is that the selection of the transects must be unbiased in relation to the density of the animals. This is achievable using helicopters, whereas road and track-based surveys are known to be inaccurate.

The distance sampling survey method has been used for all Kosciuszko-wide and Alps-wide horse population estimates. The last three surveys were led by Dr Stuart Cairns of the School of Environmental and Rural Science at the University of New England. The same team estimates kangaroo numbers in NSW and the same method of helicopter survey is used for many counts of wildlife, from polar bears to pronghorn antelope.

The 2019 survey was peer reviewed by international experts in the field from the St Andrews University, Scotland and the CSIRO while the 2020 survey was peer reviewed by experts from the CSIRO and the Queensland Department of Agriculture and Fisheries.

Representing precision

All measurements without exception have some “imprecision”, referred to by scientists as the “error” of the measurement. In the case of wildlife counts, many component measurements are being combined, including the height of the aircraft, its position, the distance from the transect to the horses, and the number of horses in groups.
FERAL HORSES IN KOSCIUSZKO NATIONAL PARK

These errors magnify, resulting in wide “error bars” accompanying each population estimate. The longer the bar, the less precise the population estimate compared to estimates with smaller error bars.

The error bars in Figure 2 represent the range of values most likely to represent the true value, to a 95% level of confidence. In statistical terms, if the same survey could hypothetically be done thousands of times at the same instant in time, the result would fall within the range of the error bar, 95 of 100 times on average. More of these alternative values would fall on, or be close to the given value, with fewer near the outer limits.

The result of the 2020 survey was 14,380 horses with 95% confidence limits of 8,798 and 22,555. This is the scientists’ preferred way to express the result. Putting this in common terms, the horse population in the area surveyed was at that time roughly 14,000, and to a high level of reliability (95%) it was between 9,000 and 23,000 horses, but more likely to be closer to 14,000 than at the limits of the range.

Is precision important?

Is a count accurate to the nearest single horse necessary, or is a rough estimate sufficient to the nearest one hundred, one thousand or five thousand horses enough? We already know that the total horse population has been changing over time. There has been an obvious increase in numbers over the past 50 years. In the past 20 years the increase has been documented by the official surveys. Repeated use of the same helicopter survey method demonstrates that the population is now approximately five times greater than when the first scientific count was carried out in 2001. It also occupies a greater area of Kosciuszko. Historically, there have been episodes of mass horse deaths due to bushfires and food shortages exacerbated by either drought or deep snow and extreme cold weather. Within each year there will be fluctuations in the population associated with breeding and mortality.

The most important strategic questions about the horse population are its approximate size and density, and roughly at what rate these values are increasing or decreasing. On the ground we want to relate horse density to environmental impacts, but this can be done with more localised surveys.
The information provided by the Kosciuszko-wide aerial surveys is sufficiently precise to respond to the growing horse population. We do not need more information or more precise counts to begin to act on the problem. More frequent and more localised surveys will be needed to manage the control program as it gets closer to the final target in each area.

**TRENDS**

Plotting the major catastrophic events – food shortages due to drought, and bushfires (which cause further food shortage as well as killing horses directly) – on the population growth graph reveals the recent drivers of horse population reduction.

Between the fires, the horse population grew at an average rate of 18% per year (Figure 3). The trend since 2000 is one of a growing population, interspersed with two major reductions. The first occurred after the early 2003 bushfires that burnt about two-thirds of Kosciuszko National Park, preceded by a period of drought. The second occurred after a longer

...drought period and a smaller bushfire in January 2020 that burnt about one third of Kosciuszko National Park and less than 30% of the area occupied by horses.

Despite the 2020 fires, in the northern end of the national park where 42% of the survey area was burnt, total horse numbers barely changed (based on observed densities of the 2019 and 2020 surveys). Only a small part of the area was severely burnt and horses in less severely burnt areas would have escaped the slow-moving fires. This result was supported by on-ground observations.
FERAL HORSES IN KOSCIUSZKO NATIONAL PARK

The drought had a particularly large effect on the smaller horse population in the southern part of the park in the Byadbo and Pilot areas. In this survey block that was little affected by the summer 2019-2020 bushfires, the horse density (and horse numbers) dropped by about 50% between May 2019 to October 2020.

When considering the limited change to the northern horse population due to the bushfires and the drought impacts on the smaller southern population, the population reduction between 2019 and 2020 may not in fact have been as dramatic as the graph indicates.

