

REPORT ON PROCEEDINGS BEFORE

ANIMAL WELFARE COMMITTEE

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

CORRECTED

At Macquarie Room, Parliament House, Sydney, on Wednesday 27 March 2024

The Committee met at 9:30.

PRESENT

The Hon. Emma Hurst (Chair)

Ms Abigail Boyd

The Hon. Wes Fang

Ms Sue Higginson

The Hon. Aileen MacDonald

The Hon. Bob Nanva (Deputy Chair)

The Hon. Peter Primrose

PRESENT VIA VIDEOCONFERENCE

The Hon. Stephen Lawrence

The CHAIR: Welcome to the third hearing of the Committee's inquiry into the proposed aerial shooting of brumbies in Kosciuszko National Park. I acknowledge the Gadigal people of the Eora nation, the traditional custodians of the lands on which we are meeting today. I pay my respects to Elders past and present, and celebrate the diversity of Aboriginal peoples and their ongoing cultures and connections to the lands and waters of New South Wales. I also acknowledge and pay my respect to any Aboriginal and Torres Strait Islander people joining us today. I ask everyone in the room to please turn their mobile phones to silent. Parliamentary privilege applies to witnesses in relation to the evidence they give today. However, it does not apply to what witnesses say outside of the hearing, and I urge all witnesses to be careful about making comments to the media or to others after completing their evidence. In addition, the Legislative Council has adopted rules to provide procedural fairness for inquiry participants. I encourage Committee members and witnesses to be mindful of these procedures.

Associate Professor ANDREA HARVEY, Associate Professor, University of Sydney, and Chancellors Research Fellow, University of Technology Sydney, sworn and examined

The CHAIR: I welcome our first witness and thank you for giving your time to give evidence today. Do you have an opening statement that you'd like to give?

ANDREA HARVEY: I do. I have post-graduate veterinary qualifications in animal welfare science, including a PhD in assessing wild horse welfare. I've been working with wild horses for 11 years across a range of areas, so in addition to my PhD that involved two years of field work across different sites in Kosciuszko National Park, I've also carried out pro bono veterinary work for a range of brumby re-homers over the last 10 years, including gelding over 100 stallions for rehoming. I've also conducted immunocontraceptive trials in captive brumby populations and have personally homed and trained brumbies.

I've published and lectured widely on the subject of wild horse welfare. I was also the veterinarian and deputy chair of the Scientific Advisory Panel that ran for two years from 2019 to 2021 for the development of the 2021 wild horse management plan. I've subsequently been engaged in consultancy work for National Parks and Wildlife Service, providing advice and undertaking animal welfare audits for a range of the management methods that are used or have been trialled. I was not, however, involved in the animal welfare audit for aerial shooting.

I am here today not to give my personal opinion on aerial shooting or other aspects of wild horse management but as an expert in animal welfare, and specifically in wild horse welfare, to provide factual information. I consider my role is to provide high-level expertise on the welfare impacts associated with aerial shooting and other management methods, using my knowledge of scientific evidence based both on literature and my firsthand experience. By doing so, I hope to assist sound, honest and transparent scientifically informed decision-making that truly prioritises animal welfare outcomes and the ethical management of wild horses.

Wild horse management is an ethically challenging scenario and there are no easy solutions that will please everyone, but we must be honest and transparent about those challenges and how decisions are made. If the Government decides to use aerial shooting for wild horse management, it must be transparent in the reasons for doing so and must be honest to the public about the welfare impacts of shooting horses from helicopters. Proponents of aerial culling frequently state that it's the most humane lethal management method, and some even say the most humane way of managing wild horses, but this is wrong. The RSPCA definition of a humane death is "when an animal is either killed instantly or rendered insensible until death ensues, without pain, suffering or distress".

Aerial shooting achieves none of these aims. Aerial shooting involves pursuing horses with a helicopter, which even if for one to two minutes can cause varying degrees of breathlessness, muscle fatigue, exhaustion and heat stress, particularly if they're galloping at maximal speeds through fear from the pursuing helicopter. Following the chase, horses are shot with bullets aimed at the chest. With a chest shot, animals die as a result of haemorrhage. The time to death is variable depending on the precise location of the shot within the chest. It is possible to be a rapid death if the shot is directly into the heart, a level of precision that would be very challenging from the air, but death is never instant as is required to state that it's a humane death.

The gun shot will cause pain by penetration of muscles, bone and nerves, and the resulting haemorrhage causes weakness, breathlessness and anxiety. This major haemorrhage causes a reduction in blood pressure which will result in horses usually dropping quickly to the ground, but precisely when insensibility or death occurs is impossible to state with any certainty from the air. It is fair to say that subsequent multiple shots will usually ensure that the horses do die quickly, and with the current operating procedures it would be unlikely that any horse suffers for longer than several minutes, but they certainly do not die instantly. They will inevitably suffer pain and distress prior to insensibility and death. These welfare impacts may be short in duration but they are severe in intensity.

To the best of my knowledge, no expert animal welfare advice provided to government over at least the last eight years has recommended aerial shooting in this way. The independent technical reference group that advised on the 2016 draft management plan only recommended aerial culling if chase times were less than one minute and horses were rendered immediately insensible after a first shot to the head. The Scientific Advisory Panel that I was deputy chair of made similar recommendations but it subsequently became clear that this was impossible to achieve due to the technical challenges of shooting from the air. Both expert committees recommended aerial shooting should only be considered in very specific circumstances. Furthermore, there are substantial inherent challenges in auditing animal welfare outcomes with aerial culling. Indeed, they cannot be effectively audited in the same way as other methods.

In the last two weeks I initiated a poll of veterinarians, conducted through the Centre for Veterinary Education of the University of Sydney, and to date 81 per cent of 36 respondents so far do not consider any form of aerial shooting with chest shots to constitute a humane death, with those that do consider aerial shooting to be humane only accepting a less than one minute chase time. The Scientific Advisory Panel recommended following the *International Consensus Principles for Ethical Wildlife Control*, published in 2017. These principles include that management methods should cause the least harms to animal welfare to the least number of animals; further, that control methods should be justifiable, socially acceptable and systematically planned. The way that aerial culling has been hastily introduced into Kosciuszko National Park goes against all these internationally recognised consensus principles.

The CHAIR: I might start with a couple of questions just because I was interested in your opening statement. At the beginning you talked about the fact you've been involved with rehoming horses, rehoming brumbies specifically. We had another witness come to this inquiry that said that rehoming was extremely cruel and said that actually aerial shooting was less cruel than rehoming these animals. As a veterinarian, could I get your opinion on that?

ANDREA HARVEY: I think that's absolutely not true. I think, of course, with any rehoming—and this applies for all animals in all situations—there are always some situations where welfare outcomes may not be optimal, and those are constant challenges in rehoming of all animals that we need to continuously strive to improve and overcome those hurdles. But it's absolutely true that there are lots of huge success stories of brumbies that have been rehomed and it is possible to do in a very humane way.

The CHAIR: You also said that for aerial shooting there needs to be very specific circumstances that need to be met. The Government's SOP for aerial shooting allows shooting during foaling season. It doesn't specify any maximum chase times. It allows shooting in mountainous and tree-covered terrain where it's harder to see the horses. Do you have concerns around some of those aspects around the SOP and do you feel that the current program meets those very specific circumstances that you mentioned?

ANDREA HARVEY: I do have concerns about those and I don't believe that it meets the specific circumstances. The recommendations for when aerial culling may be needed were very specific circumstances, where no other methods may be suitable, for specific horses, in specific locations of the park. There's an inherent problem with auditing the animal welfare outcomes with aerial culling particularly. That was highlighted in the recent trial where animals could only actually be assessed within a few minutes of being shot if they were in an open plain area where the helicopter could effectively land safely in order for the veterinarian to go and check that those horses were dead. Effectively, it can't be audited in areas where a helicopter can't safely land quickly.

The CHAIR: Just to quickly go back to the rehoming, can you talk a little bit about the rehoming that you have done and where you have seen it being done in a humane way and actually for the animal's better welfare?

ANDREA HARVEY: I think, going from the beginning, one of the misconceptions that I've seen arise a lot during the inquiry is that from the point of the passive trapping of these animals. Some people perceive that to be cruel because they're wild animals and they perceive that they are going to be very distressed by that process. But actually, the way in which the trapping is done is extremely good. I have audited these processes. The welfare standards are extremely high because the horses are gradually habituated to yards, so at the point that they're trapped in the yards they're very used to going into those yards and associating it with positive experiences because they get hay and salt licks within the yards. By the time they're actually trapped to be loaded for transport, they are, generally speaking, pretty calm.

The National Parks and Wildlife Service staff are highly skilled in managing these horses from the point of trapping and transporting to their holding yards. They are effectively already training the horses from the first point that they approach them in the yard. They're training them to associate the presence of people as a positive thing. In fact, even by the time the horses are transported to a rehome, they often are really already relatively calm and very accepting of people at that early stage. That's purely due to the way that the trapping is done and the skill of the staff involved. Certainly, there could be different outcomes if it wasn't done in that way.

The CHAIR: So your opinion is that the rehoming that is currently being done in Kosciuszko National Park is a high-welfare project?

ANDREA HARVEY: Yes. I think there is variation. I think that the situations where there are the highest welfare outcomes are when horses are habituated to people and receive some level of training before they then go on to other homes, and that the people that are taking the horses are experienced people and are very committed to their care. Problems can arise when well-meaning people take on horses that they're not experienced to be able to manage. That's a process that needs continuous improvement, for sure. But certainly there can be very good welfare outcomes when that's done well.

The CHAIR: I have one more question. I know you have done research about the mental state experiences of wild horses. For the benefit of the Committee, can you talk through some of that research and how that would apply to horses being chased by a helicopter, potentially surviving horses, or horses being split from family groups? What is that sort of mental state? How does that research apply to what is happening with aerial shooting?

ANDREA HARVEY: My whole PhD really was about identifying what we call indicators of welfare in wild horses—these are physical changes that we can observe or measure—and scientifically validating them in terms of the mental experiences that they are likely to reflect. We can certainly pick up changes in horses' postures, body language and facial expressions, for example, when they are experiencing pain, anxiety, distress, fear.

The CHAIR: How does that then apply to being chased by a helicopter, surviving a shoot and being maybe only one of a family group that survives? What will the experience of those horses be?

ANDREA HARVEY: Certainly horses are—when they're fleeing from a helicopter, they're fleeing because they're extremely fearful. The problem with the way that aerial shooting works is that they usually will be going at maximal speed in order for the helicopter to be close enough to get as accurate shots into the horses as they can. In order to get close enough, they've got to be chasing the horses pretty fast, so the horses will be going at maximal speed and that is because they are fearful.

Obviously, the type of other more subtle changes in things like their body postures and facial expressions are not going to be observed from the air. If somebody is trying to do an animal welfare audit from the air, they might say they can't perceive any evidence of animal welfare impacts, but that's just because they can't be seen from the air. I think we know that when social animals like horses, which are highly social, get split up from herd members, they usually will exhibit signs of distress. Again, in this situation, we may not be able to observe those signs of distress but we know that they exist from other situations.

The Hon. WES FANG: Associate Professor Harvey, thank you very much for appearing today. I would go through your credentials, but I know Ms Sue Higginson will probably touch on that a bit later because she tends to do that with all of the expert witnesses.

Ms SUE HIGGINSON: Can we just not?

The Hon. WES FANG: You do often do that. I want to drill down a little bit. In your opening statement, you talked about the RSPCA guidelines for adverse animal welfare outcomes. But you have given evidence in your opening statement that makes it seem impossible for the RSPCA's guidelines to be met with aerial culling. Is it your opinion that that is the case?

ANDREA HARVEY: I guess what I was providing in my opening statement was the RSPCA's definition of what a humane death is. Yes, their definition of a humane death cannot be met with aerial culling.

The Hon. WES FANG: Last time we heard from the Australian Veterinary Association that they were not worried about the adverse animal welfare outcomes, or they didn't believe that there would be adverse animal welfare outcomes. Could you provide some context? I think you said you'd done some research through a veterinary group. Can you provide some context into that research and what the view might be around some of those comments from the AVA?

ANDREA HARVEY: I think, firstly, using the word "humane" can be a little bit misleading because that means different things to different people. We've talked about a specific definition for a humane death, but when we're talking more generally about what is a humane method of managing wild horses, people will use lots of different factors to take into consideration to conclude what they think is humane. And so, when we're talking about animal welfare, I prefer to talk about animal welfare impacts because that's very specific. We're talking about the impacts on animal welfare and we're not thinking about any other factors.

I think often when people are answering the question about whether something is humane, they aren't directly answering the question about whether it's having adverse animal welfare impacts; they're trying to interpret lot of different information, thinking about practicalities or finances or other things. They're trying to interpret lots of different factors into their answer, rather than just thinking about the animal welfare outcomes, and I think that can lead to misleading answers.

The Hon. WES FANG: In that respect, do you believe that the current aerial culling program that is underway through the National Parks and Wildlife Service is resulting in the humane deaths of the brumbies? And do you think that it can provide guaranteed animal welfare outcomes in the context of the SOPs being actioned the way that they are?

ANDREA HARVEY: If we stick to the RSPCA's definition of what a humane death is, aerial culling doesn't achieve that. I think people use the word "humane" in a broader context to consider situations where there

may not be alternative methods. For example, in an exclusion area that's very remote there may be horses that are impossible to trap and, taking all those factors into consideration, some people may conclude that in that situation aerial shooting may be the most humane because other options aren't possible. But that still doesn't mean that that's a humane death. There certainly are adverse animal welfare outcomes. We always have to weigh up—all management methods obviously are going to have some adverse animal welfare outcomes, and that is going to be different across different areas of the park and across different horses even with the same method. So we have to be really specific about what adverse animal welfare outcomes we're talking about when we're discussing the differences across different methods.

The Hon. WES FANG: If that's the case then, and humane death isn't guaranteed for those horses, how has the RSPCA provided context to the SOPs, and how is National Parks and Wildlife Service currently conducting aerial culling if, by their own definition, the RSPCA's humane deaths aren't being met?

ANDREA HARVEY: I would assume that the RSPCA is considering, in the circumstances where aerial culling is being used, that there are no more humane alternatives that are possible. But I think that would be questionable, and it's hard to know whether that's the case because the information hasn't been transparent in terms of exactly what regions and what context the aerial culling is actually being utilised in.

The Hon. WES FANG: Clearly you have done lot of work in this space, and I think you said you had done work for National Parks and Wildlife Service previously. Why haven't they asked for your opinion in this matter, given that you seem to be at least as strong a subject matter expert as other people that they have sought advice from?

ANDREA HARVEY: I can't answer that question.

The Hon. WES FANG: Are they perhaps vet shopping so they can get an answer that they want? Is that conceivable?

ANDREA HARVEY: It's possible. I have been outspoken about chest shots in particular—that I do not believe that constitutes a humane death. That's not a personal opinion; that is a fact. So there perhaps could be wariness about using my expertise when there are chest shots involved.

The Hon. WES FANG: From social media we know that there has been an investigation, detailed in *The Daily Telegraph* last week, into a horse that appeared to have only been shot once in the chest—not in the heart area, but outside the targeted area—and that horse subsequently died but away from the area where it was shot, we believe. Is the RSPCA perhaps conflicted in conducting that investigation? Should the police or the Animal Welfare League—the other two bodies in New South Wales that are able to conduct animal welfare investigations—perhaps be looking at this matter and at National Parks and Wildlife Service for their aerial culling?

ANDREA HARVEY: I guess that this is a highly challenging area, and it's probably fair to say, with no disrespect to them, that RSPCA inspectors may not have the expertise to really effectively assess those situations. One of the issues with aerial culling and the auditing is it's impossible after the event to really be able to give any assessment as to whether that horse died humanely or, indeed, how long it took to die. This is partly because of the inherent procedures in how aerial culling is done, because they have the policy of repeated shooting after the first shot to try and ensure that death happens in a timely manner.

But that means that many horses will have several shots, and if you're examining the carcasses after the event you can't tell which bullet ultimately killed the horse. Where there is one shot, it is hard, without examining the carcass, to know if there was definitely one bullet shot or whether another shot had been missed. It is very hard to say how quickly that horse died. Even where the gunshot wound is outside of what looks like the target area, depending on the trajectory of the bullet, that may still be going into the chest, but there's absolutely no way of knowing how long it took that horse to die when you're seeing the carcass.

The Hon. WES FANG: But if it did not go through the heart it would not have died instantly.

ANDREA HARVEY: It would not have died instantly, no. Maybe quickly—within minutes is the kind of time region we're probably talking about—but certainly not instantly.

The Hon. BOB NANVA: Dr, I have skimmed through your PhD—congratulations, by the way. I have not managed to get through all 622 pages, but it is a very worthy read.

The Hon. WES FANG: What have you been doing, Bob?

The Hon. BOB NANVA: Reading a PhD thesis. Something that I am interested in is that the Scientific Advisory Panel itself noted that past horse management plans failed to remove a sufficient number of horses from the park in light of the breeding rate of 17 per cent annually. The risk that that poses from an animal welfare

perspective is that a high density of horses over great areas over a longer period of time could result in poor welfare outcomes, largely because horses are pushed out of the woodland areas of the park where food availability is limited. Do you have concerns that if broadscale horse management is not initiated at the park there will then be poor animal welfare outcomes for the horses that remain and the horses that will come down the track?

