

REPORT ON PROCEEDINGS BEFORE

**PORTFOLIO COMMITTEE NO. 7 - PLANNING AND
ENVIRONMENT**

**INQUIRY INTO HEALTH AND WELLBEING OF KANGAROOS AND
OTHER MACROPODS IN NEW SOUTH WALES**

CORRECTED

At Macquarie Room, Parliament House, Sydney, on Friday 11 June 2021

The Committee met at 10:00

PRESENT

Ms Cate Faehrmann (Chair)

The Hon. Mark Buttigieg

The Hon. Catherine Cusack

The Hon. Ben Franklin

The Hon. Shayne Mallard

The Hon. Mark Pearson (Deputy Chair)

The Hon. Penny Sharpe

The CHAIR: Welcome to the first hearing of the inquiry of Portfolio Committee No. 7 - Planning and Environment into the health and wellbeing of kangaroos and other macropods in New South Wales. The inquiry is examining a range of issues relating to the health and wellbeing of kangaroos and other macropod populations, including indicators of historical trends, the impact on kangaroo populations of commercial and non-commercial killing of kangaroos and threats to their habitat from the impact of climate change, drought, bushfires, land clearing and exclusion fencing. It will also examine government policies and programs related to kangaroo management and whether current practices are in line with biodiversity conservation legislation.

Before I commence I would like to acknowledge the Gadigal people who are the traditional custodians of this land. I would also like to pay respects to the Elders past, present and emerging of the Eora nation and extend that respect to other First Nation peoples present. Today we will be hearing from a number of stakeholders, including researchers, animal welfare advocates, farmers and pastoralists, representatives and the Kangaroo Management Taskforce. While we have many witnesses with us in person, some will be appearing via videoconference. I thank everyone for making the time to give evidence to this important inquiry.

Before we commence I would also like to make some brief comments about the procedures for today's hearing. Today's hearing is being broadcast live via the Parliament's website. A transcript of today's hearing will be placed on the Committee's website when it becomes available. In accordance with the broadcasting guidelines, media representatives are reminded that they must take responsibility for what they publish about the Committee's proceedings. Committee hearings are not intended to provide a forum for people to make adverse reflections about others under the protection of parliamentary privilege. In that regard, it is important that witnesses focus on the issues raised by the inquiry terms of reference and avoid naming individuals unnecessarily. While parliamentary privilege applies to witnesses giving evidence today, it does not apply to what witnesses say outside of their evidence at the hearing. I therefore urge witnesses to be careful about comments you may make to the media or to others after you complete your evidence.

All witnesses have a right to procedural fairness according to the procedural fairness resolution adopted by the House in 2018. If witnesses are unable to answer a question today or want more time to respond, they can take a question on notice. Written answers to questions taken on notice are to be provided within 21 days. If witnesses wish to hand up documents they should do so through the Committee staff. In terms of the audibility of the hearing today, I remind both Committee members and witnesses to speak into the microphone. As we have a number of witnesses in person and via videoconference, it may be helpful to identify who questions are directed to and who is speaking. For those with hearing difficulties who are present in the room today, please note that the room is fitted with induction loops compatible with hearing aid systems that have telecoil receivers. Finally, could everyone please turn their mobile phones to silent for the duration of the hearing.

CLAIRE GALEA, Biostatistician, sworn and examined

RAY MJADWESCH, Consulting Ecologist, before the Committee via videoconference, affirmed and examined

The CHAIR: I welcome our first witnesses. In the hearing room we have Mrs Claire Galea. Mr Ray Mjadwesch is appearing via videoconference. There is an opportunity for both witnesses to make a short opening statement. Mrs Galea, do you have a short opening statement to make?

Mrs GALEA: Yes. It is about three minutes if that is okay?

The CHAIR: Thank you.

Mrs GALEA: My name is Claire. I am a full-time biostatistician and PhD candidate within the field of medical statistics. I have been a statistician for over 25 years, and I have published over 50 peer-reviewed papers. My masters dissertation was based on population trends over time, as are the Department of Planning, Industry and Environment [DPIE] quoted documents that I will be reporting on today. I started looking into the original 2019-2020 quota report at Christmas just gone, and I first noticed some mathematical errors and things that seemed out of pattern to me. That prompted me to inquire a little bit further. So, I decided to go through all the tables in the document and look at them. I found some errors from incorrect percentage calculations to population estimates that were doubling in a year and patterns that just did not make logical sense to me. I thought, "Okay, I have got to keep digging."

I found another version of the report, and some errors still existed but a table had completely changed. A population of wallaroos had gone from 160,000 to nearly 300,000 by something called a correction factor. Being a mathematician, I thought, "What is a correction factor; go digging." So I went further and found that this correction factor had failed to have been applied right back to 2008, and I thought, "How did they not notice these 13 years of incorrect errors?" So I looked into this, looked into the correction factor, and I was mathematically concerned by this term. I did not understand how these populations could change when this correction factor did not take into account topography, the time of year, water sources, anything. I was starting to get concerned. Reading more documents, I then found a quote from the DPIE that said that if the drought persists then these wallaroos stop breeding. But the population had gone up by 300 per cent. I was just finding this to be more and more mathematically and statistically impossible. Please remember I am a biostatistician. I am not a biologist. That is not my field. I just study data, I look at patterns, and that is what I do.

Then I thought, "How do they count? What do they do?" I noticed that over the 40 years the methodology had changed as well multiple times, but they were predicting trends over this whole time period. My speciality—what I do as a biostatistician—is looking at population trends over time, looking at this from a different range of topics. They were setting thresholds from these time trends and the data was just unreliable when there are so many different methods. So then I thought, "I have got to do this." So I then plotted every single table that was in this. I plotted it, I mapped it and I thought, "These trendlines are looking worrying." I found some populations where I could work out just using standard regression, no advanced statistics—I am using DPIE's data—plotting a straight line and finding that by Christmas next year some of these are going to be at day zero; there is going to be none left. That was so worrying.

In summary of my opening, I have worked on so much data. I have worked on military data, educational—a range of data. I have never seen data this concerning where there are statistically and mathematically impossible values in this. It is very worrying. I have a couple of recommendations to summarise: that we have an independent investigation into the methodology of how these numbers are counted to ensure survival of the species and new and globally applied methodologies of population counting, and that mathematical rigour is applied to these methods.

The CHAIR: Mr Mjadwesch, I assume you have an opening statement as well.

Mr MJADWESCH: Just very briefly: I am a consulting ecologist. My core business is wildlife survey. Over 10 years ago I went through a similar process to what we just heard where I mapped the distribution and abundance of kangaroos according to the government data and found a decline—a very serious decline that was acknowledged by the New South Wales scientific community. Subsequently the departments have changed their survey methodologies, which is not what you are supposed to do in science. I have been working for the last couple of months all over New South Wales—Griffith, Broken Hill, Moree, Inverell, Lithgow. You name it, I have been there in the last two months, and I have been paying attention to how many kangaroos I have been seeing—not very many. I have seen a lot of mice, so I do understand what a plague is. When I read about kangaroo plagues, I compare it to the mouse plague that is going on at the moment, where there is evidence of mouse plagues but there is absolutely no evidence of a kangaroo plague anywhere. I would really enjoy being invited by some of our

macropod experts to go for a drive and have a look at the plague. I would love them to show me one. I am here just to address my submission, which discusses the problems with the surveys and the harvest model.

The CHAIR: We have until 11 o'clock for this session because, clearly, there is a fair bit to delve into. Members will indicate if they have a question, rather than time being allocated. Deputy Chair the Hon. Mark Pearson will begin the questions.

The Hon. MARK PEARSON: Thank you very much for appearing. Mr Mjadwesch, you make a very strong statement, saying:

The management of kangaroos in NSW is in breach of every piece of legislation that is supposed to protect the environment and our wildlife, simply on the basis that, in my opinion, it is materially *and deliberately* ommissive and misleading.

Can you explain what you mean by this? Why I pitch this question to you is that in those pieces of legislation, if an animal is killed without a licence or if a licence is issued to kill an animal which should not be killed, it is a criminal offence. Your statement is quite strong. Can you elaborate and elucidate on that for us?

Mr MJADWESCH: Yes. It was much more going to the fact of misrepresenting the facts. There are regulations in New South Wales and Federal legislation which require ecologists, people such as myself if I am working on an environmental impact statement [EIS], or anyone in the scientific field to report the facts. When you look at the data, the decline is absolutely obvious. The New South Wales scientific committee conceded that up until the point of 2010-2011 when I submitted a nomination to see the kangaroos listed as a threatened species. Subsequently after that we had, as is predicted in the nomination, the populations rebounding at quite phenomenal rates, so over 400 per cent increases per annum in some districts, which is just a biological impossibility for a slow-breeding marsupial. They have one young per annum. So it seems to me that there is rather large-scale misrepresentation of the facts with relation to how kangaroos are faring under the current management settings. That is what my comments were based around.

The Hon. MARK PEARSON: Mrs Galea, you have described a concern about the methodology, the statistics et cetera and you talk about a correctional factor. Can you elucidate on what you think is the correctional factor which the department relies on in its methodology of calculating how many numbers of particular species are there in order to determine how many can be killed commercially or by mitigation?

Mrs GALEA: Sure.

The CHAIR: Before you answer that question, just taking one step back, could you please explain to the Committee: What is a correctional factor and why is it used? And then we will go—

Mrs GALEA: Yes.

The Hon. MARK PEARSON: Take us on that journey.

The CHAIR: Correctional factor for dummies.

The Hon. MARK PEARSON: Is it a correctional factor?

The CHAIR: Yes, sure.

Mrs GALEA: To be honest, I had not seen this correction factor, so mathematically I pulled it apart. It is only applied to wallaroos. In 1997 a study was done up in the Northern Tablelands to compare the helicopter sightings versus ground sightings and the differences between the two. It was shown that the helicopter survey on average observed 54 per cent of the wallaroos compared to those on ground. So the helicopter saw less but helicopters scare animals. There are a lot of factors to go with that. We have got topography, we have got everything there. This was one study which only executed five surveys. They only found evidence during autumn that this difference existed. So what they then did—they use a correction factor of 1.85, which accounts for 54 per cent. It is like assuming that for every kangaroo we have there, it is 0.85. So the population is increased because they saw 54 per cent less. Wallaroos, from my readings—again, I am not a biologist—they prefer to be in the trees, they are harder to see, so the correction factor was applied.

Stepping away from the biology, mathematically, they only saw it once in autumn. The study has not been replicated in the Northern Tablelands. It was done in 1997 and it has been applied throughout to these wallaroos no matter what time of year for all these tables. And, as I said, the reissue of this correction factor, they missed it in 2008, 2009. Hang on, then they did it in '11 and '12 and then went back. So it is a mathematical concern for me but I guess it is not replicated. Where is the validation of this tool that they used? If we were to design a statistical tool which then had to be applied to something, I would have to validate it and repeat it. Does that summarise what the correction factor is?

The Hon. MARK PEARSON: Is there a correctional factor for kangaroos?

Mrs GALEA: It is only applied to wallaroos.

The Hon. MARK PEARSON: What is your interpretation or understanding of the methodology that is currently used to calculate the number of kangaroos that are actually out there?

Mrs GALEA: In terms of a summary of the problems of the methodology that I found from a mathematical perspective?

The Hon. MARK PEARSON: Yes.

The CHAIR: We will see if Mr Mjadwesch also has something on this. You keep going, Mrs Galea, and then he may want to comment on that.

Mrs GALEA: Sure. I guess, pulling it apart from statistical—the aerial surveys that they use, aerial surveys produce bias. You have two main sources of bias, that is your sighting probability and your visibility challenges when you are using aerial surveys. As quoted by the person behind it, they are only "reasonably effective", aerial surveys. The transect locations where they locate the transects for each of the sightings using the aerial surveys, of serious concern after they are counting them is that there is no visual record. A lot of studies globally will have cameras on the planes or will use satellite imagery to record to verify the herd count or what they are looking for. We do not have that and that is quite concerning.

The climatic factors are not taken into consideration, so the global standard of allowing, when we are looking at populations, is to look at a drought index, which obviously is seriously applicable in Australia. You will notice on page 6 of my submission I have a graph for you. That graph shows the population of the wallaroos. It is Department of Primary Industries [DPI] raw data. I have not done anything to it. I have put the drought index—the globally recognised Standardised Precipitation-Evapotranspiration Index. These factors need to be taken into consideration when estimating populations. They have used multiple survey methods. There are errors in it. Sometimes you are only doing these every three years but working out quotas. If we are doing time projections, the populations could seriously decline.

The research quality concerns me, the accuracy methods, the modelling that they use. The statistical models they built work very well on large populations but sometimes they are only seeing 11 actual animals on the ground and applying methods that work for a thousand. There are outliers in the data. The first thing when we get data as statisticians is we graph it—look at it and graph it. Populations going from 300,000 to 1.1 million in a year are very concerning in these methodologies, not just from how they are counting with no visual record of anything to the mathematical modelling they do. To get a population to go from 508 to 295,000, that is a very big mathematical and statistical stretch.

The CHAIR: Mr Mjadwesch, did you have something to say? Would you care to comment on this line of inquiry as well?

Mr MJADWESCH: Just briefly. They did have correction factors that were being applied to kangaroos in the western zones until 2016. This was one of the criticisms of the program that was in my nomination, on the basis that they had revised the correction factors numerous times over the years, since the 1980s when they first started using them, and every time they revised the correction factors they revised them upwards. So we were not getting a consistent analytical constant being applied through their calculations to come up with final populations. I produced a graph that illustrated how the correction factors were increasing while the populations were theoretically stable. The correction factors had increased by a factor of about six times while the population was the same, which suggests to me—that graph is not in my submission but I could happily provide it to the Committee—that a six times increase in correction factors in a stable population basically was an indicator that the population had declined by up to one sixth of its former population.

So in 2016 the department abandoned the use of correction factors for western New South Wales and they went to the same methodology being applied in the eastern half of the zones, which is a distance methodology which has in-built corrections they basically call a detection probability that assumes that kangaroos or the target object is distributed evenly in the landscape. So it basically places observations into different bins at different distances from the line of transect and levels them all up to show that the animals are all equal according to the closest bin's density. So there are basically still corrections being used in the analysis, but it is called a different thing.

The CHAIR: We have just been handed a document, Mr Mjadwesch, that I think you wished to table. Is that correct?

Mr MJADWESCH: Yes. I was going to send that up towards the end. It has a list of questions on pages 2 and 3 that go to the issue of the use of correction factors and how flying over national parks was an incorrect survey methodology in terms of generating population estimates for harvest zones where shooting

occurs. That was also abandoned by the department in 2018 in the western zone, so basically that is an admission by the department that the methodology that had been applied up until 2017 was not a valid methodology for estimating kangaroo abundance in harvest zones.

The Hon. MARK PEARSON: Mr Mjadwesch, you mentioned that you do not agree with the statement that when land is cleared that is a perfect environment for kangaroos to flourish and survive. These are claims that are made by people who say that kangaroos—this is in a mitigation argument—are a threat to the fodder for livestock. But you disagree that this clearing of land automatically causes kangaroos to thrive. Can you elucidate on that, please?

Mr MJADWESCH: Yes, I can. It is not just me who says it. Graham Arnold was a CSIRO researcher in Western Australia and he did a spatial analysis of their distribution and found that even in remnants of less than two hectares kangaroos dropped out. He did a study of nearly 500 remnant units in the sheep wheat belt in Western Australia. After the loss of vegetation—by the time a remnant is less than two hectares in size. After the loss of vegetation the second most important factor influencing absence was the presence of humans. He found very clearly that kangaroos persisted in remnant vegetation.

Viggers and Hearn was another study done in 2005 which found that kangaroos rarely ventured further than 150-odd metres away from the edges of remnant vegetation. So when you get large broadscale clearing, they said the limit in range away from remnants was about 400 metres as a maximum. So when you get broadscale clearing, that is removing the habitats of kangaroos. Short and Grigg found the same thing in 1982 and they described it. They basically said that when you clear vegetation you expose kangaroos to the measures brought against them by farmers, with reference being to shooting. There were accounts in the 1970s where observers were reporting the mallee being cleared and they said that basically you have got piles of burning mallee and piles of dead kangaroos and emus because at the same time they are clearing the mallee or the bush, they are shooting the wildlife and removing it.

It is basically a process of clearing the landscape and it does not just refer to vegetation. If you look at a vegetation unit like grassy box woodland, for example, that has been in New South Wales—95 per cent of box gum woodland has been removed. I did a study a few years ago on 44 remnants and found kangaroos in very few of those 44 remnants. We are looking at 95 per cent of a vegetation type that has been removed and then within those fragments that are left, most of those fragments were so small that kangaroos no longer persisted in those either. I am very interested in absence and looking at absence and mapping absence. That is what I do with data when I get the raw data from the department.

The CHAIR: Can I jump in with a question about data? Thank you both for your submissions, which are incredibly informative and very good. Mr Mjadwesch, on page 15 of your submission—I am just trying to pick apart some of this to get an overall sense of what is happening. You have got KMZ1—which I assume is kangaroo management zone—red trend 1988-2020. Sorry, this is the grey trend. Let's talk about the grey trend in your submission, which states:

Grey kangaroos in KMZ 1 have reportedly declined from 450,000 kangaroos in 2016 to only ~7,000 in 2020. If the 450,000 figure was correct then this is a decline of 98.5% in just 4 years, suggesting the program is clearly neither carefully monitored, well regulated, nor sustainable.

Can you just talk firstly to the 450,000 kangaroos? How was that defined? Where did that figure come from?

Mr MJADWESCH: Yes. It came from the National Parks report on—whatever one, the annual report or the quota report. One of the population reports. I am not sure exactly which one. I just get all the table data from the government reports and put them into a big Excel spreadsheet that I have of all of the kangaroo results for New South Wales and other States.

The CHAIR: Just to be really clear with this, who is undertaking the surveys?

Mr MJADWESCH: That is an interesting question. I am pretty sure the western New South Wales ones are mostly staffed by National Parks staff. I am pretty sure. The eastern zone ones are conducted by a consultant out of the University of New England [UNE]. But, again, his co-authors on that project are National Parks and Wildlife staff as well. I am pretty sure most of the people who actually do the counting are attached to the department—to the kangaroo management unit.

The CHAIR: The 98.5 per cent decline—the approximately 7,000 in 2020—where does that figure come from?

Mr MJADWESCH: Out of the department report. I can take that on notice and send you the report, if you like.

The CHAIR: So every year National Parks and Wildlife Service produce a report in terms of kangaroo numbers.

Mr MJADWESCH: Yes. They survey the western zones every year and the eastern zone surveys are conducted on a three-yearly rotating basis.

The CHAIR: Are they suggesting that decline is from drought?

Mr MJADWESCH: Yes. When I first raised this issue with the department in 2011 and demonstrated to the kangaroo management unit manager at the time the populations in the western zones had declined by 80 per cent to 90 per cent in every single zone, the manager responded, "It is drought," and I said, "Why are you still shooting them? An 80 to 90 per cent decline is very serious." But they did not even blink. I was basically told to go away. They were not particularly interested in somebody from outside looking at the data.

The Hon. BEN FRANKLIN: I just wanted to follow up just to get something very clear in my mind. You are saying the department put out a report in 2016 saying there were 450,000 kangaroos and the same report said in 2020 that there are only 7,000. Is that right?

Mr MJADWESCH: That would be correct so long as I did not make a mistake in my spreadsheet.

The Hon. BEN FRANKLIN: Understood. Sorry, was that for the Western Division or was that for all of New South Wales?

Mr MJADWESCH: The page we are looking at, is it page 14?

The CHAIR: Page 15.

Mr MJADWESCH: I have on my page 14 two graphs, with red trend at the top and the second graph at the bottom is the grey trend.

The Hon. BEN FRANKLIN: We have got the same one.

Mr MJADWESCH: Is that the one we are talking about?

The CHAIR: Yes.

Mr MJADWESCH: What was the question again?

The Hon. BEN FRANKLIN: My question was simply where they are. Was this just the Western Division or was this all of New South Wales?

Mr MJADWESCH: That is specifically the Tibooburra zone. KMZ1—those two graphs refer specifically to the Tibooburra zone.

The Hon. BEN FRANKLIN: For the grey kangaroos. Got it. Thank you.

The CHAIR: Mrs Galea has some clarification.

Mrs GALEA: Yes. I have the document here. It is the 2021 Quota Report for the Department of Planning, Industry and Environment, *New South Wales Commercial Kangaroo Harvest Management Plan 2017-2021*. The tables are here. Can I also add to Mr Ray to say that it is in Tibooburra where it has gone—correct—from that 450,000 down. We can also go to the—

The Hon. PENNY SHARPE: Just to be clear, it is 450,000 down to 7,000. Is that what you are saying?

Mrs GALEA: Yes. The exact numbers are 451,594 down to 6,859.

The Hon. PENNY SHARPE: Over which period is that?

Mrs GALEA: That is in 2016 to 2020 and there is a quota population set—if I am reading this correctly, the quotas are set from the previous year. Mr Mjadwesch, please help back me up here. In 2019 the population was 48,502. The quota set then therefore for 2020 was 6,782. But in 2020 the population is only 6,859. That is in Tibooburra. We could turn over to Cobar, where there has been a 99 per cent population fall—

The Hon. PENNY SHARPE: Can I stop you? This information is incredibly important. Understanding the methodology, about which you clearly have significant concerns, is good. But you might need to be a bit slower for us as we take you through it. You are mathematicians. We are not. Definitely not in this case. The 450,000 figure is from 2016. Then we get to 2020. You are saying that the department's own figures on the count of grey kangaroos is that there are less than 7,000. The quota issue is separate. Obviously, there is an impact there. That is the drought. We know that kangaroo populations are massively impacted by drought. Is that your explanation for that? Or are you saying that the 450,000 has been massively overestimated in the beginning?

Mr MJADWESCH: If you look at the grey kangaroo trend from 2014 to 2016—those two rates of growth are biologically impossible. So there is something seriously wrong with the 450K estimate. I think it is much more likely that that peak in the graph does not exist and it went from being very low in 2011, when I did my work, down to 7,000 now. I do not believe the 90-plus per cent climbs into 2016 is correct. I believe that the increase between 2011 and 2016 was not correct.

The CHAIR: We will go to you, Mrs Galea, on this point as well. You say in your submission, Mr Mjadwesch:

... in the absence of shooting the maximum population growth rate is only ~10% per annum, according to detailed field studies and life-tables. I would like the opportunity to take the Committee through how population growth rate is calculated ...

I think this is a really important point. Could you just explain this in detail to the Committee?

Mr MJADWESCH: Does everyone have a piece of paper and a pen? We are going to have to do some sums here. Let us assume we have a population of 1,000 kangaroos just for the sake of having an easy number to work with. Out of that population they have done numerous studies of joeys in pouches. There are 50-50 males and females in the pouch. But as they mature, there is higher male mortality. There are issues around that I could talk to, but they are not particularly relevant. By the time we get to adulthood, a stable population of 1,000 kangaroos in a forest somewhere will generally have about 70 per cent females and 30 per cent males. So out of that 1,000 you have 700 females. Seventy per cent of 1,000 is 700.

The next part of it is to look at fecundity. Young females do not generally have their first joeys until they are about three years old. They can get pregnant before that, but their joeys do not make it. They cannot have a joey in the first 18 months at all. They cannot even mate or get pregnant. They are babies following their mothers around. The first young that they start to produce is by about three years. After about 12 or 13 years, they stop breeding because they are too old. Out of that 700—various people have looked at it, including Dawson. They have put forward a figure of 65 per cent of females in any given year will have a joey. So we need 65 per cent of 700. I am more than happy to lift that up to say 70 per cent of them might have joeys just to max it out, in which case we would have then 490 joeys in a year out of 1,000 kangaroos. Is everyone with me?

The CHAIR: Yes.

Mr MJADWESCH: Multiple studies again have looked at juvenile mortality. Unfortunately for kangaroos, 70 per cent is a very normal figure of mortality. So 30 per cent of the 490 are likely to survive. Again I am prepared to lift that 490 up to 500 just to make the sums easier. We might have 500 joeys. If 70 per cent of them die, we have 150 joeys that survive. Is everyone with me?

The CHAIR: Yes.

Mr MJADWESCH: We have 1,000 to begin. We have plus 150. People have looked at how many kangaroos die every year. There are various figures, from 5 to 20 per cent. If we say 5 per cent as lowest proportion of kangaroos that might die that year, we have 950 left. Then we add the 150 joeys. We have 1,100 kangaroos, including 150 new joeys minus the 50 adults. That 100 is the growth. That is 10 per cent increase. That is the maximum. In drought conditions, they stop breeding and 100 per cent of joeys die and 50 per cent of the population can die. This is for grey kangaroos. Red kangaroos and wallaroos can breed slightly quicker because they have a shorter pouch time. They have a 10-month period in the pouch. It is slightly quicker. They can get up to about 14 per cent per annum.

The Hon. BEN FRANKLIN: What is the gestation period?

Mr MJADWESCH: For a grey kangaroo, the gestation period is only about 30 days of being pregnant, but because the joey comes out as a tiny little jellybean, it takes 12 months to grow in the pouch to an emergent joey for grey kangaroos and it takes eight to 10 months for a wallaroo and a red kangaroo to get out of a pouch.

The Hon. BEN FRANKLIN: For grey kangaroos your fundamental contention is that they can only really increase at most by 10 per cent population growth each year.

Mr MJADWESCH: That is correct. That is not contested. That has actually been found to be the case by detailed field studies as well.

The Hon. PENNY SHARPE: That is great. That all makes sense, I think, to the Committee. I think we are now across that. But that is clearly not the way in which the department has counted the growth. Can you explain how they have counted the growth to get to the figures they are getting?

Mr MJADWESCH: No, I cannot. I cannot explain—

The Hon. PENNY SHARPE: So we need to ask them. That is fine. We will definitely get an opportunity to ask them. We will do that. That seems pretty fundamental in terms of actually understanding what is going on with the population. Thank you for taking us through that. Your very strong contention is that they are just massively over-optimistic around that. What you have taken us through is a theoretical count and one method of doing it. Clearly, they have a different method. Do you have any views about that?

The CHAIR: Then we are back to the 450,000 figure.

Mr MJADWESCH: This has come up in the past. In 1988 there was a Senate committee hearing into animal welfare. Part of their portfolio looked at kangaroos. They picked up on an increase in South Australia, at the time, of 84 per cent. They described it at the time as biologically impossible. The experts came in to try and respond to an 84 per cent increase. The theories were that kangaroos had migrated, which has subsequently been found to be not the case. Grey kangaroos actually have a very small home range. Female grey kangaroos will live in one square kilometre for their whole lives if they do not get disturbed and shot at. Male grey kangaroos—perhaps four square kilometres. But they do disperse when they are almost mature to go and find somewhere to live. That is a big part of male mortality. There is a lot of kangaroos getting run over and going into farmland, where they end up getting shot, instead of being somewhere safe, in a national park.

