

Submission
No 145

**INQUIRY INTO PROPOSED AERIAL SHOOTING OF
BRUMBIES IN KOSCIUSZKO NATIONAL PARK**

Name: Name suppressed

Date Received: 23 October 2023

Partially
Confidential

Submission

**Kosciuszko National Park Wild Horse Heritage Management Plan:
Draft Amending Plan**

INTRODUCTION

Horses, both domesticated and wild are charismatic animals. Nevertheless, there are sound environmental reasons for reducing the damage caused by unsustainable wild horse numbers in Kosciuszko National Park (KNP).

This submission focuses on the control methods of ground shooting and aerial shooting only.

The submission identifies anomalies, inconsistencies and deficiencies in the reports and Standard Operating Procedures which have informed the preparation of Kosciuszko National Park Wild Horse Heritage Management Plan (the Plan) and the Draft Amending Plan (Draft Amending Plan).

There are many shortcomings including inconsistencies, lack of objectivity, unsubstantiated comments, and bias in the following documents:

- A Model for Assessing Relative Humaneness of Pest Animal Control Methods, second edition June 2011 (Humaneness Model),
- Assessing the Humaneness of Wild Horse Management Methods (ITRG Report),
- Final Report of the Independent Technical Reference Group (ITRG Final Report)
- Final Report of the Kosciuszko Wild Horse Scientific Advisory Panel, September 2020 (SAP Report),
- Standard Operating Procedures HOR002 and HOR001.

These documents are not impartial and should not be relied upon to make informed management decisions.

COMMENTS

TOR (a): The methodology used to survey and estimate the brumby population in Kosciuszko National Park

Comment

I have no comments on this issue.

TOR (b): The justification for proposed aerial shooting, giving consideration to urgency and the accuracy of the estimated brumby population in Kosciuszko National Park

Comment

I could find no explanation in the Plan or the Draft Amending Plan for the target date of 30 June 2027 for meeting the target population objective of 3,000 animals. I note this date is shortly after commencement of the 59th Parliament of NSW following the general election in March 2027. It would seem the target date for achieving the population target may have been based, in full or in part, on political considerations.

The Plan expressly states control methods will be selected for use based on *“maximising animal welfare outcomes”* and *“optimal animal welfare outcomes is a key priority”* (section 6, the Plan). On this basis aerial shooting as proposed in Amendment 5 of the Draft Amending Plan cannot be justified as objectively it is relatively *less* humane than ground shooting as shown by the following:

- I. The Humaneness Model notes that the wounding rate may be *higher* with aerial shooting compared with ground shooting because animals are shot whilst they are moving (Humaneness Model, Appendix 7). Further critical comments about the Humaneness Model are provided in Appendix 1 to this submission.
- II. Cockram (2011) showed that wild Red deer shot with the aid of a helicopter experienced significantly worse welfare outcomes than animals shot by a stalker: *“Plasma cortisol concentrations in deer shot using helicopter assistance were similar to those in deer at the slaughterhouse, but higher than deer shot at night or during the day by a single stalker, or in a field.”* As well, blood lactate concentration, a marker of stress¹ was greater in deer culled with the assistance of a helicopter than in deer shot from the ground by stalking. The authors noted *“The difference in the blood lactate concentration between those culled with the assistance of a helicopter and single-rifle culled deer might have been a consequence of greater muscular exertion in those culled with the assistance of a helicopter.”*

Blood chemistry results as shown in this study provide additional insight to understanding the true welfare impacts of pursuing horses by helicopter during of aerial shooting operations. It is very surprising this study was not cited in any of the reports that informed the preparation of the Plan or Draft Amending Plan.

- III. The ITRG report citing Hampton (2014) acknowledges aerial shooting is an inherently imprecise technique. This has been borne out in published studies Hampton (2017), and the report English (2000) as well as media reports of NPWS aerial shooters operating over private land without permission Ellicott (2017).
- IV. Aerial shooting faces many recognised constraints: *“In areas of heavy cover (e.g. vegetated creek lines, woodlands and forest) effectiveness is limited since horses might be concealed and difficult to locate from the air.”* For safety reasons *“shooting from a helicopter cannot be done in adverse weather conditions (e.g. strong wind, rain, low cloud, hot days that cause unpredictable thermals).”* (SOP HOR002).