ANDREA HARVEY: Yes, I do. I think the difficulty, though, is that all of the management methods have not been given a fair chance. In the past, the only management method that's been done has been passive trapping, but that hasn't even been consistently done. There was very little passive trapping between 2016 and when trapping was re-instigated on a higher, broader scale after the 2021 management plan came in place. There's often been quite a lot of delays in instigating management options. Although I do think that that's a concern—if there is no management at all. However, we seem to be flipping from one extreme to the other, and in some ways that's being used to justify broadscale aerial culling because of the situation that we're in now. But the other management methods haven't really been given a fair chance, in my opinion.

The Hon. BOB NANVA: Is it your view that all methods, whether they're lethal or non-lethal methods, have the potential for moderate to extreme adverse outcomes for wild animals, particularly horses, and to reduce those potentially adverse animal welfare outcomes it's more a case of having the right conditions, the right protocols and the right skills of people that are implementing those measures, rather than making a generalised statement or view about one method or the other?

ANDREA HARVEY: Correct. The animal welfare outcomes aren't so much dependent just on the method but on how that method is carried out. All methods have the potential to have severe adverse animal welfare outcomes, and it's variable whether those can be mitigated or not. With a lot of the other methods, I feel that they can be more effectively mitigated, and National Parks and Wildlife Service has demonstrated the ability to mitigate a lot of the potential adverse animal welfare outcomes with a lot of the other methodologies that are being used. The issue with aerial shooting is that there is much more limited ability to mitigate some of those adverse animal welfare outcomes and, importantly, that the issue with auditing animal welfare outcomes is so problematic. With all the other methodologies, what was advised by the Scientific Advisory Panel and what's being carried out by National Parks and Wildlife Service for the first time, I believe, is monitoring animal welfare outcomes and using that information to improve procedures and policies to further improve animal welfare outcomes.

But all of the other methods, it's really possible to very effectively audit animal welfare outcomes. Whereas with aerial culling it's not possible and so it's really hard. To a degree they can improve welfare outcomes, which has been done. I think the results of the recent trial, yes, horses were dying reasonably quickly but they weren't dying instantly. They can't improve on that. That's kind of the best that they can do, and then there was still the problem of not being able to audit at all in areas where the helicopter couldn't safely land. So it's just really inherently problematic to improve it further and to audit it effectively.

Ms SUE HIGGINSON: My colleague the Hon. Bob Nanva asked about the welfare impacts on large numbers of horses. I know you talked about that we haven't done enough passive trapping through that period, but could you talk about what he was asking—when you have explosive, large numbers of horses in an area, particularly if we went into a period of drought, what are the welfare impacts?

ANDREA HARVEY: Sure. Basically, without any management, horses will be managing their own populations through resources. Effectively, there isn't usually an issue with water supply in Kosciuszko National Park, so we're mainly talking about food supply. When there is good food supply, reproductive rates will be higher. In horses, fertility and reproductive success is related to nutritional status, so the reproductive success will be higher when there is good nutrition. When there are more horses and there is poor nutrition, then they will start to have nutritional challenges. Certainly, as we enter periods of drought then there will be horses that start starving to death and that can happen over prolonged periods of time.

The problem with the current management program is that when populations of horses are reduced suddenly, that also results in a rebound effect in their reproduction increasing again and population numbers rising rapidly. So although it makes sense to manage the populations so that we don't have those adverse welfare outcomes of lots of horses starving to death, if we remove large numbers of horses, the population very quickly rebounds and we get to that situation again. So it is challenging to be able to meet that middle ground.

Ms SUE HIGGINSON: On that, when a population is challenged nutritionally, they will feast on the entire environment until their welfare outcomes start manifesting through nutritional deficiency. Is that how it will play out?

ANDREA HARVEY: I guess it depends what you mean by feasting on the entire environment. They generally are grazers, so horses will predominantly eat grasses rather than trees and shrubs and bushes.

Ms SUE HIGGINSON: That's what I mean. So they will eat all the resources available and then die of starvation? Is that generally what will happen?

ANDREA HARVEY: Correct.

Ms SUE HIGGINSON: Can you outline any welfare implications for native species of having large numbers of horses in the park?

ANDREA HARVEY: I think that's a very broad area. I haven't conducted studies on other species within the park. It's going to be extremely variable depending on what areas of the park are concerned. There are very different species distributions across different areas of the park, and it depends on what species of animal is concerned in terms of how they may be impacted. I think one of the problems is whilst there is some evidence that when there are very high horse densities there are going to be negative impacts on the environment and other species, what we do not know, there is no research to determine, is what that density is—so whether horses have negative impacts at lower densities or just at very high densities.

The best available evidence that we have is a recent study that was published last year by Dr Dave Berman, who was Chair of the Scientific Advisory Panel, where he was looking not at other species impacts but broader environmental impacts at different densities of horses, and it did show that at lower densities there were insignificant impacts and that, from a management perspective, in high horse density areas only moderate reductions in their density was, therefore, likely to have very beneficial effects on the environmental impacts. I guess we don't have the information to answer your question completely, but that's the best available information that we have.

The CHAIR: Thank you. Sorry, I see that your hand is up, Mr Lawrence, but we do have to move on because we are quite over time. I understand that there were other questions from the Committee, so I think that there will probably be some questions that we give to you on notice. The Committee secretariat will contact you with those. Thank you so much for coming in today and sharing your expertise with us. We really appreciate your time.

(The witness withdrew.)

Mr ANDY CHAMBERS, Managing Director, AirborneLogic, before the Committee via videoconference, affirmed and examined

The CHAIR: I now welcome our next witness. Do you have an opening statement that you'd like to give?

ANDY CHAMBERS: Very briefly, I wanted to let the Committee know that we have recently undertaken an aerial imaging survey of an area of the Kosciuszko National Park with the intent of identifying horses in RGB— or red, green, blue—imagery and undertaking a machine learning methodology to attempt to count those horses via an automatic method, but also reviewing that imagery by a combination of visual methods from our team and opening that site of the accumulated photographs to the public for vision as well.

The CHAIR: Can you begin by telling us the difference between your results and perhaps the results from National Parks survey?

ANDY CHAMBERS: I can comment on the methods that we have used, which essentially are undertaking a remote sensing project whereby we've used an aircraft with high definition aerial photography to run transects in a similar line perhaps to what may have been used in other methodologies. I'm not overly familiar with the standard methods used by National Parks because it's not something that we do as a business. We are very much a remote sensing and data analytics company, not an ecological survey company.

The CHAIR: How many horses did you find in your survey?

ANDY CHAMBERS: At this stage, over the area that we captured imagery for, which was 21,000 hectares or 210 square kilometres, I think at last check with my team we were sitting at somewhere around about 250.

The CHAIR: Sorry, 250 horses?

ANDY CHAMBERS: Correct.

The CHAIR: That's significantly lower than the results by National Parks. Can you explain why you've used this different survey method and how reliable it is? Obviously, any survey method is overall an estimation, but can you talk about the reliability of the survey method that you've used, if we're looking at two survey methods which are extremely different, to try to help us understand?

ANDY CHAMBERS: The methods used in remote sensing have been around for many, many years— well over 30, 40 years of utilising aerial photography means to capture large-scale imagery over areas. This process that we have utilised is no different to that. I guess the beauty of this method is that it creates a permanent visual record of an area and enables somebody to come back over many times and have a look at that imagery, which is, in fact, what our team has done over a period of weeks since the imagery was captured. It was the ability to look at this both manually by visually looking at the images.

Because the imagery was captured at five-centimetre detail on the ground—we have what we term ground sampling distance, which is essentially the size of the pixels on the ground. Those pixels are five centimetres. That's an extraordinary amount of detail to be able to visually identify things. We've certainly had no trouble in identifying what we believe to be horses in those images, which are, as I mentioned, freely available for the public or the Committee to have a look at. It's very evident in those images the difference between horse habit, I suppose, in either lying down or standing up, grazing or head in the air, casting a shadow at times on the ground. It is very, very obvious that that is, in fact, a horse.

From that imagery, we have been able to visually look at the horses that we've seen, and we are now building a machine learning module, which essentially involves training the machine to understand what it's looking at, which requires us to put boundary boxes around each of the horses that we have identified. Again, these are very standard machine learning and visual identification methods used across the machine learning and AI fields to endeavour around visual identification of objects. I think this is the point with what we are doing here. It's somewhat irrelevant whether it's a horse or whether it's a tree or whether it's a rock. What we are doing here is training a model to look for a specific object, and in this case it happens to be a horse. So we have followed that pattern in many other types of work that we do—for instance, whether it be trees or vegetation as well.

The CHAIR: Just one last question. Do you believe that this methodology is possibly the most reliable model that we can use to actually estimate the number of horses or anything in the park?

ANDY CHAMBERS: Again, I'm probably not qualified from an ecological perspective to say how reliable or otherwise other methods might be. But I think what we are seeing with the use of this form of imagery is that when matched with machine learning and AI techniques, which are increasingly available across science,

it's an incredibly reliable way to do things because you have that accurate record of imagery that one can go back and look at multiple, multiple times.

Ms SUE HIGGINSON: Thank you very much, Mr Chambers. I've got a hundred questions, but I'll just do two quick ones because time is limited. Your excellent images, which I've looked at in some detail now, seem that they are very effective in picking up the details of horse tracks and disturbance by horse tracks. Is your work in other areas of Australia? Have you seen this kind of density of horse tracks in images similar to those of yours from North Kosciuszko?

ANDY CHAMBERS: No, because we haven't looked in areas where there is horse activity. Other areas where we would be operating, for instance, wouldn't have horses. They might have, for instance, feral goats or possibly stock, for instance. So it's hard to discriminate between what animals might be causing those tracks.

Ms SUE HIGGINSON: Also, in your research and report, you said that you advised against using thermal imagery and that there's no capacity to look under tree cover. Could you explain where that comes from and what the logic in that is?

ANDY CHAMBERS: I think that needs some clarification. We still believe that there is some potential for thermal imaging. Really, what was controlled here was the budget. Essentially, this was a community-driven project, funded by the community, with a limited budget. So what was very difficult for us to do was to fly an area at the appropriate time of day, capture normal RGB—red, green, blue—imagery, the imagery that we see as humans, and then also capture thermal imagery that was likely to give the best results over the area that was chosen to be flown. So no different with RGB imagery and thermal—once you get in under a tree canopy, you're going to have some issues with the image being obscured because of trees and so forth. It's a timing aspect as to when you actually fly and capture that data, but it doesn't mean to say that the thermal imagery is not capable of being used. In fact, I think it would be a complementary dataset, should the affordability aspect be there for this community project.

Ms SUE HIGGINSON: So no analysis of what was under tree cover was able to be undertaken?

ANDY CHAMBERS: Correct. We basically flew an area that was over the open plains area. Some of the imagery extended out into treed areas. There have been some observations under those treed areas of horses, but yes, there's going to be variability no matter what technique you use.

The Hon. WES FANG: Mr Chambers, you may not be aware, but the Invasive Species Council put out a press release this morning, in fact. They have used your imagery, and they have taken images from your website and have sought to define parts of your imagery as proof that there is damage from brumbies in relation to Kosciuszko National Park. I believe the evidence you just gave to Ms Sue Higginson was that it's impossible to actually determine how those tracks that they've claimed were made; it could be the case that it was made by goats or feral pigs or any other animal. Is that the evidence you gave earlier?

ANDY CHAMBERS: Correct.

The Hon. WES FANG: So it would be incorrect for the Invasive Species Council to put out a press release claiming that it demonstrates damage to the park when, in fact, that's not the case at all?

ANDY CHAMBERS: Well, I haven't seen that press release, so it's difficult for me to comment on what they've provided. But, yes, I think the tracks that you can quite clearly see in the imagery have clearly been caused by something. Ecological research, I believe, would be required to determine exactly what. Some assumptions could be made, of course, and no doubt some of those assumptions would be that they are absolutely horses, perhaps, and that wouldn't be unreasonable, but I think there would be some additional research required there to determine that authoritatively.

The Hon. WES FANG: I appreciate that. I just thought it was worth clearing up before we have other witnesses that are appearing today. In relation to the questions around the ability to capture images under tree canopies et cetera, is it your understanding, I should probably say, that where there are other survey methods that are employed by, say, the National Parks and Wildlife Service or another organisation, the same difficulties in getting images and counts under canopies would be similar in respect of any survey method, unless you are using things like thermal imagery?

ANDY CHAMBERS: Anything that relies on human vision has the potential for that vision to be obscured by something like a tree. No matter whether you take that imagery, for instance, as we have done, from an aircraft or whether you view that moment in time from an aircraft, for instance, or a helicopter, as I understand some of the methods previously have done, then you are going to have that problem of not being able to see through a tree canopy, for instance. So you are going to have some level of obscured vision.

The Hon. WES FANG: So it's not unique to your survey method; it's a problem across any visual survey method. Would that be a reasonable assumption to make?

ANDY CHAMBERS: I think so, yes.

The Hon. WES FANG: In circumstances where you have a number of horses that you have identified through your survey method, could you provide—and I'm not sure if you can or not, but there's a variance in the number that is cited by the department and the National Parks and Wildlife Service. I think between 14,000 and 24,000 horses—it's within that ballpark of where they claim the variance of the numbers are. Would you be able to provide some context as to where you believe the numbers and the variance might be, and the possibility that we are perhaps within that 14,000 to 24,000 variability, given your results?

ANDY CHAMBERS: To be honest, no, I don't think I can, because I'm not really familiar with those techniques that are used for those surveys by National Parks. I mean, that variability may be due to a vast range of issues. I think all I can really comment on is what we've physically seen. So far, we've had a lot of sets of eyes go over this imagery and we're seeing in that ballpark of 350 horses or so. That'll go up and down a little bit from an individual horse number, I suspect. Once we've finished the machine learning component of this, we'll obviously run that model to validate, again using techniques that are used in the machine learning, AI and vision learning systems—highly publicised and highly referenced through literature—as a way to cross-reference those numbers. So that's the sort of level of numbers we're seeing in that area that I described.

The Hon. WES FANG: We've seen the numbers coming out of National Parks and Wildlife Service given to us by the Minister in the House—that there's been hundreds of horses in the past few weeks, actually, that have been culled using aerial methods. Would you be able to provide some thoughts around, if that rate of culling was to continue, what the numbers might look like in six months, given that they're closing the park now for a six-month operation?

ANDY CHAMBERS: Not really, because I think it's going to be a case of, using this technique, what are the numbers one would see on any particular day of capturing imagery and that might vary depending on a range of factors like heat in the day, climate, weather and so forth, as to whether there were horses out in the open or not.

The Hon. WES FANG: My last question is, do you believe we are closer to a number that's of the 24,000 variety or closer to the number that's of a 3,000 variety?

ANDY CHAMBERS: I think all I can comment on is the numbers that we've observed in the survey that we've completed. Others are drawing conclusions around what that might mean from a density perspective, but we focused specifically on the task at hand for us, and that was to image a particular area and count what we could with confidence inside that area.

The Hon. WES FANG: If we extrapolated your numbers out through density to the park size, what would you calculate it out to be?

ANDY CHAMBERS: I'm not familiar with the total area that previous estimates were done over. I've not looked at that level of reporting at all from National Parks, for instance, so it would be difficult for me to comment on that, I'm afraid.

The Hon. WES FANG: I appreciate that.

Ms ABIGAIL BOYD: Thank you, Mr Chambers, for this project. It's really super cool and I enjoyed looking at it this morning. Unfortunately, the first horse I zoomed in on was dead but, apart from that, I found lots of live ones as well. It's just a really good program. How was the test section selected? Why did you choose that one?

ANDY CHAMBERS: The area that was flown, that 210 square kilometre area, was selected—I should probably reference how we came about doing this work. We were approached by Mr Rocky Harvey, who had undertaken this crowdsourced funding—GoFundMe—approach, and asked whether we would be prepared to fly an area and do a count, and whether that fit within our professional expertise. We said yes, it would, and we were happy to do that work. He essentially came to us and said, "Here's an area that we would like to look at. We've selected this area over a range of high country, open area and we'd like to have a look at what are the different techniques that you could use." So it was client driven. We, essentially, were given an area and asked, "Can you fly this area, how much would that cost and how much would it cost to do the machine learning component?"

Ms ABIGAIL BOYD: There's obviously been a lot of disagreement over the total number of horses in the park. If you had the resources, how hard would it be to do an accurate survey of the entire park using your method?

ANDY CHAMBERS: Relatively easy with an unlimited resource, because it's really just a case of equipping an aircraft with the appropriate cameras and undertaking a flyover of the full area. I think what we would have to qualify out of that would be, as we've described in the early questioning here is, there are going to be areas that are open using RGB—or red, green, blue—normal aerial photography techniques where we can see things and we can see things clearly, unobscured by trees. Then there are going to be areas that are under heavily wooded and sloping terrain, which are far more difficult, obviously, from the perspective of seeing things. That is potentially where thermal imaging would assist that process. So I think if we were talking about an unfettered budget and ability to fly a significant area, we'd be looking at what is that total area and then how many days flying that would require at repeat times so that there was an ability to compare data and see what was occurring in one area repeatedly over a period of time, and then potentially be using those thermal techniques as well as further support.