However, there is one tragic conclusion. Since 2001, the horse population grew until large numbers of horses perished in a major bushfire or drought. This is an ineffective and inhumane way to manage a population of feral animals.

EFFECTS OF THE TRAPPING AND REHOMING PROGRAM

The number of horses removed from Kosciuszko National Park can be compared with the Kosciuszko horse population and its growth rate.

The NPWS horse removal program that has operated since 2003 relies exclusively on passive trapping. Trapped horses are rehomed where possible, and remaining horses are destroyed at an abattoir. This has only removed a small number of horses each year as a proportion of the total horse population.

The number of horses removed has ranged from none in financial year 2018-19 to 658 in 2011-12, with an average of 220 horses removed each year. The removal rate since 2003 has averaged 4% of the total population. During 2020-21, the post bushfire horse removal program that is still underway has removed 446 horses from the northern part of the park to the start of March 2021, but this only represents 3% of the current park-wide horse population.

The highest horse removal rate was

\[
\text{Monitoring cameras record feral horses muddying a stream and causing stream bank erosion.}
\]

\[\text{Photo: NSW Department of Planning, Industry and Environment}\]

### Kosciuszko National Park horse population surveys 2001-2020

<table>
<thead>
<tr>
<th>Survey year</th>
<th>Horse population estimate in Kosciuszko: rounded to nearest 1000</th>
<th>Lower confidence limit</th>
<th>Upper confidence limit</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>3000</td>
<td>1142</td>
<td>4858</td>
<td>Walter and Hone 2003(^i)</td>
</tr>
<tr>
<td>2003</td>
<td>1000</td>
<td>464</td>
<td>2284</td>
<td>Walter 2003(^ii)</td>
</tr>
<tr>
<td>2005</td>
<td>1000</td>
<td>759</td>
<td>1955</td>
<td>Montague-Drake 2005 Table 3.4(^iii)</td>
</tr>
<tr>
<td>2009</td>
<td>4000</td>
<td>2237</td>
<td>6671</td>
<td>Dawson 2009(^iv)</td>
</tr>
<tr>
<td>2014</td>
<td>5000</td>
<td>3344</td>
<td>7313</td>
<td>Cairns and Robinson 2015, Cairns 2019(^v)</td>
</tr>
<tr>
<td>2019</td>
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<td>14,419</td>
<td>23,581</td>
<td>Cairns 2019(^v)</td>
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<tr>
<td>2020</td>
<td>14,000</td>
<td>8,798</td>
<td>22,555</td>
<td>Cairns 2020</td>
</tr>
</tbody>
</table>

\(\text{i\: Originally estimated at 6000, but adjusted as a result of further analysis described in Cairns 2019.}\)
\(\text{ii\: Australian Alps National Parks (AANP) count reduced proportionally by Walter 2005.}\)
\(\text{iii\: Australian Alps National Parks count reduced proportionally by author.}\)
\(\text{iv\: NPWS management plan quotes different figure.}\)
\(\text{v\: Australian Alps National Parks count reduced proportionally by the NSW Government.}\)
between the years 2009-10 and 2014-15 when the rate averaged 7%, with the 2011-12 peak being 10%. A rate of horse removal of 7% is insufficient to lower the total horse population if it is growing at 18% a year.

With food-limited species like horses, there will be a threshold number of horse removals per year that must be exceeded before the population begins to decline. The program to date has achieved many times fewer horse removals than the number required to begin reducing impacts on national park values and is making literally no difference to reducing the horse problem.

It is incorrect to call the current NPWS horse removal program a “control program”. The NPWS, with politically imposed constraints that limit removal methods, has been undertaking a “harvesting program” that fails to reduce the national park horse population.

The main beneficiary of the program has been people who seek government-provided horses which can genuinely be said to have lived in Kosciuszko National Park.

**CONCLUSION**

The NSW Government has solid scientific information revealing an alarming trend of unrestrained horse population growth in the state’s largest and most sensitive national park.

It is time to stop quibbling over exactly how many horses are in Kosciuszko National Park. Instead, there must be a determined focus on reversing the population growth trend and the start of real population control.

References

4. Ibid.

Source documents for horse population surveys

Reclaim Kosci was formed in 2018 in response to the passing of special legislation protecting feral horses in Kosciuszko National Park. Reclaim Kosci represents a broad consortium of individuals and organisations that love Kosciuszko National Park and seek to protect it from the impacts of feral horses.

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