The wild horse Removal Areas – 146,000 hectares (21% of the park) encompass large areas of heavy cover including vegetated creek lines, woodlands and forest, where SOP HOR002 acknowledges effectiveness of aerial shooting would be limited. Personal communication with a private helicopter pilot/operator based in Sydney has confirmed the limitations of aerial shooting in forested areas. SOP HOR001 asserts,

¹ Raised blood lactate concentrations can occur following breakdown of muscle glycogen after extreme muscular exertion and from catecholamine-induced glycogenolysis

without citing any objective evidence, that *“Ground shooting is best suited to accessible and relatively flat areas where there are low numbers of problem horses.”*

It seems that achieving the target of 3,000 residual horses (i.e. removing 11,380 animals) by 30 June 2027 is highly unlikely.

- V. Aerial shooting SOP HOR002 contains contradictory statements. On one hand it states that aerial shooting from a helicopter is used in remote and/or inaccessible areas, yet it also states that in areas of heavy cover (e.g. vegetated creek lines, woodlands and forest) effectiveness is limited. The support for aerial shooting by the ITRG panel and Scientific Advisory Panel is in my view inappropriately ‘enthusiastic’ which raises suspicion and concerns which are identified and discussed elsewhere in this submission.
- VI. The Scientific Advisory Panel emphasises in Appendix 3 of their final report *“... management methods with the least negative impacts on animal welfare should be employed, with ongoing welfare assessments and auditing, and alteration of management practices as necessary to ensure that unnecessary harms are minimised.”*

Given the observations by Hampton (2017) - a large study on aerial shooting of feral horses in central Australia - that the instantaneous death rate (IDR) was 63% and that *at least 1%* of horses were non-fatally wounded, in the non-vegetated clay pans and extensive grasslands of the study areas, it is difficult to reconcile the SAP’s unbridled support for aerial shooting with their comment *“These methods are only be (sic) recommended in the following circumstances: where there is a very low likelihood of significant welfare impacts...”*.

With the study by Hampton (2017) showing an IDR of just 63%, a greater than 1% rate for non-fatal wounding, with 3% of horses not shot in the cranium, neck, or thorax, and 3% of animals displaying bullet-wound tracts affecting the forelimbs and 8% affecting the abdomen with aerial shooting, and purportedly in compliance with the national model SOP, it is clear that aerial shooting does *not* lead to a ‘very low likelihood of significant animal welfare impacts’ as claimed.

TOR (c): The status of, and threats to, endangered species in Kosciuszko National Park

Comment

I have no comments on this issue.

TOR (d): The history and adequacy of New South Wales laws, policies and programs for the control of wild horse populations, including but not limited to the adequacy of the 'Aerial shooting of feral horses (HOR002) Standard Operating Procedure'

Comment

- I. I note the Draft Amending Plan advises in Amendment 4 that HOR002 – Aerial shooting of feral horses (Sharp 2011d) will be added to the existing SOP's and Model Code of Practice. However, there are *multiple* versions of HOR002 published in 2011 and it has not been possible to access the specific version published under the auspices of the Invasive Species Cooperative Research Centre as cited in the Draft Amending Plan. The only readily accessible version of HOR002 is the version published by PestSmart: <https://pestsmart.org.au/toolkit-resource/aerial-shooting-of-feral-horses/>
- II. Standard Operating Procedure HOR002 makes contradictory statements, asserting on one hand asserting that aerial shooting from a helicopter is used in remote and/or inaccessible areas, while also stating that effectiveness is limited in areas of heavy cover (e.g. vegetated creek lines, woodlands and forest).
- III. Standard Operating Procedure HOR001 – Ground shooting of feral horses, asserts that *“Ground shooting is time consuming and labour intensive and is therefore not considered an effective method for largescale control”*. Remarkably however no such acknowledgement is made in SOP HOR002 for aerial shooting, despite the comment *“In areas that are accessible a ground crew of several people walking or in all-terrain vehicles can be used to locate and humanely kill any wounded animals.”* Failing to acknowledge that aerial shooting is arguably *more* labour intensive than ground shooting is deceptive by omission and suggests bias.
- IV. The ITRG Report cites two studies that have examined the welfare impact on wild horses during aerial culling operations, noting that in one of those studies of n=452 culled animals (unpublished study) - subsequently published as Hampton 2017 - a wounding rate of 1.1% was observed. Worksheet HAP09 purports the inferred instantaneous death rate was 74%. This is not correct. Hampton (2017) reported the IDR was 70%, not 74% as claimed. It was the inferred point of aim that was 74%. As well, seven horses were found alive non-fatally wounded at the time of ground inspections (Hampton 2017).