Ms ABIGAIL BOYD: So it's possible. When we're talking about unlimited resources, what are we talking? If this was to satisfy, or at least provide some clarity over the total numbers, what sort of resources? I don't want to put you on the spot; maybe you want to come back on notice. But the idea of having an accurate, or a more accurate, publicly accessible way of finding out how many horses are at least in the open grounds—because obviously the other survey methods have also used that and have the same limitations—would be incredibly valuable. What sort of resources are we talking to get that?

ANDY CHAMBERS: I'd be guessing, but I would think somewhere probably in the region of half a million to a million or something like that.

The Hon. BOB NANVA: You're not putting this count out to be a measure of absolute abundance, are you? This is really just a measure of relative abundance in terms of the survey count?

ANDY CHAMBERS: Correct, yes. We'd never professed for a moment to suggest that this would be the be-all and end-all. It was an opportunity to demonstrate that there are techniques available that are consistent with remote sensing that have the ability to undertake this type of work, so we're certainly not suggesting for a minute that this is the be-all and end-all.

The Hon. BOB NANVA: So what's fundamentally missing is the unseen component for the purposes of any count at the national park?

ANDY CHAMBERS: Correct, there's always going to be a problem in working out how one counts underneath the tree canopy.

The Hon. BOB NANVA: In terms of the methodology that you have used, has it been validated? I know it's relatively novel, but has it been validated, has it been applied to other known populations where there is a count with more established methods, and peer reviewed?

ANDY CHAMBERS: The remaining part of this project is to prepare a public report that we will circulate through the same site that we put the imagery on, and that report will be peer reviewed. We've engaged a professor from the University of Adelaide, someone that we deal with on other areas of research around remote sensing and image recognition and AI machine learning work. So that professor is well known from the Australian Institute for Machine Learning based in Adelaide university and we believe will be very capable of peer reviewing the work that's been done.

The CHAIR: You talked about the number of 250 or 350 horses. I think the Hon. Wes Fang was asking some questions about once that is put into a model to create an estimate of the number of brumbies. I know that you said that you haven't done that yourselves. Do you feel that there's a statistically significant number counted to be able to apply that to a model?

ANDY CHAMBERS: It's a very good question. The number of observations that we have at the moment are challenging from having a useable number of training datasets to develop that model. There's some discussion around having some flights over a second area, which would enable additional validation of numbers by, one would assume, seeing additional horses in that imagery and helping to build the model. One of the issues that we have at the moment, in the work that we're working through from developing that model, is that it's a relatively small number from a model-building exercise. Essentially, from a training dataset, when we started this exercise, we perhaps thought that we might see several thousands of horses and that that would be a good number to train the model. But as it's turned out, we're in the ballpark of 350.

The CHAIR: So it's a much smaller number than expected.

ANDY CHAMBERS: Yes.

The CHAIR: My understanding is that the other methodologies used to count the number of animals are very similar. They have got some of the same problems with not counting the number of animals under canopies and under trees. However, we've also heard evidence during the inquiry that there's often very few horses in those areas because they tend to be out in the open areas grazing and they're unlikely to go under treed areas. But, obviously, both methodologies that are used don't count the small number of horses that might be in those areas. My understanding is that the primary difference between your method and the other methods is that you've done the photo imaging. Where you've gone along the transection, you've actually taken photos so that it can be checked and rechecked by multiple people and counted, whereas the method that was used by national parks was a simple, crude counting from the helicopter without any double-checking. Is that the best way of understanding it—that it's the photo imaging that makes yours different?

ANDY CHAMBERS: I think so. Really, what we're trying to achieve here is to take out human error—take out that moment where you may or may not see something. We still have some level of error in these numbers, as you may have seen in some of the imagery. There are certainly shapes where we were unclear whether it was a horse or not in the image. We're having a think about whether we might be able to subsequently fly anything at higher resolutions—so smaller pixel sizes—to help in those situations. But overall, it's about having that permanent record and removing the potential for there to be human error.

The CHAIR: I understand, and you've mentioned it several times, that those images are available. Why is that transparency so important? That helps create a situation where everybody can have a look at it. The Committee has been invited to have a look, and the Government has been invited to have a look at it. Is one of the important aspects of this that everybody can see these images and, therefore—and there will be a range of counting—we can create that range and everyone can agree on a number or a range within that number?

ANDY CHAMBERS: Absolutely. In any of the work that we do as an organisation and as a business, we have some pretty strong ethics around transparency. That has come from over 35 years of working across environment sustainability and a range of other business areas. It's really important to our business—ethics and transparency. One of the things that we've found with this type of work is that the more you can open that up and enable there to be scrutiny, it removes some of those lack-of-trust factors and enables people to have a clear and open vision of what's going on. We're really strong supporters of that type of approach.

Ms SUE HIGGINSON: Going back to the thermal imaging that could be used, have you got previous experience with the challenges? I am aware that government efforts to survey for native wildlife through thermal imagery has proved significantly challenging, notwithstanding the enormous effort that has gone in over the last few months. Are you able to talk about what your understanding is in terms of some of those challenges that we would face in trying to use thermal imaging to understand what is happening under tree canopy?

ANDY CHAMBERS: We have done work in the thermal identification of koalas on Kangaroo Island here in South Australia. That has also presented some extreme difficulties. A lot of that has got to do with the movement of the animal and the conditions. For instance, if there is wind blowing at the time, that might blow a branch or a tree and obscure the image. Time of day is quite critical, as is weather. For instance, in trying to undertake thermal imaging in extreme heat, heat can really impact on the success of that work. Sometimes there is perfect timing around this. In mildly cooler weather, for instance, like pre-dawn, when the land temperature is at its coolest but the heat coming from the mammal is the greatest, there can be the biggest likelihood of a temperature difference between the object that you're interested in and the background temperature. Those things can come into play in terms of the success or otherwise of a thermal survey, notwithstanding the comments earlier around being obscured by very dense vegetation, for instance.

The Hon. WES FANG: Mr Chambers, the New South Wales Government has lauded the approach of seeking to use thermal imaging for koalas. The environment Minister has been progressing a lot of that count issue. Given that the New South Wales Government is prepared to accept thermal imaging for koalas, would it then follow that you would be prepared to use thermal imaging for a count of brumbies, for example? Would that methodology seem to flow through?

ANDY CHAMBERS: It may do, definitely. The interesting thing with using thermal imaging at the heights that we're talking about with large mammals like horses is that, because of the size of the animal, you have a greater capacity, potentially, to pick up that thermal mass as distinct from a koala.

The Hon. WES FANG: That was the next question I was going to ask. Given that you have had some success with koalas and their density and size, being a very small mammal in relation to a horse, would it not be reasonable to assume that the size and heat signature of a much larger animal would be easier to detect than, say, a koala?

ANDY CHAMBERS: I believe so, yes. One of our areas of interest with the shape recognition, size recognition, pixel recognition and the thermal mass of that size of animal is to start working through whether there's a potential methodology to discriminate between species—for instance, to discriminate between a horse, a deer and a pig, for argument's sake.

The Hon. WES FANG: That logic in, potentially, the AI, or whatever the modelling does, can perhaps distinguish—given that the heat signature would be the size that it would be for a horse, you could actually get quite an accurate number out of what you do with the survey area.

ANDY CHAMBERS: Potentially—apart from those aspects of the image being obscured. For instance, being behind a large rock or a very dense piece of vegetation.

The Hon. WES FANG: But those matters would be limited in their number. For the vast majority of the survey detections, you would be able to have a good read in order to be able to determine the number. Would that be a fair assumption?

ANDY CHAMBERS: Certainly over the open areas and certainly over the transition areas between thinner vegetation and the deeper, more sloping areas of vegetation, yes.

The Hon. BOB NANVA: Mr Chambers, I'm interested in which other scientists, ecologists or ecosystem researchers have made use of your model or similar models to yours?

ANDY CHAMBERS: There's a range of research being done with remote sensing on these matters. I'm certainly aware of this work being done by researchers at Flinders University here in South Australia as well. We had contact with Flinders around the koala aspect in being able to get better at using thermal techniques, in particular, to identify mammals in vegetation. There is a range of literature available. Apologies, I can't quote those off the top of my head here and now, but there is certainly a range of literature published where these forms of remote sensing techniques have been utilised for this type of work.

The Hon. BOB NANVA: You'll have to excuse my ignorance, because you may have covered it and I've missed it, but is the area that you covered in your count the same area as that last conducted for the horse helicopter index conducted by National Parks?

ANDY CHAMBERS: I believe a part of it. The 210 square kilometres that we covered does cover over a part of that survey area that was undertaken.

The Hon. BOB NANVA: Do you know what proportion?

ANDY CHAMBERS: I'm sorry, I don't know.

The Hon. WES FANG: I just want to drill down on the numbers a little bit more. You detected around 350 horses in around 210 or 212 square kilometres. Is that a reasonable number?

ANDY CHAMBERS: That's correct, yes.

The Hon. WES FANG: That would provide then around 1.6 horses per square kilometre in your detection area?

ANDY CHAMBERS: Correct.

The Hon. WES FANG: I believe that Stuart Cairns' interpretation was a minimum of 10 horses per square kilometre and a maximum to around 20 per square kilometre. In that instance, it would seem that the numbers that you detected fall far short of where Stuart Cairns has calculated the numbers to be. In that respect, how much more area would you need to survey to determine a statistical model of the numbers across the park to have a more solid number? Because if the numbers as we've just gone through are accurate, where Stuart Cairns is saying there are 10 per square kilometre and there are 1.6, potentially we are down at around 3,000 now.

ANDY CHAMBERS: I think the short answer is the more the better. In the world of data, it's always the more data you can get the better. Ideally, we would want to cover all of those open areas so that there was a fair and frank comparison between the area that we've flown here and other areas that may have horses in. Notwithstanding the fact that from any one day, there may likely be variability, depending on the ambient conditions.

Ms SUE HIGGINSON: Mr Chambers, does it sound right to you that the area that we refer to as the Rocky Harvey count area was 161 square kilometres compared to the horse helicopter transect in 2020, which was 1,299 square kilometres, and the horse helicopter index northern plains survey, which was 395 square kilometres? Does that sound familiar to you, in terms of the surveys that have been undertaken?

ANDY CHAMBERS: If I could take that on notice to check those numbers, because I've not seen them—I've not seen those reports.

The CHAIR: Thank you again, Mr Chambers, for joining us today. We appreciate your time and you sharing your expertise with us. There was a question on notice, which the Committee secretariat will be in contact with you about. There may be further questions from the Committee, which we will send to you on notice as well. Thank you again so much for your time.

(The witness withdrew.)

Dr DON FLETCHER, Retired Ecologist, affirmed and examined

The CHAIR: I welcome our next witness. Do you have a short opening statement that you'd like to make?

DON FLETCHER: Yes. First, thank you very much for inviting me along. I think animal welfare is very important and the evidence for that is in my submission and my career choices that I've made—it's an area, of course, of high emotion, in particular in regard to horses in Kosciuszko National Park. What that really requires, therefore, is a firm focus on evidence as the basis for decisions. I commend the Committee for what it has been doing here. I think it's up to people like us to lead by example in that way. Sometimes that can be very difficult because it's challenging to explain. A lot of the evidence comes from science. There are many barriers: you have to speak English, you have to understand the language in which scientific papers are written, and you have to cope with the maths and statistics. That's not for everyone.

Many of the journals are behind paywalls, in spite of the move to open access publishing. That's racing ahead now. Much of the important research is from the older era, and you need to be part of a big institution to have access to it. So it's all quite difficult. I think we, collectively, need to make a significant effort to improve on that. In regard to my part in that, if anyone feels like I can help by ringing me up after this is all over—any member of the Committee or the secretariat—I'll do my best to help.

Just quickly, without anticipating questions, referring to the notes that I think you've probably received, I would ask that they can be tabled as part of my submission, so in addition to the earlier item. Thank you for nodding. In those I talk about the importance of dividing the three counts that are being discussed the most at the moment into two kinds. The three counts I refer to, of course, are the helicopter line transect density sampling which has been done most recently by Stuart Cairns and by a whole lot of other people previously. That's one of them. Another one is the helicopter horse index by the Kosciuszko staff, which ran from 1998, I think it was, to 2021. That was applied only to the open plains in the north of Kosciuszko, and they explicitly have said is not a population estimate. It's an index, because they didn't believe they were seeing all the horses. Then the third one is the more recent one that we've just heard about.

I think I can help by clarifying differences between those. First of all, any estimate of the population needs to account for those individuals that weren't seen in the method. All methods fail to detect some proportion of the animals. There are in fact very few methods that statisticians and ecologists have developed that have ways to deal with that. "Quantifying what you can't see"—it sounds like an impossible thing. One of those is the distance sampling method, which is used by the Stuart Cairns-type survey. It has that feature built into it. There are a couple of others as well; they're in my notes.

The other two methods, both of them, that involved aircraft in the northern plains are both indexes. Whether they're applied to the entirety of the national park or some subset—or, in this case, the part or all of the open plains—they are only indexes. They can be very useful in providing the rate of population increase or decrease—and knowing, yes, it's going up and, yes, it's going down or whatever it's doing—but they do not give you total abundance. Really, there is just no valid way of comparing between methods that estimate absolute abundance and indexes. They're fundamentally different things.

Just talking about the staff helicopter horse survey that ended in 2021, in my opinion it's been really excellent. It's provided an excellent index for the amount of horses in that area of the open plains. I've put a chart in the notes that were sent out recently showing that. An important feature about that is these people are seeing the horses moving. That's quite different than the more recent survey, which is looking vertically downwards from 1,000 metres and the horses are being picked out of still imagery. That movement is wonderful for being able to see things. You can see animals' injuries, to some degree, because they move. That characteristic is shared by the helicopter line transect distance sampling by Stuart Cairns, because they're flying over the trees and the open areas but they're seeing the animals move. It makes a huge difference to how many you can pick up.

All methods for estimating abundance need to be proven. There have been any number of times that people have thought, "Wouldn't it be a great idea if", "This really ought to work", "Let's try whatever", and it turns out it didn't work. Whatever it is that we need to use for determining numbers—and they're terribly important to determine—we need a proven method. In science, that means it's published in some sort of peer-reviewed journal that deals well with that particular topic. There's any amount of journals that deal with abundance estimation.

In regard to the recent work that was organised by Rocky Harvey with AirborneLogic, the delivery of that has been, in my opinion, outstanding. The imagery is excellent. The online application that enables you to look at it is astonishingly good—it's remarkable. The company deserves some commendation for that. My calculation is that, given that they covered an area of 212 square kilometres, to apply that over the whole area of horses in the

park would be about \$1.5 million, if it cost the same as this has cost. My understanding of the cost is based on Rocky Harvey's online updates, which are very fulsome. I think he's saying \$87,000 for the current exercise.

The current exercise covered a bit less than half of the open plains. The open plains have an area of 394 square kilometres. The survey covered an area of 212, including the surrounding woodlands, which he said the method does not see into. Therefore, the area of woodland in that 212 needs to be subtracted in order to understand those numbers. My subtraction of that is the one that you've heard from this morning. Obviously the Invasive Species Council has been in contact with Ms Higginson here.

The Hon. WES FANG: Yes, they tend to do that.

DON FLETCHER: But I came out with 161 square kilometres there. It'd be good for AirborneLogic to go and do their own calculation. But given that the method is acknowledged not to see under the trees, we need to focus it on the open part, because it covers both. It's a really small area. To magnify that across the park is a really big cost, but also there's the issue of how you develop this method into something that gives you a quantification of the horses that are not seen. We don't have that. No-one's come up with even a wild idea about how do that. There's just nothing there. It really needs a whole lot more development. I think it's a wonderful method.

I think that the future will be, eventually, that some sort of aerial platform—light aircraft, drones, whatever—and thermal imagery will be the way that we count a lot of wildlife. But we can gauge the current state of development of this by looking at the international literature. There are people all over the world trying to solve problems like this. What you will see, I believe, if you look at that international literature is a number of publications where thermal imagery and aerial platforms are used to count animals that live in the open. Jellyfish is a really good example. But a nice Australian example, an outstandingly good one, is to count the flying foxes in a flying fox colony. They're animals right out in the open and it's a limited area, so the drone can cover the whole area all at once. It doesn't have to deal with the issue of, when you're covering big areas, it's going to take many days and so the animals can move between the areas. That's working.

But when we look at animals like horses, which are on the ground and underneath the trees to some extent, the only example I can find is deer in South America. There was an exercise with a captive population and then they deployed the method with wild animals. In that case, with the known population of over 100 animals, the method counted—depending how you applied it—between 50 and 80 per cent. Whatever they do, there's still that component they're not seeing with the thermal imagery. Then they went to deploy it in the more extensive national park area and decided only to do it on open areas. So they provided a figure but, once again, it's not the figure for the entire population. It's only the ones visible in the open at that particular moment in time.