They also suggested that, maybe the next time we counted them, we counted the joeys. That again is not how you do macropod surveys. If a joey is dependent on its mother and the mother dies, the joey dies. You are actually supposed to count them both as one animal because they are basically linked to the mother's survival. Whatever excuses they came up with in 1988 were accepted by the committee because they were very reputable people espousing these theories. But since then, none of the theories of an 84 per cent increase have actually stacked up when you examine them and nobody has ever attempted to or answered me when I have tried to get answers about increases of over 200 or over 400 or over 600 per cent, like some of the data that has come out of Queensland. Nobody wants to look at it.

When I was at school learning how to use a calculator they said, "If an answer looks wrong, it probably is." But when I say, "These look wrong", people just say, "Go away." They are not interested in discussing it or having me in the same room to have these discussions. I would love to have a chat with them, but they will not even answer an email.

The CHAIR: Mrs Galea, do you have any comment in relation to the 450,000 figure at this stage?

Mrs GALEA: Yes. In 2014 to 2015 there is a claim that the population went up by 426 per cent. Mathematically—

The CHAIR: Just to clarify, the population of?

Mrs GALEA: Of grey kangaroos still in Tibooburra. There is a 426 per cent increase in one year. But that is just not in this table. It repeatedly happens. I agree with you, you look at the numbers and you think that just cannot be right. It is very concerning but it is throughout the document.

The Hon. MARK BUTTIGIEG: On that interchange we just had then, is it your evidence that the methodology underlying the official figures from the department has never been articulated or presented? It is just a set of figures that is presented as fact and there has been no interchange in terms of, "Well, this does not stack up" because of the reasons that Mr Mjadwesch has just outlined. There has been none of that dialogue or challenge check or methodology exchange, is that what we are saying?

Mr MJADWESCH: There sort of has been. There was a report written in, I think it was, 2001 by Gilroy and Cairns, which went through the methodology. But it was another one of the reports where they decided that they were reviewing the correction factors, and at the same time that they were talking about the methodology they increased the correction factors. Nobody has ever really gone into a discussion of these increases or attempted to explain how the methodology can result in 400-plus per cent increases from one year to the next year. I do think it is a problem that there has been very little communication of how they do their analysis and getting the data out of the departments is like pulling teeth—quite hard. But when you do get the data and analyse it independently and spatially, it really does not show increases of 400 per cent.

The Hon. MARK BUTTIGIEG: Which department is giving these figures? Just for clarification, is it DPI?

The CHAIR: It is that document, I think, is it not?

Mrs GALEA: The Department of Planning, Industry and Environment.

The CHAIR: I assume it is now within Environment, Energy and Science.

Mr MJADWESCH: I just thought of something then actually, if I can just interrupt briefly.

The CHAIR: You are turning your face again, Mr Mjadwesch. You have to face straight to the camera, otherwise you lose the microphone.

Mr MJADWESCH: Sorry, but I don't know where the microphone is. I am looking at that graph of the grey kangaroos. Between 2015 and 2016, where the population doubles according to that graph, they changed the survey methodology. Changing survey methodologies is a really great way to invalidate your graphs because you are supposed to only graph the same methodologies. In 2016 was when the department went to a double count methodology and abandoned their distance methodology.

The Hon. MARK PEARSON: What is a double count methodology?

The Hon. CATHERINE CUSACK: That is the joey plus the mother.

The Hon. MARK BUTTIGIEG: The kangaroo and the joey. Do we know about the resident expertise in the department? Is there a unit that has the requisite qualifications to justify these studies?

Mr MJADWESCH: I think the person who is mostly responsible for it is based in the Department of Primary Industries. Steve McLeod, I think, has been in charge of developing and refining a lot of the methodologies for quite a while. I think if you get him, he might be able to answer these questions.

The CHAIR: Steve McLeod, you said?

Mr MJADWESCH: Steve McLeod, yes. He is with the department of agriculture but he is also on the Kangaroo Management Advisory Panel. He has been involved in kangaroo management for a long time, so I am sure he would be able to answer these questions.

Mrs GALEA: There is also another gentleman, if I can add, S C Cairns from the UNE—G E & S C Cairns Consulting.

The Hon. SHAYNE MALLARD: He is an academic at the university?

The CHAIR: Can I check that? Because I was going to ask a similar question. Are you saying that the "Cairns" that has been quoted throughout are consultants relied upon by the Government in terms of numbers?

Mrs GALEA: I am sorry, I am not sure of that. But he is the gentleman who did the original in 1997. S C Cairns is the author of the Northern Tablelands kangaroo management zones. He is the first author for all this work.

Mr MJADWESCH: I can answer that. Stuart Cairns is attached to UNE but he does have a consulting business. I think that he produces these reports for his consulting business but he continues to run the surveys in the Northern Tablelands, the Central Tablelands and south-east New South Wales. As I said, he was also involved with the western New South Wales surveys, at least in the 1999-2000 period when he wrote a paper with the then manager of the kangaroo management unit, Josh Gilroy. Between them, they then revised the grey kangaroo overlap zone; they revised the survey methodology; they changed the strip width that they were applying; and they changed the correction factors that were being used at the time. So, yes, Stuart Cairns should know a fair bit about the methodology as well.

The CHAIR: Interesting. Mr Mallard?

The Hon. SHAYNE MALLARD: I will start by saying that at my property in the mountains we have eastern greys and swamp wallabies on the property and the numbers are really stable. They did not explode at all over the four years.

The CHAIR: In the mountains, did you just say?

The Hon. SHAYNE MALLARD: Yes, and I look at the figures here and it says that they are very dispersed there. But my experience at the family farm at Dubbo is that they went up and down quite dramatically in the good season. Farm folklore was always that after rain a kangaroo had an embryo ready to go in the womb, one in the pouch and one outside the pouch—so they had three going at any one time. Is that taken into account in terms of these statistics? I just looked it up on the internet and it confirmed that there are three going at a time in a good season. Is that taken into account in these statistics when it says one a year?

The CHAIR: Mr Mjadwesch?

Mr MJADWESCH: Yes, I can talk to that if you like. So the third one is specifically and only red kangaroos are known to have a blastocyst, which is that third embryo in stasis. Grey kangaroos have been reported to have it extremely rarely and have only ever been found in Far North Queensland. For grey kangaroos it is only

ever up to two at a time and that is one in the pouch and one at foot. So technically, if you say, "Yes, we can have three at a time", the way to think about it is that they are like a conveyor belt and for grey kangaroos one joey drops off the end of the conveyor belt in the production line per annum. So even if they do have one in the pouch and one at the foot, they are separated in age by 12 months. So it is one joey per annum. That is why that calculation we did with the 1,000 kangaroos basically was such an easy calculation, because they are seasonal breeders, the grey kangaroos, and they produce one joey per annum.

The Hon. SHAYNE MALLARD: That is not the folklore understanding of kangaroos. I mean, from my farming background, it was that they had three going at any one time.

Mr MJADWESCH: No, it is not the folklore understanding, that is correct.

The Hon. SHAYNE MALLARD: That is interesting. The second point I want to make picks up on Mr Buttigieg's question about the expertise in the department. I am bit overwhelmed with the statistics as well, I have to say. Is the data, the information that they are using, peer reviewed? Is there a school of academics that is critical of it? Clearly you both are. Is there a groundswell of concern around this data?

Mrs GALEA: This is not peer reviewed, this quota report. Just to give you an idea from an academic concern, when you conduct surveys we look at a thing called a coefficient of variation. It is a percentage. Anything above 30 is appalling and we would not—it would be very hard. These coefficients of variation that are coming back from the Northern Tablelands are 46 per cent. So that is showing me how unreliable the data coming in is and that when they are doing their surveys they are not accounting—it is just very, very concerning.

The CHAIR: Could you just explain the coefficient of variation of 30 per cent versus the 46 per cent and why that is bad? Again, biostatistics for dummies.

Mrs GALEA: Yes, sure. Sorry.

The Hon. SHAYNE MALLARD: Why are you concerned?

Mrs GALEA: If we are looking across different surveys, and so across the Northern Tablelands they have got six different ones that they do. We want our surveys—if I went out and surveyed six different areas, like a piece of pizza, I want each piece of pizza to be reflective of the same. So the variation between my surveys that I go out and do I want to be as minimal as possible. And 30 per cent in the biostatistics world, my PhD supervisor would put it in the bin. These are coming through at 46, 36, 33 and so the variation between what they are doing—

The Hon. CATHERINE CUSACK: Sorry, just pause there. When you talk about differences between the surveys, what are the differences?

Mrs GALEA: We are looking at how the surveys are put together, the topography, everything that they should take into consideration within the surveys: where the transects are placed, the sample size that they take and are the transects reflective of the whole sample, of the whole space. Because they generally only look at about 4.8 per cent of the zone. Is that 4.8 per cent reflective to then extrapolate the population to say, "Okay, we saw 11 wallaroos here. We can, therefore, take that population, add all the wallaroos from the six surveys that we did and get a total of 508 and then extrapolate to the entire Northern Tablelands from that 4.8 per cent and go, well, there's 300,000"? So we need to make sure that each time they do this the variation between is as minimal as possible.

The Hon. CATHERINE CUSACK: So for each of the six surveys—

Mrs GALEA: The six zone areas that they are counting, yes.

The Hon. CATHERINE CUSACK: —the extrapolation is consistent for all six, or they have a difference in the extrapolation?

Mrs GALEA: I guess this is a question I would like to further because their coefficient variation that they have got coming in is 46 per cent, but I cannot get any further into the paper.

The Hon. CATHERINE CUSACK: Can I just hazard a guess? Is it there are some areas that are more heavily wooded and more gullies where it is more difficult to see, therefore the coefficient for that is different to maybe less wooded open plains?

Mrs GALEA: Absolutely.

The Hon. CATHERINE CUSACK: So each of the surveys would be—

Mrs GALEA: Statistically when we are designing our surveys we need to account for that. If we know there are going to be differences, that must be taken into consideration in the survey design.

The CHAIR: So therefore if they do like a little section of 4.7 per cent, to reduce that coefficient variable they need to do many more areas?

Mrs GALEA: Absolutely.

The CHAIR: Right.

Mrs GALEA: Can I take this time then to table two documents for you? I just want to mention here that in 2018 they did a review of their practices of how best to count populations. In 2017 the University of Adelaide started putting drones up for population counting and showed that drones, along with mathematical modelling, are up to 96 per cent more accurate than humans. Yet we are still not using drones. The Great Elephant Census in Africa, which I am sure many of you heard about, it is imagery—up in every aircraft, in every way, in every drone they are taking photos. I did the test on looking at the drone image and in there are 11 giraffes; I saw three. The mathematical work behind this imagery, if we had this then we could conduct cost-effective—we could survey the holes, we can show the empty spaces that Mr Mjadwesch is keen to show if we had this imagery. And then if they want to claim—

The Hon. MARK PEARSON: Sorry, that just brings me to my next question.

Mrs GALEA: Sorry.

The CHAIR: You are doing wonderfully. Please do not apologise.

The Hon. MARK PEARSON: It is very helpful. It is our brains—it just cannot get out. I look at a graph and my eyes glaze over. Can you just give a comparison to some of the more best practice methodologies used to count animals internationally—

The Hon. CATHERINE CUSACK: Can I just say—do you mind just pausing that question until after she has finished unpacking the survey methodology that they are doing, just this case study? I am just finding it really helpful.

The Hon. MARK PEARSON: Sure. That is all right.

Mrs GALEA: Statistically when we design our surveys we have to make sure that we are consistent, that our sample is absolutely reflective of the entire population. I understand the zones are very large but I have put together global surveys. I am behind putting together a global survey at the moment right now where we have to take into consideration the socio-economic, the income, everything. These factors are what we do and I think this needs to be seriously investigated. That is, I guess, my recommendation: we need a statistical investigation into this methodology, everything behind it—how a 4.8 per cent survey can be reflective of an entire zone; extrapolate the population from 508 to 300,000. This needs to be brought out.

The Hon. CATHERINE CUSACK: I sense that we are moving towards questions about best practice, but, Madam Chair, do you mind if I just ask a couple more questions?

The CHAIR: Yes, recognising Mr Pearson, I think, wants to also ask—

The Hon. MARK PEARSON: Actually, the question was answered.

The CHAIR: Okay, thank you. Ms Cusack.

The Hon. CATHERINE CUSACK: Taking the Tibooburra zone just as an example, Sturt National Park—I think there is another nature reserve there—is the population projection inclusive of kangaroos across the whole of the landscape or is it exclusive of the national park?

Mrs GALEA: Mr Mjadwesch?

Mr MJADWESCH: In the olden days, before 2018, they were sampling Sturt National Park and a lot of other national parks and I thought that the methodology was actually quite good. They were big, long transect lines that went from the western boundary of New South Wales all the way through every ecozone and habitat type that we have between there and the eastern end of the survey transects of the harvest zones, but it was the analysis where they fell down. They would count kangaroos in a national park and use them to generate densities that were then applied to farmland, which was not right, so they stopped flying over the national parks. I have not looked at the way that they have put out there new transects spatially, so I do not know how representative of western New South Wales the current landscape sampling system is.

The Hon. CATHERINE CUSACK: Do you know if Sturt National Park is included in the Tibooburra zone figures or not included?

Mr MJADWESCH: Not, it is not anymore. Even in the olden days they used to count them in the national park but then subtract the area of the national park when they applied their density per square kilometres of the zone. They were basically trying to come up with a population estimate for the harvestable population. So they would use the kangaroos from the national park to generate a density that was applied to farmland and then subtract the area of the national parks, which was a pretty major problem and a fairly obvious one. So the new way they do their surveys they have gone and selected a bunch of survey blocks that are scattered around western New South Wales, but they will not be applying the densities that they find to national parks because the point of the surveys is to generate a sustainable quota, so they are trying to generate a population estimate of harvest zones, which does not include the national park.

The Hon. CATHERINE CUSACK: Sorry, I just really want to stick with these national parks questions because part of the sustainability I would assume would include kangaroo population in national parks. Is that population included or not included in the Tibooburra zone statistics that you have given us?

Mr MJADWESCH: It is not included. The way that they are doing things now, and before, they have always subtracted the area of the national park. So I was just coming to that point where if a graph shows extinction it does not mean extinction, it means extinction in the harvest zones. In the national parks there is supposed to be no shooting, but every now and then people decide that they need to be shot in national parks as well. There is risk of bushfire or those sorts of impacts taking animals out of protected areas, but the estimates specifically are numbers in the commercial harvest zones. So it is farmland that those numbers are being applied.

The Hon. CATHERINE CUSACK: Madam Chair, can I just speak directly to this issue?

The CHAIR: Absolutely.

The Hon. CATHERINE CUSACK: Because I have actually been to Tibooburra and into that park several times during the time span, and National Parks were moving the water sources out of the national park, which is the policy, and I think we all understand that. But I can tell you, I have not seen a kangaroo at all in Sturt National Park. There was a kangaroo population there—there was a large population there—but I could not see a single kangaroo. I simply wish to make the point that when you are talking about the sustainability of the population you cannot rely on the national park, particularly with the policy of removing the water sources where the bore water dams were just full of kangaroo skeletons.

The CHAIR: Mr Mjadwesch, do you have comments on the Hon. Catherine Cusack's comments?

The Hon. CATHERINE CUSACK: Observation. It is just my anecdotal observation.

The CHAIR: He probably, I would assume, would wish to comment on that regardless.

Mr MJADWESCH: I am happy to. On page three there is a map, a density distribution map of New South Wales grey kangaroos, and two pages later there is a density distribution map for western New South Wales showing red kangaroos, but—

The CHAIR: We have lost you again.

Mr MJADWESCH: Sorry. In those two maps of New South Wales where I have coloured in the density of kangaroos through the State, Sturt National Park is in the far north-west corner of that map and it runs for about 100-and-something kilometres across 10 of those little squares—they are 10-kilometre grid references there. The first 10 or 12 of them are in Sturt National Park. The first map shows grey kangaroos are absent from Sturt National Park according to the data from the department and the second map shows red kangaroo distribution and it still shows that they are there, but if you look at the densities there they are very low. Yellow I think is five per square kilometre, which is very low; that should be 40 to 50 per square kilometre. And, even more, they have actually got some in transects up to over 100 red kangaroos per square kilometre in optimal habitat, which Sturt National Park have said in their management plans that this is optimal habitat for red kangaroos, being spinifex sand plain habitats, and the densities being returned out of those environments are critically low. They are still there but they are not common and once upon a time they were.

If you take the data out of the Tibooburra zone, which I think is on page 14, where I have got the graphs we were looking at before, we are looking at I think page 15—it is just after the graphs we were looking at before—you can see the take of red kangaroos in that zone has declined to almost zero.

And that will be indicative of what is happening in the national parks as well. A lot of shooters will patrol the edges of national parks because the farmers around national parks often complain about kangaroos coming out of national parks. That will have quite a big impact on the red kangaroo population because they can have a range of up to 10 square kilometres. Kangaroos living on the edge of that park are ending up likely to be shot. You can end up with very depauperate populations in a national park on the basis of adjacent shooting.

The Hon. CATHERINE CUSACK: My impression, with respect, was that the drought was having a huge impact. I wondered does the kangaroo population move in search of water?

Mr MJADWESCH: Yes. Red kangaroos will follow storms.

The Hon. CATHERINE CUSACK: And also farmers are protecting their water sources as well now from wildlife out there. So maybe wildlife has even less access to water.

Mr MJADWESCH: The drought would have had a very serious impact. They have studied red kangaroo populations declining by up to 50 per cent per annum of severe drought. Red kangaroos can and do follow storm pick during drought. They can smell a storm from miles away and they will hop off towards it. The fascinating thing about that is that after the drought breaks, they go back to their home territory if they can. They have done radio tracking studies on red kangaroos and they have a very strong homing instinct and they do have a home territory that they will occupy for their whole lives if they can. During drought they will move away. In a drought environment, if they leave the national park because the national parks have turned off all the artificial water points and they go out into the farmland, they will not be coming back to the national park, basically. The whole way that they function during drought is impacted by hostility in farming landscapes around those parks. I think there are various problems in the Tibooburra zone.

The CHAIR: I will allow one more question from the Hon. Mark Pearson to finish this session. We are just acknowledging that we are a bit over time.

The Hon. MARK PEARSON: My question follows on from that last question and answer. What do you say to the claims that agribusiness or agriculture, and us arriving in Australia and all the watering points that came with that, have changed dramatically the number of kangaroos that have populated the areas? These are the claims and these are some of the arguments as to why we are culling or killing. Can you speak to that claim? Do you agree with it or what?

Mr MJADWESCH: Very briefly. There have been multiple studies. I can probably find you six to 10 studies that have looked at exactly this. Kangaroo distribution is not based on the distribution of water points; it is based on the presence of remnant vegetation and native grasslands. They actually did a study—I think it was **Fukuda and Fencham**, who literally wrote at the start of the report that kangaroos have increased because of artificial water points. And then they did a study where they closed down every single water point within 15 kilometres and they did not report a change in the distribution and abundance of kangaroos. Their study literally showed that closing water points did not cause kangaroos to leave. It was a logical fallacy in their paper that suggested that kangaroos had increased because of the opening of water points.

There have been multiple studies that have shown exactly this point: that kangaroo distribution and abundance is not based on the availability of water. Water points were put in for stock animals. Stock animals have now been given access to semi-arid environments that they did not previously have access to, and those landscapes are now heavily degraded so they cannot even support the previously high numbers of kangaroos that used to occur there. Mike Archer wrote a book with Gordon Grigg and Tim Flannery in 1985 that described the rangeland as half as productive as it had been prior to the arrival of Europeans simply on the basis of impacts of stock. And proliferation of water points was part of that extension of the range of stock into arid rangelands.

The CHAIR: We could go on with this session. You both have a lot of information to convey but unfortunately we are out of time. Thank you very much for appearing. I believe there has been one question taken on notice and the secretariat will be in touch regarding that. You have 21 days and there may also be supplementary questions provided to you from members. Thank you for your fantastic work in the space.

(The witnesses withdrew.)

(Short adjournment)

NIKKI SUTTERBY, President, Australian Society for Kangaroos, before the Committee via videoconference, affirmed and examined

The CHAIR: Welcome to our next session for today's hearing. Ms Sutterby, can you hear me okay?

Ms SUTTERBY: Yes.

The CHAIR: Ms Sutterby, do you have an opening statement for the Committee?

Ms SUTTERBY: Yes, I do. First of all I would like to thank Cate Faehrmann and Mark Pearson for the need for this inquiry. I feel absolutely honoured to be a part of it, so thank you. Kangaroos are the victims of the largest land-based wildlife sport in the world. Despite the kangaroo meat and field industry telling the public they do not target females, according to the department of agriculture data in 2019 25 per cent of kangaroos killed by the kangaroo industry were female. This equates to 365,000 females and their joeys slaughtered in 2019 alone. This percentage is also reflected in another government study that I will refer to later.

Therefore, every night in the remote outback of Australia, without any supervision or oversight, thousands of baby joeys are being bludgeoned to death, decapitated or left orphaned by the kangaroo industry after they shoot their mother. There have been three studies into the treatment of orphaned joeys by the kangaroo industry: two by the RSPCA and one by the government. They all exposed systemic large-scale cruelty inflicted on orphaned joeys at the hands of the kangaroo industry.

The CHAIR: Ms Sutterby, can I just interrupt you for one second. Is it possible for you to move a little bit closer to your microphone. We are hearing you okay but it is a bit faint.

Ms SUTTERBY: Is that better?

The CHAIR: Yes, it is.

Ms SUTTERBY: The government study into the treatment of joeys by the industry is particularly disturbing. This was published in 2014. The researchers observed shooters swinging large furred joeys by their hind legs and smashing them against rocks, against their ute rails, stomping on their heads while hitting them with iron bars and then threw them in the dirt and walking away with their mother without even checking they were dead. The research found that dependent out-of-pouch joeys still feeding from their mothers were abandoned by the shooters and left to die alone—99 per cent of shooters made no attempt whatsoever to locate the out-of-pouch orphans or put them out of their misery, which is in clear breach of national industry code of practice for the humane shooting of kangaroos and wallabies.

In spite of this the government made a shocking decision in 2020 and updated the national code of practice for the humane shooting of kangaroos and wallabies and gave the industry full legal authority to kill pregnant and lactating females, no doubt so the shooters could maintain their quotas, their profits and have full protection from prosecution for animal cruelty. In 2015 a New South Wales man was jailed for 18 months for bashing to death nine joeys. The judge found the man's actions were senseless, brutal, cold-hearted and callous, and that he had no insight into the enormity of his actions and he had an appalling lack of empathy for the plight of each animal. So why is it okay to do this to thousands of joeys every night in this country by the kangaroo industry? What is the RSPCA doing about this? They have known about it for 40 years.

The CHAIR: Thank you for that moving opening statement. I turn to Deputy Chair the Hon. Mark Pearson for the first question.

The Hon. MARK PEARSON: Thank you for coming along and giving evidence. When you are describing what is done to these joeys, what evidence or information are you relying on?

Ms SUTTERBY: The RSPCA conducted two studies. One was in 1985 and the other was in 2002, and they had similar findings to what I described there. In 2014 the Australian Government commissioned another study by the Rural Industries Research and Development Corporation, using government researchers. That was published in 2014. That study was done over 18 months. Some 278 kangaroos were killed during that time, 30 per cent of which were female, 100 per cent of which were carrying joeys. They followed 14 shooters over 15 nights in Queensland and New South Wales.

The Hon. MARK PEARSON: When we are talking about joeys—does, or females, with joeys—what is the percentage of time that a female has one joey and has two joeys—one in pouch and one at foot? Once she is capable of having joeys, what is the percentage of time that she is carrying one or two?

Ms SUTTERBY: The report described that 75 per cent of the does had an in-pouch joey. I beg your pardon: It was around 86 per cent. Of the remaining 14, around half had a long teat, which meant they had an out-of-pouch joey.

The Hon. MARK PEARSON: Sorry, what was the percentage of joeys at foot—out of pouch?

Ms SUTTERBY: Mr Pearson, they did not describe how many had the out-of-pouch joeys, from what I read. I might have to give you that on notice. I have not got that information for you but I am happy to give that to you.

The Hon. CATHERINE CUSACK: Is "out of pouch" and "at foot" the same thing?

Ms SUTTERBY: Yes, that is right.

The Hon. MARK PEARSON: When a shooter or a harvester makes an application for a licence to kill kangaroos, they have to go to the department and collect X number of tags to kill X number of kangaroos. Is that correct?

Ms SUTTERBY: Yes, although things have changed a lot now, and I believe that it is the landowner who applies for the licence and the shooter only has to approach the landowner. It is fairly streamlined. For the professional—for the kangaroo meat and skin industry—sorry, yes, I think the shooter does have to apply for the tags and gets given the tags.

The Hon. MARK PEARSON: When they apply for a tag to kill a kangaroo, do they also get a tag that licenses them or authorises them to kill a joey?

Ms SUTTERBY: Yes, it is in their code of practice, so that would be included in the terms.

The Hon. MARK PEARSON: But in the issuing of the tag, is there a tag issued for a joey in case they have to kill a joey?

Ms SUTTERBY: No, they are just collateral damage. There is absolutely no consideration or data collected on joeys.

The Hon. MARK PEARSON: If the kangaroo is protected under various legislation and they can only be killed or harmed if the licence is given and a tag is given, is it therefore not the case that there really is not a licence or authorisation given by the department to kill a joey, which is a kangaroo?

Ms SUTTERBY: That is correct, yes, even though they are considered a live animal. In the law I do believe they are considered still protected, so they should be counted, as far as I am aware.

The Hon. MARK PEARSON: In the report delivered by the RSPCA and in other reports you have studied, if a doe has a joey at foot or out of pouch when a female kangaroo is shot, what usually happens to the joey at foot?

Ms SUTTERBY: All three studies over the last 40 years showed that the shooter makes no effort to put that out-of-pouch joey out of its misery, so 99 per cent in the government report that was published in 2014 did not make any attempt to check if there was a second teat or that they even had an out-of-pouch joey, let alone search for it and find it if they did see that they had one when they approached them. The study did do a separate study actually into the outcomes of the out-of-pouch joeys, and that showed they suffered severe stress—mental and physical distress.

Unfortunately, these were government researchers, so in my opinion there would have been some sort of bias there and a will to suppress certain evidence of the outcomes for joeys because they took the out-of-pouch joey away from its mother and they put it in a separate pen for the purposes of the research and watched what happened to it over the 10 days. Then after 10 days they killed those joeys. So we are expecting that those joeys in the wild would die of dehydration, starvation, predation and exposure. Obviously they are not going to survive without their mother.