Standard Operating Procedure HOR001 asserts that ground shooting is best suited to accessible and relatively flat terrain where there are low numbers of problem horses, yet no objective supporting evidence is provided. It is unacceptable for outdated speculative statements like this to be included in a nationally adopted SOP.

- V. As HOR002 was published in 2011 it should be reviewed and updated to include relevant objective evidence from published studies, in particular Hampton *et al.* (2017). Furthermore, it is difficult to comprehend why the helicopter induced feral horse escape response observations by Linklater and Cameron (2002) were not included in HOR002 (v2011) as these are directly relevant and informative, in particular the following comments *“Observations by the ground and aerial observers show that the helicopter induced an escape response , which included running , in all 17 of the groups monitored*

by both observers.” and “[t]he composition of 13 (76%) groups changed during the helicopter count by mixing with, and separating from, other groups with the consequent temporary gain or loss of individuals.”

The observations of Linklater and Cameron (2002) provide empirical evidence to support amending the Part A ‘Duration’ assessments for Aerial shooting (both Scenario 1 and Scenario 2) from “Minutes” to “Days” and numerical scores from “4” (Scenario 1) to “5” in Table 7 of the ITRG Final Report. The Part A ‘Duration’ assessments and numerical scores for Aerial shooting (both Scenario 1 and Scenario 2) as currently presented in Table 7 are misleading and should not be relied upon to inform management decisions. The comment in footnote ‘a’ of Table 7 purporting that behavioural adjustments/impacts in the band do not occur in aerial shooting are also false and misleading as it is highly unlikely that “the whole band is rapidly targeted and killed” as shown by Hampton *et al.* (2017). See also comments in Appendix 2 to this submission.

- VI. Standard Operating Procedure HOR002 advises that shooting from a helicopter cannot be done in adverse weather conditions (e.g. strong wind, rain, low cloud, hot days that cause unpredictable thermals). Standard Operating Procedure HOR002 further advises it is preferable not to run aerial shooting programs when mares have dependent young at foot and that foaling is concentrated over spring and summer which suggests the window for undertaking aerial shooting operations is only the 6 months between March and August. However, this is during autumn and winter, when adverse weather conditions preclude helicopter shooting operations for safety reasons.
- VII. The rapidly changing weather in KNP during autumn and winter would likely see aerial shooting crews (and supporting ground crews) sitting idly by waiting for adverse weather patterns to pass before any aerial shooting operation could commence.

TOR (e): The animal welfare concerns associated with aerial shooting

Comment

Animal welfare concerns are discussed elsewhere in this submission.

TOR (f): The human safety concerns if Kosciuszko National Park is to remain open during operations

Comment

There are numerous reports of aerial shooting operations undertaken where NPWS or LLS have shot animals on private land during aerial shooting operations (John Ellicott 2017). There are likely to be other incidents that have not been reported.

If Amendment 5 of the Draft Amending Plan is adopted, aerial shooting operations will come under intense public scrutiny, as they should. Agency managers and staff involved in aerial shooting operations, whether shooting horses or other vertebrate species, would need to be

extremely mindful of this scrutiny and commit to nothing less than 100% strict and absolute compliance with all culling and safety protocols. One way of ensuring this would be to have a truly independent auditor (a veterinarian) on board each helicopter flight tasked with publishing independent and detailed reports which are readily accessible by the public.

Given the large porous border of KNP the potential exists that protestors might attempt to infiltrate the park from remote locations and disrupt aerial shooting operations even if the park is closed to visitors.