That's the really big difference here. With the Stuart Cairns estimate of 17,000-odd, we've got a method that's applied over more than 2,500 square kilometres of mostly forested country, including an estimate of what was not seen by the observers. Then with the other two indexes—and I'll focus on the AirborneLogic one, because it's the one that everyone is talking about—we've got something that's applied over a very small area of entirely open country and has no method of estimating the component that was not seen. Anyone with good knowledge of wildlife survey for abundance estimation would look at those things without knowing the results and say, "Wow, the results are going to be really different"—and they are. It's not a surprise. I urge you to go with the methods that experienced scientists endorse. The new methods might work—and I think they will one day—but they're not working yet.

Ms ABIGAIL BOYD: Thank you, Mr Fletcher, for your attendance and for giving us the benefit of your expertise. You spoke at the beginning about how tricky this stuff is for a layperson to understand; I absolutely agree. When I'm looking at this, we do need help interpreting it. If we've got the AirborneLogic survey and we've got the surveys that have been traditionally used and we have very similar flaws in both when it comes to being able to see what's under the trees, for instance, how do we account for these very different numbers on the face of it? Especially when you have something as compelling as the visual photos that we now have that you can zoom in on to help identify horses and that kind of thing, how do we account for that? Why do we go, "Well, these are all flawed but we're still going with the traditional", rather than looking at the new evidence that has come forward?

DON FLETCHER: There are several reasons. I'll just have to marshal my thoughts a little bit. I guess the obvious thing to get out of the way first is that the two indexes are both only looking at open areas and there aren't those open areas everywhere in the park. They're quite restricted. We've got 394 square kilometres of open plains in the north of the park as well as in the northern survey block. The horses are being surveyed by the park surveys in four areas—not just one—and most of that is forested country. The two indexes have been run in an extremely biased sample. I'm sure people involved would acknowledge that because they knew that that was all they could do. That's where their method is limited to. It's only been done in the open but we need to know about horses in the entirety of the landscape. That's one reason.

Much of the following is probably speculative on my part and I think to really know the answer we would need to do the things in some comparable way—so run the two together, at least in the same season—whereas the rangers have chosen to do that horse-helicopter index thing that ended in 2021. They've chosen to do that at the time of year when they felt they would see the most horses in the open. This has been done six months apart from that. I don't know—because I'm not one of them and I haven't talked to them about it—but I'm guessing they wouldn't do it at this time of year because they would expect to see fewer horses in the open and more in the trees. That could be a reason: the balance between what proportion are under trees and what proportion are in the open.

Another reason is the difficulty of seeing the horses in the imagery when the background colour isn't contrasting. I've got an example of that in my notes. In the notes there's a photo taken from the AirborneLogic imagery and it shows, I think, seven horses that you can easily see and have been counted. If you look at the thing yourself, there's a button there; you can switch on which ones have been counted. You'll see those seven have been counted. There's an eighth horse there, which I've identified with an arrow. I think it's probably a horse but if I was them I'd be cautious about counting that because it's under the shade of a tree. It's in open grassland but at the time of day when the aircraft was over that part of the plains it just happened that the shadow of the tree covered that horse.

Ms ABIGAIL BOYD: That's the benefit of their program though, isn't it? You can, as a member of the public, then identify that and say, "I think this is a horse."

DON FLETCHER: Yes, but maybe no-one can tell. You heard Mr Chambers saying things about the second survey with better pixel resolution—that would help. Another aircraft following behind the first aircraft would also help because you would see where the horse moved and things like that. There are all sorts of refinements but I'm just running through a list of why there might be these differences. Another difference clearly is the horses that have been removed from there, but we need to look at the National Parks figures and see how many that is. They were counting 3,600 and something, I think, in 2021. They haven't removed that many from the open areas. There have got to be other reasons as well as the removals. I talked about visibility of animals in the trees, visibility in the open and time of year. They are perhaps the reasons but to really know you need to do the research.

Ms ABIGAIL BOYD: So obviously there have been many surveys undertaken over the past however many years using the traditional method, shall we call it? Sorry, what were you referring to?

DON FLETCHER: I think the answer is that there've been only eight surveys—it's not a lot—using the helicopter line transect method.

Ms ABIGAIL BOYD: My point is that clearly we have a lot of that but we've only got this one example from AirborneLogic. As you say, it's only one part instead of four sections of the park. Obviously they are not equivalent in that rigorousness—I don't know what the word is from a science perspective. We have just this one example. I understand the points about seeing under the trees is the same for both types of survey; however, does this massive difference in the numbers counted not give us some doubt over the previous surveys? Accepting that this is just this one survey, if we were to then employ this technique across the whole park, do you think it's logical that we would get a different number?

DON FLETCHER: It's certain that if you deployed this method across the entire park you would absolutely get a different number to the line transect distance sampling surveys because they are designed to estimate the proportion of animals not seen by the observer and this method doesn't do that. It's absolutely guaranteed that this will produce a lower count.

Ms ABIGAIL BOYD: That's really useful. So then the number that the other survey method uses, which extrapolates out to be the numbers that we can't see—does that have a base number of what they've observed in the open that we can then compare to this?

DON FLETCHER: Not as far as I can see. There is some stuff on Rocky Harvey's website saying that Stuart Cairns observed that he saw something per cent—I think it was 86 per cent—in the open and whatever else not in the open. Then he's assumed that the Stuart Cairns open is his open—that is, the open plains. I haven't talked to Stuart Cairns; I probably should have but—

Ms ABIGAIL BOYD: That's what we need, really—to compare like for like.

DON FLETCHER: What he's doing is he's looking at a completely different scale. That's the first thing to comment on. Stuart Cairns is looking at each observation of the horses that are counted and assigning them to either open or under trees. There are little patches of open everywhere through forests and I think a lot of that is what he's talking about. So they are looking at a different—the 394 hectares of open plains is looking at satellite

imagery sort of level. They are completely different scales and therefore they're seeing the country in a different granularity. You can't take that percentage from one and apply it to the other.

Ms ABIGAIL BOYD: But we don't have that data then from the Stuart Cairns ones to be able to compare like for like?

DON FLETCHER: No. You can't compare like for like anyway; the methods are just not compatible.

Ms ABIGAIL BOYD: Sorry, the numbers of horses in open areas that have been identified under the AirborneLogic versus the number of horses in open areas that have been identified using the Stuart Cairns method—that's what I'm talking about when I say like for like.

DON FLETCHER: I've got a map that answers that to some degree in these notes—that first bigger one, if you are able to turn to that. It has brown lines, which are my crude representation of the Stuart Cairns transects, and the pink area is where the AirborneLogic photos come from. I don't think you would be able to do it unless Stuart Cairns GPSed every observation because what we need is just the parts of his line that are going across that open area.

Ms ABIGAIL BOYD: But without that data—

DON FLETCHER: I suspect that doesn't exist.

Ms ABIGAIL BOYD: So without that data how are we able to say that the current AirborneLogic numbers, even if we used them to then extrapolate back into this Stuart Cairns way of doing things, are not going to give a more accurate figure?

DON FLETCHER: The key thing is that the AirborneLogic method lacks the ability to count the horses under the trees.

Ms ABIGAIL BOYD: And that's the evidence. Sorry, I'm trying to get it from a layperson's perspective, but the Stuart Cairns one also can't. They are extrapolating, aren't they, to what is under trees?

DON FLETCHER: No. He is observing some animals under trees. As I said earlier, the fact that they move makes a big difference to your ability to do that. It's going to be much better than when you are looking at still imagery from an air photo, so he does have estimates for both areas, yes.

Ms ABIGAIL BOYD: Okay, but you said "estimates".

DON FLETCHER: It's all an estimate. No-one is literally counting every animal; it's not possible.

Ms ABIGAIL BOYD: No, but they are under the AirborneLogic one at some point.

DON FLETCHER: They are counting every animal that was in the open at that time of year at that time of day, yes.

Ms ABIGAIL BOYD: Yes, which is not what the Stuart Cairns method does.

DON FLETCHER: No.

Ms ABIGAIL BOYD: They are extrapolating.

DON FLETCHER: The Stuart Cairns method also has real observations of a number of animals, but they use the distance sampling method to calculate from that how many were really there. I try to explain that in my original submission. There is a whole section about distance sampling, and it's got two charts in it that show you the decline of sightings with distance away from the observer.

Ms ABIGAIL BOYD: If we could combine the approaches and use the AirborneLogic data for the open areas and then apply some sort of extrapolation using the Stuart Cairns method, do you think we would still get a different number to what is done just with the Stuart Cairns method? I am trying to work out what the benefit of having this publicly available, real visual data in front of us is. Does it have potential to then give us a better or more accurate number?

DON FLETCHER: Okay. A candid remark is probably in our interest. I think the value of the imagery that's there is what it shows you about vegetation. It opens a whole new possibility that, as far as I know, hasn't been talked about. The National Parks people might have done this; I don't know. It occurred to me that perhaps there is a cheap way here that they can monitor vegetation recovery where they have removed horses, because if you do any wildlife manipulation it should be because you are going to benefit something else, and, ultimately, the proof of the pudding for any operation like the horse removal is are the other things benefiting? Measuring the vegetation in a horse removal area is a good thing to do. Maybe this is a cheap way of doing that.

But having said that, I'm not a botanist, and the botanist is going to say about my suggestion what I said about the other stuff: Where is this proven in the scientific literature, Don? I'm not a botanist; I don't know. But it's astonishing to look at, because you can see places where—if you look at Google Earth and things like that—there were bushes, and those bushes are gone in the newer, more detailed imagery. You can see horse roll pits—the bare areas that horses make—and all sorts of stuff like that. In terms of its value for managing horses, I think it's less than its value, probably, as a measure of vegetation and so on.

Ms ABIGAIL BOYD: It could be for both, right?

DON FLETCHER: Well, yes—maybe.

Ms ABIGAIL BOYD: It's worth investing in because then we could actually—

Ms SUE HIGGINSON: Can I—

The Hon. WES FANG: She's your colleague. Be respectful.

Ms SUE HIGGINSON: I have to leave early, that's all.

The Hon. WES FANG: You shouldn't leave early.

Ms ABIGAIL BOYD: Sorry, I am being interrupted here.

The CHAIR: I will let Ms Abigail Boyd finish her sentence.

Ms ABIGAIL BOYD: What I am trying to tease out is whether or not it is worth investing in this sort of technology both for measuring the impact on the ecology as well as for getting more accurate numbers, because the more evidence we have the more politics is taken out of the debate and we can focus on the science.

DON FLETCHER: All right, so another candid comment then. If I were the Queen in charge of the horses or something and I wanted to get best value for my dollar to estimate horse abundance, I wouldn't use any of the methods that have been used. I would use—I suppose it's a variant of helicopter line transect sampling. It's called double sampling or double observer. It's a mark-recapture helicopter line transect survey. There is one example of it having been done, actually, in Kosciuszko National Park. The paper is in my references—by Laake, Dawson and Hone, 2007, I think. That is really the best method for this sort of situation that is currently—

The Hon. WES FANG: That's the one that Claire Galea is advocating for, isn't it?

DON FLETCHER: No, what Claire Galea is advocating, I believe—I saw her transcript and so forth. What she was talking to the Committee about was, yes, mark-recapture, but a different thing. There are two examples of that, one of which, incidentally, is also from Kosciuszko National Park, and it's by Michelle Dawson, who is one of the key people who has done the other method. She did it in Bogong High Plains in Victoria deliberately because it was a small population. It's in my submission—described there. They counted, I think, 50-odd horses on one day and they counted 70-odd horses on the other day, and from that they calculated 80 to 90 horses were in the area, because mark-recapture is another one of these things that estimates the proportion you did not see.

But they also said this method is only suited to very small populations, not to the whole Kosciuszko-type thing. They identified a number of deficiencies of what they had done that would need to be addressed to make it a useful method in the future. There is another paper as well where the same thing has been done with horses in the USA, but it's using plain ordinary mark-recapture where you actually have to identify individual horses, and the next time you see them you have to recognise them reliably. Nobody can do that with the kinds of numbers—again, I think that's something, as I say in the submission, that might change in the future with computer-based analysis of the individual animals on videos that currently we are not doing.

But artificial intelligence is very capable of picking up differences between individuals. That's something that might happen. I suspect it's probably going to be very hard to apply to thousands of horses. It's probably something that might work with hundreds of horses even. That's different. The one I'm talking about uses that kind of conceptual thinking of a marked group and a recapture applied to the Stuart Cairns-type observation. You do that by having two people seated in the aircraft on the same side, and they're both recording, without being able to hear the other, into a multichannel recorder. They simply just record, "I see six horses here," and the next one actually sees five horses or seven horses or whatever. You are using that instant change as the basis for the mark-recapture algorithm to work on.

From the difference between the group size, you've got a mechanism of using the mark-recapture to look at what wasn't seen in that way, and from the distance out from the aircraft they are recording and the detection function, you've got another measure of how many are not being seen. By that combination, it gives better results. The reason they are not doing it is an aircraft issue. Not long after that a new rule was brought in, and they now

have a safety observer in the front seat. With the sorts of helicopters that are readily available to the park service in Kosciuszko, there isn't a suitable aircraft where you can have people seated one behind the other, so they are using the traditional distance sampling method. But clearly it would be an improvement to go to the mark-recapture distance sampling.

Ms SUE HIGGINSON: I have only got a minute and I have to run; I apologise for that. Dr Fletcher, thank you very much for your notes that help the Committee understand the difference between the methods. Is it fair to say that we really are looking at the difference—and I know this sounds so clichéd—between apples and oranges at this point, because there are a bunch of different approaches? I think you described it as the difference between the idea of trying to ascertain absolute or total abundance and indexes, and that the problem that we face with AirborneLogic work that has been done—which, I agree with you, is incredibly beneficial for looking at the condition of the national park—is that, to all of our disadvantages, horses don't stand still for two weeks on end while we get a proper sample.

Is there something that you can say, further to what you've already said, that would provide the Committee any confidence that what we've already got in terms of the population estimates, what we're working on, can literally be improved over the period of the next 12 months, which the Government has committed to, in terms of trying to reduce horse numbers, to achieve the conservation outcomes the State is legally committed to?

The Hon. WES FANG: Just noting that maybe it's because his council wants to shoot them all dead and then count them.

DON FLETCHER: It's a hard question and it's one that in my submission I suggested there should be a working group applied to it of people more eminent than me in this field. So it's a hard question, but first of all—and really this is partly an answer to Ms Boyd's question—one thing I omitted was that by only counting part of the open plains, the AirborneLogic survey has the significant question over it: What if the horses have moved between the plains? They can go backwards and forwards. We know they do that, and you can have a look in the notes I sent at the difference between 2021 and 2020. The horses are in completely different places in the two different surveys that the staff did and there was a lot of disturbance. Oh, sorry. That's another reason I forgot.

If you look on their imagery, see for yourself along the road there's a whole lot of excavations and things along quite a number of the roads in the park and there are two reasons for that. One is they're doing road grading and you can see a machine at work, and the other one is they're putting in powerlines for Snowy Hydro and there's lots of disturbance. In the notes, I've got a photo of a guy standing near a Traxcavator and whatever. Well, maybe—we don't know, but maybe—that affected the numbers of horses, and it may be just really unfortunate that I chose a date when all that was happening. That's about five reasons I've given you for why there could be differences.

Going back to Ms Higginson's question, if I understand it correctly, I actually think that some kind of index over the open plains has some value because probably you can do it reasonably cheaply and that ranger thing was very cheap compared to the AirborneLogic thing and it's given great results. It would be really nice to have that again now to compare 2021 with the situation now since they've been doing some shooting. You could run that whenever the conditions were suitable. I think it would be worth keeping that going but you really still need the helicopter line transect type thing. You can't escape it. Yes, it would be nice, it would be great to improve that by putting more money into it, which means more flying time because, with that method, it allows you to do multiple passes over the same area.

They could put the transects over a hundred metres apart, whatever, and keep on flying it, depending on the budget, and they could use the mark-recapture variant of the method as well. There are a lot of improvements that could be done, if the money's there, but the main one, I would suggest, should be the helicopter line transect based method and if you can run the index of the open plains, do it also on the open plains in the south of the park because there are other open areas that could also be done. They might be actually, handy, quicker, more responsive indexes as well, but that's for extra money.

Ms SUE HIGGINSON: Dr Fletcher, can I just—

The CHAIR: Sorry, Ms Higginson. Order!

The Hon. WES FANG: You said you've got to run off, Sue. I've got five questions.

Ms SUE HIGGINSON: I've got to go. Dr Fletcher—

The CHAIR: Order! Sorry. Ms Higginson—

Ms SUE HIGGINSON: Dr Fletcher, can you just confirm the height of the helicopter?

The CHAIR: Order! Ms Higginson, sorry. We've got six minutes left and we've only had questions from The Greens so far, so I will go to the Hon. Wes Fang.

The Hon. WES FANG: Thank you. Dr Fletcher, you said a little bit earlier, and I wrote the quote down, that we should have "people more eminent" than you involved in determining these count methods. What did you mean by that?

DON FLETCHER: There are scientists whose names we can harvest from the literature on this kind of stuff who are extremely experienced and smart and have published lots of literature on it and I'm sure we could tap in. When I say "we", I don't necessarily mean this group, but their expertise could be brought to bear. Indeed, from rumours I've heard, I think perhaps that's actually been happening just recently with NPWS, by the way.