The CHAIR: Your submission states:

The National Code of Practice for the Humane Shooting of Kangaroos and Wallabies was updated in November 2020 ...

Firstly, that is a national code. I assume there is no code like that in New South Wales; it is all national. Is that correct?

Ms SUTTERBY: It is all national, yes.

The CHAIR: It kind of beggars belief that that code has been updated in November 2020, so this is post-bushfire—the Black Summer fires—and everything as well, and that:

... shooters are now fully authorised to shoot female kangaroos including those carrying pouch young or feeding dependent at foot young.

I thought there was some kind of understanding and regulations for some time around the fact that female kangaroos needed to be avoided, so why this change just last year?

Ms SUTTERBY: That is right. The previous code of practice had provisions for the shooter to avoid killing females, or obviously pregnant females. But as we can see from the research and the data from 2019, before the code was changed, and the Department of Agriculture data for 2019, 30 per cent of females were still being killed by the industry. So, obviously, telling shooters to avoid killing lactating or pregnant females made absolutely no difference to them. But, yes, it used to have a provision in there: Please avoid killing obviously lactating or pregnant females. In 2020 they opened up for submissions for a new code of practice, and they received thousands of submissions. Very few of those submissions were taken note of. Obviously there were thousands and thousands of submissions. I do not want to quote it but there were many submissions put forward. Obviously, there was ongoing concern about the joeys and, obviously, no attention was paid to those concerns from the public at all.

And yes, they took out any reference to avoiding pregnant or lactating females at all. Obviously, like I said in my opening statement, that must be about trying to maintain the quotas and their profits. I do not know—or maybe to avoid prosecution. You would have to ask them why they took that out but the fact that—it is quite clear in the government study and the RSPCA study that there is significant concern in the community about the treatment of joeys. The RSPCA study in 2002 found that the public attitude towards blunt trauma is strongly negative, that animal welfare and wildlife groups had expressed concern and, in some cases, outright disgust regarding the current methods used to kill dependent joeys, and that the fate of the pouch young and the young at foot when the mother was killed was a significant welfare issue. That was the RSPCA. Obviously the industry is not concerned about public opinion, about welfare, about following the law that seems to cover every single other animal in this country. It is only concerned about its profits.

The Hon. BEN FRANKLIN: To go back to the 2014 study, I am wondering if you have noticed or if you are able to identify any improvements that happened as a result of that study in the intervening seven years.

Ms SUTTERBY: No, none at all that I know. The researchers said that there obviously needs to be more training. As far as I am aware, apart from maybe briefly reading the code of practice, they have no training into how to kill these joeys properly. That was identified as a major issue in that in a lab under controlled situations, blunt trauma may be considered humane; but when you put into the mix lack of skill, the fact that they are swinging the joey by the hind legs and it is struggling, the impact in the correct place on the skull is highly unlikely. No attempt has been made despite, ironically, that study being titled improving the humaneness and welfare of the commercial kangaroo industry. It is ironical that nothing seems to have been changed. In fact, it has actually got worse, like I said, because they have now removed all potential protections of kangaroos in the code of practice. They did trial a stun gun, a captive bolt gun, in the study to see if that could help improve outcomes and that was also found to be cruel. No, there is nothing else. We just keep shooting.

The Hon. CATHERINE CUSACK: In terms of kangaroos breeding, is there a time of year when less harm would be done to joeys compared to another time of year?

Ms SUTTERBY: Sorry, are you asking me?

The CHAIR: Yes, that was a question to you. Did you hear the question?

Ms SUTTERBY: Sorry. Could you just repeat it, please?

The Hon. CATHERINE CUSACK: Is there a season to kangaroo breeding? Is there a time of year or a month of the year when you would be less likely to have the issue of joeys, or it would be reduced, compared to other times of year? If so, can you tell me what are the times of year?

Ms SUTTERBY: I know the Australian Capital Territory Government use that argument to claim they are more humane because they only do their killing during winter, but eastern grey joeys, in particular—they breed all year round.

The Hon. CATHERINE CUSACK: To clarify, I am not trying to make an argument at all. I do not know what the breeding cycle is for a kangaroo. It is a genuine question. Can you tell us what the breeding cycle is for a kangaroo?

Ms SUTTERBY: Breeding cycle as far as animal welfare for the joeys?

The Hon. CATHERINE CUSACK: The seasons of the year. Is there a time of year when they are breeding?

Ms SUTTERBY: As I said, no. They do breed all year round. There are more joeys leaving the pouch around spring. More joeys tend to be leaving the pouch [inaudible].

The Hon. CATHERINE CUSACK: But when they are leaving the pouch, they are still dependent, aren't they?

Ms SUTTERBY: Yes, still dependent, but they start moving in and out of the pouch and start roaming around. Obviously that is a very vulnerable time for them to get separated if they were hunted by shooters et cetera. But no, they tend to breed all year round. There is no safe time of year.

The CHAIR: I think we heard today from earlier witnesses that it is up to three years that the joey is dependent on its mother. Is that correct?

Ms SUTTERBY: They are fully weaned at 18 months.

The Hon. MARK PEARSON: Just on that point, even if they are fully weaned, is there still a dependence on the mother for protection?

Ms SUTTERBY: That is right. They are still needing a mother to teach them how to be safe, what grasses to eat, what grasses to not eat, how to get from A to B. With the female joeys, they stay with their mother for life. They still stay with their mother but the male joeys will leave and join a small mob of other young males. But the females will still stay with their mother for the rest of their life.

The CHAIR: To explore that a bit further, while there might be a joey that is, say, two years old that is fully weaned, with its mother learning all these things, still dependent on its mother, at that time the female would potentially have another little joey in her pouch.

Ms SUTTERBY: Yes.

The CHAIR: It is almost like in terms of female kangaroos, there is not really a time when they do not have young they are caring for within the range of three years old or four years old, when they can have joeys, up until 12 years. They are not like little birds.

Ms SUTTERBY: That is right. Except in severe drought, where there is evidence that they do stop their breeding. They have that ability to slow down or completely stop breeding in drought, yes.

The Hon. MARK PEARSON: So we are clear on the at-foot or out-of-pouch joey, if we were to look at a mob of 100 kangaroos, what percentage of the does would have an at-foot joey?

Ms SUTTERBY: I would have to give you that on notice.

The Hon. MARK PEARSON: If you could. What is of interest about that is even if we get the blunt trauma right or captive bolt stunning of the joey that is likely to be in the pouch when the shooter approaches the dead doe—if the joey they pull out of the pouch is obviously young enough and can be killed humanely, perhaps by blunt trauma—let us say we get that right. We are interested to know how many joeys at foot or out of pouch are facing the fate of not being found and dying from exposure or predation or starvation et cetera.

Ms SUTTERBY: On that, Mark, in the 2014 government study there were 24 out-of-pouch joeys that were identified. There were at least 24 out of the 89—sorry, I will quickly have a look at that, if you can bear with me.

The Hon. MARK PEARSON: If you do not find it you can just take it on notice. That is fine.

Ms SUTTERBY: There were 278 kangaroos killed during the Government study and 30 per cent of those were female. That was around 90 females. There were 24 out-of-pouch, young at-foot joeys identified so that they were obviously aware of that. There may have been more that were not with their mum at the time. That is 24 out of 90, which is about 25 per cent.

The Hon. MARK PEARSON: Did any of the studies look at whether the average shooter or harvester could identify a female as opposed to a male by looking at a kangaroo at night-time from 80 metres away under a floodlight?

Ms SUTTERBY: I do not recall that but I can get back to you and find out if there is any reference to that. Obviously from the back you cannot tell if it is a male or a female or if it is pregnant, and even from the side if the joey is small they would not be able to tell if it was a male or a female either. They would have to be facing straight on. But I can find out.

The Hon. MARK PEARSON: Maybe if they see a joey moving in the pouch, obviously that would make it clear that it was a female.

Ms SUTTERBY: Yes.

The Hon. MARK PEARSON: My final question is did any of the studies look at the reason why and the problems with removing the head from the carcasses, as to whether the processing plant or any inspector can ascertain as to whether the kangaroo was killed humanely or not?

Ms SUTTERBY: Sorry, can you repeat that?

The Hon. MARK PEARSON: In any of the studies, particularly the RSPCA one, was it investigated whether removing the head from the carcasses makes it difficult or otherwise to determine whether the kangaroo was actually shot with a clean shot to the head or not?

Ms SUTTERBY: Yes, they refer to that quite a lot. Once the head is removed it is completely impossible to know what happened to that kangaroo, even if it is a neck shot. Yes. Absolutely. No-one knows what is going on out there. They claim that it is highly regulated and monitored et cetera, but once they remove the head, no-one knows what happened to that kangaroo and no-one knows too all the kangaroos that were shot in the face and the back and the jaw and the leg that got away. As we can see, they make no effort to locate any animal that could be in trouble. It is fairly clear in everything I have read that they do not have the time nor the financial ability to be driving around in the middle of the night looking for these injured or orphaned animals. It is the ones that are injured and get away that no-one knows about and they cannot be regulated.

The CHAIR: Just looking at the Government's submission that they made to this inquiry—and we will be having them as witnesses at Tuesday's hearing—under current Government policies and programs in regard to in-pouch and at-foot joeys they refer to the commercial code, suggesting that the code outlines detailed requirements for the euthanasia of dependent young and includes standard operating procedures for the euthanasia of pouch young and dealing with dependent young at foot. Could you explain to the Committee what that process is? What are the requirements for euthanising dependent young and the standard operating procedures?

Ms SUTTERBY: I am so sorry, I got distracted. Somebody came into the room. Can you repeat the question?

The CHAIR: This is in relation to the commercial code requirements for euthanising dependent young. What are the requirements for euthanising dependent young? The code also says standard operating procedures for the euthanasia of pouch young and dealing with dependent young at foot. How are shooters supposed to euthanise these joeys?

Ms SUTTERBY: Obviously I do not have the code right in front of me. I am sorry about that. Basically, it is blunt trauma to the skull sufficient to destroy brain activity and brain function to destroy the brain. That is for furred joeys. If they have any fur, they are required to be killed by blunt trauma by any blunt, hard object sufficient to destroy the skull. Anything un-furred can be decapitated. They are required to—

The CHAIR: Gosh. That is pretty confronting.

Ms SUTTERBY: Yes. The research says that decapitation is not humane if you are not stunning them first and if you are not making them unconscious first because brain activity continues for another 30 seconds. With the out-of-pouch young, they are meant to be located and shot in the brain. But that is obviously not happening.

The CHAIR: It really is extraordinary that we have policies that specifically state that is what people out there shooting for non-commercial or commercial reasons need to do to young animals that they find.

Ms SUTTERBY: That is right.

The CHAIR: Are there any other animals that you can think of where these types of policies exist? That is possibly not a question you can answer, but it is quite extraordinary that we outline this in such detail.

Ms SUTTERBY: Yes, that is right. As I said, a man went to jail for doing that to nine puppies for 18 months. That is an interesting comparison as to how we view this sort of treatment of a sentient animal. The other comparison of blunt trauma is, of course, the harp seals in Canada. We know what sort of outrage that caused the public. Visions of doing that to harp seals and the study that the Government report refers to clearly states that that was found to be extremely inhumane what they were doing to those baby harp seals. They are some comparisons. I do not know how the law goes with—if you are on a remote farm and the farmer does not happen to have his gun with him and he finds an animal in distress, he may do that because he has no other choice. He might get away with that. But to do this to a healthy animal when it is completely unnecessary—that mother was healthy and should not have been killed and that joey was healthy. There is just no excuse.

The Hon. MARK BUTTIGIEG: I was just curious, listening to that evidence and reading some of your submission, there is this huge disconnect between humane treatment and the way females are killed and the way joeys are killed and all the rest of it, and then how that is recognised officially in policy versus how—most people would be shocked, I think, to understand that this is actually officially sanctioned as opposed to what should happen. Are you able to give us any insight into how those policies or sanctions came about? It is kind of counterintuitive that you would have government officials sanctioning that sort of cruel behaviour. I am just curious to know the history or the evolution of how this all came about. Was it a biased lobby that influenced government? Can you throw any light on that because I am not sure how that would come about.

Ms SUTTERBY: I guess it has been part of Australian history—colonial history, anyway—to hunt and persecute and commit horrific cruelty on kangaroos, from when we first came here. There is clear evidence of that. The attitudes that have been promoted in the propaganda machine about kangaroos—pest, plague, all the negative connotations that have been given to them—the public has been prepared to accept any treatment of this animal because they have been persecuted and brainwashed into believing that this is just how it has to be. "We have to get rid of them. Farms are suffering. So whatever happens has to happen." I think there has been a deliberate attempt to keep all this quiet. That government report was quietly shelved by the Government and never acted on. They continued to go out there and tell the world that this industry is clean, green and humane.

When it comes to the practices being used, I do not know why there is such neglect and cruelty allowed to happen. I have thought about why. I wonder, with the larger joeys, whether they do not want to spare that bullet on the larger ones or whether it would be too dangerous to hold down a large, distressed, struggling animal and try and blow its head off. I guess that would be quite dangerous for the shooter. They are in a situation, I guess—they are in a bind where they want to continue to maintain their profits and satisfy farmers, but I guess that is all they are prepared to come up with. While the public remains in the dark, they get away with it.

The Hon. MARK BUTTIGIEG: Was there ever a point in time when this sort of practice was not sanctioned and shooters were getting prosecuted and there was a pushback? Was there ever a point in time when that happened? I imagine one thing would be "We just want to get on with what we're used to doing, and this is how we do it, and they're a pest. So leave us alone." But whether that has been just the accepted practice through history or whether there was a point in time when the Government did actually care about the way these things happen and then there were prosecutions and then a pushback—I am just curious to know if that was a factor.

Ms SUTTERBY: No. There has been opposition growing, I guess, for the past 30 to 40 years. It has waxed and waned. I think that that is increasing and that the industry is under a lot of scrutiny now about the way they shoot joeys. But their response is to just say we are extreme animal rights activists and that we are just peddling mistruths. That is the standard response to any criticism or any spotlight on what they are doing to the joeys. That just seems to go away after that. People accept that. Also, if the focus does increase, I guess, they protect themselves better from prosecution. I know that 10 years ago, after the Bathurst slaughter there at Mount Panorama, they adjusted the licence to protect the shooter because the shooter was going around, just shooting the joeys in the pouch.

There was a lot of scrutiny and concern about that, so they changed the shooter's licence to protect that shooter from any potential prosecution. Now they have changed the code of practice to remove any potential protection, any vague protection for the joeys. Basically, in their code of practice, it does not say anywhere that they cannot kill joeys. So they are fully protected by the law to commit this cruelty. So I think they just protect themselves.

The Hon. MARK BUTTIGIEG: That is a really good example. Thank you. That was the sort of example I was interested in because it suggests that there is a default position to just protect the practice, because perhaps there is an asymmetric knowledge about these things. In other words, "The public is not really aware. Therefore, it's not a political issue. Therefore, we'll just protect them from prosecution and they can do what they want."

Ms SUTTERBY: Yes, that is right. Unfortunately, they are a very powerful industry because they have farmers. Farmers are a very powerful lobby. It is a rural industry, so they come out and cry "Jobs!" and "Rural money!" Unfortunately, kangaroos are caught up in a political war and they are the victims. So they continue to suffer after the RSPCA shone a light on this in 1985. Nothing has changed. It has actually gotten worse. So while this industry and the farming industry want kangaroos gone from their paddocks, while that continues and while there are votes in it, unfortunately, it is going to continue unless someone takes action. It is time. The RSPCA has known about this for 40 years. Why are they not doing something? Is it because they are getting government funding? It is just appalling. If the man down the road did this to a dog, he would be in jail.

The Hon. MARK PEARSON: Unlike the baby harp seals, which are clubbed to death in the bright light of day, on the bright white of snow, all this activity is occurring up to three or four hundred kilometres from

the nearest town and in the dark of night. Is that why there is very little awareness in the community as to these practices?

Ms SUTTERBY: You are exactly right, Mark. It is very difficult. But there is footage out there, of this. The media has the evidence. The ABC has all this evidence. We have pleaded with them to do similar reports on what is happening to our own beautiful kangaroos, on *The 7.30 Report* or *Four Corners*, just like they have done on the greyhounds and horses. Every other animal that suffers in this large-scale way of cruelty, the ABC will do reports on. But they will not touch this. They will not touch it. I am sorry, but I blame the media too because they are refusing to seriously expose this industry as well. That is a problem.

Yes, it is a problem that it is so remote. But there is footage out there. We know that there is lot of footage out there. The *Kangaroo* movie—we had such great hopes that this would shine a light on it and finally Australians would realise what is going on. Do you think that any of the mainstream cinemas would show it? This has all been covered up because it is political, because no-one wants to upset the farmers, no-one wants to upset rural industries. That is what this is about. It shocks everyone when we find out. It shocks everybody. But it is going to continue to happen until someone has the balls, from the ABC or the media, to truly give this exposé. The public needs to know. That is what the researchers said in their final statement in this government report. To not tell the public what is going on would be serious neglect.

The CHAIR: Thank you very much, Ms Sutterby. On that very powerful note we are out of time. Thank you very much for your work in this area and for appearing today.

Ms SUTTERBY: Thank you very much.

The CHAIR: You have taken a question on notice. The secretariat will be in touch with you regarding that, and you may have some supplementary questions.

(The witness withdrew.)

MICHAEL LETNIC, Professor, Centre for Ecosystem Science, University of New South Wales, affirmed and examined

BENJAMIN ALLEN, Senior Research Fellow (Wildlife Management), University of Southern Queensland, sworn and examined

HEATHER CAMPBELL, Chief Executive Officer, Bush Heritage Australia, before the Committee via videoconference, affirmed and examined

GRAEME FINLAYSON, South Australian Arid Rangelands Ecologist, Bush Heritage Australia, before the Committee via videoconference, affirmed and examined

The CHAIR: I welcome our next witnesses. We will go to opening statements. Dr Allen and Professor Letnic, do each of you have a short opening statement to make?

Professor LETNIC: I am happy to speak.

The CHAIR: You do not have to. Have you prepared a statement?

Professor LETNIC: No, only in my head. I am not going to read one out.

The CHAIR: To the Bush Heritage Australia representatives, I assume one of you has a short opening statement?

Ms CAMPBELL: Yes, we have prepared a short statement and I will read that when you are ready.

The CHAIR: Professor Letnic, just a couple of minutes, then, if that is okay?

Professor LETNIC: That is fine. I am an ecologist. I have been working mainly in outback Australia for 25 years and I have had a lot of experience with kangaroos in that time. They are a really complex issue. For many people, kangaroos are a pest because there are too many. They are an agricultural pest and they are an environmental pest. They are also an animal that we love and we love to see. Above all, I guess, another issue in western New South Wales is that they are actually a road hazard as well; they present a danger. My general feeling is that we have got a highly modified environment in New South Wales. We have suppressed populations of the kangaroo's main predator, the dingo; we have provided a lot of water; we have improved pastures; and so kangaroo numbers have grown enormously.

That poses lots of problems for the environment. There are too many kangaroos in lots of places—more than the environment can sustain—and that has lots of flow-on effects. Kangaroo numbers are driven by rainfall. When there are droughts their numbers crash because they starve to death in their thousands. As well as that, there are thousands of kangaroos that are killed on the road each night because there are many, many kangaroos and it is inevitable that there are collisions with cars. I am really concerned that we have too many kangaroos. We need to limit kangaroo numbers, which is a really difficult issue this Committee is dealing with. I am more than happy to think about finding solutions to reduce kangaroo numbers and their impacts on the environment and to make it a safer place to drive.

The CHAIR: We will now go to Ms Campbell. Dr Allen, I am assuming you do not have a statement?

Dr ALLEN: I had one. It is a bit boring in light of the previous discussion, but I have taken a few notes.

The CHAIR: No, please, we will go to you first and then Ms Campbell.

Dr ALLEN: Okay. I did not want to read the one that I had prepared, but I thought that perhaps the few minutes that I have got at the beginning might be useful to touch on some of the points that have been previously raised.

The CHAIR: Sure.

Dr ALLEN: I am a wildlife ecologist as well. One of the advantages or positions that we often take on things is a much broader time frame that we think about and a much larger scale. We tend not to focus on things like whether you used a rock or a brick or a hammer on that individual, but more about how that species is treated across this State or that State or the country, and we think of those long-term views. So that is where we come from with how we apply proscriptions to how you would manage a population. It is not so much the fine-scale things we are interested in, as important as they are. It is more those broader-scale things.

To touch on a couple of other things with respect to methods about how we count stuff—kangaroos being one of the many things we count—it is incredibly challenging to count wildlife. It is not a simple task. If it was we would probably not be having many of these debates. It is very difficult and methods improve over time. So it

is not particularly concerning at its face that methods change from this year to that year, because we should change them. We should be getting better. If we were doing what we did 50 years ago we would also be having a problem. So I would not be too concerned about the fact that methods change, as a rule.

Also, one of the things that I have learned as a scientist is that science is not a fixed thing; people will debate. There are people on both sides and you can stack up the credentials of this team versus that team and peer review this or peer review that, but I would not lend too much weight to just the view of any one person, just because it is a group of people all nutting their stuff out together. There will always be someone who is just as qualified with a different view to the previous person. The same goes for us. That is science. They are always pushing forward and all that sort of thing.

Another point is that many of Australia's animals, including kangaroos, are what we call "boom and bust" species, which is just a feature of much of our wildlife. It is not particularly noteworthy—again, think of those broad scales and long time frames—that an animal goes up or down. That is a normal thing, for animals to go up or down, particularly in Australia.

One other point is that peer review does not guarantee reliability. Just because someone says it is peer reviewed, that does not mean it is authoritative or good, or good science or best practice science. In fact, some of the best journals in the world have the highest rates of retractions in the world. So I would not rely on something just because somebody said it is peer reviewed.

Euthanasia—killing something—can be very confronting when you get down to the nitty-gritty of how that is done. Most people tend not to want to know or think about where their food comes from. But people kill animals for a variety of reasons, such as to eat them, and have done so since people were invented, and still do. You can get bogged down in thinking about how this animal dies and how bad that looks. But placed in perspective with the ways that other animals are managed—chickens, pork, cows, sheep and all the other things that people eat around the world—you will find that the harvesting of a wild animal, kangaroos in this case, is usually far more humane and far more harmless than most of the other animal industries that we take food from.

Lastly, Professor Letnic is right that kangaroo management is probably one of Australia's most vexed wildlife management issues. There is probably not many other wildlife in Australia that have as much contention around them as kangaroos. There is no easy fix, but my experience would suggest that everybody involved—whether it be the public, livestock industries, political organisations, animal rights organisations—is on the same page in that they would like to do something about it. They would like to improve it, correct it and make changes to this thing. It is just very difficult to make that happen. I do not have the answers for how to make that happen. But I think there is goodwill from all sides to at least want to do something about it, so it gives me some hope that we can progress it further in the future.

The CHAIR: Thank you very much. Now we will move to Bush Heritage Australia, Ms Campbell.

Ms CAMPBELL: Thank you for the opportunity. As conservation managers across Australia, our goal is to protect all ecosystems and all species in them through understanding and managing the impact of threats to the biodiversity values across the landscapes in which we work. Bush Heritage Australia works in partnership with our neighbours, local communities, traditional owners, government agencies and university researchers. Much of our managed lands have been influenced by recent anthropogenic changes, which threaten the complex ecosystems we are trying to protect.

Some examples of these modifications are the addition of artificial stock watering points, the installation of vermin fencing for exclusionary suppression of apex predators, altered fire regimes, removal of native vegetation and improvement of pastures for agriculture. All of these factors have implications for ecosystem function and, in many regions of Australia, have contributed to increased numbers and associated impacts from both introduced species such as feral goats, deer, pigs and rabbits, and from native species that otherwise would have been regulated by the natural ecological processes.

To address these often requires some difficult management decisions. Moreover, a lot of these modifications cannot be reversed; thus, management intervention must be implemented to ensure that we can get the biodiversity gains, particularly for all species. So it is within that context and using the best available science that at times we have to make really hard decisions in relationship to the control of kangaroos.

The CHAIR: Thank you very much for those opening statements. I will go to Mr Mark Pearson for the first questions.

The Hon. MARK PEARSON: Thank you very much for appearing and giving your submissions. My first question is to Dr Benjamin Allen. I understand that you had been retained to do a study of exclusion fencing.

Dr ALLEN: Yes. I have been fortunate enough that the first cluster fences, we call it, in Queensland were sealed up in 2013. So we have been monitoring kangaroos and a whole bunch of other fauna in and around cluster fences in Queensland since that time.

The Hon. MARK PEARSON: In your report you indicate that in your view kangaroo populations benefit from being caught in exclusion fencing.

Dr ALLEN: Yes. One of the things I learned in Ecology 101 is that for every intervention, whether it is a fence or a border point or whatever we might do, there are always ecological winners and losers. So when you put up a fence, some things are going to win out of that and other things are going to lose out of that, and kangaroos appear to be one of the winners.

The Hon. MARK PEARSON: How does a western red kangaroo in a drought that sees or smells a storm coming in the far distance and wishes to go there and starts to go there and comes across a 100-kilometre long exclusion fence—how does that kangaroo benefit from that?

Dr ALLEN: That kangaroo does not; it cannot get in. But, like I mentioned in my opening statement, we are not just focused on that kangaroo; we are focused on entire populations and species of kangaroos. So at an individual level, that one might be excluded, but at a population or species level there is far more inside than outside. So you can focus on the individual impact to that one or the ones on the outside, but the data that we have indicates that there are three to four times greater densities inside the fence than outside.

The Hon. MARK PEARSON: Let us say a western red is wanting to go north-west towards activity that is a storm to obviously get some feed et cetera—and no doubt there would be a mob of them that want to go there—if it is wanting to go north-west, and depending on which side of the fence it is on it is going to be able to go there, but have you studied what actually happens to these western reds in drought? Are they going to be provided with water by the landholder in those situations when they cannot get through the fence to that source of food and water?

Dr ALLEN: There is no single answer to the question because every landholder does different things—some landholders do not like them; others do like them—and we tend not to focus, again, on those individual-level things. I have never put a radio tracker on a kangaroo to watch where it goes in a drought, but we do monitor populations across large areas, inside and outside fences, and not just these ones but whole regions. What we find is that inside these fences kangaroo populations fluctuate up and down, as you would expect, but their numbers are just greater. So to answer your question specifically, I do not know if kangaroos want to leave or not but what we have found is that populations on the inside would often not need to go because the land condition and things on the inside mean they do not have to.

The Hon. MARK PEARSON: But why would a landholder want to put up an exclusion fence to include kangaroos?