TOR (g): The impact of previous aerial shooting operations (such as Guy Fawkes National Park) in New South Wales

Comment

The impacts of the GFRNP aerial cull have been extensively reported and are well known. The paper by Rosalie Chapple is especially informative as it provides insightful comments on the political and social context as well as the public outrage surrounding the GFRNP aerial cull (Chapple 2005).

It is important to note the GFRNP operation was conducted under the provisions of the FFAST protocol, albeit over 20 years ago, as it is a stark reminder that real-life aerial shooting conditions and outcomes are vastly different from the hypothetical and fanciful Scenario 1 (best case) proposed by the ITRG and SAP.

I submit only the very first animal in a social group would be chased for <1minute and rendered insensible with the first shot and does not recover consciousness prior to death as proposed in Scenario 1. It is highly unlikely remaining animals in the group will all be killed under the hypothetical 'best case' conditions of Scenario 1.

Term of Reference (h): The availability of alternatives to aerial shooting

Comment

The obvious alternative to aerial shooting is ground shooting. Contrary to the many unsubstantiated assertions that ground shooting is relatively less humane than aerial shooting, the truth is ground shooting by licensed Vertebrate Pest Control licence holders, using semi-automatic (category D) firearms with sound suppressors and thermal vision equipment is highly effective, humane and cost efficient. See Case Study on Ground Shooting in this submission.

Case Study on Ground Shooting

In early October 2023 a professional licensed Vertebrate Pest Animal Control licence holder reported he had recently undertaken a culling operation on private land in NSW in which his two-man team humanely removed 27 horses in 18 minutes. He utilised a thermal imaging drone to locate the horses' bedding area, then approached to dispatch the animals at night-time with head shots at ranges from 50-78 metres.

He used an Australian-made Wedgetail Industries WT25 AR10 .308 calibre semi-automatic rifle fitted with a Wedgetail Industries suppressor ("silencer") shooting Focchi 150 grain factory ammunition. This operation involved a 2-man team comprising one shooter and one spotter to identify and accurately determine the range of the targets. The total cost to the landholder for the night's work was \$2,200 plus GST. They also removed 11 deer and 6 foxes.

This case demonstrates that professional Vertebrate Pest Animal Control operators, working in small teams, using appropriate equipment including category D (semi-automatic) firearms, sound suppressors and thermal imaging optics - can be very effective in undertaking wild horse culling operations humanely and economically from the ground.

Ground shooting avoids many of the limitations of aerial shooting.

Given the many limitations, logistical difficulties, expense, and public objection to aerial shooting the NSW government should keep an open mind to engaging private licensed, private Vertebrate Pest Animal Controllers to undertake the culling operations from the ground.

Term of Reference (i): Any other related matters

There are many related matters that require comment however I will only touch on some of these.

1. Multiple unexplained anomalies in the Humaneness Model

Appendix 1 is a critical analysis of the scores assigned to aerial and ground shooting. It shows the model gives preferential scores for aerial shooting across multiple species. This suggests a deliberate attempt to portray ground shooting as relatively less humane compared to aerial shooting.

2. Unsubstantiated scores for ground shooting in the ITRG Report

There are numerous statements that are not supported by objective evidence and are simply speculation by the ITRG, including:

- ground shooting is best suited to shooting very small numbers of horses
- it is “suspected” that wounding rates for ground shooting are higher than for aerial shooting (page 7 ITRG report)
- humaneness scores for ground shooting are based on the unfounded assumption that only one or two animals in each social group will be killed with footnote ‘a’ in Table 7 Final ITGR report) stating:

^a Note that the duration for ground shooting is given as days, whereas minutes are given for aerial shooting. This is because the panel considered the impact on the band of horses being targeted and not just the individual horse that was shot. In ground shooting, only one or two horses are usually shot at a time, as the others will disperse and cannot be easily followed up on the ground. This means there will be behaviour adjustments/impacts in the band over the next few days. This does not occur in aerial shooting where the whole band is rapidly targeted and killed. (emphasis added)

This assumption is unjustified, and no objective evidence is provided. Remarkably, this comment has not been applied to aerial shooting (Scenario 1 or Scenario 2) despite the observations in Linklater and Cameron (2002) which showed that the presence of a helicopter (without shooting taking place) has substantial and widespread negative impacts on horse behaviour and group composition.