The Hon. WES FANG: Okay. Would that be because you would be somewhat conflicted because of your involvement with the Invasive Species Council?

DON FLETCHER: I don't think so. My involvement within—well, obviously I'm not paid.

The Hon. WES FANG: I was going to ask that. They say that they engage you. I've had a look through some of the previous releases from the Invasive Species Council where they say that you've been engaged—I guess, in a corporate sense—to provide advice to the Invasive Species Council. Have you never been paid by the Invasive Species Council?

DON FLETCHER: No. I have never been paid by the Invasive Species Council or anyone else involved with the Kosciuszko horse issue. I retired in 2016 and that was when I was working for the ACT Government and, yes, it was interested in the horses, but it wasn't part of this. So, no, nothing like that at all.

The Hon. WES FANG: So you've been a long-time volunteer for the Invasive Species Council. Is that a way to describe it?

DON FLETCHER: That's correct. They've approached me. I think they've probably been, to be candid, pretty careful in the ethics of how they've approached me, and it's been entirely up to me whether I responded. They've asked for advice on an issue.

The Hon. WES FANG: Yes.

DON FLETCHER: I've been happy to provide that where I can because I know it's hard to get.

The Hon. WES FANG: Would that caution, do you think, perhaps have flowed through to putting out a press release this morning featuring you and commentary that you've made in relation to the AirborneLogic information?

DON FLETCHER: Sorry, can you remind what words it says that you're thinking of?

The Hon. WES FANG: There's an Invasive Species Council press release that they've put out today, and they cite you and they say, "Former ACT Government ecologist, Dr Don Fletcher, who is giving evidence in a New South Wales parliamentary inquiry today"—and then it goes on to talk about some of the comments that you've made, but given that this was put out earlier this morning, you've obviously given comment and advice to the Invasive Species Council on this very issue before appearing at this inquiry, given that they've sought fit to put out a press release with your name on it.

DON FLETCHER: I've passed a copy of my notes that I passed to this Committee to the Invasive Species Council. That's correct.

The Hon. WES FANG: Okay. In that respect, then, given that you've been engaging with them prior to your appearance today, when you said that they act in a careful manner, would that not be a lesson in a careful way of not seeking to be conflicted?

DON FLETCHER: I'm happy to provide my notes to anybody that might—

The Hon. WES FANG: But you did this prior to appearing and you did it to the Invasive Species Council, and they've sought then to put out a press release seeking to get ahead of what they would say the images that AirborneLogic have produced indicate, but we've heard already that it's not possible to make that determination from the imagery that the Invasive Species Council said it can. Would that not prevent—

DON FLETCHER: I'm sorry, can you clarify that last remark for me? You said something's not possible. I'm not sure what's not possible.

The Hon. WES FANG: AirborneLogic themselves have said it's not possible to attribute the marks in the photographs that the Invasive Species Council suggests are attributable to the brumbies, yet that evidence—not that evidence, but that press release—was put out this morning carrying your name.

DON FLETCHER: Yep, got it now, sorry. It took me a while to understand the question.

The Hon. WES FANG: I like to have a long lead-in, just to sort of draw you into my way of questioning.

DON FLETCHER: Good question, Mr Fang.

The Hon. WES FANG: It was a great question. I tend to do that.

DON FLETCHER: The answer, I think, is that no other animals have been detected in the survey, not even one single pig, sambar deer, fallow deer. These are known to be in the area; there has been quite a bit of public discussion about them, and none of them is visible, and there are no goats. As far as I'm aware, there are no goats for quite a long way around there, but there are no goats in the imagery, more importantly. Everything that was counted in the imagery—and I think the correct number is 337 from the latest update; we heard 250 and 350, but I think the actual number is 337. Those 337—it's my understanding—are all horses. No-one is suggesting any of them is something else so I think the inference that the lines on the ground are mostly due to horses is not too unreasonable.

The Hon. WES FANG: But it's an inference, isn't it?

DON FLETCHER: It's a fair but arbitrary but reasonable sort of thing in that you can't say there isn't a whole lot of pigs under the trees that come out at night and make those sort of tracks but there's not really good reason for thinking that might be the case.

The Hon. WES FANG: Are we not perhaps cherrypicking though—that there are certain animals that, as you rightly said, we know exist in the area but because they're not counted in the photos they can't have made those tracks; it has to be the horses. Yet when we're flipping it around and looking at the numbers, we can't count the ones that are under the—because we can't count the ones it discredits it. You seem to be cherrypicking the facts to suit the narrative that you want to progress forward. I understand that—that's the way the Invasive Species Council works—but I think that needs to be put on the table.

DON FLETCHER: No, that's not the case. Bit of a misunderstanding—crossed wires there. It's assumed that there are horses, pigs and both kinds of deer under trees. The only animals that have been seen in the imagery are horses. They're—

The Hon. WES FANG: I'll let the Hon. Bob Nanva ask some questions because he is a real expert in ecology.

The CHAIR: That was an unnecessary comment but I'll throw to the Hon. Bob Nanva.

The Hon. BOB NANVA: Doctor, I ask this question of someone that does trust the scientific methodology behind the helicopter line transect distance sampling method.

The Hon. WES FANG: Man of science, he is.

The Hon. BOB NANVA: I don't profess to be an expert at it but I trust the science like I do trust the science on a range of other issues that I'm not an expert on. I do ask, as a layperson, a significant barrier for laypeople on that count method is a lack of understanding or acceptance as to how there could be more animals than people can see—number one. Number two—how sampling methods can estimate populations with such a degree of accuracy. When you look at the ratios such as getting an estimated count of 15,000 wild horses from 1,300 that might have been observed, people are naturally very dubious about that. Then when you have a projection or a width of confidence intervals where you say there are between 14,000 and 25,000 with a 95 per cent confidence interval, again laypeople struggle to understand that. Could you, for the purposes of an explanation for laypeople, explain why distance sampling particularly is a reliable predictor of population estimates?

DON FLETCHER: Because the answer about why distance sampling is reliable is that large numbers of sceptical people who have invested a lot of time and effort in the estimation of wildlife abundance have tried it and tried other alternatives and believe in it and have had papers that are reviewed by sceptical peers published in—and it's been tested on known populations. People have done all sorts of weird and wonderful things. There's one study where someone went around and dropped bricks on the bed of a lake even and then went across it in transects in something looking down into the water so that you couldn't see them all and found that the number estimated by distance sampling was accurate. There is uncertainty about it and that's indicated by those wide confidence intervals.

One of those really hard things about ecology is that when you're dealing with large open areas with high numbers of animals, we just don't have the ability to come up with super precise estimates. There's no technology on the planet that does it; whatever you do has big confidence intervals. That's another comment I should have made, by the way—that neither of those two indexes has any confidence intervals around it so they haven't—

The Hon. BOB NANVA: Sorry, AirborneLogic and—

DON FLETCHER: The AirborneLogic method or the staff helicopter horse index—in neither of those has there been a confidence interval estimated. The current way of doing the method doesn't let you do it so there's an unknown amount of uncertainty around both of those. That's a serious problem. That should be addressed. It's very hard to provide that confidence.

The Hon. BOB NANVA: It's the nature of any statistical modelling that you're not going to have a complete, unambiguous degree of accuracy but what confounds people are, I suppose, the ratios and the intervals. I want to come back to a point that you just raised because, again, as a layperson the thing that would give me a high degree of confidence is if the application of distance sampling has been compared to actual counts and you can ostensibly assess the accuracy by comparing a total count of a known population to what the distance sampling model has come up with. You say that has taken place?

DON FLETCHER: Yes, that has certainly been done quite a number of times. I picked, I think, three examples out of a number of others that I was aware of that I've put into my original submission where people did some other thing to find out how many were actually there and then ran the distance sampling method over that to compare it.

The Hon. BOB NANVA: And they have been—

DON FLETCHER: They have been acceptably close, yes.

The Hon. BOB NANVA: Is that in the context of wild animals?

DON FLETCHER: Yes. I'll give you one I was involved in. In five reserves we used three methods to estimate the number of kangaroos and, to be candid, I was expecting to get a "This method is always a bit high, this method's always a bit low and this one's in between" type of result. The methods were pellet counting—that means counting the dung of the kangaroos—and there are standard methods for doing that. It's quite an expensive method because there's a lot of work needed. The next one was distance sampling but on foot—not aerial—so it was walked transects. The third one was a total count. We picked these reserves because they were ones where we could surround it with people and have people walk in and count every kangaroo head count, then do it again and then do it again. It was only accepted if all three of the attempts to do that were within 10 per cent otherwise we said there's something wrong with our method.

That's one of the strengths of replication, which we haven't seen with the two indexes. You can throw it out if it's giving you rubbish. With those five reserves we had those three methods and the results were that the 95 per cent confidence intervals were overlapping for all three methods in all five cases and across the five there was no one method that was consistently the higher or the lower; they were just random. What we said was that means, statistically speaking, they are the same. There's one example but that's from personal experience. There are quite a lot of other ones—quite a lot of overseas ones and one or two Australian ones.

The Hon. BOB NANVA: Could you provide the most analogous examples to the situation we find at Kosciuszko to the Committee on notice?

DON FLETCHER: Yes. I could do that.

The Hon. WES FANG: Chair, I know we are almost out of time but I wanted to clarify one thing. Dr Fletcher, you said earlier in your evidence that you knew that the Invasive Species Council had given Ms Sue Higginson some information. Can you expand on that and explain to us how you knew that?

DON FLETCHER: Because the number was the same as my number—the 161 square kilometres. It's unlikely that if someone else estimated it they came up with exactly the same number.

The Hon. WES FANG: So you've given information to the Invasive Species Council before your appearance today. Ms Sue Higginson has obviously been given information from the Invasive Species Council that's come from you and what you're saying is that that's obviously there's been an information flow. Have you spoken to anyone else from the Invasive Species Council? Did you talk to Ms Sue Higginson before you appeared today?

DON FLETCHER: I beg your pardon?

The Hon. WES FANG: Did you talk to the Invasive Species Council or Sue Higginson before appearing today?

DON FLETCHER: Yes, I did. I spoke to Jack Gough. I didn't speak to Ms Higginson.

The CHAIR: Thank you for coming in today. I know we've gone over so thank you for being very generous with your time. Because there are so many questions there might be some more questions from the Committee to you on notice, which the secretariat will be in contact with you about.

(The witness withdrew.)

(Short adjournment)

Ms LYNETTE SUTTON, Founder/Sanctuary Manager Advocate, Genetic Research, Hoofs2010, before the Committee via videoconference, sworn and examined

The CHAIR: I now welcome our next witness to the inquiry into the aerial shooting of brumbies at Kosciuszko National Park. Do you want to start with a short opening statement?

LYNETTE SUTTON: I did type up an opening statement; I hope it's not too long. To the Chair and members, firstly, I would like to say I do not have any academic entitlement. However, I do have a life experience in horsemanship and 14 years dedicated to the wild horses and the management, or lack thereof. If we can start correctly by identifying the horses and not use the term "feral horses", rather than a title given by government agencies and the likes of ISC and The Greens, to install an image of something undesirable. I have been researching the term "feral", and whilst over 150 years ago the escaped horses could be titled with that description, the horses we are discussing today have not been domesticated and over a period of free living without human intervention have retained the historical DNA alleles from their ancestors. If we can address the species as wild horses, we would then be referring to them correctly.

Over 14 years we have worked to engage a humane management strategy and engaged with parks staff and tried also to engage with Ministers, to only have months and weeks of work used, as one might say as toilet paper. Why have all brumby advocates been ignored? Why has funding been in abundance for the opposition of wild horse management, only to be used for eradication programs? Ancestral DNA testing has been ongoing for over 14 years, with the late Richard Crispin initiating the Australian horses to be included in the world wild horse database. The testing has shown a remarkable genetic viability, with minimal inbreeding evident. The genetic lines are that of many horses on the world's rare breeds list. The strengths evolved in our wild horses in many ways, such as bone structure and survival and retaining of markers that are no longer in our country—again, no funding has been forthcoming to any wild horse advocate or rehoming strategy. All work is being done with funds raised by the Australian population.

The saving of wild horses, humane management and ensuring they will be a part of the Australian way of life has been solely funded and performed by the Australian community. In these times of eradication programs, many good citizens have tried to make a positive impact on the lives and sustainability of wild horses—some stepping on a very shaky limb. Why? Because the need to save wild horses is a part of their heritage, and the means for most to do that task are not there. It's a limb that requires a lot of work and foresight to do it properly and to have the very best outcome possible for the wild horse and the person who has taken on this task. What I would like to see is funding to ensure those who have heart to assist displaced wild horses and also care for our amazing national park is available.

Every single Australian cares about the environment. We also care about the very animal that helped in a large way not only to establish this great country but also to defend its shores. We also state the way forward must be sustainable herds living as they have done and positive management to be ongoing throughout the future. When the only managers of the wild horses and general population were excluded from involvement in Kosciuszko National Park, the Government took on an area of land they could not manage. It is obvious to all who visit the park and spend time observing the demise of many attributes that should be enhanced. Ski fields, progress to accommodate the needs of mankind should not be above the needs of park inhabitants. We pray for common sense in the way forward and that the eradication program cease, and future management set forth to ensure all stakeholders are considered on the road forward.

The CHAIR: I have asked this question today already, but I just thought it was an important one, particularly given that you also talk about rehoming strategies. One of the witnesses that we had heard from previously described rehoming as cruel and said that aerial shooting is less cruel. I just wanted to get your response to this in regard to the welfare of horses that are being rehomed.

LYNETTE SUTTON: I think, in a reality sense, if the playing field was even—so there was funding for positive management as well as funding for eradication programs—a lot or some of the issues mentioned by Mr Coleman would be avoided. I've worked with quite a few different park rangers. I've worked with Victorian parks and New South Wales parks. The men are professional. The work they do is a very tough job, and the animals do suffer some stress, but they settle very quickly. Anyone who has anything to do with horses knows that you can take a domestic horse out of its environment and take it somewhere else, and it takes some time for it to settle.

The horses are very resilient. They have coping mechanisms. It's just amazing that they can be stressed at the trapping yard, travel calmly. I have lots of videos on my page of horses that I have transported myself from the wild to the sanctuary. There are also videos of horses transitioning after a day or two in the holding yards,

where they've had their treatment, being released out into the paddocks and they adapt very, very well. It's a matter of funding for most to achieve a successful outcome, but there is no funding—none whatsoever.

The CHAIR: What sorts of funding packages do you think should be available to ensure that some of these rehoming efforts can be significantly expanded?

LYNETTE SUTTON: I mean, I've been doing a bit of research this week. Invasive species get 29 per cent of funding from the Government for their programs, let alone other grants and so on. We get zero, absolute zero. The work that we do is funds raised by the general public, and it's ongoing. For every single person, for us, our feed budget is \$40,000 a year. We raise that ourselves, with the help of followers and general public. We have rehoming programs, we have strategies, we have documentation, and we offer a life security for whatever horses we step up and home. That takes funding. We're very lucky that we have a good following, we have a great committee and we have a great accountant that we can achieve the goals that we have. We've only rescued 250 wild horses in the past 14 years, but that's because we have a boomerang policy. When the animal becomes at risk for any reason—the rehomer's situation changes or whatever—the horse comes back to us.

We have limited land. It's not about the Government giving us money every year. It's about allocating land so that people can do the task. A lot of horses don't make rehoming—they're not suitable; they have been too long in the wild; they are aged. Some of them train well; some of them don't. So they need a life sanctuary. We have tourism. We work with the children from the special school, who come and do situations and work with the wild horses. There is no funding for that. That's all raised by the population. We're not asking for funding willy-nilly, but let's be realistic here: Give us 29 per cent of a budget. Make us earn that money. Make us accountable for that money—"Where's that money going? What are the benefits?" Because to say that rehoming is not successful, you can't say that. It's an uneven playing field. We have no funding. We can only do what's humanely possible by support of people in the community, and that's how most rehomers are working.

The CHAIR: I have one other question. I am also hearing that some rehoming groups are actually being ignored. They're reaching out; they're trying to offer homes for brumbies. I am just wondering if you are hearing the same and if you have any insight into this.

LYNETTE SUTTON: Again, it comes back to funding. You can't set someone up to do something successfully without the tools needed to do that successfully, and getting those tools is a struggle. It is something that every single one of us goes through—those thoughts of how are we going to do it. We don't get consideration. I can speak for myself: I sent out 50 registered letters with a management plan with all the foresight possible to members of Parliament. I got one reply—one acknowledgement. That was from Kate Washington, who was at the time the shadow Minister for the Environment, who took it to Matt Kean. There was never another word about that. It is not tabled. It is not looked at.

How can we make the management of the national park protect the environment and also protect what is important to a lot of the community: the very animal that is existing there? To say that aerial culling is the only way—I mean, 14 years I have been at round tables, writing plans, government meetings, only to be ignored. Nothing has changed—14 years of waste. And now it's, "Oh my god, there's too many horses, let's eradicate them." I drove a long distance a few weeks ago around the national park. I viewed Snowy Hydro 2.0 and earthworks everywhere for different things that I googled, and searched about mining in the early days, and a lot of that park is not natural. It never will be what it was before man became involved. You can't return it.