Dr ALLEN: You would have to ask landholders, but lots of them like kangaroos.

The Hon. MARK PEARSON: You are saying that kangaroo populations seem to benefit by being caught inside kangaroo fencing. How are they benefiting if the reason for the fence is to exclude them?

Dr ALLEN: The reason for the fence is to exclude predators—dingoes from sheep.

The Hon. SHAYNE MALLARD: Not just kangaroos.

Dr ALLEN: I am not aware of any government program that says "here is money to build a fence and exclude kangaroos". Fences are put up to exclude predators, and kangaroos are just one of many herbivores—others being sheep, of course—that they are trying to keep safe in there.

The Hon. MARK PEARSON: Are you saying the landholder is putting up the fence to protect the kangaroo?

Dr ALLEN: Protect their sheep, and kangaroos derive some benefit from that in three ways; so again these interventions have positives and negatives. The negative is it will stop you moving—a fence's job is to stop things going one side to the other, that is what it does. But there are three ways in which kangaroos and other fauna benefit—not just kangaroos, but kangaroos benefit from the act of fencing and predator removal. You are taking away their main predator, for starters.

The Hon. SHAYNE MALLARD: Wild dogs.

Dr ALLEN: Wild dogs, dingoes—you are taking away their predator. So that is good for sheep; it is also good for kangaroos. We heard about some statistics earlier about predation rates and levels of breeding and fecundity and mortality and all those sorts of things. You are taking away one of their key causes of mortality;

that is good for kangaroos. The other way is that disease—dingoes and kangaroos have a disease called hydatids; it is a parasite that goes through both the predator and the herbivore to function, but when you take away the dingo out of that thing, which is what the fences there are meant to do, you are also taking away the parasite from kangaroos. So kangaroos benefit by having less parasites as a by-product of the fencing and predator control. And then, because you have got greater control over land condition, that the fences essentially enable greater control for good or bad, you are now in a situation where they are no longer competing at rates that they used to compete with before, so your populations might not go so high and level—boom and bust—but they might sort of be a bit flatter. So the act of fencing, coupled with the other land management activities that are going on, tend to mean that kangaroos, like sheep, do better out of the whole scenario rather than worse, and that is what we are finding in the data.

The CHAIR: Can I jump in with a question on that before throwing to the Opposition? Does your research include whether, as a result of exclusion fencing, you have got the predators out and the kangaroos are inside—does it factor in then whether those landholders then shoot those kangaroos inside?

Dr ALLEN: We are not doing any work specifically to see what this landholder does or that landholder does. We are working at that broader scale level again around what is going on across a whole cluster or a whole region, and at that cluster or regional level we see kangaroo populations much higher inside than outside. That is different to a smaller scale, whether it is this farm or that farm, which can be polar opposites. Some will have none—like, zero kangaroos—and then others will have loads of kangaroos. So there are quite big differences literally from that side of a fence to that side of a fence, but scaled up across clusters and regions those differences sort of fizzle away and you have got higher populations inside them.

The Hon. CATHERINE CUSACK: Your research is Queensland based. Is that correct?

Dr ALLEN: Yes. The first cluster fences went in in Queensland in 2013 and they are just creeping into New South Wales now.

The Hon. CATHERINE CUSACK: I am just trying to work out what region because a lot of the areas we are talking about today are actually in kind of not sheep farming areas but irrigation zones and the exclusion fencing is being used by irrigators to, I guess—

Dr ALLEN: Keep roos out.

The Hon. CATHERINE CUSACK: Stop emus and kangaroos.

Dr ALLEN: I admit that ostensibly fences are there for wild dogs, which are a very serious predation issue for sheep, but wild dogs are not the only thing impacting sheep producers; kangaroos are as well. So I am sure that there are people who put up fences for kangaroos just as much as they do for wild dogs.

The Hon. CATHERINE CUSACK: But I am talking about vast areas of agriculture that are not sheep farming, they are crop farming, and this is to prevent wildlife from accessing what could well be artificial water sources. I am trying to get my head around the fact in Queensland I can see what you are doing in relation to sheep farmers, but how does that translate to these issues in New South Wales? Have you looked at that?

Dr ALLEN: You are right. In the region that we are working in Queensland there is not a lot of cropping at all. It is mainly pastoral. Cluster fences in Queensland are pretty much everywhere from the border up to Longreach. A big chunk of the State—1,000 kilometres that way and 500 kilometres away.

The Hon. CATHERINE CUSACK: Just in terms of the impact on biodiversity and stopping the movement of wildlife, whose role is it to look at those issues—genetic, gene pool issues—all of those sorts of things? As I say I am not a Queenslander; we are in New South Wales.

Dr ALLEN: I am embarrassed to be a Queenslander this week too.

The Hon. SHAYNE MALLARD: In this place too.

The Hon. CATHERINE CUSACK: We will try to be nicer to you here.

Dr ALLEN: Whose role is it? Well, I guess it all depends on the issue that you are looking at and which species you are looking at.

The Hon. CATHERINE CUSACK: Kangaroos in particular.

Dr ALLEN: Fencing is one of those things that its job is to stop things going one side to the other. That is the fence's job. And there are consequences that you intend—you intend to keep wild dogs out or dingoes out or you intend to have better ability to control them on the inside—but one of the unintended consequences is that

you stop other things as well. Whether or not that is a problem depends on what else is going on. The fact that it stops them is not necessarily a problem.

The Hon. CATHERINE CUSACK: Because we are here today talking about kangaroos, can you tell us about that?

Dr ALLEN: Yes. By and large cluster fences do a great job at stopping kangaroos going from one side to the other.

The Hon. CATHERINE CUSACK: But do you think kangaroos are winners from that?

Dr ALLEN: At the scales that we are working out in Queensland, there are more kangaroos inside than outside. The reasons for that is the other land management activities that are associated with fencing—not the act of putting up a fence itself but all the other stuff that goes along with it like predation control—they benefit kangaroos.

The Hon. PENNY SHARPE: There are obviously more kangaroos inside the fences than outside the fences—generally more healthy populations, I assume, breeding at better rates. Is that what you are seeing? Is there a concern about particular populations of particular species as a result of the fences? Is there concern in Queensland about that?

Dr ALLEN: At the cluster level, the bigger level, no. At an individual property level you might be concerned about that.

The Hon. PENNY SHARPE: I think this is for you, Professor Letnic, and possibly Ms Campbell. We had some evidence from our very clever biostatisticians this morning. I do not know whether any of you saw that. It was challenging in terms of the detail. One of the things that came out of it is that they put up some work that the New South Wales Government has done which is around grey kangaroo populations in the Tibooburra area. It basically suggested that from 2016 there was around 450,000 grey kangaroos across a large area but then it suggested by 2020 that had gone down to less than 7,000. Is there a problem with the maths here or is that possible given the type of boom-and-bust nature of the drought during that period of time? Could you try and unpack that for us?

Professor LETNIC: Look, I work in that area. I monitor kangaroos in that area and I cannot vouch for the exact numbers. There would have been a decrease in kangaroo numbers of that scale.

The Hon. PENNY SHARPE: That is huge, obviously.

Professor LETNIC: It is huge. And those animals starved. They started starving probably in the middle of 2018. I was up there doing a field trip and there was animals starving left, right and centre. They were being knocked off by wedge-tailed eagles and, in fact, it was really inconvenient because we were doing some experiments on kangaroos and we had no more kangaroos to do experiments on. Simply, the animals all died around us. And those animals starved; they do not die of thirst. They typically starve under a tree and there is this really poignant thing where they starve on top of the bones of the kangaroos that starved in the previous drought. There is this cycle. We get big rains, kangaroo numbers increase and they do really well and they breed and every 10 years or so we have a bigger drought and the numbers crash. It is the big kangaroos that die first and usually females get through and some small males get through and the cycle starts again. It is a cycle.

The Hon. PENNY SHARPE: You are not particularly concerned by that dramatic crash. Leaving aside the arguments, a dramatic crash like that is not unreasonable?

Professor LETNIC: It is not unusual. What it is a sign of is that the kangaroo population is too high. We have this population that is too high and going above the environmental carrying capacity.

The Hon. SHAYNE MALLARD: Sustained by farmland, farm practices?

Professor LETNIC: This is in the rangeland, so it can be in national park or other rangelands, but basically the population is too high for the environment and eventually the environment cannot sustain them and their numbers crash. In that process the kangaroos eat out the whole country so there is no food or shelter for other animals and a lot of plants are endangered.

The Hon. PENNY SHARPE: That is what I was getting to. What is the impact when there are too many concentrated in a particular area?

Professor LETNIC: And that particular area is the western third of the State. It is a big area.

The CHAIR: Can I just see whether Bush Heritage has any responses to this particular issue? It is okay if you do not but I thought I would give you the opportunity to comment.

Ms CAMPBELL: Thank you for the opportunity. I cannot speak for that part of New South Wales at all but certainly we operate a sizable reserve just over the South Australian border from Broken Hill and we have seen significant changes in kangaroo numbers where they can be very high and then they crash and we get huge suffering due to drought. It is something that we would expect to see in some landscapes and not in others. I do not know whether my colleague Dr Finlayson wants to add anything there.

Dr FINLAYSON: Yes, certainly. I concur with some of the comments that Professor Letnic just made. We have had in 2018 at the peak of the drought in that whole region—I work at Boolcoomatta station, which is in the far north-east pastoral region—kangaroo numbers just got to a stage where they were just dropping dead on top of other kangaroos. They would hang around water points and, as Professor Letnic pointed out, they were dying of starvation because they had access to water. There was just no longer any perennial grasses left, which are their primary forage species. Yes, there was enormous die-off and then we are back to lower numbers. I am sorry but the audio was a bit tough to hear but it sounded like you were reporting on thousands of animals that were dropping in that region over a relatively short period of time and it was similar in South Australia.

The Hon. CATHERINE CUSACK: Do you consider that to be a natural process or an unnatural process?

Dr FINLAYSON: Well, as Professor Letnic also pointed out it has become a natural process because of the changes that have been made to some of these landscapes. We have altered the provision of water. We have altered and removed predators so populations of kangaroos are able to get beyond the carrying capacity of these landscapes to a point where they get to these really high numbers and then there is nothing left for them to eat and it crashes. In a sense it is natural from an ecological process point of view but because the balances are all out of whack it means that they get to these points and that bust period is more extreme than ideally what it should be.

The CHAIR: I was wondering, then, with the figures that we have heard in earlier evidence this morning that the Hon. Penny Sharpe was just referring to—the 450,000 figure. Professor Letnic, what is your understanding as to how the government determines those numbers for its kangaroo management plan?

Professor LETNIC: I am not entirely certain of the exact specifics but it is the extension of a long-running program where they have counted kangaroos out of aeroplanes—maybe they have moved to helicopters these days—but they have a fixed transect on either side of the aeroplane and they count kangaroos in timed intervals that they can see. I would think that those numbers would be approximately right, but there is always going to be error in those numbers. In our counts, so we are working—

The CHAIR: Sorry, what do you base that assertion on, that you think those numbers would be approximately right, in terms of science or evidence?

Professor LETNIC: Partly because it is a really long-running program and it has been a very contentious program with lots of improvements. The program was initiated by Graeme Caughley at CSIRO in the 1970s, who was a very eminent ecologist who spent a lot of effort developing the program and trying to verify their counts from the ground as well as from the air. Since that time many other scientists have tried to refine and improve the technique to increase the accuracy. As they have gradually refined it, there have been no big shifts in the numbers that they are recording, which suggests that the numbers they are getting are more or less consistent. That is in the absolute numbers of kangaroos.

The CHAIR: There was evidence that we heard this morning that if you are saying there have been no shifts and they are just refining it, what would be the need over a certain period of time? The evidence this morning said the correction factor was revised upwards, I think, ultimately six times.

Professor LETNIC: Correction factors work to—that is where the observers are trying—was it between observers or the correction factor?

The CHAIR: I think the overall correction factor, not between observers.

Professor LETNIC: Okay, not between observers. That is where there would have been trying to—there are kangaroos that they would miss. There would be kangaroos that are under trees or somehow they are in the shade and they are missed, so I think they would be trying to account for those animals. If you do a count in winter, it is quite easy to see a lot of the red kangaroos. They might be early in the morning, they might be sitting in the sun basking, but in the middle of the day a lot of animals will be in the shade and you will miss them. So the time of day will influence what your counts produce.

The CHAIR: That is right, that is what we heard today in terms of what is a correction factor. But the question was why would a correction factor change over time to the point that it becomes six times what it was? Surely the reason for the correction factors does not change in terms of animals hiding in the shade or what have you. What would you think is the reason why these correction factors have been revised upwards consistently?

Professor LETNIC: I would have to take that on notice to look that up. I do not have the information.

The CHAIR: Do you think there is any chance that the correction factor has been revised upwards to indicate that there are more kangaroos than there actually are? Is there a danger of that?

Professor LETNIC: No, I would not think so.

The Hon. PENNY SHARPE: Professor Letnic, your submission talks about harvesting. You talk about two things, one of which I think will be quite controversial—the one about moving to female harvesting as well for management purposes. We have also had a lot of evidence with concerns about the boom-and-bust nature, the numbers are down, there is still a certain quota, we have not really been able to unpack whether the quota was ever fulfilled—my sense is that it is not and those numbers are down because they are just not there. Could you talk us through your views around the quota harvesting and the management of kangaroos? Clearly your evidence is that there is an overabundance, particularly in certain areas but not everywhere. Could you talk us through that?

Professor LETNIC: My feeling is there are too many kangaroos. I think there are some ironies in perhaps how it is managed in the long term. The kangaroo harvesting program initiated as a cull to reduce the numbers of kangaroos for farmers. Over time it has become an industry. In the process of becoming an industry, quotas have been introduced, upped, elevated, possibly to the point where it becomes counterproductive for the farmers and the environment. If you are going to sustain an industry, you need to have enough kangaroos to harvest. By having a harvest of kangaroos then you need to maintain a high population, particularly because a few years back the harvest went male only. That places even more pressure on the environment and leads to a general increase in kangaroo populations. What I am discussing here is irrespective of fluctuations in the population, it is just at the average level.

The Hon. PENNY SHARPE: Basically you are saying by having an industry, it requires a higher population.

Professor LETNIC: It is counterproductive, yes. You have a higher population, so perhaps it defeats the purpose a little of having the harvest, but then you have an economy dependent on it as well. So, it is really difficult. When I suggested in my evidence that the harvest shift, that was from an environmental point of view. In the last few years we have been doing studies in national parks and conservation reserves in western New South Wales and in South Australia. Certainly at the peak of the drought we found that kangaroos were having a very damaging effect on the environment and it was very high numbers.

The CHAIR: Can I check in terms of those studies, who were they undertaken for?

Professor LETNIC: Which studies?

The CHAIR: The studies you were just talking about.

Professor LETNIC: They were not undertaken for anyone, they were funded by the Australian Research Council. There is a photograph in my submission of the landscape at Yathong Nature Reserve in western New South Wales and also one in the Sturt National Park. In both of those environments there are these massive effects with kangaroo exclosures. There are no other herbivores of any appreciable number in those parks. Those were effects of kangaroos on those landscapes at that time. They are massive effects. There is no food for anything else.

The Hon. PENNY SHARPE: So all those little desert-dwelling marsupials and those kinds of things are basically eliminated as well when there is an overabundance of kangaroos.

Professor LETNIC: Yes.

The Hon. BEN FRANKLIN: Can I pick up on that directly and ask all the witnesses: Can you talk to the actual impacts on the environment if kangaroos are not properly managed?

Professor LETNIC: The scaling up is something that we still do not know about. We are trying to get funding to look at this. We know that the kangaroos can decimate the vegetation and the natural assumption is that there will be nothing to eat or nowhere to hide for other animals. At this stage that evidence has not been scaled up. There has been no way to do an experiment at a scale large enough to demonstrate how that translates to other animals but it is desperately needed, I think, to look at, particularly with regard to conservation research, where we have massive numbers of kangaroos in many parts of New South Wales possibly at the expense of the other animals we are trying to protect.

The Hon. BEN FRANKLIN: Dr Allen, would you like to have a crack?

Dr ALLEN: To add to Professor Letnic's comments, when you have an environment that has multiple species in it all relying on the same sort of stuff but you advantage one species over another—kangaroos being

the one that is advantaged by having water points, take-away predation, those other things that advantage that one—that species can get to a point where it starts to impact all the others in a variety of ways. Overgrazing is how you would generalise it but it basically means nothing to eat and nowhere to live for other things. We might not have data at this place or that place or at the grander scales that we would like to have, but the processes are pretty clear and pretty well understood, that if your land management practices advantage this guy over those ones then those ones are going to suffer in some way.

The Hon. SHAYNE MALLARD: That includes other macropods like wallabies.

Dr ALLEN: Including other macropods and including kangaroos themselves. Give them too much of a good thing and it will hurt them too. This is what Professor Letnic is talking about with this overabundance issue. You might think it is bad to turn off the water or to shoot that kangaroo or whatever, but the act of not doing that only means that millions more later will need to die of starvation. It is not good for kangaroos either to be allowed to overpopulate.

The Hon. SHAYNE MALLARD: Artificially flourish.

Dr ALLEN: Absolutely.

The Hon. BEN FRANKLIN: Would either of the Bush Heritage Australia people like to make some comments about the environmental impact of kangaroos?

Dr FINLAYSON: Sure. I am happy to comment on that. I work in South Australia and some of the comments that Professor Letnic has made are relevant to the work that I am involved with because one of the sites where he was able to come and sample includes one of our reserves up at Boolcoomatta in the north-east pastoral. One of the main activities that we undertake when we take over properties like Boolcoomatta and Bon Bon Station and all of our reserves is to monitor whole ecosystem changes ultimately with the goal to return the country to good health and a balance in the ecosystem. In terms of the impacts of kangaroos, at Boolcoomatta we have installed a series of experimental exclosures to look at grazing impacts of things like rabbits and also kangaroos. We have little compartments that include an area that keeps out kangaroos, an area that keeps out rabbits and a combination of the two.

A recent publication, which Mike Letnic would have pointed out, highlights some of the differences in these exclosures that are evident based on these exclosures that are set up where kangaroos impact on the grasses, rabbits impact on the woody vegetation and there are flow-on effects that we are hoping to explore in the future with expanded experimental research to look at things like termites, small vertebrates, reptiles and small mammals. At the moment there is a paucity of information on these flow-on effects. The impacts on bird species or the granivorous that lose these grasses right down to these invertebrates are really imminent when kangaroos get beyond the current capacity of these reserves. It is something that is challenging for us because we work in and around communities which are primarily for agricultural reasons—so sheep farming—and all these changes that have occurred we need to work alongside communities, which is our approach.

The Hon. BEN FRANKLIN: Thank you very much. Can I move back to Professor Letnic and the discussion you had with Ms Sharpe about the harvesting issue. Obviously it is government policy to harvest male kangaroos. I would just like a little more clarity about why your submission suggests the harvesting of female kangaroos.

Professor LETNIC: At the moment it is males and females. I think it has changed, hasn't it?

The Hon. BEN FRANKLIN: Yes.

Professor LETNIC: What I suggest may not actually be harvesting in the end because I think the numbers need to be reduced a lot for the environment. But, effectively, with the male harvest—kangaroos have a polygamous mating system where one male will mate with a number of females and there is a group of less dominant males off running around looking for mates. If it is a male harvest it tends not to have a huge impact on the population because the breeding component of the population is left untouched. That is the females. It actually facilitates having a sustainable harvest and having a very high population where you are sort of taking off the males. Even with the shifts to bring back females, there are weight limits on the kangaroos that can be harvested. A lot of the smaller kangaroos start breeding before they actually reach harvestable size. So there is still a large breeding component of the population. From an environmental perspective, a more female-based harvest would be beneficial, but it might not work for a harvesting industry.

The Hon. BEN FRANKLIN: How do you manage the animal welfare component, particularly with regard to joeys?

Professor LETNIC: I stayed away from that in my submission.

The Hon. BEN FRANKLIN: Indeed. That is why I am asking the question.

The Hon. PENNY SHARPE: That is why we are honing in on it.

Professor LETNIC: There are bigger animal welfare components that are not taken into account. One is that these animals starve. Inevitably, if a drought comes animals starve. They are finished off by wedge-tailed eagles. It is not very pretty. The other thing is—and I am not sure I have been hearing much about it—thousands of these animals die on the roads. Probably hundreds of these animals die on the roads each day. I had some students go out to western New South Wales recently on a bus and people came back and said, "What were the bumps in the middle of the night?" The bumps in the middle of the night were the kangaroos that are hit by the bus. The bus does not stop.

The Hon. CATHERINE CUSACK: Why were they going on a bus in the middle of the night? Everyone knows not to do that.

Professor LETNIC: They were on a long trip to Broken Hill. The buses hit kangaroos and they do not stop.

The Hon. PENNY SHARPE: Broken Hill is so dangerous for kangaroos.

The Hon. CATHERINE CUSACK: Tell them not to go on the road at night.

The Hon. MARK PEARSON: You need to go in daytime, then, don't you?

Professor LETNIC: Thousands of kangaroos are dying on the roads and it is something that we do not even think about and does not come into the debate here. That is not very humane either. Most of those animals are not attended to. It is not safe for humans as well. That is another issue I think we need to think about when it comes to welfare and having so many kangaroos.

The Hon. BEN FRANKLIN: Understood. Dr Allen, did you want to add something?

Dr ALLEN: To add to that welfare thing, one of the weaknesses of many people involved in most animal welfare debates when it comes to wildlife is they get very focused on the one individual animal that they are focused on, but that animal exists in an environment with multiple other animals and by focusing on the welfare of just that one you miss volumes of other animal welfare issues. We can focus on the welfare of individual harvested kangaroos, but that kangaroo lives in a place where there are multiple other animals that experience welfare issues every single day. By trying to improve the welfare of that one, you harm the welfare of all those other ones. So if we are genuinely concerned about improving animal welfare, even just kangaroo welfare, you cannot ignore the role of roads, shooting, water points and all of those other things that we do in the way you would approach that welfare.

Let's say in a hypothetical world you could kill every single kangaroo instantly and painlessly and every single joey absolutely perfectly. It still does not fix the overall welfare issues of massive population die-offs of kangaroos and everything else associated with it. One other thing I will touch on about harvest rates and quotas and that sort of stuff is that wildlife managers are usually involved in trying to make things go down. We want to kill pests and reduce numbers and we use a whole lot of tools and strategies to wipe things out. The flip side of that is we use a whole lot of tools and strategies to try and help things like bilbies, bettongs and all our endangered animals. If you are trying to take out an animal just by harvesting the biggest males, for a polygamous animal that is the worst way to try and take out a population. You will never achieve it. The fact that we would harvest adult males or even adult females will never achieve the population reductions that you would need if you are interested in the rest of the fauna.

The Hon. MARK PEARSON: Therefore, the commercial industry is not a viable strategy to keep kangaroo numbers under control.

Dr ALLEN: Not if you are only harvesting a very small proportion of large adult males.

The Hon. MARK PEARSON: Just flowing on from that, Dr Letnic, you say that there can be a steady influx of juveniles to replace kangaroos killed by the commercial industry and non-commercial shooters. Do you have direct evidence that this occurs in areas where killing is taking place?

Professor LETNIC: Yes. There is always a lot of young at foot around when we do our kangaroo counts and a lot of those young at foot are produced by kangaroos that are too small to harvest. Their mating system works so there is a continual flow. Most does will have one or two young at a time; one in pouch and one at foot. So there is that continual process of recruitment. If we go back to a more natural situation where dingoes or wild dogs are present, what happens is their predation focuses more on the juveniles—the joeys. They are very effective

at capping the populations because they stop that flow of young ones into the population, which is something we do not do with our harvesting.

The Hon. MARK PEARSON: Have any of your studies looked at the impact on the integrity of the mob by shooters always choosing to take the big, larger animal when now they can take the larger doe? Are you aware of any studies of taking out the larger animals in mobs—being the mothers and fathers or grandfathers and grandmothers or whatever—having an impact on the integrity of the mob like it does other species?

Professor LETNIC: I have not done studies on it, but my understanding would be that there are usually other males around, non-dominant males, that are happy to step in.

The Hon. MARK PEARSON: You mention that kangaroos have a deleterious impact on the environment. How can that be when they have been here for so long? Did this apparent impact on the environment occur before livestock was introduced?

Professor LETNIC: What we have done is across the country we have changed the country to make it a better place for kangaroos. We have taken away their predators and we have improved the pastures and we have provided waters. If you drive across the border of New South Wales into South Australia or Queensland across the dingo fence, there are far fewer kangaroos on the South Australian or Queensland sides of the fence. My study teams—at the height of the kangaroo numbers, before the drought—in a 15-kilometre drive would see in the order of 100 kangaroos in Sturt National Park. We would drive into South Australia and if we did a similar drive, we would be lucky to see one in five trips. Kangaroos were at much lower numbers in the presence of predators. The other thing that is really different across the fence is the grass cover. There is much more grass in the areas where there are dingoes. The reason for that is there is just less grazing pressure from kangaroos. Kangaroos are having those really high numbers. They are suppressing that ground cover vegetation and having damaging effects on the environment.

The Hon. MARK PEARSON: If dingoes are the natural predator that keep kangaroo numbers down, why are you advocating the killing of kangaroos rather than the reintroduction of dingoes as predators?

Professor LETNIC: I do not think the reintroduction of dingoes is anywhere a realistic option in New South Wales, from my experience. It is certainly something that I think would be an interesting thing to trial, but I do not think it was a practical thing to advocate for in this particular submission.

The Hon. MARK PEARSON: Because of agribusiness?

Professor LETNIC: Because of the current state of political affairs in New South Wales, yes. We are focused on agriculture and maintaining a sheep industry.

The Hon. BEN FRANKLIN: Because you want people to be able to eat, basically.

The CHAIR: Your research is undertaken for the NSW Department of Planning, Industry and Environment. Is that correct? Who funds your research?

Professor LETNIC: No, my research is principally funded by the Australian Research Council.

The CHAIR: But it is funded as well through the department. Is that correct?

Professor LETNIC: No, I do not receive any funding through the New South Wales Government.

The Hon. SHAYNE MALLARD: I do not think it is fair to criticise the source of his funding. I know where you are going and I do not think it is very fair.

The Hon. BEN FRANKLIN: Well, it is not the case.

The Hon. PENNY SHARPE: We have not actually asked this question today: Which species of kangaroo are endangered in New South Wales?

Professor LETNIC: Well, none of the large kangaroos, to my knowledge. Some of the small—

The Hon. PENNY SHARPE: The reds and greys are not?

Professor LETNIC: No. The euro is not.

The Hon. PENNY SHARPE: It is the smaller ones, like the rock-wallabies?