The HAP09 worksheet for the impact for Domain 4 of aerial shooting states: *“Aerial shooting forces horses to run a short distance, which restricts normal behaviour and interactions. However, the entire group is killed therefore there are no long-term effects on social groups.”*

This is a disingenuous remark given that the HAP09 worksheet cites Linklater and Cameron (2002) which observed widespread disruption and mixing of social groups during the helicopter census operations.

In my view the ITRG panel members have intentionally tried to discredit ground shooting by (a) making the unsubstantiated and unjustified assumption that in ground shooting only one or two animals in each social group are shot before survivors escape, and (b) that behavioural or interactive restriction (Domain 4 assessment) during aerial helicopter operations has only “Mild impact” to produce a more favourable humaneness assessment for aerial shooting.

Furthermore, the Humaneness Model provides clear instruction to practitioners, including:

- When using the model to evaluate the humaneness of a particular technique, the Assessors will be expected to state what type of evidence was used to assign the degree of welfare compromise in each domain (page 39), and
- Where there is doubt or lack of objective knowledge about whether an animal will suffer severely, one should assume it will do so i.e. the ‘benefit of the doubt’ should be given in favour of the animal (page 41).

The ITRG panel failed to apply these important guiding principles to their assessments for aerial shooting. This failure seems to be a clear case of the ITRG panel making subjective adverse humaneness assessments and unsupported comments for ground shooting to support a (predetermined) preference and more favourable humaneness scores for aerial shooting.

- The discussion of Ground Shooting (page 7 ITRG report) states: *“The likelihood of removing an entire social group of wild horses is low with ground shooting due to the rapid escape behaviour of the species in response to loud disturbance (Linklater and Cameron 2002), so the impacts of disrupting the social group were included in the assessment.”* The cited paper Linklater and Cameron 2002 relates to loud disturbance caused by helicopter during the conduct of horse census - there was no shooting involved. It is totally inappropriate for the ITRG panel to attribute the findings of Linklater and Cameron (2002) to ground shooting. This appears to be another instance of misrepresenting the findings from an aerial shooting study to make adverse inferences about ground shooting.
- The Aerial Shooting worksheet (page 1) specifically recognises the scenario in which an animal is shot but not killed (wounded), no follow-up shots are applied and there is a protracted period until death (if it occurs) *“...was not assessed as this would necessarily have a poorer outcome than the above scenarios.”* (emphasis added)

This alarming and frank admission that the ITRG panel knowingly failed to undertake and report a relevant assessment that would have portrayed aerial shooting poorly is unconscionable. I submit, the scenario not assessed by the ITRG panel is a realistic scenario and should have been included in the ITRG report in the interest of transparency.

- As noted in Hampton (2017) despite the study protocol requiring strict adherence to the national model standard operating procedure, which mandates that bullets are fired at either the cranium or thorax and that animals are shot at least twice, 3% (95% CI 2-5%) of horses did *not* display at least one bullet-wound tract affecting the cranium, and/or cervical spine and/or thorax. It was estimated that 37% of horses were not rendered immediately insensible. Figure 4 in Hampton (2017) shows that about 40 (6%) of 630 feral horses shot showed only ONE bullet-wound tract.

These real-life data belie the fanciful assumption by the ITRG panel that *all* animals in a social group will be killed during aerial shooting operations, under either Scenario 1 or Scenario 2.

3. Recovery and disposal of carcasses

A serious concern is the fate of the culled horse carcasses. The Plan devotes just 2 sentences to carcass management and provides no guidance other than to say a range of management

options are available. That carcass disposal options are not identified suggests a policy position on horse carcasses has not been formulated.

The sheer number of animals to be culled (over 11,000) presents several major problems including attracting feral scavengers (foxes, dogs, feral pigs, European wasps etc.) and adding a massive nutrient burden to the park. This is likely to have lasting negative effects on the native fauna and flora communities. Social impacts are also possible with the sight of decaying carcasses likely to have a lasting negative effect on park visitors.