The other thing that I would like to raise and to be noted is that we all hear about the negative effect the horses have on the native animals, yet not once, other than pugging, which is the horse's hoof imprints—what is the direct impact on the native animals? No-one has ever said that. What has a wild horse caused loss of, or direct extinction of, or negative to—which particular native animals?

The CHAIR: Thank you for that answer. That is really useful.

The Hon. WES FANG: Ms Sutton, thank you very much for appearing today and thank you for the evidence that you have given so far. I want to touch on some of the other aspects around this issue. You are well known for your advocacy around rehoming and your advocacy around the brumbies in general, but could you provide some insight on the impact it is having on people—brumby advocates and people who love horses—to know that these iconic animals are being culled using aerial culling?

LYNETTE SUTTON: Look, for every single one of us—sorry, I get a bit emotional about it. For every single one of us that have put the hard yards in—and I mean years of negotiating and trying to work out a way to satisfy all stakeholders of the national park. To see this, after 14 years, as the outcome for the wild horses—there are a lot of people that are not coping. There are good people—good, honest citizens—that probably would be pushed to doing things. We have seen that over the past few years: panels being taken down in the national park and a horse head dropped in the National Parks office. These are things that good people are being pushed to do

as a matter of sheer desperation, because we work with the horses, we see the qualities. We understand. We are researching genetics to see: are they something unsightly? Are they something undesirable? No, they are not. For all of us—and we have 16,000 followers, which is not a large number in the bigger picture of things, but who are all affected.

The Hon. WES FANG: Is it fair to say that part of that—and this is my word—desperation that people are feeling in relation to the issue around brumbies is because they feel that there is a better way for this to occur, and that we don't need to be culling brumbies from the air? We could perhaps be rehoming them or looking at other issues such as fertility control to get a manageable and reasonable outcome that doesn't see us shooting horses?

LYNETTE SUTTON: Definitely. The thing is that you have independent Australian citizens stepping up to do a positive, humane management strategy. We are training them. We are preparing them. We are microchipping. We are DNA-ing. We are being responsible. We don't have the funding to step up to the mark that everybody else has. We don't have the media power. I guarantee you that if pictures of horses being shot were on general media, the outcry and the support for the wild horses would increase 100 per cent—because people don't know. They see posts by the Invasive Species Council.

They are all horses. The word "feral" in itself denotes something undesirable, something unworthy. For anyone who doesn't know a horse or doesn't see the finished product of the horse, it is something that—they don't have the ideals of just how beautiful, how genetically sound. The inbreeding is minimal. There are genetic strengths in these horses that we will need in the future of the equine world, because our horses are becoming weak. Anyone that knows anything about horses knows that the horses are suffering a lot of human problems. These horses have found a way to live without us.

The Hon. WES FANG: In the break I was talking to somebody who is here. She has provided some information to me, and I am going to table it. You can't see it, but you may have seen it online. I remember seeing the photos in one of the forums online about the way that children are being impacted by the thought of horses being shot. These are three submissions from children. They are effectively drawings, but they are also an attempt to try to communicate to people what the impact is of the Government shooting an iconic species with helicopters. It is impacting people, young and old. Given that there is that amount of goodwill towards the brumbies in the population, do you believe that we can, if properly funded, find a way to manage these horses without aerial culling?

LYNETTE SUTTON: We definitely can. The thing is about it, we have visitors from all over. We have had volunteers from across the world that have come and done a program for six weeks, just volunteering and learning the Australian way. We have elderly people that live in our community that come out on the bus. They can't walk, but the bus drives through the sanctuary and they get to see wild horses. And we have kids with disabilities from the special school often come out here for a barbecue, and they will go and spend time with the horses.

We have kids that are normally shut down and withdrawn that somehow get a connection with one of the horses, because they do work on vibration and they do work on how you are internally, and they feel anger and they feel passiveness. The elderly people are more so affected in the sense that they have memory of their father who was a Light Horseman or the settlement of the country. That connection is ingrained in them for 60 years of their life, and then they see a new generation coming in where our only solution, our only answer to one species living in a natural environment is to eradicate it. It doesn't make sense.

The Hon. WES FANG: It is funny, the way that you describe that situation. My great-grandfather was in the Light Horse. My son, who is autistic, does equine therapy and has become an exceptional horserider. I can see what you are saying and the impact that this would be having on, not only my life, from that perspective, but also other people's lives. You've said that it is just a question of funding to have a more humane outcome for these horses. What do you estimate would be the requirement for a more humane and more equitable outcome for the brumbies? What do you think it would cost the Government instead of spending money on helicopters, marksmen and all the other associated costs with the aerial culling of these brumbies?

LYNETTE SUTTON: I think that a standard would need to be set so that associations in this field become incorporated—become charities. I think that the funding should be available for initial set-ups of land. There should be a governing body that is applied to for that funding. I don't think it should be just willy-nilly given out. I think that there needs to be accountability; there needs to be an annual report as to how successful this has been and what the funding is covering. We have already worked on those things, and I do believe I sent you my suggested management plan. We have been working for the last two years, as well as the 30 horses we have in care, to raise the funds to purchase land.

Once the land is acquired, I think that each of those incorporated associations can set up programs where funding isn't just reliant on the Government, where they can use tourism and educational—we work 100 per cent volunteer. Not one person is paid. No money is spent on media campaigns or whatever. We work off word-of-mouth. I looked at the Invasive Species Council's budget submission—\$18 million for wild horse management. What are they going to do? Put \$5 million aside for wild horse rehoming. God knows that we get nothing now. Imagine what we could do with a minuscule amount of funding from the Australian Government.

The Hon. WES FANG: Yes. I am happy to open it up to other questions. I have plenty more, but I don't want to monopolise the time.

The Hon. AILEEN MacDONALD: I wonder what the capacity is at the sanctuary for the wild horses?

LYNETTE SUTTON: My sanctuary?

The Hon. AILEEN MacDONALD: Yes.

LYNETTE SUTTON: We are full. We cannot take any more. As I said, funding to purchase land—some sizeable land. You can't do successful rescue if you don't have foresight for—yes, okay, these ones may train up well for rehoming programs and these ones need long-term sanctuary. The biggest issue for every single person is having the space to do it successfully. I would love to put my hand up and say, "Yes, I'll take another load of horses." I cannot. I cannot take those while we work to raise our own funds.

The Hon. AILEEN MacDONALD: How many wild horses do you have there at the moment?

LYNETTE SUTTON: I have 30 wild horses on 10 acres.

The Hon. AILEEN MacDONALD: Does it mean that you can't participate in the rehoming at the moment because you like to bring them back to the sanctuary first, do the assessment and then rehome?

LYNETTE SUTTON: I cannot participate at the moment. As I said, we have been working for the last few years to raise the funds to buy sizeable land so that we can set up a better program than we have at the moment. We have worked on our rehoming policies, our DNA testing, microchipping and vaccinating. We offer life sanctuary to that animal. Anything that we step up to rescue, we are responsible for it for its life, because life situations change for people. It is like we are using donated funds to rescue an animal, and an animal is a responsibility you must have for life. That was ingrained in me, and that is why our policies are the way they are. We've had four horses come back due to circumstance changes for those who are homers. So we have to keep space if something is to arise where an animal needs sanctuary again.

The size of the land is very important and the quality of the land of, course. We have looked at land where we thought we need to get some land; we need to do that desperately. The fact of the matter is that land has gone ridiculous, and buying land—you need land that is conducive to wild horses. In other words, we spend \$40,000 a year on feed at the moment. That was our annual budget last year, which is roughly about \$1,400 a fortnight, which we raise. You need land where you can grow hay for seasons where it is not quite so good. You need a set-up like we have. I am quite happy to send photos of how we are set up here. You need an intense working area which has a holding yard, a vet crush and whatever, because once an animal comes into domestic life, it comes under domestic legislation, so you still must do the basics to care for an animal.

You can't just stick it out in the paddock and say, "Okay. It is safe now. I don't have to do anything further." That is incorrect. We don't want to rehome like that. We don't want to rescue like that. We don't want to see a problem where people are stepping up—which is happening, I will admit—rescuing mobs of horses and turning them out as they are because, not too far down the track, the breeding of those horses is then going to be another issue that needs to be addressed later on. So having a facility and having the funding to be able to bring in wild horses, gelder stallions, release them as family units, have an annual management strategy where you are bringing in the foals—easy to train and easy to rehome—document, DNA, and do all of that sort of thing so you have a productive animal rescue and not just hoarding of horses, which is very important.

The Hon. AILEEN MacDONALD: When you are rehoming the horses and you have brought the horse in and assessed it, how do you work with the rehomer so that you are satisfied that the horses are going to good homes?

LYNETTE SUTTON: Our strategy, first off, is that the person interested writes an expression of interest. That is an introduction to our committee; not all of our committee are here on the sanctuary. They tell us about their facilities, their abilities, their dreams and hopes and why they want to take on a brumby. That is the first port of call. Then we invite them for a visit and we put several horses in. We bring several different-minded types of horses in, and they get to work with each one of those horses. One horse they may join up with and have a

relationship with. We assess them. We allow them to catch the horse, pick up its feet, brush it and do everything with it.

Once they do that and they want to make an application, they then supply two references from professionals in the equine industry such as a vet, dentist—there are a quite a few different people. Those references come in, and then we do a lease agreement, which we have made by horse lawyers, where it says that you can't use this animal for breeding if it is a mare. We do not rehome colts. All animals are gelded. They go through a couple of hoops, which is the best that we can do with what we have to try to establish a good home. Most of our rehomers are either out showing their horses in open competition or they're using them for working with people with disabilities and so on, and most keep us updated. We get photos every now and then of how the horse is going. If life changes, then the animal comes back to us and we go through that process again.

The Hon. BOB NANVA: Could you give me some clarity on the rehoming process, because I am fairly new to a lot of this. Do rehomers have specific requests with respect to colour, age, temperament and gender, or do they typically take—

LYNETTE SUTTON: That is a great question. We have a joke—or we have done—some of us long-term rehomers. We call it the colour tax. Everyone wants a pretty colour. Yes, coloured animals—we are Australian and we do have preferences. The coloured horses are easier to rehome than non-coloured horses. That is quite a common thing. At the end of the day, I suppose you could look at it like this: If you had two animals you were going to rescue and this one you know the genetic history of and you know it's got some very good genetics and this one doesn't—if we were able to do that before we rehomed, then you would be choosing the quality or type of horse that you take, not just a visual. Yes, people are visual as to sometimes what they want to take. A lot of people just want it. They want to step up and they want to help. They want to take on rehoming a brumby, so there is room for that rescue to take in another one. Probably 60 per cent of rehoming is that people want to help.

The Hon. BOB NANVA: Does that request for specificity around the type of horse that people ask for—is that a bit of an impediment in the rehoming process for you?

LYNETTE SUTTON: Again, it comes back to funding. If you take a mare and you don't have \$1,000—that bill to geld that animal. You know what I mean? It's about the cost. If you take a mare from the wild, chances are she's pregnant. Are you in a position to take on a mare and a foal? These are things—the reality of rehoming. What can the person financially and responsibly take on? That does make a big difference whereas, if you have sanctuaries, then mares can go to sanctuaries, have their foal in safety. That foal then can go through the program. Instead of rehoming two horses at once and giving someone some burden, you're actually doing it responsibly.

The CHAIR: Thank you so much for your time today. Your evidence has been extremely useful. There may be further questions from the Committee. The secretariat will be in contact with you about those questions. Thank you again for all the work that you do.

(The witness withdrew.)

Mr ROBERT SMITH, Executive Director Park Operations Inland, NSW National Parks and Wildlife Service, on former affirmation

Mr ATTICUS FLEMING, Deputy Secretary, NSW National Parks and Wildlife Service, on former affirmation

The CHAIR: I now welcome our next witnesses. Thank you both for making the time to give evidence today. Would you like to start with a short opening statement?

ATTICUS FLEMING: Thank you, Chair. As I think the Committee is well aware, the National Parks and Wildlife Service is required by law to reduce the horse population to 3,000 horses in four retention areas by 30 June 2027 and by law to reduce the population outside of those areas to zero. Firstly, I wanted to quickly commend the national parks and wildlife staff who are implementing horse control to meet this legal requirement. I think I have said to the Committee previously that feral animal control is not something that staff enjoy doing. It can be very challenging and very confronting. Staff are undertaking this control because they are required by law to do so and because it is necessary to prevent severe impacts on the environment and cultural heritage in the park. They're implementing control in accordance with the best science and the best practice, demonstrating great professionalism, skill and, importantly, an absolute commitment to the highest welfare standards. They continue to do this despite ongoing harassment, threats and abuse.

We will continue to take measures as an agency and as a government to support and protect staff and, where possible, we're required to take action against those who harass and threaten public servants who are simply doing their job. I will just thank the unions in particular—the PSA—for their support in this respect. Secondly, I did want to provide an update on the number of horses removed. As at 25 March this year 4,196 horses have been removed from the park since the plan came into force. So 959 have been rehomed, including 43 on the weekend just past. That is 23 per cent of all horses removed. One thousand three hundred and thirty-six have been shot from the air. That is 32 per cent. And 1,029 have been shot from the ground. That's about 25 per cent. Since the date—

Ms SUE HIGGINSON: Sorry, how many—

ATTICUS FLEMING: Sorry, did you want me to repeat one of those?

Ms SUE HIGGINSON: The 32 per cent—what was the number?

ATTICUS FLEMING: It was 1,336.

The Hon. AILEEN MacDONALD: And was it 1,229?

ATTICUS FLEMING: One thousand and twenty-nine have been shot from the ground. Since the date of the population survey last year, 1,663 horses have been removed. So that's part of the 4,196—310 from removal areas, 1,353 from retention areas and, of those, 1,030 from the southern retention area. The point there is there's been very little control in the north or very low numbers of horses removed in the north since the survey was undertaken. Thirdly, I just wanted to comment on the welfare standards. I'm pleased there have been no adverse welfare outcomes so far in the implementation of the aerial shooting program. I will say that, to the best of my knowledge, this is the most heavily scrutinised feral animal control program in Australia.

We've had an independent vet evaluating the preliminary program of aerial shooting. There'll be a further evaluation by that independent vet later this year. The RSPCA has an ongoing audit role. Obviously it observed the preliminary program and continues to observe the program at its election. We've had a previous independent review of ground shooting operations, which found we were meeting the highest welfare standards. I think there's been at least one previous complaint investigated by the RSPCA, which found no evidence of any breach. I'm aware of a complaint made to the RSPCA last week by a person who inspected carcasses, I think, in the southern part of Kosciuszko. I don't intend to comment on the specifics of that case, noting the RSPCA will have a process to respond to that complaint. We'll, of course, provide all information and access that the RSPCA requires.

I will say generally, in relation to our aerial shooting operations, I speak regularly to the staff involved in delivering these operations. I consistently ask the question or similar questions: Did the operation occur without any adverse welfare incidents? For all operations, I am told and advised the SOP has been complied with. That means multiple bullets to the target area. It means no non-fatal woundings and no adverse welfare outcomes. However, I just want to stress we're not complacent. With any feral animal control operation, there is always a risk. We have best practice systems to minimise this risk. Those systems are working at the moment. We will constantly review them. If any incident occurs, we are and will be transparent. We'll learn from the incident and we'll implement any additional measures that are required.

The final point I wanted to cover, I guess, was the survey and some of the population estimate pieces. Again, as you know, the 2023 survey generated an estimate of 12,797 to 21,760 horses. That's the 95 per cent confidence interval. Another way of looking at that is that we can be 97.5 per cent confident there are at least 12,797 horses—or were at the time of the survey. There has been some evidence given to this Committee which I'm sure was given in good faith but contains some errors. I'm not going to try to address all of them but I did just want to call out two or three. There was evidence provided that, for reliable modelling, it's necessary to see a minimum of 60 clusters. To avoid any confusion, in the 2023 survey there were 272 clusters in the northern Kosciuszko block and 120 clusters in the southern block. To the extent 60 clusters is important, this threshold has well and truly been exceeded.

There was evidence given to the Committee also that it's necessary to assume zero horses in areas where the helicopter did not fly. This represents a misunderstanding of the survey methodology. The 2023 survey looked at a survey block, which is about 39 per cent of Kosciuszko. It sampled or counted horses in a little over one-fifth of that survey area. That one-fifth area is an unbiased and representative sampling of the larger area. It is valid, therefore, to extrapolate from that one-fifth to the entire survey area. There was also evidence given that the University of St Andrews peer reviewed the 2019 survey report and really "ripped it apart". This is not an accurate statement. I'll give you two quotes from the University of St Andrews: "We have no concerns about design or field methods", and, "There is no reason to doubt the reported abundance estimates and the derived finite rates of population growth." We've released that report in GIPAA so if the Committee doesn't have it, we'd be happy to provide it.

I think the evidence that you've heard today confirms that the 2023 population survey is consistent with the best available science, noting of course that there is still uncertainty when you are looking at trying to estimate numbers over very large areas. We will continue to look at ways to improve the survey design to test new and evolving technologies and to welcome input from all stakeholders as part of that process. We are taking a very conservative approach in looking at the number of horses to be removed in 2024. There is that 3,000 statutory target in retention areas. We are assigning that across the four retention areas. For example, 2,335 horses will be retained in the northern retention area. We have estimated the population in each retention area based on the 2023 survey. In calculating the number of horses to be removed from each retention block, we are using the lower 95 per cent confidence interval for each retention area and we are including a buffer. We are very confident that, as a result of this operation, there will be more than 3,000 horses in retention areas when we do our next survey later in 2024.