Professor LETNIC: The rock-wallabies are endangered.

The Hon. SHAYNE MALLARD: And they are protected.

Professor LETNIC: Also, up in the north of the State, there are restricted distributions for some of the really small wallabies like the parma wallaby. Then there are the really small kangaroos—things like bettongs—which are really endangered and some of which are extinct.

The Hon. PENNY SHARPE: But essentially, when we are talking about trying to manage large populations, these are the greys and the reds and others?

Professor LETNIC: Yes.

The Hon. PENNY SHARPE: And none of them are on any endangered list? There is no scientific list in Australia which suggests that they are in danger of extinction?

Professor LETNIC: No. If any of you live on the North Shore you would probably be familiar with swamp wallabies and you would see their carcasses where they are hit by cars on Eastern Valley Way or the Wakehurst Parkway.

The Hon. SHAYNE MALLARD: But they are protected.

Professor LETNIC: They are protected, but they jump on roads. They are doing quite well in the Sydney area.

The Hon. SHAYNE MALLARD: They are as big as a kangaroo. They are not small. They are quite big.

Professor LETNIC: They are quite big and they are very common.

The Hon. SHAYNE MALLARD: But they are protected.

The Hon. PENNY SHARPE: All native wildlife is protected.

Professor LETNIC: Yes.

Dr ALLEN: It can be the case that those larger kangaroos, in the numbers that you see them, are at least part of the reason why some of those others are not doing so well.

The CHAIR: Professor Letnic, I do want to clarify—sorry, but it is important when you are presenting—I have your research titled "Grazing by over-abundant native herbivores jeopardizes conservation goals in semi-arid reserves" and it does say that "This research was supported by funding from the NSW Department of Planning, Industry and Environment".

Professor LETNIC: Yes, okay. Yes, it was supported in part by the department in a roundabout way. It is part of a program looking at the cover for ground-nesting birds, is our concern, and we were particularly interested in—that project came about looking at the effects that kangaroos are having on ground cover habitat.

The Hon. SHAYNE MALLARD: It is not quite—

The CHAIR: No, I just asked a very specific question about funding from that department—

Professor LETNIC: But that was a partial—

The CHAIR: —and I just needed to clarify—

Professor LETNIC: But the principal source of funding is the Australian Research Council.

The Hon. PENNY SHARPE: But the implication is that there is some problem in terms of kangaroo harvesting, which is just not true.

The Hon. SHAYNE MALLARD: Yes, trying to discredit it.

The CHAIR: I am just asking the question in terms of whether Professor Letnic received any funding from the State Government. I just had to clarify that.

Dr ALLEN: I do not know if it is the case for Professor Letnic, but certainly it is the case for me and for most other wildlife researchers that usually funding is taken from all sorts of different places—State, Federal and local governments, non-government organisations, all sorts of things—and often times you will have multiple agencies contributing to different components of a project. At the beginning of that project they might have nothing to do with each other. Someone might be paying you to go and study plants and then someone might be paying you to study kangaroos and ostensibly they are not meant to be together, but later on you collect data and go, "Oh, I will put these things together."

The Hon. SHAYNE MALLARD: But it does not compromise the integrity of your work.

Dr ALLEN: No, well, it should not.

Professor LETNIC: I will argue that there is no conflict of interest.

Dr ALLEN: Yes.

The Hon. BEN FRANKLIN: I have one final question, if I may. One of the fundamental issues of this inquiry is, basically, have any of the kangaroo populations dropped to such a level that they are now unsustainable and that therefore we should be engaging in a range of strategies in order to protect them rather than this just being part of the boom-and-bust cycle that we have heard evidence on. My question to each of you is this: Is it your view that kangaroo populations have dropped to that sort of unsustainable level?

Professor LETNIC: No, I believe that kangaroo numbers will recover. They have been through these cycles before. We would have been through a very similar situation in the 2002-2004 drought. We would have been through a similar situation in the 1982-1983 drought and probably several droughts in between that period as well. I think that we are just seeing part of a longer-term cycle related to rainfall-driven fluctuations in productivity.

Dr ALLEN: I am the same. I would not have any concerns over a bust period. I am sure if we come back in another 10 years' time we will go through a boom period.

The Hon. BEN FRANKLIN: Bush Heritage Australia?

Ms CAMPBELL: Our views would be the same. Dr Finlayson, did you want to add to that?

Dr FINLAYSON: Yes, I am the same. I reflect on the situation in South Australia, which mirrors a lot of western New South Wales. We are seeing young animals and I think likewise through the millennial drought it was a similar situation where numbers went really low and then we reached periods that were higher than what had been seen in the past. So, there is no cause for concern at this point.

The CHAIR: That is the end of our questions and the end of this session. Thank you very much for appearing today.

(The witnesses withdrew.)

(Luncheon adjournment)

FARNHAM SEYEDI, Volunteer solicitor, Animal Defenders Office, affirmed and examined

TARA WARD, Volunteer managing solicitor, Animal Defenders Office, affirmed and examined

MICK McINTYRE, Director, Kangaroos Alive, and Director, Second Nature Films, affirmed and examined

KATE CLERE, Director, Kangaroos Alive, and Director, Second Nature Films, affirmed and examined

LOUISE BORONYAK, Scientific Adviser, Kangaroos Alive, sworn and examined

The CHAIR: I welcome our next witnesses. Thanks very much for coming along. We usually begin with a short opening statement. Can I get an indication of who is going to make statements as part of this panel? We will start with you, Ms Boronyak. If you could keep it short.

Ms WARD: Could we commence? We have got one between us.

The CHAIR: If you have an order that is great. Please begin.

Mr SEYEDI: The Animal Defenders Office [ADO] congratulates the Legislative Council and the Committee for establishing this important inquiry and we thank the Committee for inviting us to the hearing today. We welcome the opportunity to be able to put our concerns to the lawmakers in this State about the regulatory framework that applies to the treatment of kangaroos. We are concerned about individual kangaroos as well as the much altered ecosystems in which these individuals live. We submit that both can be protected; it does not have to be a choice between one or the other.

The ADO's concern about the treatment of individual animals is based on the recognition as stated in the ACT Animal Welfare Act that kangaroos are "sentient beings who are able to subjectively feel and perceive the world around them. They have intrinsic value and deserve to be treated with compassion and have a quality of life that reflects their intrinsic value". With these ideals of its sentience and compassion in mind, we urge the Committee to consider the regulatory framework that purports to protect the welfare of individual kangaroos. This framework is woefully ineffective and the main reason it is is because it is not enforced. This lack of enforcement is tragic, not least because while New South Wales welfare laws are far from perfect they none the less could provide kangaroos with more protection than is currently the case in reality.

Shooters are subject to the Prevention of Cruelty to Animals Act and regulations. The Prevention of Cruelty to Animals Act does not adopt the shooting codes as a means to exempt shooters from prosecution for cruelty as it does for other codes of practice. Shooters can also commit offences under the Biodiversity Conservation Act for harming kangaroos. If they kill or injure an animal not in accordance with the code, their licence will not protect them and they should be able to be prosecuted for unlawfully harming and killing native wildlife. With the millions of these animals who have been killed over the years we ask why are shooters not investigated for potential noncompliance with animal welfare laws? Why is the prosecution of shooters under these laws so rare as to be virtually non-existent? The laws are there, albeit imperfect, but why are they not used to protect these sentient animals?

Those who participate in kangaroo shooting may claim that the answer to this is because the animal welfare codes of practice for kangaroo shooting are complied with. We submit that there is very little, if any, meaningful evidence to support this claim. The existence of the shooting codes is not evidence of compliance. The codes are not the conclusion; they are the beginning. We cannot conclude that shooting kangaroos is humane because they are the codes. The codes may be able to provide minimal protection to kangaroos only if they are complied with, and we do not know if they are complied with unless kangaroo shooting is monitored and monitored where it matters, not at processors or chillers but at the killing point where the animals are shot, where the young are wounded and allowed to escape to suffer slow, painful death, where the volunteer shooters who are not even required to have any kind of competency training in firearms, let alone veterinary training, can apply blunt force trauma to the head of a young sentient pouch joey until dead.

At the ADO we hear from people who live next to properties where kangaroos are shot for so-called damage mitigation purposes, whose lives are made a misery by the shooting and slaughter. They tell us that they beg authorities to come and inspect but the authorities decline, often citing a lack of manpower. They tell us that no-one is checking and that the shooters know that. Understandably the residents ask what is the point of any restrictions or laws if no-one will come out and inspect? We therefore submit that until there is meaningful monitoring of shooting where the damage is inflicted it cannot be said that shooting kangaroos is carried out in line with the codes or that the codes are complied with or that shooting kangaroos is humane.

Finally, even if the codes were complied with some of the time, their standards are so low that they still could not make shooting kangaroos anywhere near humane. Even with full compliance, no code can render

humane the violent killing of young animals or eliminate the painful body shots or wounding of any age animal. Kangaroo shooting is inherently cruel, particularly for young animals. The inherent welfare risks cannot be regulated out of existence. That is why the ADO submits that ultimately the only humane approach is to learn to coexist with wildlife rather than to destroy it. Thank you.

The CHAIR: Thank you very much. Mr McIntyre, is this the order that you want this to go?

Mr McINTYRE: Yes, thank you, Madam Chair. Thank you for inviting us to present evidence at this inquiry. To us, this is an historic occasion. This is an opportunity to look at our largest marsupial herbivore and all the inherent issues surrounding their management in New South Wales. The subject of kangaroos is something that my partner Kate Clere and I know something about over the last nine years while researching and producing our featured documentary *Kangaroo: A Love-Hate Story*, and the subsequent setting up of the not-for-profit Kangaroos Alive, who we are speaking for today.

Over this period we have travelled extensively over the New South Wales and Queensland landscape and we got to do things that most Australians or most people of New South Wales do not get to do. We got to meet and interview key stakeholders to do with kangaroos. We interviewed farmers and commercial shooters, politicians, activists, scientists, academics, and what we experienced in all of these travels really did shock us. As people of New South Wales, as Australians, it really did shock us. To put it bluntly, we discovered an animal welfare crisis, and we will get into that detail a bit hopefully during this inquiry. But I just want to draw your attention to some of the things we did witness firsthand: lack of kangaroos on the landscape, which we were shocked by; the brutal treatment of kangaroos, which I think you have heard a bit about already in this inquiry; and the no sense of inherent value of kangaroos alive in Australia.

What we learnt researching the film was the narrative from our government and media that there are overabundant populations of kangaroos and that they are in plague-like numbers. As filmmakers we wanted to capture this phenomenon on film; that it is a very cinematic experience if we could do that. So in our research for the film we put the word out there for people to show us where to go to film these so-called plague-like proportions and we got no responses, we got no uptake on that, which was surprising. In fact, in the thousands of kilometres that we put in through New South Wales and Queensland, we did not see any large populations at all, and what kangaroos we did see we were shocked at how small they were.

The other narrative that we heard in researching the film was that the commercial kangaroo industry is humane and well regulated and it follows a national code of practice. What we learnt and we witnessed firsthand is that this national code of practice has no monitoring—none—and we know this because we were out there filming. We filmed commercial shooting, we were out in the middle of the bush filming these shootings and we saw it is in the middle of the night, it is in the middle of nowhere and no-one is watching. These are people that are out on their own with absolutely no monitoring. We witnessed what happens to the baby joeys. I know that you have heard testimony already today about the baby joeys situation.

Well, we witnessed it. We witnessed what happens when the female is shot. We witnessed that the baby joeys, the ones that are left after the mother has been killed, they are either left to die of starvation and exposure or, as you have heard already today, they are bludgeoned to death. What was even—I do not know, can it be more surprising than that as an Australian to witness that and to learn that? But also we learned that the governments of Australia and New South Wales keep no records of how many baby kangaroo joeys are killed every year. There are no government statistics. This was quite extraordinary to us. We thought that basically killing of kangaroo baby joeys had become the face of the kangaroo industry in Australia and as an Australian that was not something that we were particularly proud of. This is a blind spot in Australian culture. In fact, the baby joeys are afforded such little consideration that in the national code of practice, as you have already heard today, it simply recommends that they are bludgeoned to death.

Since we learned firsthand and witnessed that it is impossible to monitor what is going on with the shooters, we put forth the argument that the national code of practice is worthless. To put it simply—and I wrote this here—the killing points are where the kangaroos are harmed and if the killing points are not monitored it cannot be said that the animals are harmed in a way that is in accordance with the code. We call on this inquiry to recommend that the Government stop using this code as a justification for how well regulated the killing of kangaroos is. I think that it is mischievous and scurrilous to say so, because there is no way that we know that the code is being followed if there is no monitoring. We have already witnessed why.

We do know that the New South Wales State cruelty laws apply and we look forward to the Committee inquiring into what to do about those State cruelty laws in regards to the killing of kangaroos rather than relying on a code, as I have mentioned, that we consider is worthless. This lack of monitoring really needs urgent attention to address this animal welfare crisis. The release of our film brought international visibility and scrutiny on the killing of kangaroos. When the film was released we were invited to screen the film in the European Union

Parliament. After that screening in the Parliament in Brussels several members of the European Parliament started drafting a bill because they were shocked at what they saw. There is a bill being put before the EU Parliament to ban kangaroo imports into the EU. Similarly, after the film was released in America there is a similar bill being put to the US Congress.

Clearly the killing of baby joeys has struck a chord with people in America and Europe and we really hope that it can strike a similar chord with Australians. This has resulted in several big brands stopping the use of kangaroo products in Europe and America. Brands that I am sure you have heard of—Gucci, Prada, Versace, Carrefour supermarkets—have all ceased the use of kangaroo products once they learned what we are doing to kangaroos in Australia. What is heartening for us is that we have screened the film hundreds of times in Australia and we also have seen by the reaction of people in Australia that they do not necessarily agree with what we are doing to kangaroos in Australia. We really hope that this inquiry can be a turning point for the people of New South Wales, a change of direction from just being focused on somehow that we have to manage them and kill them, rather than figure out ways that we can coexist with them and find out the inherent value of them to our society.

We have learnt that kangaroos are one of the key species to the health of the ecosystem of this State. We have also learnt that they are the cornerstone of the tourism industry. I know we are talking pre-COVID times but the figures speak for themselves: 70 per cent of the four million international visitors that came to New South Wales pre-COVID indicated that they wanted to see wildlife, particularly kangaroos and koalas. That is a high figure of people wanting to see our wildlife. We really urge this inquiry to recommend that more studies be done on what is the value of kangaroos alive to the people of New South Wales. Thank you for this opportunity. I am going to hand over to Ms Boronyak, our scientific adviser, who is going to talk a bit more about the science.

Ms BORONYAK: Thank you for establishing this inquiry and for inviting us to speak today. It is important to consider various stakeholder perspectives on the important issues of how kangaroos are managed in New South Wales. We argue that the management and treatment of kangaroos across the State of New South Wales is unethical, unsustainable and based on pseudoscience. The current view of kangaroos in the New South Wales landscape continues to be through an outdated colonial view. This view fails to value the health and welfare of wildlife and the benefits and inherent value of our kangaroos. Given that Australia as a whole is identified as one of the top seven countries in the world that contribute to biodiversity loss, the time to act is now. Wildlife is integral to the health and function of ecosystems. Wholesale removal of kangaroos as our top herbivore will likely have important implications for ecological resilience.

I draw on my expertise in investigating this issue of kangaroos for the past decade and also the knowledge from our expert team from the Animal Welfare Institute that is comprised of a group of international wildlife ecologists. We highlight four key points that we would like the Committee to consider: the lack of clear management objectives in the New South Wales kangaroo management plan; the method to set commercial quotas; that there needs to be a consideration of all forms of mortality of kangaroos in the quotas; and the localised depletion of kangaroos across the State. Firstly, wildlife management plans need to have clear management objectives—management objectives that are consistent with the obligation to protect wildlife and the environment and have broad public support.

The New South Wales kangaroo management plan talks about ecological sustainability. This is such a vague term; it is effectively meaningless. Any plan that contains the word "ecological" must surely consider the holistic approach and consider the effect of land use changes, erection of fencing, the control of dingoes and the effects of natural and non-natural events such as fires and droughts. We believe that the kangaroo management plan does not consider these effects effectively. The kangaroo management plan fails to even define the minimum target density for each of the species that are harvested in each zone making it impossible to determine whether any management objectives are even being met.

As part of my PhD I have studied other wildlife management plans such as wolves in the USA. They talk about a minimum number of wolves below which would trigger some sort of management intervention. Yet the department has yet to define the upper and lower bounds of ecological sustainable populations for each of the four commercially killed species. Only then could we determine if the program meets this objective. In other fields such as fisheries management Australian scientists lead the way in an ecosystem-based approach and we hope that this can translate to kangaroos as well.

Secondly, as we had this morning, the management system is based on quotas that are set as a percentage of population numbers. As Ms Galea and Mr Mjadwesch made so clear this morning there are large uncertainties around the survey methods to establish populations. Doubts were raised about the validity of survey methods and the correction factors used. There is a phrase in modelling that says "garbage in and garbage out". If the data you put into a model is inaccurate the resulting information that you get at the end of your modelling is also going to

be inaccurate. The science involved in counting wild animal populations is challenging and difficult. We need to consider levels of uncertainty and we need to understand that kangaroos are not distributed evenly across the landscape, and there are factors such as seasonal variability and landscape variability that need to be considered.

As you heard this morning the DPIE figures show biologically implausible changes in estimates between the surveys and a number of submissions raise concerns over the population estimates. This clearly shows there is a need for greater transparency and evaluation of the methods used to estimate kangaroo numbers and the data that these estimates are based on. When faced with uncertainty, best practise in wildlife management is to often bring together a team of international experts in order to estimate abundance. This allows experts from different fields to assess raw data and methodology. This has often resulted in quite considerable improvements to the methods, estimates and uncertainties. It makes the science underpinning the counting of wildlife populations much more robust. As Mr Mjadwesch noted this morning, when he attempted to discuss his concerns with the department, he was ignored. One would infer from this that the estimates lack rigour and transparency.

My third point is that we should consider all sources of kangaroo mortality in the quota. This includes non-commercial shooting; extreme events such as prolonged drought, fires and flooding; land clearing; predation; impact of roads on kangaroos in terms of injuries and mortality; entanglement in fences; and calculating the number of baby joeys that are killed. Any limits set should be on the total number killed in all causes, including commercial hunting. This is not a radical idea. It is perfectly normal for other types of wildlife management and we do not understand why it is not done in New South Wales. It is evidence of a failure to sustainably manage a commercially exploited species. Lastly, all of these factors lead to the potential for an overestimation of kangaroo numbers, and a quota based on this is likely to lead to local depletion as we saw in the DPI data this morning. This has been brought up in other statements. In order to address this problem, management areas need to be much smaller, with their boundaries clearly determined and also an indication of habitat quality and how this affects the abundance of kangaroos.

Kangaroos Alive believes that the management and killing of kangaroos in New South Wales is one of the worst examples of indifference and intolerance towards wildlife in the world. This reflects badly on New South Wales and tarnishes Australia's reputation. As you know, governance is one of the most important factors for ensuring environmental management and conservation. Globally recognised best practice in terrestrial environmental governance is based on the principles of equity, transparency, accountability, inclusion and fairness. The various submissions demonstrate that the New South Wales kangaroo management plan fails to address any of these principles.

In conclusion, Madam Chair, we would suggest that the inquiry recommends much greater transparency by the department to publish the raw count data, the formation of a panel of international experts to critically review all aspects of population estimates and quotas including their associated uncertainty, and greater clarity around how the department monitors shooting at the point of kill to ensure compliance with the code and kangaroo welfare. We envisage a brighter future where all kangaroos and humans can coexist. In the land of sweeping plains, there is room for us all. Thank you very much.

The CHAIR: Thank you very much, all of you, for your opening statements. We will now go to questions.

The Hon. MARK PEARSON: Thank you very much all of you for coming and for your submissions. My first question is to the Animal Defenders Office. You talk about the devastating impact of bushfires on kangaroos and your concern about the ongoing killings—that nothing has actually changed in terms of the licensing to kill kangaroos. You are concerned that this undermines the objective of ecologically sustainable development under the Biodiversity Conservation Act and the fact that the precautionary principle is not being adhered to because there has not been a change. Can you elucidate that concern?

Ms WARD: Sorry, Deputy Chair, could you repeat the last bit of the question?

The Hon. MARK PEARSON: You mentioned that the application of precautionary principle should be applied if there has been a main event which has an impact upon wildlife under the Biodiversity Conservation Act. Are you concerned at the fact that the killing of kangaroos is continuing—commercial or non-commercial—without any change after the bushfires, even though they are protected under the biodiversity legislation?

Ms WARD: That is correct. It would just be an application of the precautionary principle, which, as we know, can go various ways and can be used by—if we want to put it in these terms—both sides of an argument. But animal advocates would just be suggesting that, until there is more information, more science and more research on the impact of those fires on numbers of kangaroos and their habitat and everything that goes to their survival, any kind of killing should be curtailed until that research is done. That would be an application of the precautionary principle. In other words, we do not wait until we have the research. Given the potential

consequences both from a welfare and ecosystem point of view as well as a sustainability point of view, it would be applying the precautionary principle in that way.

The Hon. MARK PEARSON: Could it be possible that the secretary of the department of environment, by omitting to do anything after the bushfires in relation to the killing of kangaroos, could be in breach of that precautionary principle in the legislation?

Ms WARD: From a nonlegal perspective—I would not want to hazard a view on the legal consequences—but from an application of that principle, that would certainly be an interpretation or an argument that could be made, that that principle is not being applied in this case.

The Hon. MARK PEARSON: When a commercial shooter applies for the tags to kill, say, 100 kangaroos or whatever and goes and collects the tags, are there any tags or licences issued to kill joeys?

Ms WARD: My understanding is that there is one licence issued to the shooter: a commercial harvesting licence. I am not aware that there are separate licences, if that was the question, issued for the killing of young kangaroos.

The Hon. MARK PEARSON: I understand that when a shooter—a harvester—shoots a kangaroo, they put the tag on the kangaroo and then part of the tag is broken off and has to be sent back to the relevant department so that the numbers of kangaroos are determined. Is that correct?

Ms WARD: I am not across the finer details of the administrative side of those aspects of the licence, but that is certainly what one would expect. The importance of licences in general is that they do enable a minimum level of accountability and transparency. That is why animal advocates were so concerned about the August 2018 changes to the non-commercial shooting regime that effectively did away with the shooters themselves having to apply for and comply with a licence.

The Hon. MARK PEARSON: Part of that licence is to have a tag for each kangaroo.

Ms WARD: That would be a condition of the licence. That is correct.

The Hon. MARK PEARSON: For non-commercial killing, since that requirement for that tag was removed in 2018, are you concerned that the ongoing killing of kangaroos without the use of drop tags could put the person shooting those kangaroos in breach of law?

Ms WARD: The main point is that there is no way of knowing because there is no monitoring at the point of kill. We simply do not know, but the likelihood is certainly there, whether the licence conditions require the tags to be used or there is no licence. Because there is no point of kill monitoring, what is to stop a shooter—and I pose this as a hypothetical—if they mis-shoot an animal, from simply leaving that animal, not tagging the animal and moving on? It is in the dead of night. It is in remote locations. There is simply no way of being able to be sure that that is not happening unless we have that monitoring at point of kill.

The CHAIR: Mr McIntyre and Ms Clere, from that point, what did you see during your filming?

Mr McINTYRE: We have witnessed just that hypothetical. It is not hypothetical; it happens out there in the field.

The CHAIR: Could you expand upon that for the purposes of *Hansard*?

Mr McINTYRE: An animal will be shot and wounded and run off into the bush and not be chased and not be found. We have seen it and that is what happens out there.

Ms CLERE: Also when the industry made a female-only kill for other commercial industry, when females were killed—sorry, a male-only kill, they would actually kill females by mistake at night and just leave them on the ground because they could not sell them. From a distance, they could not see the difference in sex of the beast, and so they would kill it and then get closer and then just leave it there. The male-only, female-only issue is not law. It is just what the industry made up for itself for a while, but I think it is now gone. They probably are not doing that with females any more, but that was what was happening quite a lot when we were making the film.

The CHAIR: We will be able to speak with people later about this as well, but would you like to comment, from your experience, on distinguishing between a female and male kangaroo from a distance and at night with how this shooting occurs. Is that easy? What have shooters themselves told you, as I am sure you have talked to them about it?

Mr McINTYRE: What we witnessed was how far away the animals were. I have been out on a shoot and I have witnessed it and, talking to the shooters, they acknowledge that the animals were a long way away.

I learnt that they rely on high-powered sniper rifles. These animals do not hop in front of the car. These are animals a long way off into the bush. I am not an ecologist. I cannot comment on how difficult it would be but, knowing the distance, I am happy to have a layman's understanding that it would be difficult in the middle of the night at that sort of distance to understand whether it is male or female. What I can do is just back up what Ms Clere just told you that we have witnessed what happens when the shooters find that they are actually female; they actually just leave them in the field. So they are not reported.

The CHAIR: I just wanted to ask a question in relation to the Animal Defenders Office and your submission. I think you were saying something about how the authorities are urged to investigate by people who might have shooting in their area or are adjacent to where shooting occurs and the authorities do not investigate. How are those complaints lodged by the people who are concerned? How do they lodge the complaint to the authorities?

Ms WARD: Just to clarify, this information is provided to us via people who come to us because they are desperate. They have usually tried everything else, tried approaching other authorities. They come to our volunteer-run organisation because they literally have nowhere else to go. What they want to know from us is what are the laws, what is the regulatory framework, what can they do. So we invariably get a wideranging account of what they have done. That may or may not disclose any kind of formal complaint. Usually it is just in the form of, "We rang the authorities." We are told, "I rang them on this occasion. I rang them on that occasion. I tried to contact them." In that sense, it is anecdotal; it is their account to our organisation.

The Hon. BEN FRANKLIN: Thank you all for being here today. In some of our previous evidence, we have heard that one of the reasons why there is a view that the culling of kangaroos is necessary is because of the impact that they have on the environment, on other animals, groundcover and so forth. I was just wondering if you could talk to balancing up those two competing issues.

Ms BORONYAK: I will take this question. Thank you very much. Kangaroos appear to be the fall guy for mismanagement of land in New South Wales. There have been many studies. A 2016 study by Mutze et al concluded that kangaroos had no negative effect on native pasture cover or species richness, and pasture degradation is perpetuated more by rabbits. We also have four million goats, rabbits, deers and pigs that also contribute to total grazing pressure and would have impacts on the ecology. So it is not just kangaroos. If you are dealing with holistic systems, you cannot just take one species out, because it is an interplay of species in the ecology.