The recent report *Carcass ecology in the Alps* by Newsome and Barton (2023) acknowledges carcasses act as a focal point of attraction for native and introduced scavengers; decomposition can influence soil physiochemistry and below ground invertebrates; vegetation that grows following decomposition also influences use of the area by herbivores; carcasses influence multiple trophic levels within alpine food webs. Therefore, a clear policy on carcass management is required.

Given the sensitive nature of the Alpine environment consideration should be given to collection and removal of carcasses from the park and composting with wood chips, as is practised in the United States Department of Transportation (Elizabeth Kolb 2006).

CONCLUSION

This submission has identified many anomalies in the reports that have informed the preparation of KNP Management Plan and the Draft Amending Plan. Remarkably, it seems the serious deficiencies and lack of impartiality identified by this author in the Humaneness Model were not identified by either the ITRG Panel or the Scientific Advisory Panel.

It appears the 'experts' simply accepted at face value the assigned humaneness scores for aerial shooting and ground shooting for the non-horse species (deer, feral pig, goat, donkey, camel) presented in the Humaneness Model without critical review, in a manner reminiscent of Bellman's Fallacy – where an erroneous conclusion may be quoted by another researcher, and again by a third researcher, after which it becomes an accepted truth (Dr John Wilson).

This revelation casts serious doubt about the *true* welfare impacts of any pest management program utilising aerial shooting, not just for horses, but for other pest species as well.

While the experts acknowledge there are significant knowledge gaps in understanding of horses in KNP, and that a lack of objective data means there is always some reliance on subjective data, there is simply no excuse for suggesting that "*there will be behavioural adjustments/impacts in the band over the next few days*" with ground shooting but not with aerial shooting. This is discussed further in Appendix 2.

RECOMMENDATIONS

1. As a matter of urgency, the following documents be referred *independent* and *thorough* review by the Office of the NSW Chief Scientist and Engineer:
 - a. *A model for assessing the relative humaneness of pest animal control methods*, Second Edition June 2011
 - b. *Assessing the humaneness of wild horse management methods*, ITRG 2015
 - c. *Final report of the Independent Technical Reference Group*, March 2016
 - d. *Final Report of the Kosciuszko Wild Horse Scientific Advisory Panel*, September 2020
2. Private contractors i.e. Vertebrate Pest Animal Control (VPAC) licence holders be consulted with a view to identifying those contractors with the relevant experience and equipment to undertake ground shooting at night.
3. The Minister for Environment should implore the Minister for Police remove the regulatory hurdles faced by Vertebrate Pest Animal Control (VPAC) licence holders in acquiring Category D firearm licences and prohibited weapon (“silencer”) permits.
4. A plan be developed for removal of horse carcasses from KNP and disposal off site.
5. Consideration be given to extending the arbitrary (political?) 2027 deadline for meeting the target number of horses to remain in KNP.