Finally, I did just want to make some comment on the crowdfunded project to count small horses in a small section of Kosciuszko. We really welcome any contribution to this challenge of estimating populations over large areas and, in particular, any contributions looking at how technology can help us in meeting this challenge, and we are really happy to work with others. We haven't been given information on this particular project, but obviously there is some information on the website and social media. I would constructively offer the following observations, which also reflect the view of the CSIRO and the department of agriculture and fisheries experts that we have consulted.

The first point is that there is no scientific basis for the selection of the 21,000 project area. In other words, there is no survey design. It's not a representative or unbiased sample and therefore it does not and is not able to tell us anything about the population of horses in that northern survey block or in Kosciuszko as a whole. Secondly, I think you have also heard evidence that while the proponents of the survey seem to be suggesting it is a count in fact it does not provide perfect detectability and you are not counting every horse, even in that area. As with pretty much every survey technique, you need to deal with this issue of what are you not seeing. That is not addressed in this project.

Thirdly, again, I think you have heard today that it is not apples and apples when you are looking at this versus the 2023 survey that we have conducted. What that particularly means is you can't take the average density in the northern block from the 2023 survey, which is a much larger area, and say, "Therefore, that average is what will apply in this much smaller area." It's just not a valid use of data or survey outcomes. Having said that, while there are issues, it's really exciting to look at people trying to use new technology. We are doing the same thing with drones, aerial imagery and a whole lot of things. We will certainly be happy to work with anyone to improve the uptake of that technology.

The final thing I wanted to say is that aerial shooting has been introduced as one of the tools we can use for a reason, and that is that we cannot meet the statutory target without aerial shooting. In making that decision, we satisfied ourselves, of course—and the Government satisfied itself—that aerial shooting can be delivered in accordance with the highest welfare standards. But, to be really clear, if aerial shooting is not part of the measures that we have, we cannot meet the target of 3,000 horses by 2027 and, if we cannot meet that target, that means that the ecology, the environment of Kosciuszko National Park and the threatened species in Kosciuszko National

Park are at much greater risk of extinction. That is how important it is to be able to undertake the full suite of control measures. If we can't use the full suite of measures, you are drastically increasing the risk of extinction for threatened species in the Kosciuszko National Park. Sorry, that was probably a little longer than it should have been.

The CHAIR: That's fine. I might start by asking a couple of questions myself. I was wondering why National Parks did not follow the advice of the RSPCA in relation to the SOP that was developed for aerial shooting. Why were certain aspects of their recommendations ignored?

ATTICUS FLEMING: Could you please give me an example?

The CHAIR: Sure. The RSPCA commented in their response to the SOP in regard to the risk of orphaning and starvation of young at foot and asked if there were changes that could be made around the time of year for using that strategy, to avoid foaling season. They also recommended more specific requirements around chase times, rather than having no limit on the chase time. They also raised concerns around shooting in dense, covered terrain because of the animal welfare impacts there. My understanding is that the SOP hasn't addressed any of this. I am wondering why the RSPCA feedback was ignored in those aspects.

ATTICUS FLEMING: The RSPCA feedback was not ignored. I will take them in reverse order. In terms of the terrain—I'll probably not get the language perfect—the SOP has a specific provision which says that you basically cannot take the shot unless you have a clear view or a clear shot. I think it includes the words "if in doubt, do not shoot". The SOP is very clear that, if you are in terrain where it's either not safe or where welfare considerations would mean you shouldn't take the shot, you don't take the shot. We have addressed that point. For the issue of foals, we did include additional measures in the SOP to ensure that staff were constantly looking for foals. I can't remember all of the measures but there were three or four things that were added into the SOP to ensure that foals, if detected, were shot—

The CHAIR: But the recommendation was to avoid shooting during foaling season.

ATTICUS FLEMING: I think the point from the RSPCA was more a question around whether things could—

The CHAIR: Around the timing of aerial shooting during foaling season.

ATTICUS FLEMING: I understood the RSPCA comment to cover two things: the timing and what other measures should be in place. So we added other measures in place. In terms of the timing, our judgement is that there are potentially foals at any time of the year. There are some parts of the year where there are more likely to be more foals.

The CHAIR: That's what I meant when I said foaling season, which the vets have said.

ATTICUS FLEMING: We didn't include in the SOP a prohibition on operations at any particular point of the year. The fact that there are going to be foals potentially present all year round means that whenever you are conducting this operation you need measures in there to protect foals, and that's what we've done.

The CHAIR: With all due respect, we have also heard evidence from veterinary experts in this space during the inquiry that there is certainly a higher welfare risk during the period of time where there is going to be far more foals, particularly in regard to aerial shooting and splitting up families. We have also heard evidence of shot family groups with foals now missing and that the dead bodies of the foals haven't been located by people who have gone into the park after aerial shooting operations. I assume that that's the major concern around shooting during foaling season and the increased risk during those more dense periods where there is going to be a significantly larger number of foals, which the vets have indicated is a period of time. Previously, there were regulations in place that would stop the shooting of these animals during these periods. The current SOP has lifted that restriction.

ATTICUS FLEMING: I want to emphasise that this is a really significant and important issue and we treat it as such. The SOP didn't lift requirements. I think we've worked through, having looked at the RSPCA advice, and tightened the requirements around foals. We haven't gone to the extent of saying that there are some times of the year where you shouldn't do operations, but in practice—

The CHAIR: But it was previously in there.

ATTICUS FLEMING: May I please finish—

The CHAIR: It being removed is what I mean when I say it has been lifted.

ATTICUS FLEMING: It wasn't in our SOP.

The CHAIR: That's correct. It's not in the SOP.

ATTICUS FLEMING: The national SOP contains a couple of measures. It basically encourages not to shoot at some times of the year but that national SOP acknowledges that there will be shooting at times of the year when there are foals.

The CHAIR: I'm just talking about the foaling season. We've all recognised, and the vet did recognise, that there'll be foals at all periods of time of the year. We're just talking about the foaling season when there is a significantly larger number of foals.

ATTICUS FLEMING: I'll try to summarise my answer very quickly. We're very conscious of the issue. It's a very important issue. We've included measures in the SOP to minimise the risk. You mentioned evidence that there were foals that had been abandoned. I have not seen evidence of foals being abandoned. I'm happy to look at that if there is evidence. But we have measures in the SOP that seek to ensure that that doesn't happen. When we're planning our operations, while it's not in the SOP, what you've seen is that the bulk of our operations this year are going to be carried out in the north, in particular, in that area, from April onwards, which is avoiding the major foaling season. So we are conscious of that issue. It is factoring into our operational decisions, and in the SOP itself we've included measures to minimise the risk. That is the balance that we are seeking to strike.

The CHAIR: With regard to some of those measures in regard to the foals, you said that—correct me if I'm wrong—one of those is to have a shooter on the ground to shoot any foals that have escaped those family groups. My understanding, though, is that one of the explanations for the use of aerial shooting is that ground shooting is not always possible because you can't get to the animals. How is it that you can ensure that a ground shooter can get to escaped foals, but you can't get to them otherwise and therefore you need to use aerial shooting? It doesn't quite make sense to me.

ATTICUS FLEMING: That's not one of the provisions in the SOP.

The CHAIR: Can you explain to me what the provisions are, then?

ATTICUS FLEMING: Yes. There is a provision that says, "team members should be aware of the possibility of isolated foals, whether due to maternal abandonment"—obviously there are some foals—

The CHAIR: Which we have also heard evidence has never been detected in horses, ever.

ATTICUS FLEMING: I won't comment on that. It says, "whether due to maternal abandonment, disturbance or other factors. Keep a lookout for such foals and any isolated foals should be shot."

The CHAIR: But how?

ATTICUS FLEMING: We have another provision that says to the extent reasonably—

The CHAIR: How are isolated foals shot if they're not shot aerially or on the ground?

ATTICUS FLEMING: They are shot aerially.

The CHAIR: So that's not a provision. That's just saying shoot all horses that you can see. I'm wondering what the welfare provision is in regard to foals being split from family groups with the horses being shot during foaling season.

ATTICUS FLEMING: The provision is that team members need to be aware of this risk. They need to be on the lookout, and then they need to not fly past but actually—excuse me for putting it bluntly—shoot isolated foals that are found. We're building into the process the fact that there needs to be continued vigilance for isolated foals, and they can't keep flying and continue with an operation. They need to take action to ensure that that isolated foal is not left. There are other measures: To the extent reasonably possible, consistent with the other provisions, dependant foals should be shot first. So there is a series of provisions that seek to ensure that we are minimising the risk.

The CHAIR: So the series of provisions is essentially to be aware that this is a major welfare risk?

ATTICUS FLEMING: It is a major welfare risk, yes. We acknowledge that.

The CHAIR: But the provision itself is just be aware.

ATTICUS FLEMING: No, the provision is that you prioritise locating and removing isolated foals.

The CHAIR: That you prioritise shooting foals before their mothers?

ATTICUS FLEMING: Yes.

The CHAIR: What about the requirement around chase times?

ATTICUS FLEMING: I think you'll recall from the preliminary program the median chase time was 54 seconds. The requirement in the SOP is that the chase time is kept to a minimum to the extent that's reasonably practicable.

The CHAIR: The recommendation from the RSPCA is that there is a specific time limit, and we heard this morning from a vet that that should be under one minute. I understand that you're saying that in the trial it was 54 seconds. I'm wondering, just in regard to the SOP, why you haven't specified a maximum chase time in regard to animal welfare, because that could potentially allow a chase time of two to three minutes, which we've heard is a major animal welfare concern. Keeping it at a minimum is very vague terminology.

ATTICUS FLEMING: Because in all of these matters you are trying to manage a number of different risks. One of the welfare outcomes that we're looking for is to remove all members of a family group. Obviously, the chase time needs to be a bit longer if that family group is a little larger. Our staff who are delivering the program are very aware that they need to keep chase times to a minimum. I think the preliminary program demonstrates they are very conscious of that and that they have achieved that outcome, and 54 seconds is a good outcome, but they do need to make judgements as they're implementing the program. They're juggling a number of risks to get the best possible welfare outcome. One is removing foals first if they come across foals. Two is removing the entire family or social group to minimise stress and to get the best welfare outcome in that sense. When you put all of those things together, it makes it difficult to make a very specific requirement in relation to timing.

The CHAIR: So we're relying on awareness again.

ATTICUS FLEMING: We're relying upon the judgement of highly skilled, highly trained people who are putting welfare at the top of their list of factors when they're implementing this program.

The CHAIR: But you can understand why people feel that welfare is not being put at the top of a list when the SOP itself doesn't even follow the very bare minimum advice from the RSPCA themselves.

ATTICUS FLEMING: I can understand that people are very concerned, as we are, about welfare issues. I can't understand people arguing that we are not putting welfare at the top of our list, because we are and I think that's very evident.

The CHAIR: But the bare minimum advice from the RSPCA hasn't made it into the standard operating procedure, and that's one of the community concerns. A concern that we've heard repeatedly throughout this inquiry is that that very bare minimum of advice hasn't been included in the SOP. You've come here today to say, "You just need to trust us. These are experts. They're going to use judgement. They're going to use awareness, and therefore we don't need the bare minimum advice from the RSPCA."

ATTICUS FLEMING: No. What I'm saying to the Committee is that we've listened to the input from independent vets and from the RSPCA. We have made adjustments to the standard operating procedure after having listened to that input, and we are subject to a huge level of scrutiny. We have independent vets flying around watching what we do. We have the RSPCA auditing what we do. So the level of transparency—it's not a matter of trust.

The CHAIR: But that's not transparency to the community.

ATTICUS FLEMING: It is, because the results are published.

The CHAIR: So the community has access to those RSPCA audits and to those vet reports?

ATTICUS FLEMING: We've published the vet report, and the RSPCA will take action if they see us breaching welfare requirements.

The CHAIR: I know that there'll be other questions, so I'll finish with this. I noticed you said there was no evidence of any breaches. However, you've also recognised that on Friday RSPCA inspectors attended the park to investigate a cruelty complaint. My understanding is you don't want to comment on that because it's an ongoing investigation. But given that there is an ongoing investigation, how can we say that there's no evidence of a breach when there's an active investigation underway?

ATTICUS FLEMING: There has been no evidence of adverse welfare incidents up to this point in time, and that includes the review by the independent vet and the auditing by the RSPCA until this point. I didn't want to comment on the complaint that was made on Friday. I will wait to see the outcome of that complaint.

The CHAIR: If it's proved that that horse did have one shotgun wound that caused the death of that horse, what actions will the department take?

ATTICUS FLEMING: As I said, I won't pre-empt the inquiry but in my opening statement I acknowledged that in any feral animal control operation, you can't eliminate all risk. The commitment I can give is that we will be transparent and that we will review anything that needs to be reviewed and make the changes that we need to make, if there are changes required. That transparency, I think, has been a feature of the process up until now. As I said, I don't think there is any other feral animal control program in the country—probably not ever—where the people implementing the program have had an independent vet and the RSPCA flying around literally observing what they're doing and then publishing reports on it. We welcome that transparency.

The CHAIR: In regard to that transparency, are you also saying that whatever the results are of that RSPCA investigation, you agree to make that public?

ATTICUS FLEMING: I don't want to pre-empt the results of that, but—

The CHAIR: Not about what the results are but that you would be open to making sure that that was publicly available?

ATTICUS FLEMING: What I was going to say is I think that will be a matter for the RSPCA.

The Hon. WES FANG: Mr Fleming, thank you very much. I missed you at estimates. I was disappointed to see you were not well enough to attend. I had plenty of questions for you at the time. One of those was around Mr Coleman's last appearance before this inquiry and I'm sure you are ready to address some of those points. He indicated that he had communicated to National Parks and Wildlife Service that the use of 360-degree cameras on the helicopters and scope cameras was desirable—is the word I'll use. I think that in the instance that Ms Hurst has just spoken about, where there's conjecture as to perhaps adverse animal welfare outcomes, it could be the case that those scope cameras and 360-degree cameras might have provided the evidence to clear National Parks and Wildlife Service if there is found to be adverse animal welfare outcomes. How come you haven't put those cameras on the helicopters yet?

ATTICUS FLEMING: The discussions that we've had with the RSPCA on this topic were of a general nature around the operational issues. The full list of issues that would need to be considered if the use of cameras was to occur—noting that would be, effectively, a government policy position that would need to be considered and noting, of course, that presumably everyone would agree it would have to apply generally across all government operations, all private land operations and recreational hunting—you wouldn't single out, presumably, a single operation by single agency and say, "You need to have cameras but no-one else does." I think the point was that the discussion was really that there were much bigger issues here to consider. Just to be clear, there has not been a specific request from the RSPCA for us to use cameras in the horse control operations in Kosciuszko.

The Hon. WES FANG: I appreciate that you would want to bring in other organisations and other programs into this recording discussion because obviously that provides you a level of cover—those are my words and I'll finish my scenario before I put the question to you—and you would want to drag everyone else in because you would be aware that government has a lot of inertia so these things would take time. But it wouldn't be, as you've just said, a government policy position; it could be part of the SOP that is implemented by National Parks and Wildlife Service. You've stated previously that having the RSPCA involved in the development of, and commenting on, the SOPs was one way that you would seek to have better animal welfare outcomes. Mr Coleman's evidence before us was pretty clear—I provided a copy in estimates and I can get another one again for you but I'm sure you've read it—that he had communicated to you his preference, not wanting to put words in his mouth, that you record this aerial cull. You could do it tomorrow. Is that not the case?

ATTICUS FLEMING: All I can do is repeat the fact that there has been no specific request to us to use cameras in the aerial shooting of horses in Kosciuszko National Park. In terms of your—

The Hon. WES FANG: So—

ATTICUS FLEMING: If you don't mind, I'll be brief. In terms of your initial question, no. I think introducing cameras, in the way that you've talked about it, into feral animal control operations actually does have significant policy implications. Therefore, it is the sort of thing that the agencies within government who undertake feral animal control including Local Land Services and others—it is something that we would consider as a whole-of-government position. That's the way we should do things.

The Hon. WES FANG: But there is a difference, isn't there, because when National Parks and Wildlife Service, through the Minister, were prosecuted by RSPCA in 2000 in relation to aerial culling of brumbies, that hasn't necessarily been the case in other methods? In that respect that's where the difference is and the requirement to record would be different from the regular aerial culling of other feral animals.

ATTICUS FLEMING: I'm not sure I follow your question entirely but maybe I could just add this: In terms of aerial shooting—so obviously aerial shooting of feral animals is something that, within New South Wales, National Parks and Wildlife Service and Local Land Services both conduct very significant programs.

The Hon. WES FANG: And I'm supportive of that.

ATTICUS FLEMING: We coordinate our operations to a high level including ensuring consistent training standards and consistent standards across part of a vast program. We are intimately connected in terms of how we work together and a change like this would have implications across government and for others. There's no doubt about that.