The Hon. BEN FRANKLIN: There is also the suggestion that kangaroos go through their boom-and-bust cycles and at the moment, obviously after the drought, we are in a bust, as it were. Do you agree with that contention? I would be interested in your thoughts.

Mr McINTYRE: I think you would have heard from Ray Mjadwesch. In fact, I enjoyed that he got pens and paper out and helped you understand that 10 per cent growth—there is no boom for kangaroos. I also heard that testimony this morning that we are in a bust situation and that there will be a boom. There will be no boom; there will be a 10 per cent growth. This notion that there is going to be a boom in numbers is again part of the mythology that we learnt while making the film. There is this mythology about kangaroos that seems to come through the colonial lens that we look at it from. So, no, there will be no bust in kangaroo. There will be a 10 per cent increase over every year.

The Hon. BEN FRANKLIN: Okay, in your opinion. Can you have a look at other government management approaches that might be applicable for kangaroo management—for example, if there is any that you know of in managing other animals, in managing pests, compliance systems, things like that. Basically, are there other things that are already in place—other strategies, legislative frameworks, regulatory frameworks and so forth—that might actually be applicable for kangaroo management that might be applicable for us to look at? If you do not know of any, that is fine. This is not a trick question. I just want to give you that opportunity if you know of any.

Mr McINTYRE: Australia is one of the world-leading countries in the management of whale population. So I think you could ask some Australian whale scientists that question. I think what you will find is that they will come back and say what Lou Boronyak has already told you in her opening notes that what it requires is an international review of current practices. To answer that, yes, there are models out there—whales being one of them—and what the Australian scientists will tell you about whales is that it requires an international look at the situation so you get lots of international expertise. That is why we approached some of those whale scientists to help us with our submission because Australia does have a track record in that field.

The Hon. BEN FRANKLIN: I did have one final question to the Animal Defenders Office. I noticed in your submission you suggested that barbed wire should be legislatively phased out. I was wondering if you can

talk about if there are viable alternatives to it, because it obviously performs an important function and, if so, what your suggested alternatives would be if we did phase it out.

Ms WARD: We would rely on the ingenuity of our farmers to investigate and implement alternatives. As long as would be required for that, that would go into the phase-out period. While we do not have the answers, we are lawyers, we would rely—of course, there would need to be consultation et cetera, but I am sure that the ingenuity of our farmers and our agricultural industry would be able to come up with something as relatively straightforward as that.

The CHAIR: That is a good response. You would think so.

Ms BORONYAK: Can I also just make a point on that? There are examples of wildlife-friendly fencing, and the current barbed wire fencing can cause significant entanglement when kangaroos attempt to go over the top and then their feet can get caught within those wires and they die an excruciating death over a prolonged period of time.

The CHAIR: Can I just explore the management framework. Your opening statement had very good evidence around comparing what happens with other animal populations and what indeed is management when it comes to kangaroo management. Firstly, has the Government stated, "This is the ideal population for this area so that we can manage these kangaroos sustainably and all of our native vegetation is conserved and therefore we would need, for example, 750,000 kangaroos in this particular area"? Does the Government not do that?

Ms BORONYAK: My understanding is that in the current kangaroo management plan that goes from 2017 to 2021, they do provide the population density thresholds but they are only outlined for red kangaroos in zone two, which is the Broken Hill zone, and of course there are multiple kangaroo management zones. They talk about an initial threshold of 7.8 red kangaroos per square kilometre and that should trigger a quota change from 17 per cent to 10 per cent. The lower threshold is 6.4 red kangaroos per square kilometre and that should trigger a cessation of commercial hunting in that zone. They have provided those density thresholds but only for one species in one management zone.

We would like to see, to determine whether they are meeting their management objectives, all of the management zones and then the density threshold and the triggers that would trigger a necessary intervention into the management of kangaroos or a reduction in the quota for all commercially harvested species. They are only counting kangaroos to kill them. That is the only reason why they are counting them, and that came in because the US pushed for that in the seventies and eighties when there were real problems around kangaroo numbers.

Mr McINTYRE: Can I just comment on that? I think that is really interesting. We learned that as well. The management of kangaroos in New South Wales and Australia has never been done from the conservation of kangaroos. It has only ever been done to satisfy quotas for commercial killing. Again, I think it is a question that we need to ask ourselves as a society. It is time that we looked at kangaroos in a different way.

The CHAIR: Does that tie in as well here in New South Wales? I was surprised to learn that the selling of the tags themselves goes to fund the unit. It is a self-sustaining situation, is it not?

Ms BORONYAK: Yes.

The CHAIR: The selling of tags funds the people employed to work on the kangaroo management. Is it the taskforce or the unit? Do you know what I am talking about?

Ms BORONYAK: Yes, the Kangaroo Management Unit.

The CHAIR: What is your view on that?

Ms BORONYAK: It is in the department's interest to keep issuing licences to kill kangaroos because that funds the department's operation. With the killing of wolves, the tags are sold in the US and that also funds wildlife management agencies. That is not unusual. You might see that there is a bit of a conflict of interest in that.

The Hon. MARK PEARSON: My question arises from that. We will be receiving evidence that if the kangaroo industry is reduced or halted—commercial industry or other industries around it—there will be this massive loss of employment and serious problems in rural engagement and employment. I was interested in your point about tourism. If 70 per cent of people who visit Australia are so keen to see kangaroos, et cetera, would there be an employment around tourism that could equal if not be an even greater offering of employment than the commercial industry or an issuing of tags?

Ms CLERE: We were really surprised when we travelled round that there was literally no kangaroo tourism, yet everyone wants to see them. In fact, it is quite hard to see a kangaroo in the wild when you come as

an international tourist. That is quite a problem right from the start. You cannot actually see them or do not know where to go and there is not enough. I do not think we have looked into the amount of money we could be making from this. I know they have done studies on how much one whale alive is worth as opposed to a dead whale. We have not done those studies and that was one of the primary things we saw.

We went to Sturt National Park where we saw the large red kangaroos prior to their being none, as we spoke about this morning. There is an airport into Tibooburra, which is tiny but usable, and we were just imagining the amount of employment in that town, which is a tiny town. Tibooburra could have actually had loads of, say, Chinese tourists flying out from Sydney to Tibooburra to spend a day in the national park there. From our experience, it is one of the world's greatest things to see these large red kangaroos. It is like an African safari. I think that town should be looking into the cost.

I know we visited the sanctuary up in Alice Springs and it was booked out every day. I think this is something that is on the cusp of something that we could be doing in Australia—really changing our whole relationship. If kangaroos were on land to make money and farmers or agricultural people—I know that golf courses are bringing in visitors to see the kangaroos on the golf course and it brings their money up in the golf course. People stay for coffee; they pay to see the kangaroos. I definitely think that is a huge gap that we have not discussed yet.

The CHAIR: We need to leave it there. Mr McIntyre?

Mr McINTYRE: Can I just table a copy of the film for every member of the Committee?

The CHAIR: Yes, please, that would be great.

Mr McINTYRE: If they do not have a DVD player, the link is on our submission.

The CHAIR: Thank you so much. Thank you everyone for the work you do. Thanks for appearing today.

(The witnesses withdrew.)

ANNABEL JOHNSON, Head of Policy & Advocacy, NSW Farmers Association, affirmed and examined

BRONWYN PETRIE, Conservation and Resource Management Committee Chair, NSW Farmers Association, before the Committee via videoconference, sworn and examined

LACHLAN GALL, Councillor and Kangaroo Management Representative of the Pastoralists' Association of West Darling, before the Committee via teleconference, affirmed and examined

The CHAIR: Would anyone like to make an opening statement?

Ms JOHNSON: Yes, please. I will start and then Ms Petrie has a few words as well.

The CHAIR: Mr Gall, do you have an opening statement as well? I believe that was a nod. We will start with Ms Johnson, then move to Ms Petrie and then to Mr Gall.

Ms JOHNSON: Good afternoon, Committee. My name is Annabel Johnson and I am head of policy and advocacy at NSW Farmers. Unfortunately, our main speaker, Greg Rogers, chair of New South Wales Farmers Western Division Council, has been unable to attend due to adverse weather this morning. I will read an opening statement on behalf of NSW Farmers. Our other farmer representative, Bronwyn Petrie, will also provide a short opening statement. The farming and scientific communities alike acknowledge that kangaroo populations can and do reach unsustainable levels. Landscape changes post-European settlement, such as the presence of crops and dams, provide consistent food and water sources and have allowed the species to flourish beyond what the natural environment otherwise would allow. This overabundance puts strain on farming and our environment and has made population management necessary.

During the drought unsustainable populations of kangaroos put extreme pressure on landholders who were already under very difficult seasonal conditions. In many areas of the State farmers who could barely keep their own stock fed and watered were also competing with the added grazing pressure from kangaroos. As drought conditions worsened, kangaroos were dying from starvation and dehydration. The drought measures for kangaroo management made humane culling of distressed and dying kangaroos simpler but, unfortunately, it was too little too late. The decline in kangaroo numbers during the recent drought is consistent with population changes during comparable historical droughts and is not of ecological concern. However, NSW Farmers believes that more should have been done to prevent the unsustainable numbers that had amassed. Better kangaroo management in the first case could have prevented the situation of mass suffering that followed.

Some final points: Exclusion fencing is an extremely important tool for protecting agricultural assets from invasive pest species such as wild dogs and feral pigs. We support the role of the commercial harvesting industry in sustainable kangaroo management, and this industry should not be subject to further regulation. The farming community has shown they can perform best kangaroo management without onerous tagging and "shoot and let lie" requirements. These should not be reinstated. Kangaroo populations need to be better managed to avoid the situation we witnessed in the most recent drought. Failure to adequately manage kangaroo outcomes will lead to bad outcomes for farmers, the environment and animal welfare. I will now allow Bronwyn to say a few words.

Ms PETRIE: Bronwyn Petrie, farmer at Tenterfield and the Chair of our Conservation and Resource Management Committee for NSW Farmers. Please note I spent nearly half my life in far western Queensland where the red kangaroo was actually our totem. I worked with the Department of Primary Industries. I am very familiar with large holdings. We need a holistic approach to the kangaroo population and management issue to encompass environmental, agricultural and social outcomes. During the drought even property owners who had kept drought reserves had to destock their livestock because they could not compete with the invading kangaroos. [Audio malfunction].

The CHAIR: Sorry, Ms Petrie, if I could just interrupt. You started muffling—I think you turned your head away. I think your microphone is in the centre.

Ms PETRIE: Sorry, can you hear me now? Is that better?

The CHAIR: Yes, it is. You might just need to repeat your last sentence.

Ms PETRIE: I just said that during the drought even property owners who had kept drought reserves had to destock—even people who solely kept goats—because they could not compete with the kangaroo numbers that were invading into their property. Our western division chair, Greg Rogers, who could not come here today—the Government did a count on his place and he had over 9,000 kangaroos, which is a density of greater than one-third [audio malfunction].

The CHAIR: Sorry, Ms Petrie, I have to interrupt you again. I think it is—and the same thing happened with the previous witness—your microphone appears to be in the centre of your screen so you need to move to your left a bit.

Ms PETRIE: There?

The CHAIR: I think that will be better, yes.

The Hon. MARK PEARSON: It is like an X-ray.

Ms PETRIE: Or is it the other way? Is that better?

The CHAIR: No.

Ms PETRIE: I think it is this way. Is that better?

The Hon. BEN FRANKLIN: No, it is worse.

Ms PETRIE: Is that worse?

The CHAIR: That is worse.

Ms PETRIE: Is that better?

The CHAIR: Yes.

The Hon. MARK PEARSON: Stay there; do not move.

Ms PETRIE: I will raise my voice, sorry. Just quickly, I was saying that kangaroos belong to the Crown, as do our other native species, yet it falls to the farmers to have to deal with the dying kangaroos, having to drag them out of dams or troughs and put them out of their misery, and the Crown is nowhere to be seen. That takes a huge mental and physical toll on our farmers, and we need to cover that responsibility better. To make it worse, national parks now have very large holdings, particularly in the western division, where, when they take over those farms, they decommission the water assets—the dams, the bore drains—so the native animals that have grown up with that water then either die if they cannot get away quickly or, in the case of kangaroos, they migrate elsewhere onto the private land. [Audio malfunction].

The CHAIR: Sorry, stop there for one second again, Ms Petrie. Sorry to do this; I need to make sure that every sentence you say is picked up by Hansard. You will have to start that last sentence again. Your video is pixelating at certain times. I wonder if we should try turning Ms Petrie's video off.

Ms PETRIE: If I stop the video?

The Hon. BEN FRANKLIN: Yes, good idea.

The CHAIR: Turn the video off and then continue, thank you.

Ms PETRIE: I have done that.

The CHAIR: Could you start your last sentence again?

Ms PETRIE: Is that better?

The CHAIR: I think so at this stage.

Ms PETRIE: I said: Exclusion fences are primarily erected to keep out wild dogs but they are over very large acreage and resident kangaroo populations have plenty of room in which to live there, and that is where NSW Farmers believes population control should occur at a property level, not across a large regional level. Thank you.

The CHAIR: Thank you, we got there. Mr Gall, can you hear me? Do you have an opening statement to make? You are on mute, but at least I got a nod.

Mr GALL: Yes, can you hear me? [Audio malfunction].

The CHAIR: This does not look good either. Mr Gall, you said you might have connection difficulties because of where you are based. We will use the telephone now. Apparently we have that as a backup for you. We will call you and resume. Mr Gall, can you hear us now?

Mr GALL: Yes, I can hear you well. It is better this time around.

The CHAIR: That is great. We have this incredible situation where we have you muted on the video and talking on the phone. It is the best of both worlds. You have muted your video, haven't you?

Mr GALL: My video is still operational.

The CHAIR: If you could mute the microphone on your video, and we have got you loud and clear. It is a strange situation but it is quite good. Do you have an opening statement, Mr Gall?

Mr GALL: Yes, I do. The Pastoralists' Association of West Darling has been representing the interests of pastoralists in western New South Wales since 1907. I have been the Pastoralists' Association kangaroo management representative for 11 years. The Association seeks to develop pragmatic solutions to the problem of too many kangaroos. Over the course of European settlement pastoralists have observed how the four most common species of kangaroos found in western New South Wales have increased in number and range in response to predator control and the provision of artificial water points. Pastoralists have also observed how kangaroo numbers naturally rise and fall in response to seasonal conditions. The Association supports commercial harvesting of kangaroos as the best way to manage kangaroo populations at sustainable levels.

Unfortunately, the actions of animal rights activists have contributed to loss of markets for kangaroo products, which in turn has reduced the effectiveness of commercial harvesting as a population control measure. A steady increase in the number of kangaroos over time, as shown by the dashed line in the graph on page 1 of the Association's submission to this inquiry, demonstrates that commercial harvesting is not placing the future of the four common species of kangaroos in western New South Wales at risk. Some pastoralists have turned to exclusion fencing for two reasons: to control wild dogs and limit kangaroo numbers to sustainable levels. However, the adoption of exclusion fencing in western New South Wales is limited by the cost and unsuitable terrain.

The impact of drought on kangaroos is many orders of magnitude higher than commercial harvesting. From an animal welfare perspective, allowing millions of kangaroos to starve to death during droughts is an incredibly cruel outcome, but this is unseen by almost all Australians. We do see this happening and it is unacceptable. The Seventeen Twenty drought saw more than 99 per cent of kangaroos in Sturt National Park, a 325,000-hectare national park in the far north-western corner of New South Wales, starve to death. I ask why there is so much concern about commercial harvesting and fencing but people turn a blind eye to this. I ask why there is so much concern about how the commercial industry deals with joeys but not a word is said when female kangaroos dealing with drought conditions turn their pouch young out onto the ground to die.

It must be noted that kangaroos are most frequently invisible in the landscape. Just because people do not see them does not mean that they are not there. The population of the four most common species of kangaroos in the commercial harvest areas of New South Wales is down by 40 per cent over four years due to deaths associated with the Seventeen Twenty drought. Kangaroos have dispersed into the landscape since rain started falling last year. Kangaroos do not like busy roads, so the best places to see them are not where people are looking for them. One of the biggest unknowns is that kangaroos are actually nocturnal, so the best time to see them is not when people are looking for them. Thank you.

The CHAIR: Thank you very much for that opening statement.

The Hon. MARK PEARSON: Thank you, Mr Gall. I would like to ask you a question. In your submission you speak very favourably of the decision back in 2018 by the then Minister for Primary Industries, Niall Blair, to stop the requirement of tags for non-commercial killing. Are you still in favour of that?

Mr GALL: Yes, I am.

The Hon. MARK PEARSON: Could you tell us why?

Mr GALL: It increases the opportunity for compliance with the relevant regulations. There is still the requirement to apply for a licence, stating the species and number of kangaroos that a farmer or grazier wishes to cull. Once the culling has been undertaken, the farmer or grazier still has to complete and submit a return to the National Parks and Wildlife Service, stating how many kangaroos were culled.

The Hon. MARK PEARSON: But it is the case, though, that without having a tag, a farmer can just drive up nearby a mob of kangaroos and shoot them from the vehicle and drive away. Is that not the case?

Mr GALL: I would suggest to you that removing the requirement to tag the carcass actually increases compliance because there is no longer the task of having to apply a tag, which ultimately ends up blowing across the paddock, to each carcass. So if the farmer or grazier has to still apply for the licence and fill out a return and furnish that to the National Parks at the end of the licence period, then that still fulfils the reporting requirements. And farmers and graziers are more likely to do that because the onerous task of applying a tag to each individual carcass is removed.

The Hon. MARK PEARSON: Is the requirement of a drop tag not just for the Department to keep track of the numbers of kangaroos that are being shot? But if a person shoots a kangaroo and then has to put a tag on it, does it not also fulfil the welfare requirements that by putting a tag on the kangaroo, it gives the person who shot the kangaroo the opportunity to check that the animal is actually dead and can offer a coup de grâce shot if it is not, and also check the does as to whether they are pouch joeys or joeys at foot? If you do not have to walk up and put a tag on a kangaroo, is it not the case that those welfare checks are not in place?

Mr GALL: Tag or no tag, there is still the requirement for those who are undertaking the culling to follow the provisions of the national non-commercial code of practice for the killing of kangaroos.

The Hon. MARK PEARSON: But that provision is filling out a form, isn't it?

Mr GALL: And in times of drought, the female kangaroos are not actually carrying babies in their pouch.

The Hon. MARK PEARSON: At all?

Mr GALL: So looking in the pouch is looking in an empty vessel.

The Hon. MARK PEARSON: So you are saying that during drought, no doe—no female kangaroo—will have a joey in the pouch or a joey at foot. Is that what you are saying? Is that your evidence?

Mr GALL: In the most recent '17-'20 drought, that was the experience of pastoralists in Far West New South Wales. This is a well-known feature of kangaroo biology, that they cease breeding during periods of drought. And when conditions are particularly severe, they will actually throw the pouch joey out onto the ground and leave it to die.

The Hon. MARK PEARSON: The other side of the welfare check still is not happening, and that is as to whether the animal has been cleanly killed or not. There is not a requirement to go and visually check that, is there?

Mr GALL: I think you will find that in the relevant Code of Practice, there are provisions covering the dispatch of the animal and ensuring that that is done in an appropriate manner. In any case, the death of a kangaroo by shooting is far kinder to the animal than letting them starve to death over a period of weeks or months.

The Hon. MARK PEARSON: I would agree with that, but the shot would need to be a clean shot. Following on from the answer you gave just before then, so you would now support the issuing of drop tags, wouldn't you? Now that we are out of the drought and the kangaroos are bouncing up again, there will be joeys in pouches, so you would support the reintroduction of the requirement for drop tags so that the shooter would then be required to check the pouch. Is that right?

Mr GALL: No, I do not support the reintroduction of drop tags because, as explained previously, that is an extra job for the shooter to undertake, which is actually a disincentive to licensing and compliance. But certainly the provisions in the Code of Practice, including checking the pouch for young, still remain and must be followed.

The Hon. BEN FRANKLIN: I will start with NSW Farmers. Ms Petrie, you are welcome to jump in as well, of course. Firstly, I was wondering if you can talk to me about how the overgrazing of kangaroos can impact farmers and how kangaroo impacts particularly compare with impacts from other native fauna?

Ms JOHNSON: Ms Petrie is a farmer who has experienced that, so let's hear from a farmer who has actually lived through it.

The Hon. BEN FRANKLIN: Ms Petrie, away you go.

Ms PETRIE: Thank you for the question. Can you hear me?

The Hon. BEN FRANKLIN: Yes, absolutely.

Ms PETRIE: In the Western Division up to 50 per cent of grazers are kangaroos, rabbits and feral goats. That is quite significant for that area. I am further east of that but, to give you an instance, we have a resident kangaroo population here on our small home farm. We have 25,000 acres, however. Those kangaroos have survived through the drought.

The Hon. BEN FRANKLIN: You are a little bit muffled.

Ms PETRIE: I have given my phone number.

The CHAIR: I think that is what we will have to do. What I think is happening is this connection is unstable. Hang up and we will call you.

Ms PETRIE: As I said in my opening statement, one of our members out west had to completely destock her property of goats because she could not compete with the kangaroos that were coming in from other drought areas. That was replicated across the west. Here, further to the east, we had an influx of kangaroos from the central area of New South Wales and they were completely eating out the native vegetation grazing lands as well as cropping areas. On top of which, in general terms, we have seen a massive increase in national park estate in our shire. Just to give you a personal experience, we used to only ever aerial bait every second year because we quite liked having some dogs to keep the kangaroo population under control. With the transfer of land from State forest to national park plus private farmland as well, and the change in the management of removing water sources plus not doing the regular cool mosaic burns, that has resulted in rank grass for the macropods. They moved into the farmland and, therefore, the pigs and dingoes followed.

We now aerial bait twice a year, we hand bait, we trap and we shoot. We cannot walk around anymore without something in our hand. The kangaroos are not stupid; they will go where there is food. We have had farmers lose crops and we have had farmers lose their native pastures and their grazing pastures. It is really unfair on them but it is also very unfair on the kangaroos and other native species where earlier intervention needs to take place. There needs to be better management of 10 per cent of our State which is under public land. That is just national parks plus there are others. We need to look at this holistically. We have got farmers who were not only impacted by drought but then could not even use their drought reserves because the kangaroos came in and took over. All they control is their livestock. They cannot control the kangaroo numbers. The Government was nowhere to be seen with the responsibility of managing and looking after the welfare of those native animals.

Ms JOHNSON: I was just going to add to that following on from the evidence that you heard previously about the implication that the impacts from other invasive species or native species was part of the issue. The impact from kangaroos in this most recent drought was far greater than rabbits and those sorts of species that were raised in the evidence previously. As Ms Petrie highlighted, we had farmers having to completely destock because they were feeding kangaroos and they could not feed their cattle, sheep and goats. We had crops wiped out because the kangaroos were looking for feed and they went on to the crops and found it. The total grazing pressure was far greater and it had a far bigger impact on our farming businesses than the other species named.

The Hon. BEN FRANKLIN: Can I move to the changes to the non-commercial shooting regulations, which changed as farmers were facing the worst drought in history, probably. Can you discuss the impact of those changes and if you could revert to the pre-2018 regulations—if farmers could revert to the pre-2018 regulations?

Ms JOHNSON: I will start off. As we have noted in our submission, we support the way that it currently stands. We feel similar to what Mr Gall spoke of, that it is a balance. We are able to undertake the necessary—welfare checks are already required under other parts of legislation. If there is an animal that is in distress under the Prevention of Cruelty to Animals [POCTA] Act, there needs to be actions undertaken. Also it is very important in terms of biosecurity. It is not good to leave carcasses lying around. It encourages pigs to come onto property, which creates other issues. I will pass to Ms Petrie because she has experienced the changes.

Ms PETRIE: Following on from Mr Pearson's question as well on the same matter, for a start we do not shoot from inside the car. You sit in a driver's seat and see how you go with a rifle. We have to do a head shot by law. We have to do a head shot. There is the requirement to check for welfare. Farmers are not cowboy rabid killers, leaving maimed animals floundering around the paddock. The vision you sometimes see on television of idiots driving up and shooting willy-nilly at animals is sickening. That is not your farmer. We do not want to see the animal starving to death. We work humanely. We do not like killing things. The number of farmers who are under great stress already where they have had to put their own livestock out of misery where they have gotten stuck in dams et cetera is bad enough without having to add to it what is happening to a vast number of farmers having to put down kangaroos and other animals as well.

I have a lady here in Tenterfield whose husband had a stroke. She is in her 70s. She is out there feeding and watering cattle. She barely can cook herself a feed she is so tired when she comes back from looking after her husband. She could not go and control the kangaroo numbers and she could not get a professional kangaroo shooter there because of exactly what Mr Gall was talking about before. She could not pay him because of the record drought we were under and they would not come because they could not just shoot and let lie. This is a huge problem. That takes away a resource also for Aboriginal people, as well as what Ms Johnson said about that then creates a smorgasbord for pigs et cetera to come along and predate on those carcasses and then they will move to the native animals, little animals and lambs et cetera and dig up native vegetation. You have got to have a reality check here. Farmers do not go around destroying wildlife and seeing the vision of that without doing it properly and professionally.

The Hon. BEN FRANKLIN: Mr Gall, your submission refers a number of times to the commercial kangaroo shooting industry. I was just wondering if you can give us a broader understanding of the impact of the commercial kangaroo shooting industry on regional economies and its importance in your view.

Mr GALL: I understand that the Committee is hearing from industry representatives at a later point in time, so I believe that question is best directed to them. But, certainly, in terms of offering employment opportunities and generating economic activity in small towns in remote and regional New South Wales, the commercial kangaroo industry is a small but important contributor.

The Hon. BEN FRANKLIN: Finally, your submission says grazing pressure from kangaroos, in your view, brought forward the onset of the recent drought by six months or so. Just picking up on the issue of the changes to the non-commercial shooting regulations, did that assist in trying to deal with that and, if so, what do you think the future of those regulations should be?

Mr GALL: The changes to the conduct of the non-commercial cull certainly assisted in terms of meeting compliance obligations because the unnecessary and onerous requirement of attaching a tag to the animal was removed, whilst still maintaining all the requirements regarding licensing, reporting and animal welfare. Certainly, on property scale, there would be some pastoralists in western New South Wales that would have culled enough kangaroos to make a difference to the situation on their properties, but in many cases it got to the stage where any culling activities were too little and too late. The number of kangaroos that starved to death due to drought is approximately 10 times the number of kangaroos that were culled.

The Hon. BEN FRANKLIN: A point well made. Thank you very much.

The CHAIR: When we talk about the code of practice, how is compliance against that code enforced on the ground? Maybe we will start with you, Ms Petrie.