REFERENCES

- Cockram *et al.* (2011). Comparison of effects of different methods of culling red deer (*Cervus elaphus*) by shooting on behaviour and post mortem measurements of blood chemistry, muscle glycogen and carcass characteristics. [*Animal Welfare* 2011, 20: 211-224](#)
- Edwina Mason. Rotting horse carcasses greet long weekend visitors to Kosciuszko National Park. *About Regional*, 3 October 2023. <https://aboutregional.com.au/rotting-horse-carcasses-greet-long-weekend-visitors-to-kosciuszko-national-park/435398/>
- Elizabeth Kolb. Composting Road killed deer. US Department of Transportation, Federal Highway Administration. [*Public Roads* July/August 2006.](#)
- English 2000. Report of the cull of feral horses in Guy Fawkes River National Park in October 2000. 15 November 2000.
- John Ellicott. Woman runs for cover in aerial culling outrage. *The Land*, 2 March 2017. <https://www.theland.com.au/story/4500901/woman-runs-for-cover-in-aerial-culling-outrage/>
- John Wilson. The Bellman's Fallacy and other biases. Australian and New Zealand Society of Occupational Medicine Inc. (ANZSOM). <https://www.anzsom.org.au/resources/the-bellmans-fallacy-and-other-biases#:~:text=The%20Bellman's%20Fallacy%20was%20originally,it%20becomes%20an%20accepted%20truth>
- Jordan O. Hampton, Glenn P. Edwards, Brendan D. Cowled, *et al.* Assessment of animal welfare for helicopter shooting of feral horses *Wildlife Research*, 2017, 44, 97–105. <https://www.publish.csiro.au/WR/WR16173>
- Linklater and Cameron (2002). Escape behaviour of feral horses during a helicopter count. *Wildlife Research* 2002, 29, 221-224. https://www.researchgate.net/publication/262987702_Escape_behaviour_of_feral_horses_during_a_helicopter_count
- Newsome and Barton (2023). Carcass ecology in the Alps: How to minimise carcass loads. *Australian Alps National Parks*. https://theaustralianalpsnationalparks.org/wp-content/uploads/2023/06/Carcass-Ecology-in-the-Alps_ReportFinal.pdf
- Rosalie Chappel. The politics of feral horse management in Guy Fawkes River National Park, NSW. [*Australian Zoologist* \(2005\) 33 \(2\): 233–246.](#)

Appendix 1: Comparison of Aerial versus Ground Shooting Humaneness Scores

from Sharp and Saunders' Model for Assessing the Relative Humaneness of Pest Animal Control Methods (Second Edition June 2011)¹

The model's humaneness matrices contain multiple unexplained and inconsistent differences in scoring for Aerial Shooting versus Ground Shooting that consistently favour Aerial shooting.

As shown in the paired comparisons for Aerial Shooting versus Ground Shooting (red circles) there is a one category better score assigned to Aerial Shooting compared to Ground Shooting i.e. 'C' vs 'D' (Wild Deer, Feral Goat, Feral Donkey, Feral Horse, Feral Camel), and a two category better score assigned to Aerial Shooting compared to Ground Shooting i.e. 'B' vs 'D' for Wild Pigs.

	Aerial Shooting		Ground Shooting	
	Head Shot	Chest Shot	Head Shot	Chest Shot
Wild Deer		4C (not specified; assume chest)	3A	3D
Feral Pig	-	4B	2A	2D
Feral Goat		4C (not specified; assume chest)	3A	3D
Feral Donkey	3A-4A	3C-4C	3A	3D
Feral Horse		4C (not specified; assume chest)	3A	3D
Feral Camel	3A-4A	3C-4C	3A	3D

Note: In the model's Part B assessment: mode of death (*aerial v ground shooting*) compare the assigned letter (not the number) in the paired scores.

Given that alphabetical scores in Part B assessments relate to an assessment of the *killing method* only, based on time to insensibility and level of intensity of suffering there is no rational reason for Part B scores to differ between Aerial Shooting and Ground Shooting.

Conclusion

1. No explanation is given nor supporting evidence provided by the authors to explain the better (preferential) Part B scores assigned for Aerial Shooting. Preferential scores for Aerial Shooting cannot be explained merely by the claim that *"Double tap' shots (two quick shots in succession) are always used with chest shots"* (Feral Goats page 87, Horses page 93) as the authors acknowledge that *"The wounding rate may be higher with aerial shooting (compared with ground shooting) because animals are shot whilst they are moving..."* (Feral Goats page 86, Feral Horses page 93). Furthermore, English 2000 found that *"many horses received four or more shots"* during the aerial cull of feral horses in Guy Fawkes River National Park.
2. In the absence of any explanation it can be reasonably concluded the authors have attempted to portray Ground Shooting as relatively less humane than Aerial Shooting.

¹ Sharp T and Saunders G (2011). A model for assessing the relative humaneness of pest animal control methods (Second edition). Australian Government Department of Agriculture, Fisheries and Forestry, Canberra ACT.

Appendix 2: Spurious Assessment Scores in ITRG Report

'Vegetation Effect' on Aerial Shooting

Hampton *et al.* (2017) acknowledge that vegetation could affect animal-welfare outcome because trees may make it difficult to shoot horses accurately, because of poorer visibility or increased shooting distance between the horses and the helicopter. Therefore the '*Duration*' assessments in the Part A scores for aerial shooting ("Minutes") Table 1 of the ITRG report (and Table 7 in the ITRG Final Report) are likely to understate the true welfare impacts of aerial shooting.