The Hon. WES FANG: I'm broadly supportive of aerial culling but we're talking about horses, which are magnitudes larger than the other animals that are being culled in aerial methods so the outcomes seem to be different in relation to horses than they do for other animals. When Mr Coleman gave his very clear evidence before this inquiry that was also provided in estimates, which I'm happy to provide it again, that he's had those discussions and conversations with you—sorry, with National Parks—this isn't about singling anybody out. As an aside, can I say that I one hundred per cent support your discussion around staff. I think that any abuse of National Parks and Wildlife Service staff is abhorrent and you are right that doing this job will be difficult. I do not at all think that the staff need to be targeted. They are doing a job and I acknowledge that. This is not their argument to have or their fight to have so they should not be attacked.

ATTICUS FLEMING: I appreciate that, thank you.

The Hon. WES FANG: But the RSPCA has given specific evidence before this Committee to indicate to us that that is something that they are seeking to have put on the record so why hasn't it occurred?

ATTICUS FLEMING: My answer is that the RSPCA has not requested us to use cameras in this operation. Can I just add that your broader points earlier about feral animal control generally and you talked about horses being larger—I'm not sure I understand the significance of that point. From our perspective we're conducting feral animal control operations almost 1,500 hours every year. We're doing that professionally. We're doing it in a manner that meets the highest welfare standards and those standards we apply to all animals. It doesn't matter whether it's pigs, goats or horses. We are always striving to meet the highest animal welfare standards.

The Hon. WES FANG: The evidence would indicate that the target area of the brumbies versus a smaller animal and the calibre used being similar in nature, the time to—what's the words that they use?

The Hon. BOB NANVA: Insensibility.

The Hon. WES FANG: The insensibility is greater in equine than it is for other species and that's where I think the problem lies.

ATTICUS FLEMING: I'm not aware of any such evidence. You'd have to ask someone involved in shooting. Whether it's easier to hit a target area of a large animal that moves relatively more slowly or a smaller animal that darts around and tends to stick under cover, I'm not the best person to ask about that.

The Hon. AILEEN MacDONALD: Can I ask a follow-up question with regard to the communications that RSPCA NSW had with the cameras? If they were to put a formal request in writing, would you then consider or commit to cameras?

ATTICUS FLEMING: I think what you are hearing from the discussion today is that if the RSPCA puts anything to us, then we take it very seriously and we consider it. Will we agree with everything that they raise? Not necessarily. If they were to put that issue to us specifically, we'd consider it, but it does have significant broader implications for feral animal control in the State, so it would have to be considered in that context.

The Hon. AILEEN MacDONALD: You are saying that at this stage they haven't formally written to you?

ATTICUS FLEMING: Correct.

The Hon. WES FANG: You spoke about the clusters earlier and the difference in the number of clusters versus what was given in evidence. What is your understanding of what makes up a cluster?

ATTICUS FLEMING: My understanding—and I'll correct the record if I get this wrong—is that the cluster is essentially the group of horses you see close together. That can be one horse, but it is sometimes more than one horse.

The Hon. WES FANG: I was interested when you said that there was talk around the fact that there was a lack of clusters. Is part of the reason that the clusters didn't count primarily because there were not enough horses within the cluster for it to count as a cluster?

ATTICUS FLEMING: I'm confident that's not the case. I'm confident that's not the issue.

The Hon. WES FANG: That's my understanding as to why the St Andrews hadn't—sorry, the method that is specified needs to have a number of horses within a cluster to make it a cluster, and that wasn't the case.

ATTICUS FLEMING: I'll come back and correct myself if I am wrong, but I think you're wrong on that point. We are happy to provide the St Andrews report, as I said. It does what you would expect, and what we wanted. It goes through and raises issues, and we respond to those issues. It's not a whitewash; it's something that actually went through and raised the issues where they needed to be raised. But I read out some of the key conclusions.

The Hon. WES FANG: The Hon. Emma Hurst asked you questions around the SOP development and the comments that were written on the draft SOP that was given to the RSPCA for comment. We have now been made aware, having compelled the documents under Standing Order 52, that there were suggestions put forward by the RSPCA that weren't adopted. The Hon. Emma Hurst has certainly put those questions to you today. But the Minister, the department and other stakeholders have continually pointed to the RSPCA's involvement as the difference between what occurred previously—say, around 2000 with that aerial culling program—and the program being implemented now. Given the involvement of the RSPCA in those SOPs, what changes were made by the National Parks and Wildlife Service on the feedback from the RSPCA? What we have seen is that things like foaling season, the cameras, and all the advice that they have been giving—and we can have the debate around what level of conversation you had around the cameras—has been ignored.

ATTICUS FLEMING: I'll say two things, Mr Fang. One, you're not correct to characterise that as the difference between now and 20-odd years ago. There are so many changes that have occurred in the last 20 years: we are using different helicopters, we are using different rifles, we are using different ammunition, we have got thermal gear, staff are trained to a higher standard. There are many changes that mean what we are doing now is very different to what was happening 20 years ago. What I would say, and have said, is that there is a very high level of transparency associated with this operation, and that includes having independent vets observing and having the RSPCA observing and auditing. As far as I know, that hasn't happened in any other program. I think your question about that—we have listened to the RSPCA and we have made changes in response to the RSPCA. The RSPCA were really raising questions, and so we have responded to the RSPCA concerns. The RSPCA flew around and observed the operation and came back and said, "This operation has been conducted in accordance with the SOP and there is no breach of relevant welfare legislation." I think the engagement with the RSPCA is both productive and appropriate.

The Hon. WES FANG: That doesn't quite answer the question.

ATTICUS FLEMING: I think it does answer your question.

The Hon. WES FANG: The question I asked was what were the changes? What changes did—

ATTICUS FLEMING: I'm happy to take on notice and give you some detail around the changes, but I did mention some of them in response to the previous question—in particular around foals. There are two or three adjustments made which really specifically called out the need to be vigilant, and looking for isolated foals and ensuring that priority was given to the removal of those foals. I think the general point that is a really important one is that whether you are talking about feral horses or whether you are talking about other feral animals—

The Hon. WES FANG: Brumbies. We call them brumbies.

ATTICUS FLEMING: —it is impossible to eliminate every risk. If you want us to eliminate every risk, then we can't do rehoming, because there are risks in rehoming. We can't do ground shooting. We can't do aerial shooting. We can't do anything. If you want us to eliminate every risk around animal welfare, what you are saying is there can be no feral animal control and that is the end for our national parks and our threatened wildlife. The challenge for us is to get the balance right and to ensure that we have reduced that risk to the greatest extent we possibly can, so that we are doing our job—protecting parks and protecting wildlife—while still meeting the highest welfare standards, and that is what our staff are doing.

The Hon. BOB NANVA: I want to come to the question of cameras and monitoring. I'm asking you this in your context as the head of a government agency. It would be peculiar, wouldn't it, for one agency involved in the control of invasive species to be singled out for that degree of monitoring and surveillance to the exclusion of all other agencies that also undertake the removal of feral animals?

ATTICUS FLEMING: Yes, absolutely, and I think that's partly the point I'm making. At one level it's from a purely policy perspective. We work very closely with agencies and we try to integrate and align our operations, so to be introducing a particular measure for one agency would be at odds with that policy approach. But it would also be a terrible thing to say to our staff, and in particular to say, "Right, anyone who is going to be involved in doing what the Parliament has said we must do"—so the Parliament has said, "You must control horses in Kosciuszko and, by the way, we are going to introduce a requirement for you that no-one else in government has to comply with." Of course that would be a terrible thing for our staff.

The Hon. BOB NANVA: I have a more fundamental problem with it. This is from a prior life, but that is a significant workplace change. That is tantamount to workplace surveillance, which would presumably result in a change management process, which would involve consultation with staff. There are a whole range of industrial issues with respect to the introduction of that sort of technology, particularly in a context like this where the privacy of staff has been paramount in light of the threats that have been made in the past.

ATTICUS FLEMING: Yes.

The Hon. WES FANG: I'm happy to pause the culling while we—

The Hon. BOB NANVA: This is not—

ATTICUS FLEMING: You are absolutely—

The Hon. WES FANG: Let's pause the culling while we work this out, then. Let's pause the culling.

The Hon. BOB NANVA: Workplace surveillance is not a flippant policy decision.

The Hon. WES FANG: Yes, let's pause the culling until we solve the issues.

The CHAIR: Order!

ATTICUS FLEMING: You are absolutely right. For that reason, we haven't even contemplated taking it to staff, because it hasn't been requested by the RSPCA.

The Hon. WES FANG: That's not the evidence.

ATTICUS FLEMING: It hasn't been requested by the RSPCA. If it was, it would be something that the Government would need to consider.

The Hon. BOB NANVA: It would be an extraordinary change in the workplace.

ATTICUS FLEMING: The workplace and industrial issues would be huge.

The Hon. WES FANG: Police bodycams. Ambulance bodycams.

The Hon. BOB NANVA: I'll move off surveillance for a moment. The Scientific Advisory Panel has previously said that past horse management plans have failed to remove horses at a rate required to reduce the population in a substantive way, having regard to the breeding rate, at Kosciuszko National Park. Noting the numbers that you have provided at the start of your evidence, do the current settings give the National Parks and Wildlife Service sufficient confidence that the legislated targets can be met with the current framework that you are operating within?

ATTICUS FLEMING: I'll answer that in two parts. Firstly, in the absence of aerial shooting—I think I answered this question in my introductory statement—the answer would be no. There is no way we would meet the legislative targets if aerial shooting was not a part of the suite of measures that we can apply. I just emphasise that we're applying a suite of measures; we're not putting all of our eggs in one basket. But that is one measure that must be part of the basket if we're to achieve the target.

The second part of my response really goes to how we are planning our operations this year. Maybe I would put it this way. That estimate that came from the survey last year, the 95 per cent confidence interval—the bottom of that was roughly 12,790, I think. So we've got 97.5 per cent confidence there are more horses than that. Take 3,000 from that, which is the 3,000 that are to remain, and you've got 9,700-odd horses that, based on that survey, would need to be removed. What we are planning to do this year is remove up to about 8,500 horses. We can be 97.5 per cent confident there are more than 4,000 horses, not 3,000, by the time we get to the survey towards the end of the year.

That's based on the bottom of the confidence interval. If the best estimate is right—that's about 17,500, from memory—there would be not 4,000 horses left, there would be 8,000 or 9,000 horses left. Our approach is to be conservative this year and do the next survey towards the end of this year. That will tell us whether we've got the settings right and whether we need to then either continue at the same level next year or escalate or

otherwise, noting that the statutory requirement is for 3,000 at 30 June 2027. So my answer is we are conservative, and the real answer to your question is probably one we can give after the survey towards the end of this year.

I would just say in relation to that survey that there has been a lot of discussion around survey methodology and so on, and I think a lot of that discussion has been really useful, but the one point that probably hasn't been picked up clearly enough is what is the key question that we need to ask? And the key question from the point of view of the legal requirement is not actually how many horses are in Kosciuszko National Park; it is how many horses are in each retention area. That will guide how we design our survey this year and going forward. We will still look at the park as a whole as well, but we'll be really trying to make sure that we've got the best survey design and using the best survey technology to answer that question about how many horses are in each retention area.

I think one of the witnesses earlier today talked about mark-recapture distance sampling. We've put on record that that's something that we will be aiming to trial, but it's not something that can be trialled at the park-wide level because it's just too big a landscape. But for smaller populations in smaller areas, it can be trialled. It still carries with it a confidence interval and a level of uncertainty, but in the right circumstances we hope it might give us a little greater precision.

Ms SUE HIGGINSON: You would have seen the AirborneLogic API. Did it present any concerns to you about the level of impacts that are visible from those images?

ATTICUS FLEMING: It did, but I had that concern well before looking at that imagery. I think some of you are going to Kosciuszko tomorrow. It depends a bit on the seasonal conditions, but it's very clear when you're on the ground up there. You see the impacts, you see the trails from horses and you see the impact on riparian areas. It's very clear when you look at the scientific evidence. We've had the Federal Threatened Species Scientific Committee saying that if we don't control horses the risk of extinction for some of these species is significantly increased. It was interesting to note that it reaffirms, or is consistent with, the very clear scientific evidence that is there, which is if we don't reduce the number of horses, the park is going to suffer ongoing degradation and species are going to be at greater risk of extinction.

Ms SUE HIGGINSON: Just for an analogy exercise, if a member of the community was to drive in a big four-wheel drive and do the same level of impact in an area that horse trails do to a particular, say, water source, and it was deliberate, would there be a penalty for that? I'm just trying to get a grasp, in terms of the management of our protected area network and the regulation around it.

The CHAIR: You fine the horses.

Ms SUE HIGGINSON: Yes, I was thinking about that.

ATTICUS FLEMING: I think Mr Smith has managed a lot of National Parks. There are rules around that sort of thing happening.

The CHAIR: I would support giving them fines.

ROBERT SMITH: Of course, there are rules around those sorts of things. There's a range of things that cause impacts to parks in different ways, of course, and four-wheel drives can be one of them. Obviously, where we do facilitate four-wheel driving, we try to make sure that it's in the right spots, not the wrong spots. We certainly don't encourage people taking four-wheel drives where they shouldn't take them. If there's action to be taken, we would. But, yes, that's one of the impacts that can happen on parks.

Ms SUE HIGGINSON: With the conservative approach that we are taking in the maintenance of an invasive species in the national park in the retention areas, what is the plan beyond 2024 to make sure that we are doing our primary obligation and maintaining the ecological integrity of the Kosciuszko National Park?

ATTICUS FLEMING: Can I just go back to your previous question very quickly? I think the other analogy would be that, if we were seeing that kind of impact from pigs and goats et cetera, then of course we would be focused on doing something about it. Really, there shouldn't be any difference in terms of what feral animal is causing the problem.

Ms SUE HIGGINSON: Thank you. That's helpful.

ATTICUS FLEMING: For 2024 I think we have a program this year and very conservative targets for removal in retention areas. Obviously, for the removal areas, we are looking to get the population as close to zero as possible. That will be a significant improvement to remove horses from areas of the park where they currently are. I think we look at the survey towards the end of 2024 and essentially determine what our program is for next year to make sure we are getting the numbers down to 3,000. Really, that's all I think we can do. To an extent, your question gets to the various other things we are doing across Kosciuszko National Park. We are removing a lot of feral deer and pigs, so there is extensive feral animal control. Basically, the biggest feral animal control

conducted across the State is happening, including in Kosciuszko. There is a lot of work obviously on fire management. We are seeking to address all of the threats.

The other really important thing that's happening is that we are rolling out the biggest ecological monitoring program that we have ever had in Kosciuszko National Park. That's just thousands and thousands of trap nights. It's millions of images from camera traps, audio recorders, bird surveys, veg surveys and lots of water monitoring. That will give us, going forward, a really good snapshot of the health of Kosciuszko and, over time, will give us evidence as to what's happening with the health of the park, the health of threatened species, the health of the waterways and all of those things. In turn, obviously, that will inform how we pull the various management levers that we have.

Ms SUE HIGGINSON: On that, in terms of the engaged staff working on those programs, is there a workplace positive approach and a feeling that perhaps we are in a position that we can turn the health of Kozzie around? Is that the feeling amongst your staff?

ATTICUS FLEMING: Would you like to answer that, Rob?

ROBERT SMITH: To go to the point about the eco health program, I think what it does do is set up a clear framework for us to be able to really get a sense of how that particular park and other parks where we are running the program is happening. To the point about the staff engagement and whether they see a lot of positive benefit from running it, that would be yes. It's such an extensive program, like Mr Fleming said, around the number of images and the amount of information that we are actually being able to pool together to get a clear picture about what the park looks like. It's a snapshot in time at this point. As an ongoing piece of work I think it will be transparent, not just to staff but to the rest of the community about how the park is being managed. Do you want to add to that?

ATTICUS FLEMING: The thing I'd add is that, if you look specifically at the program to control horses, I would say there are two things that I'd reflect on in terms of the staff. One is the very genuine and deep commitment to welfare. Some of the independent reviews have called on that. Our staff are very committed to welfare. As I said in my introduction, it's a challenge to do any kind of feral animal control. But there is also a sense that the horses were having a significant impact on the park and that that was quite demoralising. To be able to do something about it is significant and welcomed by staff.

The CHAIR: I have one last follow-up question to some of the questions asked by the Hon. Wes Fang. I know you mentioned that welfare provisions were put into place in regard to the fact that aerial shooting would happen during foaling season and that those welfare provisions were to be aware and vigilant to make sure that the foals were shot and to prioritise shooting foals before their mothers. Did you get further feedback from the RSPCA that that adequately addressed their major concerns around shooting during foaling season?

ATTICUS FLEMING: Off the top of my head I can't recall that, but I'm happy to take it on notice.

The CHAIR: If you could take on notice, first of all, whether the RSPCA were asked to give further feedback that that addressed some of those welfare concerns and, if they did give feedback, if you could also provide that feedback on notice as well, that would be good.

ATTICUS FLEMING: Yes.

The CHAIR: That concludes our session today. Thank you for your time in giving evidence to the Committee today. I believe there were some questions taken on notice and there might be further questions from the Committee. The secretariat will be in contact with you in regard to those questions taken on notice.

(The witnesses withdrew.)

The Committee adjourned at 13:35.