Ms PETRIE: I do not personally go and shoot kangaroos, but it is like any other code of practice that we work under that is regulated by the appropriate government department, which in this case is NSW National Parks and Wildlife Service. If anyone is doing the wrong thing you can guarantee that someone will report them, as you would be very well aware with issues such as native vegetation. Farmers are very much under the spotlight—pardon the pun—with all sorts of regulation of our activities. I just wish the same regulations applied to the people responsible for our native species, namely the Crown, because I think that has been the most terrible lack there. Do not forget that ammunition actually costs quite a lot of money, each bullet, and yet it is up to the poor farmers to try to regulate those populations and to put an end to the suffering of those animals where they have been allowed to get completely overpopulated.

The CHAIR: I think Ms Johnson also had a response there.

Ms JOHNSON: The question you asked was quite specific around compliance, so would we please be able to take that on notice and come back to you specifically with the way that it is operating?

The CHAIR: Yes, I think that would be good. I am aware of the fact that there are a certain number of compliance officers, if you like, but we are hearing evidence that there is very little monitoring undertaken on the ground. So, yes, anything you can do in terms of shedding light on that would be appreciated.

Ms JOHNSON: Yes. We will take it on notice.

Ms PETRIE: I believe Mr Gall has an answer there.

The CHAIR: We will go to Mr Gall and then to Mr Buttigieg for questions.

Mr GALL: Yes, thank you. You are correct. There are compliance officers that enforce the regulations and I have personally seen them out in the bush conducting compliance activities in the past.

The CHAIR: I understand those compliance officers are not compliance officers with sole responsibility within, for example, the kangaroo management program but are also compliance officers for native vegetation, threatened species and a range of other things?

Mr GALL: It is my understanding that definitely, at the very least in the past, there were compliance officers that were wholly and solely engaged in the job of kangaroo compliance.

The CHAIR: Just to be clear on that—this is clarifying—I think that was up until July 2013 that there were compliance staff with sole responsibility for kangaroos, and now that has merged with regional staff that are also having to do native vegetation and other things. So when you are saying "in the past", Mr Gall, can we just confirm what that means? Is it prior to July 2013?

Mr GALL: Yes that is correct.

The Hon. MARK BUTTIGIEG: I note that in the submissions it has been stated that there is an overabundance of the kangaroo population. We heard evidence earlier today that the methodologies surrounding how those population figures are come up with are questionable. So, firstly, what do you say to that? Is it possible that kangaroo populations may in fact be declining and we may actually be using the wrong methodology but the farming community is seeing them proliferate because they are being pushed onto farmlands? In other words, kangaroo populations are in the wrong places because of those policies of removing water sources and all the rest. So you can reconcile the two opposing views by the fact that they are in the wrong places and affecting farming communities but if they were more spread—in other words, away from them—it would not actually be the problem that it is. Is that a fair assessment?

Ms JOHNSON: I can only speak from the farmers' side. Our farmers are reporting increased numbers sort of—you would need to look at the State holistically to decide whether there are those components, where they were previously but now are not. But our farmers—I would not say across the board, but in a majority of the State—are reporting increases in kangaroo numbers. Obviously, with the drought and the pressures that were out west there were further movements east in search of food and water. But it is a common theme that our members report increasing kangaroo numbers.

The CHAIR: Is that anecdotal? Is there a specific way in which you gathered that data from your members over a period of time?

Ms JOHNSON: No, it is anecdotal. We have not—I just want to be clear, that sort of experience—I am just stating the farmers' experience that we are hearing anecdotally. It is certainly consistent with what you said.

The CHAIR: We will have to leave it there. We are out of time for this session. Thank you very much for appearing. Thanks for persisting with our technical challenges there with dialling people in from the west. We really appreciate your attendance today.

(The witnesses withdrew.)

(Short adjournment)

GEOFFREY WISE, Independent Chair, Kangaroo Management Taskforce, before the Committee via videoconference, sworn and examined

ALEXANDER RUSSELL GRANT, Natural Resource Management representative, Kangaroo Management Taskforce, before the Committee via videoconference, sworn and examined

LEON ZANKER, Western Landcare representative, Kangaroo Management Taskforce, before the Committee via videoconference, sworn and examined

The CHAIR: Thank you all for appearing. Are one or more of you going to make an opening statement?

Dr WISE: Yes. Would you like me to lead off?

The CHAIR: Please.

Dr WISE: I am Geoff Wise, here on behalf of the Kangaroo Management Taskforce [KMT], which I am sure you would have all read is a very comprehensive, diverse group of people. We have been operating together for about five years, with a focus on continuous improvement on better science and better outcomes for kangaroos. Our focus is certainly on western New South Wales but we have ended up networking up to a national level because of the interests of other people around the country who have ended up taking in our activities. But certainly I commend to you the detailed submission that our task force has contributed, and I have also made a personal submission with 24 recommendations. We have no intention of talking to either of those submissions but we are happy to take questions.

We would just like to share with you five key points and then Leon Zanker will make a few extra comments from a landholder perspective. The first of the five key points is about the boom-bust cycle of kangaroos. We believe the driving force of all aspects relating to kangaroo health and wellbeing and all other aspects to do with kangaroos is linked to that boom-bust cycle. That is the overarching aspect. The second point is that kangaroos have to be looked at in the big picture of the whole ecology, the whole of biodiversity, the whole of all legislation—whether that be the Biodiversity Conservation Act, animal welfare legislation, the Crown Lands Act and whatever. Trying to isolate kangaroo issues outside of the bigger picture we believe leads to, I will not say false outcomes but out of context outcomes.

The third point we emphasise is that for the future of kangaroos they must be managed. They have got to be managed effectively with adaptive management. The lack of management at all levels from government to industry is not going to improve the outcome for kangaroos or for the economy. When I say management, whether that be threatened species of macropods or whether it be the overabundant species. Our fourth key point is that the greatest concern to us for the health and wellbeing of kangaroos is the massive welfare concerns that occur at the beginning of and through any dry period in that boom-bust cycle. That pales into insignificance the health and wellbeing concerns associated with landholders and the commercial kangaroo industry in any of their intervention components.

The fifth point relates to the ownership of kangaroos. It is explicitly stated that they are owned by the Government. Landholders are only the caretakers; they have got no ownership responsibilities. The duty of care responsibility of the owner we believe has been neglected and there are great opportunities for that to be improved. They are our five key points. I will hand over to Leon to speak from the landholder perspective, which will probably highlight some of those points a bit more. Thank you.

Mr ZANKER: My name is Leon Zanker. I have been a farmer and grazier all my life—I am over 60 years of age now. For the last 40 years I have been living and working in the Western Division of New South Wales on a sheep, cattle and goat grazing property. Our area suffers from highly variable rainfall, highly variable seasonal and climatic conditions and yet we have to make our living by managing our domestic livestock in concert with those seasons. We have to manage in accordance to the feed availability that we have got. I do not have any ownership of the kangaroo, yet I have got to suffer the financial loss associated with their overgrazing impacts. I have also got to go through the sort of emotional trauma of having to deal with the massive animal welfare outcomes as kangaroos go through that starvation cycle, their eruption cycle. It is actually even illegal for me, a landowner, to put down, to euthanise a starving kangaroo.

The biggest single contributor to the increasing pressure that we cannot manage actually is the kangaroo. Their numbers are not in decline. Right now, our overall kangaroo numbers are probably the lowest they have been for a long, long time and that is purely because we have just gone through the worst drought in living memory. We have had the biggest mass starvation event happen over the last three years that I can remember in my 40 years. Our feed conditions—we have had a bit of a seasonal break out our way, which is great. So our kangaroo numbers are down but, overall, their numbers are not in decline given that they will respond very rapidly

to the seasonal conditions. Their breeding rates, their survival rates are very high and, as I know from experience, each good season is accompanied by a rapid increase in population and then, as night follows day, the eruption cycle means that overpopulation results in a massive bust part of the cycle where millions of kangaroos die of starvation, which is the worst animal welfare outcome you could possibly imagine.

In our country we have got the four large macropod species: the red kangaroo, the eastern and western grey and the euro. As I said, their numbers are not in decline; they are in a build-up phase now coming out of a drought. Another point I would like to make is that where I live I am 700 kilometres from my nearest shopping centre, so that almost always entails shopping at least in the early morning, evening or at night-time. During the 2017, 2018, 2019 period I was not game to drive at night. So imagine the cost that imposed on me having to do everything in the daytime—drive to town, do my shopping and drive back the next day or the next day simply for the fear of kangaroo collision. The number of kangaroos that were smashed to death or injured in road collisions with road trains, vehicles et cetera on our section of road alone it is absolutely mind-boggling. The animal welfare consequences of that are absolutely horrific.

We have always used professional commercial accredited harvesters, harvesting our kangaroos in an effort to keep their numbers under control. Years ago when the commercial industry was able to take close to full quota we did not really have too much of a problem. In recent years the commercial industry has not been able to take anywhere near the quota, so we have had no other option but to resort to non-commercial culling, which is something we do not want to do, we do not like to do, but we are forced to do it because there is no effective management shown by the actual owners of the kangaroo.

I fully endorse the commercial industry. It has been the very best way, for a whole heap of reasons, for managing our kangaroo numbers, not the least of which is the fact that all harvesting happens under a very strict regulated code of practice—so that has to ensure the very best animal welfare outcomes. It also utilises what we all know is a very valuable resource, and why should we leave that in the paddock when we can actually utilise it? In summary, what I cannot do as a landowner who makes his living from caring for animals, I cannot accept this boom-bust cycle and the horrific animal welfare consequences that go with it. I have a legal, moral and ethical responsibility to look after my domestic animals. I would like to pose the question: Who takes on the moral and legal responsibility of looking after the kangaroo? I have not got an answer to that question yet from anybody. The greatest threat to the health and wellbeing of kangaroos, in my view, is the continuation of a kangaroo management policy that does nothing more than sustain the numbers of actual kangaroos. It does nothing to take into account their actual cycle, it does nothing to take into account the effects on landscape, biodiversity and environment through mass overgrazing.

The CHAIR: Thank you for that opening statement.

The Hon. MARK PEARSON: Thank you very much for coming and for your submission. We have had evidence today, and it has been corroborated by other scientists, about the actual breeding rate of kangaroos—that it is approximately 10 per cent. If the breeding rate is widely acknowledged to be approximately 10 per cent every year can you please justify how a harvest rate of 20 per cent for reds and 15 per cent for greys is actually a sustainable practice?

Mr ZANKER: I would not actually accept that 10 per cent; it might be an average. But my 40 years' experience in the rangeland is that coming out of a good season like we are going through right now breeding rates are extremely high. They will have joeys at-foot, they will have joeys in the pouch and some could even have young embryos ready to come to the pouch. Breeding rates, in my view, really only go into decline when those levels are put under severe stress and in our country that stress is predominantly associated with the effects of overpopulation and drought. To say that there is only a breeding rate of 10 per cent I think is not telling the full story.

The Hon. MARK PEARSON: That is your position. But, unfortunately, the scientists who are giving evidence that is pretty much what they, from their observations, have seen.

The Hon. BEN FRANKLIN: One scientist.

The Hon. MARK PEARSON: I will move to another issue. Do you support exclusion or cluster fencing?

Mr GRANT: If I may answer that. I certainly support exclusion fencing as a tool for kangaroo management. I guess I would make the point that any tool is subject to various class of management. Under good management exclusion fencing is a very valuable tool for landholders specifically to manage land condition. I might go as far as to say that in the last 15 years of working in western New South Wales I have seen areas of good condition that are not subject to some sort of fencing containment to manage kangaroo numbers. When I am talking about land condition I am talking about the ability of vegetation and the land to minimise erosion,

maximise biodiversity and maintain animal production outcomes. I think particularly in terms of welfare you need to consider the welfare of other native species other than kangaroos under an overgrazing situation substantially suppressed.

Dr WISE: We are getting a loss of static on this end. Are you hearing us clearly?

The CHAIR: Yes, we are.

Dr WISE: Could I just revert back to the previous question. From graphs that I have seen of the annual increase in population numbers during a good seasons, I would have thought that some of those graphs would demonstrate that the increases are greater than 10 per cent. That is after any removal of kangaroos for the commercial harvesting industry or whatever. The balance between young animals coming in and old animals dying out, I would have thought that graph could be increasing at greater than 10 per cent in the good seasons.

The Hon. MARK PEARSON: I am just interested in how much you take into account Indigenous connection with kangaroos. Do you think the kangaroo management task force is actually respectful of the place of kangaroos in Indigenous customs and lore. I have spoken with Elders who are saddened by the treatment of kangaroos and the destruction of their great migration pathways—I think this is where exclusion fencing comes in—in terms of what the Indigenous people see of the movement of kangaroos over a given space over hundreds of thousands of years. I have been informed that much of the Indigenous knowledge about the landscape is not taken into consideration. Can you tell us about whether the Indigenous customs and lore are taken into account by your task force and have you undertaken consultations with Elders when you are looking at this whole issue of our impact on kangaroos?

Mr GRANT: The kangaroo management task force does maintain Aboriginal membership, but we also receive advice from the Aboriginal Community Advisory Group and Western Local Land Services. So we use them as sounding boards for the information that we present and as much as possible we incorporate their advice—and that advice is obviously coming from their Elders.

The Hon. MARK PEARSON: Just on that point, can you give us an example of how you have taken on their advice and implemented it?

Mr GRANT: I will have to take that on notice. Certainly the participants in the task force have been supportive of our aims and what we are trying to achieve.

Mr ZANKER: Just to add to that, you mentioned the word "respect" and how that might align with the commercial industry. My understanding is that the way kangaroos are commercially harvested is done so, as I said before, with the best animal welfare outcomes to harvesting under the code of practice. My understanding from the Aboriginal perspective is that they also highly respect the kangaroo and what they do not like to see is waste and ill-treatment. Both of those things the commercial industry works very hard to ensure that that does not happen. I see a very strong correlation being between the respect side, which is what the Aboriginals as I understand would like to see, and what the commercial industry affords.

The Hon. MARK PEARSON: I suppose the question is do the Indigenous Elders see that? Do you have any evidence of that? That they see the harvesting of kangaroos falls in line with the standing they give kangaroos in their lore and laws? For example, we were given evidence this morning—and it has not been contested—that about 550,000 joeys a year are killed in Australia. These are animals for which there is no commercial tag or non-commercial tag, they are considered to be collateral damage. The joey at-foot is very rarely found; it runs after the mother is shot and probably dies a long lingering death of starvation or predation. How can you align that with an absolute respect for the welfare of these animals when this is an actual fact that is happening to probably 300,000 joeys a year?

Dr WISE: If I could just come in. You talk about Indigenous Elders, there are obviously Indigenous Elders scattered right across the Australian landscape and different ones obviously have some differing points of view. We have gone out of our way to work with the Indigenous Elders and Indigenous communities. We have had workshops run by Aboriginal people with Aboriginal people in keeping them engaged in us gaining better knowledge and a better understanding. We openly acknowledge that in those Aboriginal groups that might have a kangaroo as their totem, might have a totally different attitude to other Aboriginal Elders, if you like. I am not aware that there is a single unanimous view of Indigenous Elders one way or another on an issue such as this. Certainly there are a significant number of Aboriginal people in western New South Wales involved in the commercial harvest industry. They are happy to be involved in it and yet they are the ones that you are suggesting might be part of that indiscriminate waste on joeys. I would think the Aboriginal people as much as anyone else are just as disappointed in the millions of adults and joeys that die during the down season.

You quoted figures. I think it could be estimated from the kangaroo count figures of both the population counts and the commercial take that there could have been as many as three million joeys in the Tibooburra zone alone that died from 2017 to 2020 through starvation, thirst and importantly neglect by their dead and dying mothers. We can all throw figures around. I am only saying that is an estimate, but I think that could be a potential number of joeys that suffered. At the same time, over the same four-year period from 2017 to 2020 there were 739 harvested females under the commercial harvest program. Even if every one of them had a joey, how many of those joeys were not killed in accordance with the defined code of conduct? The killing of a joey from a doe that might have been harvested.

The Hon. MARK PEARSON: Thank you very much. I was not inferring that the Indigenous people were part of that decision to be killing joeys in that way. I will just move the question along. Do you think that the community would accept that the commercial industry leaves up to 350,000 joeys to die from predation, starvation or exposure? That is a fact as part of the commercial industry. Certainly it is extremely tragic and it is something that we are going to have to put our mind to as to what happens to these kangaroos when they are dying in drought, but that is something that we are not directly influencing. We are probably indirectly influencing. But when we go out on a commercial kill, the evidence is that that many joeys are dying in that way as a direct consequence of the commercial kill. Do you think the community would accept that?

Dr WISE: It is a fact that a greater number of joeys are dying from other causes—natural causes, if you like—through lack of proper management of kangaroos by the owners of the kangaroos.

Mr ZANKER: In addition to that, you mentioned a figure associated with the commercial industry. Commercial industry accredited harvesters have to operate according to the code of practice. Whatever joeys they have to euthanise, it is done so in accordance with the code of practice and that complies with—

The Hon. MARK PEARSON: I will have to just interrupt. That might be the case if you can get the joey out of the pouch, but the joey that is at foot when the mother is shot will flee. The chances of the shooter finding that joey are highly unlikely. That is the evidence that has been given to us by experts today, and shooters will tell you that as well. I am just asking you, do you think that is acceptable to the community for a commercial industry?

Mr ZANKER: I think we have to come back to Dr Wise's juvenile perspective. You are making that claim. Professional shooters harvest very few females in their take. They make an assessment of what size joey that doe might have. They make a deliberate decision whether to take that doe or not. If it is obvious that she has a large weaned joey afoot, under the code they choose not to take those. I know you are quoting extremes and looking at an emotional viewpoint but as Dr Wise pointed out, the number of joeys that are perhaps less than effectively taken out is absolutely insignificant than the amount of joeys thrown out of the pouch by does that are dying of starvation, hit by road trains and whatever.

The Hon. BEN FRANKLIN: Thank you all not only for being here but for the work that you do in this space. It is valued and very important. At the beginning of the questioning there was obviously the discussion about the 10 per cent number in the increase in koala populations each year—

The CHAIR: Kangaroo.

The Hon. BEN FRANKLIN: Kangaroo populations each year. Whether it is 10 per cent or not, your lived experience over decades out on farmland and in communities is that kangaroo populations do substantially increase—in fact, one of you gave evidence before about not driving in the evening because of that—and then substantially drop off. Could you talk to that briefly?

Mr ZANKER: We had a fair bit of trouble hearing you.

Dr WISE: Explain again the key question.

The Hon. BEN FRANKLIN: Basically, I was looking for your comments on the fact that in your lived experience there are these booms and busts in kangaroo populations. We have had people say that there cannot be booms and busts. One scientist said that is because there can only be a 10 per cent increase each year. My question is: In your lived experience over decades in the west of the State, have you experienced these booms and busts and can you talk to that a little?

Mr ZANKER: My anecdotal experience of that is those booms and busts do occur. If you look at the population growths from national parks and now Environment, Energy and Science—look at the latest one, the 2021 population information from their aerial counts and then go back historically for the past 30 years or 40 years. Have a look at population growths year by year. Have a look at the peak in the population. Have a look at the crash. Have a look at the following peak. If you maintain that 10 per cent is a breeding rate, there is no way that

you can go from the low in one year to a peak of 16 million or 17 million three years later with a 10 per cent breeding capacity. Breeding cannot do that.

The Hon. MARK PEARSON: Precisely.

Mr ZANKER: I just go on the facts if you want to look at the graphs. But anecdotally, as we come out of the drought we have very low numbers and that is where we are at right now. If we get a run of one or two or three better seasons, which is historically what happens, those kangaroos breed up very quickly and very prolifically. As soon as we go into that dry time, starvation sets in because drought conditions set in. As a land manager, I have no effective means of managing their grazing pressure.

The Hon. BEN FRANKLIN: The space about the graphs and the numbers is contested. The point that I was trying to make is, in your lived experience when you see it on the ground, you have seen that there are times when there are lots and lots of kangaroos and there are times when there are almost none. Is that correct?

Mr GRANT: If I may answer that, I would say that is totally correct. The residents of western New South Wales in a decade or time frame continually see it. The kangaroo population estimates produced by the kangaroo management group broadly reflect what is found on the ground where there are substantial increases in kangaroo population numbers with good seasons, given that kangaroos are very much opportunistic breeders. With the fall off of seasonal conditions and available foliage, most people have seen the dramatic declines and see evidence of that decline in terms of dying kangaroos. Presently, yes, there are very few kangaroos in the landscape. It is totally different to what it was two years ago. So, yes.

The Hon. BEN FRANKLIN: Thank you very much. We had evidence from our last session that 99 per cent of the kangaroos in the Sturt National Park perished from starvation. He made the point similar to the point that you have made today, which is that that animal welfare outcome of kangaroos starving to death in the most appalling situations is obviously something that is devastating and something that is not an acceptable outcome and that we need to ameliorate if we can. I go to the third point in the key points in your submission when you talk about this fact:

... the NSW community accepts this death by privation—

implicitly; that is my word—

as the predominant mechanism by which over-abundant kangaroo populations are moderated and stabilised. The KMT does not accept that this is an acceptable welfare outcome and calls for improved public education and awareness of the reality facing kangaroo populations.

In your suggestion that this animal welfare outcome—the death of these animals—when there are too many of them from starvation and that the community needs to do something different, could you speak to both the educational outcomes that you would like to see differently and the other management practices that we should be implementing in order to deal with or ameliorate this situation?

Mr GRANT: I guess you could probably frame it in terms of the urban-regional divide somehow, but certainly in western New South Wales people feel that the issues of kangaroo overpopulation and when it crashes are poorly understood by a vast majority of people that are outside the region. What we would like to see is a broader, more strategic approach to kangaroo management whereby there are proactive efforts to manage the increasing populations. There is a pattern that populations rise to a peak during good seasons and then crash with the onset of drought. Certainly, our ability has increased these days to understand that poor seasons will come. We can be very much more on the front foot in terms of potentially managing kangaroo populations via a range of practices prior to the onset of good seasons.

It gets back to—we are working in a reactive sense currently, and it is like the changes to the non-commercial culling that occurred two years ago, which was done reactively. What we need to be able to do is get on the front foot and be able to recognise that when populations get over a certain level, we know that there will be a crisis coming and that non-commercial or commercial harvesting should be enabled wherever possible. Landowners should be supported in other means of managing kangaroo populations, whether it be by fencing, water point control or whatever other means that we can identify that can moderate the swings in kangaroo population to avoid this boom-and-burst cycle.

Dr WISE: [inaudible] on the opening part of that question about perception that it is all just nature out there from more highly populated areas like Sydney, if you like.

The Hon. BEN FRANKLIN: That was quoting from your submission.

Dr WISE: There are horrific photographs from occasional kangaroos suffering and being burnt through the coastal bushfires, all of which is outside any of the area where kangaroos are counted. They are in relatively small numbers compared to the millions that we are aware of that are out of sight and out of mind by the wider

population that have suffered so much. So there is a pretty massive perception issue here between those on the ground who are witnessing it all compared to, if you like, the complacency and lack of understanding of the small population who have a voice without knowing the reality.

The Hon. BEN FRANKLIN: Could you just briefly address what, in your experience that you have seen, are the impacts on the environment caused by kangaroos? In particular, in the times when there is an overabundance of them, what are those actual practical impacts on the ground?

Mr GRANT: There has been some recent research done which highlights the sort of impacts that we see and documents quite well, which I have referred to in our submission. We are looking at the impacts of chronic overgrazing on pastures, which is reflected primarily on ground cover, which has impacts on erosion, of course, and the amount of biomass available. It also gets back to the species present. We know that kangaroos are selective grazers on tussock grasses and that sort of thing. Primarily, those sort of species get depleted in overgrazing situations, particularly our perennial grasses. Once the perennial grasses are depleted and basically the landscape becomes predominated by more annual ephemeral species, your countryside is far more affected by drought conditions because the vegetation does not persist. It effectively blows away with the onset of drought.

I guess together with the decline in native vegetation—and you have got to remember that in western New South Wales we are talking about the native grassland vegetation, but you are also looking at impacts on biodiversity because obviously where you have got no ground cover, no grass cover, all those other native species that are dependent on that sort of habitat have nowhere to live and have nowhere to forage. You see that in birds, a whole range of small animals, reptiles and the associated birds of prey—a whole range of species. My view is western New South Wales should be the biodiversity reservoir for New South Wales but, in fact, our biodiversity is hugely suppressed by this grazing pressure. What part of it is due to domestic grazing pressure or what part is due to kangaroos, well, certainly in some situations it might be domestic group stock management, but certainly many landholders totally have destocked their country in the most recent drought. That has no impact on the landscape because of the ongoing impact of kangaroos.

The Hon. BEN FRANKLIN: Thank you very much.

Mr ZANKER: To give you an example of that very thing happening, a large chunk of cattle country that is predominantly covered in buffel grass—terrific cattle feed, terrific sheep feed, even better kangaroo feed. That country we totally de-stocked by mid-2018, so we had no domestic livestock on that country whatsoever. We still had grass up four inches high. That country got hammered through by kangaroos for over 18 months before the actual peak of the drought just saw them starved to death. That country today has absolutely no buffel grass left on it. The total vegetative cover is totally different to what it was before. Whether it will come back over time, I do not know. The thing that nobody really appreciates is the grazing anatomy of a kangaroo. It has a jaw with its teeth set forward and it can graze much closer to the ground than any other animal that we domestically graze. It also has the ability with its front feet to actually dig up those grass roots. So in that total overgrazed and over-dense situation, their effect on the landscape is absolutely catastrophic and are going to the point of, in our case, probably a reversal.

The Hon. MARK BUTTIGIEG: I just want to tease out a theme which has sort of, I think—in my mind, anyways—emerged from today and it is somewhat cross-purposes. I will start by asking a simple question. We heard fairly compelling evidence this morning that there is a biological or physical limit, if you like, to the population growth rate based on fairly simple reproductive biology. That upper limit was 10 per cent. What do you say to that logic?

Mr ZANKER: I cannot understand the question.

The Hon. MARK BUTTIGIEG: The evidence we heard this morning from—I am just trying to remember the witness.

The CHAIR: Sorry. Are you saying it is a volume thing? Did you hear the question?

Mr ZANKER: No, you are coming through quite muffled.

The Hon. MARK BUTTIGIEG: I am sorry. Is that better?

Mr ZANKER: Not really.

Dr WISE: From what I understand of the question, we will need to take that on notice after we have got a chance to have seen the reference you are referring to.

The Hon. MARK BUTTIGIEG: So you did understand the question?

Dr WISE: No, I haven't. We are having trouble hearing it.

The CHAIR: The question—I will just repeat it—is in relation to evidence we heard this morning that kangaroo population numbers will increase by roughly 10 per cent per year in a good year based on simply the biology of the kangaroos in terms of how often they can have a joey.