Excerpt from Table 7 in Final report of the Independent Technical Reference Group

METHOD	PART A			PART B		
	Impact	Duration	Score	Impact	Duration	Score
.....						
Ground shooting (head shot)	Mild	Days ^a	5	None	Very rapid	A
Ground shooting (chest shot)	Mild	Days	5	Moderate	Minutes	D
Aerial shooting (Scenario 1) ^b	Moderate	Minutes	4	None	Very rapid	A
Aerial shooting (Scenario 2) ^b	Severe	Minutes	5	Severe/ extreme	Very rapid/ minutes	D

^a Note that the duration for ground shooting is given as days, whereas minutes are given for aerial shooting. This is because the panel considered the impact on the band of horses being targeted and not just the individual horse that was shot. In ground shooting, only one or two horses are usually shot at a time, as the others will disperse and cannot be easily followed up on the ground. This means there will be behaviour adjustments/impacts in the band over the next few days. This does not occur in aerial shooting where the whole band is rapidly targeted and killed.

^b Scenario 1 (best case) is where horses are chased for <1 minute, are rendered insensible with the first shot and do not recover consciousness prior to death; Scenario 2 is where horses are chased for >5 minutes, are not effectively rendered insensible with the first shot and are shot again resulting in death.

Spurious Assessment Scores for Ground Shooting and Aerial Shooting

There is no rational reason for assigning "Days" and numerical scores of 5 for the Part A *Duration* assessment for ground shooting in Table 1 of the ITRG report. **NOTE:** Part A assessments examine the '*impact on the animal prior to the action that causes death*' – see Humaneness Model page 41.

As shown in Figure 1 (page 10) of the ITRG report Ground Shooting (HAP08) is a single-stage control method, so ground shooters are unlikely to be in close proximity of wild horses to be shot "days" before the actual shooting takes place. Any reconnaissance prior to initiating ground shooting is likely to be performed at a distance and have no negative animal welfare impact.

The ITRG Part A assessments for ground shooting are spurious, unjustified and should be very carefully reviewed and corrected. There is no justification for the explanation in footnote "a" to Table 7 in the ITRG Final Report for the assessment that the *Duration* of the impact ("Days") is unique to Ground shooting. It is also clearly applicable to Aerial Shooting as indicated by the comment in the assessment of Aerial Shooting (HAP09):

"There is the potential for horses to be severely injured whilst being pursued. They are running at high speed and so a fall could result in catastrophic injuries such as a broken leg. They could also run over the top of slower moving animals."

The ITRG panel ignores the possibility of any negative consequences of aerial shooting on horses that are part of a social group which are *not* shot and killed. It assumes that *“the entire social group is killed, therefore there are no long-term effects on social groups”*. This is unrealistic.

The ITRG acknowledges in HAP09 that the scenario where an animal is chased (by helicopter) and shot but not killed (wounded), no follow-up shots are applied and there is a protracted period until death (if death occurs), was not assessed. Clearly, the impact of this scenario on other surviving members of the social group would also be “Days”.

Ignoring this reality and failing to assess the impact *“as this would necessarily have a poorer outcome than the above scenarios* (Scenario 1 and Scenario 2) mislead decision makers on possible consequences that need to be taken into consideration, regardless of the likelihood. I submit Scenario1 is also unlikely, yet the ITRG panel assessed it.

Finally, it is concerning that the ITRG panel did not include the following comment from the Ground shooting HAP08 worksheet in the aerial shooting worksheet HAP09:

“Shooting of individuals should stop when the flight response of the herd limits further accurate shooting (except when a mare is shot that has a dependent foal. The shooter must wait until the foal returns so it can be shot).”

when it is acknowledged in the aerial shooting worksheet that *“When animals are shot at, some will be killed outright, others will be missed and some will be wounded but not killed”*. The study by Hampton (2017) also demonstrated widespread disturbance caused to horse bands when chased by helicopter.