Mr ZANKER: As we said before—we are repeating ourselves. Anecdotally, I refute that figure.

The Hon. MARK BUTTIGIEG: Okay. I already asked that.

Mr ZANKER: In good seasons it is far, far greater than that. It has to be to present us—

The Hon. MARK BUTTIGIEG: Sorry.

Mr ZANKER:—with the populations that are on our country.

The Hon. MARK BUTTIGIEG: The key word you used there is "anecdotally". Is it not possible, through the lens of a farmer or someone who is on the land, that the intensity of interaction with kangaroos as a result of kangaroos being pushed onto farmland because of drought and other factors, that you are extrapolating that perception into population growth that is just not there overall? Is that not possible? I am not being critical of it. I am just trying to get a handle on the reality here.

Mr ZANKER: We are a pretty big landscape out here. In between those national parks there are vast amounts of privately owned property where that movement—yes, there is movement induced by good seasons and isolated rainfall. Kangaroos, as we know, especially reds, will move to where the best feed is and concentrate their grazing pressure there, increasing their grazing pressure. But, as I understand your question, you are referring to kangaroos moving out of parks and conservations areas and thereby artificially enlarging the numbers. I do not really believe that would be the case. If anything, our numbers that we take from our annual counts I would suspect are very much on the low side because they are done in the daytime with fixed-wing aircraft whereas kangaroos move at night, early morning and late evening. If there is an error on population size, I would imagine that population is far greater than what you are suggesting.

The Hon. MARK BUTTIGIEG: So you do not accept that the biological methodology or the science, if you like, is a valid way of calculating maximum population growth?

The Hon. BEN FRANKLIN: There was only one.

The CHAIR: Allow him to ask the question.

Mr ZANKER: It is not based on a 10 per cent figure because kangaroos are opportunistic breeders. They take full advantage of good seasons. They stabilise their breeding in the average season and they cease their breeding as they go into and endure the worst of the droughts. To quote any figure like that is irrelevant unless you can qualify at what stage of that seasonal and breeding cycle you are referring to. To come out with a flat figure like that is just totally ambiguous and irrelevant.

The Hon. MARK BUTTIGIEG: No, the point I am trying to make is: Do you think it is inconceivable that kangaroo population growth could overall, in a macro sense, be on a downward trajectory but because you have a more intense interaction with them, you are seeing them on farmland, you think the population is actually exploding when it is not?

Mr ZANKER: No, I do not accept that pretence. If you look at our grazing strategies where landowners—we manage our grass. We make our living from managing our grass so it is in our best interests to conserve our grass. As we all do and as we all did in the last drought, many of us were totally destocked only to see consistent and ongoing heavy grazing pressure from kangaroos. I do not accept that pretence at all.

The CHAIR: These sessions are always shorter than we would like, but we have run out of time for this session. If we have any other supplementary questions, the secretariat will submit them to the task force to answer within a period of time. Thank you very much for your time.

(The witnesses withdrew.)

The Committee adjourned at 16:15.

IN-CAMERA PROCEEDINGS BEFORE

**PORTFOLIO COMMITTEE NO. 7 - PLANNING AND
ENVIRONMENT**

**INQUIRY INTO HEALTH AND WELLBEING OF KANGAROOS AND
OTHER MACROPODS IN NEW SOUTH WALES**

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At Macquarie Room, Parliament House, Sydney, on Friday 11 June 2021

The Committee met in camera at 16:15

PRESENT

Ms Cate Faehrmann (Chair)

The Hon. Mark Buttigieg

The Hon. Catherine Cusack

The Hon. Ben Franklin

The Hon. Shayne Mallard

The Hon. Mark Pearson (Deputy Chair)

The Hon. Penny Sharpe

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Evidence in camera by **WITNESS A**, Aboriginal Elder , affirmed and examined

The CHAIR: Welcome. Thank you very much for coming to this in-camera session for the inquiry into the health and wellbeing of kangaroos and other macropods in New South Wales. Before I commence I would like to acknowledge the Gadigal people of the Eora nation, who are the traditional custodians of the land on which we meet today. I also acknowledge the lands you are coming from today. I pay my respects to the Elders past, present and emerging and extend that respect to other Aboriginal people present. I welcome , who has agreed to give evidence in private today. I know that it is a big decision for you to speak to us today, , even in private. We thank you for the perspective you are about to share with us.

Please note that this is an in-camera hearing. The evidence is confidential. It may be valuable to publish some of what you say and, if so, the Committee secretariat will consult with you about this, taking into account your privacy. As you would be aware, your evidence is protected by parliamentary privilege. It is important to remember though that privilege does not apply to what you say outside of your evidence at the hearing today. There may be some questions that you can only answer if you have more time or information and, if so, you can take a question on notice and provide an answer within three weeks. I understand that you may have a short statement to make.

WITNESS A: I would like to acknowledge the traditional owners, the Gadigal people, and the wider Aboriginal community and acknowledge everyone here today. I have lived in the area I live for about years. It is a semi-urban area. Firstly, could I have these documents tabled?

The CHAIR: Absolutely.

WITNESS A: It is a semi-urban area. Wildlife are already vulnerable due to the expansion of subdivisions and so forth. The area I live in is actually a wildlife corridor. It is in close proximity to national park. I have been through a really horrific period of time in the last almost four years. In terms of the amount of shooting that has gone on, a licence to cull kangaroos was given to two or three properties that were adjacent to me and between myself and the village. When you get the map that is being passed around, you will see land with a yellow boundary. That was where the licence to cull was given, and the land towards the house blocks. Another two lots of land were part of that licence to cull.

Basically what has happened with me is that I have been subjected to all types of abuse. I have had a firearm discharged and the bullet land within three metres of where I was walking at night.

I was in the property and it was dark at night. I had a bright torch; there was no doubt that I could be seen very clearly. The bullet was fired towards me and went within three metres, in the very shallow end of a dam .

From there the abuse—verbal, racial, spotlights, drones and endless shooting all night long. I have camped out in the car in an attempt to try to stop the shooting, which perhaps is hard to understand for some people. It is because of my efforts to try every other avenue to have the shooting stopped because of the concern for my safety, my family's safety, the safety of anyone that came to visit and the public's safety. As you can see from the map it is not very far to the road I live on . There was also the concern with the continual shooting that other animals were frightened. There are deer there, and large kangaroos.

There are tourist places where people go.

When we are thinking of the night-time shooting, an animal might be shot. But how many animals will be frightened and go onto the road and perhaps cause an injury where a family might even be killed—or anyone, for that matter? The past four years have just been relentless; we are talking shooting all night long. When I spoke to a council person and expressed my concerns they said they are probably just shooting a few rabbits. We are talking semiautomatics; we are talking .308s, shotguns. One time there were 57 bullets fired in an afternoon-evening. Another time on a Sunday, which is when a lot of people are coming back from their activities, there were bullets fired. I am not here today to make something that is small into something large. I am here to tell the truth, and I am here to—

The CHAIR: It is okay.

WITNESS A: I am here as a voice for the animals, because I know that so many animals have been shot. I know that so many kangaroos have been shot, and I have been out there basically risking my life. As an Aboriginal person the animals are connected to me; I am connected to the animals. I cannot sit by; I cannot leave. I do not want to. To be there and to reach out to authorities—police, the police commissioner, councils, media—you name it, I have tried it. I have written good letters. I have done a lot of research. I did not know a lot about a

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lot of this before it started. There have been firearms in my—because I lived in the country when I was younger. But I did not know a lot about what was happening there until I actually saw it. What I have seen is drones. I have hardly had experience at all with drones. We are talking about a lot of drones passing around in what looked like a circuit. We are talking laser pointers or laser flashes being used at night.

What I believe I stumbled into—and I did not know at first—a market where the animals are being used for some sort of meat or some monetary gain. The fact that someone would go to the extent of actually firing a bullet towards me was extreme. Even though I know the person has a strong dislike for me, the night the bullet was fired I was just in extreme shock. I also felt—

the thing I felt when I was out there in the dark and that shot got fired towards me was the fact that he may find me dead in the paddock the next day—the fact of what that would do—and also that why weren't some authorities listening? Why was my life and everything put at risk, and then I am still struggling out there? Nothing has come. There have been no consequences to any of this.

The person actually had his firearm licence in—I will go back a little bit. When the licence to cull kangaroos was issued, part of what my research indicates was that the police were to be notified and the neighbours were to be notified. No neighbours were notified. I was not notified, and I am adjacent, and no other neighbours that I spoke to around the area were notified. I was just left here thinking that this amount of shooting could go on forever. The police became involved after the shot was fired towards me—that was around . The police became involved then. I had rung the police on numerous occasions before this but they said "Look, the fella has a primary producer status." cows he has. There is also a commercial activity, separate, so part of it is leased. So he has cows, part of it is leased to a commercial enterprise and he can fire any sort of guns.

One night I was sitting there and if you can imagine 100 metres, there were a whole lot of people over at his house and a semiautomatic fired off 10 shots. They then went up the back with the utes—I am talking spotlights on top of the utes—and fired other guns. A shotgun was fired and it actually woke a small child. You can see that my property adjoins a larger property and there are three or four houses—three houses. It woke the child in that house. It was like the Wild West. They were out there shooting and there were spotlights in trees, spotlights everywhere, guns going off. This was the sort of thing that was happening regularly. When I approached the council they said, "Look, it is a firearm so it is a police issue." When I approached the police they said, "We cannot do anything about it. It is a primary producer; the guy can shoot." There are no limits on how many people he could have on the property shooting. Those cows gave him the status of primary producer.

In terms of applying for a firearm licence, there is no definition of rural land. If someone is a primary producer, it can be five acres. Unless the Firearms Registry looks at where the geographical location is and the danger that it presents—as you can see from my map—unless they actually take this into account when issuing a firearm licence, I believe that my experience will not be a single experience. For me, I felt like I was the protector of the animals. As I said, I would sleep in the car. I have slept in the car many, many nights in the winter. I would do it again, because they are voiceless. There is no-one to speak for them.

Recently had a camera in a gully, and we could see the kangaroos. We could see the joeys in the pouch were nearby. There was a round hole in the end of the ear, where clearly the shooting is continuing. In this instance what I have suffered—the shooting did not stop or start just with that kangaroo culling licence, because there is no-one there. There is no-one to monitor. There are no tags. At the point when they gave this licence in 2018 carcasses were then being allowed to be used by the landowner. Now, isn't that an open gate? Isn't that just open slather for the animals? Who is going to question that? Where is it going to come from that they say, "Look, how many did you shoot?"

The CHAIR:

WITNESS A: I did not find out about this kangaroo culling licence, by the way, until after the police became involved in an investigation.

Now, from what the police had told me, it was a commercial licence. From what the national parks had told me, they did not say it was not a commercial licence but they said that they had given the people involved—there are three properties—permission to shoot 25 kangaroos.

So, if you can imagine firearm all night, nearly every night—and day. It was drought time. I can remember them in the night. The kangaroos would come down towards the dams for a drink, naturally. It was

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drought. It was hot. They would have the headlights of the cars coming from the property next to the one in yellow towards the houses. They would have lights from the cars driving the kangaroos up the back with the shooters up the back.

The CHAIR: That's fine.

WITNESS A: What it is was 50 kangaroos a day were being shot. Now, I do not think the 50 kangaroos were being shot next to my house. I think part of a network and I think that the number of drones—for example, I saw 150 drones one night. I am not saying they are all different drones. I think they were doing circuits. I believe and I know that there were people involved in this that had outlets for meat to be sold, or an outlet if it was to be turned into meat—pet meat or whatever.

, they had a big freezer—we are talking like a freezer, you know, that is a container-type size. You know, that type.

The CHAIR: Yes, a chiller.

WITNESS A:

The CHAIR: , we are going to run out of time.

WITNESS A: Okay.

The CHAIR: I did not want to interrupt you, but there is less than 10 minutes now for us. Is that okay?

WITNESS A: That is great, thank you. Thank you very much for that.

The CHAIR: Thank you very much for your opening statement. I am very sorry for what you have experienced and for the stress that you have endured over a number of years with this.

you have lived at your current address for years, so I am trying to get my head around what started—like, what is the change? Obviously, there is the licence to cull kangaroos. We will talk to the Government about that and everything. What also changed? What changed in August? Do you know?

WITNESS A: No.

The CHAIR: It just started.

WITNESS A:

The CHAIR: Yes.

WITNESS A: It just started. Suddenly there was a young person there in camouflage-type gear in the middle of the day.

The CHAIR: And it had not happened before.

WITNESS A: No. I had not heard. I mean, sometimes you will hear an occasional shot; but, no, it had not happened like that before. I think the fact that I was on my own perhaps made the situation—and I had been away. I had often gone away for a number of months and come back and our land is very—like, it has a lot of bush on it. we found, like, skulls of kangaroos after we had been away before this licence to cull was issued. it went on, you know, so it is not like—I hear what you are saying and the terms. I do not know what started it.

The CHAIR: Just to be clear, do you know, is it commercial cull, or non-commercial?

WITNESS A: Yes, the police had told me that it was commercial because I asked again. I said, "It's commercial?" Like I felt it was really strange for a commercial one, but the person from the National Parks and Wildlife who had issued the licence or who had gone out and, I guess, okayed it, she said that they had given 25; they could kill 25 kangaroos, which to me, I am not sure because I have not been able to view that.

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The Hon. MARK PEARSON: Did you know the kangaroos? Did you used to see them coming and going over years?

WITNESS A: Yes. I did not know each individual one. There was a number of very large male kangaroos that would come through—like, very noticeably large. So, in the fact that we never killed anything and that we had no domestic animals, the kangaroos would come around regularly. On the day that this first shooting occurred in August with this young man, there were eight kangaroos there the day before. They would just come and then pass through, eat a bit of grass and then go on.

The Hon. MARK PEARSON: So, when you would hear them being shot, just the sound of it, is that the trauma? That was part of the trauma that you felt—knowing that these animals—

WITNESS A: Absolutely. Absolutely. And knowing I couldn't do anything. You know, the only thing I could do was what I did. You know, I could not do anymore and there was no-one to turn to, to make it stop. Because when I heard the bullets I felt the bullets. As an Aboriginal person, I am very connected. It was just so very hard to hear. In one situation a person towards the house past that yellow boundary had some cropping. What I saw was a little mob of kangaroos. I saw a really big male and I saw a small joey. I saw the big male and the joey go into the crop and I heard the bullet. This is in daylight. I heard the bullet. The little joey came back out and just hopped around, distraught. The male never came out again. These are the sort of things that could happen any time of the day, you know.

The Hon. MARK PEARSON: What happened to the joey?

WITNESS A: The joey went back with the mob, but the big one, I assume, was shot.

The CHAIR: Can I jump in? Also, do you have, where you live are there other—like, your mob, if you like— is there other concern with your family or other Aboriginal people in the vicinity near where you live with what is going on? Have you taken this to your representatives?

WITNESS A: No. Where I live is not where my mob is from, . But they have been concerned and, you know, totally supportive of trying to get it stopped.

The CHAIR: Yes.

WITNESS A: The other thing quickly I would like to mention is just the social isolation it has created for me and my family. You know, my granddaughter has not stayed in the four years—because I think to subject a child to that shooting, you know, the fear. I have also been concerned when my family come—
—because there is the anxiety because you think, "Are they going to be safe if we go up the back?" and, you know, most people do not want to hear 30 or 40 bullets. Sorry.

The CHAIR: Is it still happening now?

WITNESS A: No, it is not.

The CHAIR: Was it over a period of time?

WITNESS A: It has not happened for probably six or eight months, where there has been more shooting. But what has actually happened is that from the police I have had no finalisation, if you like, of what was decided or what decision was reached.

That was the end of that. I offered to hire, buy—because the drought continued, the part where the bullet was fired was then dry. I said, "I will hire the equipment. We'll do something. Can we get the bullet?"

part of the licence to cull is that the applicant has to notify the national parks and wildlife of who the people were shooting there. Nothing came of any of it. Basically, there was no consequence and that is part of what I think is happening. The whole system has been based on, and is now still based on, a belief that there is going to be honesty: "You go kill the kangaroos; you come and tell me how many you have done."

The Hon. PENNY SHARPE: I am sorry. It sounds like a terrible situation for you. If I am understanding this correctly, you have lived there for a long time, there are lots of kangaroos across all of this land and they move across the landscape. Obviously there has been an intensification of them at some point. Your neighbours have sought to get a culling licence to cull 25, I think you said?

WITNESS A: Twenty-five, yes.

The Hon. PENNY SHARPE: On those nights when there are lots of bullets and you would assume that they are killing more than that—was it one or two occasions, or was it 10 occasions—how many times did you have this happening when they were clearly culling in excess of what they were licensed to cull for?

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WITNESS A: I cannot prove that they have been in excess of what they are licensed to cull for.

The Hon. PENNY SHARPE: Right, okay.

WITNESS A: But what I can prove, because I have sat there all night long—

The Hon. PENNY SHARPE: Yes, that is what I mean.

WITNESS A: I am talking probably close to two years or more that this went on.

The Hon. PENNY SHARPE: On a nightly basis.

WITNESS A: Nightly or almost nightly—do you know what I am saying?

The Hon. PENNY SHARPE: Yes, several times. We are not talking about two or three occasions; we are talking about hundreds.

WITNESS A: Let us say more than four times a week. Weekends would be worse. Friday night would be really bad because they would have all the people there—men's voices mainly I could hear. Then there would be utes with a number of spotlights across them. I have had those on my face. At my son and I had to leave our house.

As we drove up the back we could see they were going to start to shoot again and he said

The Hon. PENNY SHARPE: You have obviously gone to all of these different agencies but there are so many different agencies. There is the Firearms Registry, there is the police, there is national parks and wildlife and there is local government for some general amenity issues. Is the problem also that no-one can take responsibility because each individual decision is separate from the other?

WITNESS A: Or the primary production thing, so the council could not do anything.

The Hon. PENNY SHARPE: That just overrides everything.

The CHAIR: I am sorry to say that that is the end of our time. We had only half an hour this afternoon due to so many witnesses. I wanted to thank you very much for having the courage to come here today and tell us your experience and your story. I hope that we can get some answers for you and I hope that the Committee can come up with something to stop something like that happening again.

WITNESS A: Thank you. Could I say that I would be more than happy to take any questions on notice if anyone wants to forward that because I think that my situation highlights the problem with the whole system.

The CHAIR: Yes. I am sure it is not unique either. Thank you very much.

WITNESS A: Thank you. I really appreciate the opportunity to be able to speak for the animals.

(The witness withdrew.)

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Evidence in camera by **WITNESS B**, individual and commercial harvester, before the Committee via videoconference, sworn and examined

The CHAIR: I now welcome our next witness _____, who has agreed to give evidence in private via video link today. Please note that, as this is an in-camera hearing, the evidence is confidential. It may be valuable to publish some of what you say. If so the Committee secretariat will consult with you about this taking into account your privacy. As you would be aware, your evidence is protected by parliamentary privilege. It is important to remember though that privilege does not apply to what you say outside of your evidence at the hearing. There also may be some questions you can answer only if you have more time or information to hand. If so you can take a question on notice and provide an answer within three weeks. Would you like to start by making a short opening statement to the Committee?

WITNESS B: Yes, I would just like to thank the Committee for allowing me to speak today. It will not be a great eloquent speech because that is not exactly what I do for a living, so here goes. One of my main concerns with the kangaroo industry is the huge discrepancy between the compliance regulations of the commercial industry and a non-commercial cull, which does have regulations at zero compliance. I would respectfully request that this Committee pushes to have the non-commercial cull by landholders or their workers comply to the same regulatory standards as the commercial industry and would like to see the following conditions put in place. One, non-commercial culling must be enforced to comply with the non-commercial code of practice, which does exist. But currently 98 per cent of culled kangaroos are body shot and not head shot. Two, the reintroduction of the drop tag must occur. Three, all persons, either landholder or layman culling on behalf of the landholder, must have done the shooting skills test to prove they have the equipment and the ability to cull the animals humanely.

Four, random checks must be done via compliance officers on landholders doing non-commercial culling, making sure all species are harvested humanely, offspring are euthanised and the number of animals culled is to the exact amount that the licence permits, because at the moment a landholder can get a permit to cull 500 animals and he could cull 5,000. There is no mechanism in place for accountability. Five, when the trigger point of 250,000 animals of a specific species is reached in the commercial zones, the commercial harvest ceases immediately yet landholders can still get a drop permit to shoot animals in these zones even though they are closed commercially. This must be stopped immediately because it seems quite bizarre to me.

Six, at least one special harvester should be given the opportunity to harvest animals to an acceptable level that the farmer requires prior to drop tags being issued. Seven, reported evidence to the regulatory authorities of the non-commercial industry, such as illegal culling, poisoning or inhumane shooting, must be investigated and prosecuted exactly as it would be in the commercial industry instead of being told, "There is nothing we can do about it." If we cut down a tree on our property we could be prosecuted. If we take a load of sand off our property we can be prosecuted. But you can go and cull kangaroos on your property with or without a permit and there is no consequences. How can we say that this is a protected fauna?

The CHAIR: Thank you very much _____ That was a very good opening statement.

The Hon. MARK PEARSON: Thank you _____. That was an extremely helpful opening statement. Could you clarify for me—you said up to a certain percentage body shot in the non-commercial killing of kangaroos. What percentage was that?

WITNESS B: Around 98 per cent.

The Hon. MARK PEARSON: Are you saying that when somebody shoots kangaroos with a non-commercial licence, 98 per cent of the kangaroos will be body shot and not clean shot? Is that your evidence?

WITNESS B: In my 40 years of experience I have been out and seen a lot of culling at different times. Personally, I have never seen a farmer have the equipment or the ability to be able to head shoot in the numbers that he requires to shoot swiftly. What I have seen is that they basically generally go for the chest area or heart shoot the animal.

The Hon. MARK PEARSON: What percentage of the body shots would you say is a clean shot—that is, the heart?

WITNESS B: In the heart—it is very difficult to say how many animals are being shot in the heart. I know that a lot are not shot cleanly in the heart because if they are heart shot they will run flat out generally and then drop after they lose enough blood. If they drop immediately, sometimes that shot that goes through the heart can penetrate the spinal column and make them lie on the ground and they will still be alive. That is what I have seen in my time, anyway.

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The Hon. MARK PEARSON: Is it the case that if a landowner or landholder does get this licence to kill maybe 100 or 200 kangaroos without the use of tags—what is the implication there in terms of post-mortem inspection or checking to see whether an animal needs a coup de grâce or checking whether a doe has one or two joeys with her?

WITNESS B: There is actually none because most of the animals are shot and then they just drive off to the next animal. There is no need to—in the early days when Niall Blair introduced this is in about August of 2018, I think, the drop tags were no longer required. The farmers' argument at that time was that there was a plague of kangaroos, which is not always the case. We would have what I would call a plague of kangaroos if I saw it like the current mice plague throughout New South Wales. Generally, during a drought kangaroos migrate to where the feed is and it is a congregation of kangaroos in a specific area, not necessarily a plague of kangaroos. It can look like it is a plague of kangaroos but it is not.

It is the same as when you are travelling in dry times along a western roadway and you see hundreds of kangaroos—to me, in most of my experience, 70 per cent of that population is on the road because that is where the feed is. It is like if you go now 1,000 kilometres from here to Howlong in the New South Wales or Albury or somewhere like that, you would be unlucky to see a kangaroo on the road because they are dispersed back into the countryside where the feed is very good now.

The Hon. MARK PEARSON: We had evidence from Mr Gall from the Pastoralists' Association of West Darling. He stated that during a drought no doe would have any joey in pouch or at foot. Not one. Is that correct?

WITNESS B: No, that is not correct. At the worst point of the drought, that is still not 100 per cent—it is probably 90 per cent correct at the worst pinnacle of the drought. The kangaroos do get to a certain stage during a drought—the female—where they do not breed any more. When a drought starts it generally runs over two to three or four years and at the period after the second or third year when it gets to its worst possible feed condition, the kangaroo will actually get rid of the young. I have actually personally found dead young in the pouch, which has been created by the drought.

The Hon. MARK PEARSON: Could you tell us your view on cluster fencing or exclusion fencing? Because a lot of the organisations such as the Kangaroo Management Taskforce and the kangaroo industry and also the NSW Farmers are saying they think cluster fencing is a good thing. In fact, we have had evidence to say that cluster fencing actually is very good for kangaroos. Can you tell us what the harvesters think of this or the shooters who are involved in the industry—what is their view of cluster fencing and how has it impacted on kangaroos?

WITNESS B: It has a very big impact on kangaroos because—I think I saw somewhere in a newspaper clipping in recent times that, due to the downturn in the marketing of kangaroo products and so forth, farmers have actually found others ways to deal with the problem. Cluster fencing and enclosing your property with fences that kangaroos cannot move across the landscape does, in fact, hamper them. Generally, most times when the farms have been fenced, they get helicopters in, run them up against the fences and use quad runners where shooters with shotguns will shoot them along the fence.

Not only that, the migratory pattern of particularly red kangaroos across the landscape is that when there is lightning in the distance and they can smell the scent of rain and if it is in the north, they will move to the north. If there is a fence in their way that they cannot get through, they will just run up and down that fence until they get so exhausted they get too much adrenaline and they will actually drop dead. Or by the time that they can—if daylight comes and they realise that they cannot get through the fences, if there is no water in the vicinity they will die of thirst or lack of feed. The reality of it is that it is the migratory pattern of the animals to be able to move to better pasture and to be able to move to water and to move to where there is going to be feed—the landscape is interrupted by that fencing.

The CHAIR: In your submission, which of course is a confidential submission, you talk about the fact that "the non-commercial industry has a code of practice which is totally ignored. If you report illegal, inhumane culling to government compliance officers in the commercial industry, they go red in the face, become agitated when you want it investigated and they say it is National Parks' job. Report it to National Parks and they say they cannot do anything about it—'we have been instructed by Ministers to turn a blind eye to it.'" Could you please expand upon that, particularly being instructed by Ministers to turn a blind eye to the non-compliance?

WITNESS B: Sorry, what was the last section there? I heard what you said but what was the actual question there about compliance?

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The CHAIR: I was wondering whether you could or were able to expand on anything in relation to who was saying—you are implying here that there were instructions by Ministers to turn a blind eye to what is going on in terms of inhumane and illegal culling. Is that correct?

WITNESS B: That is correct.

being able to do compliance on illegal shooting or whatever. In that case I have put forward that, for me, if there is a complaint put in about an issue, it should be put to the right people to manage that because at the end of the day if a police officer is off duty and he sees someone murdering someone on the side of the road, he does not say it is someone else's job. This is what these people are there for, whether it be non-commercial or commercial.

The non-commercial industry—many shooters have, and many people have, reported directly to National Parks and Wildlife, and their wording is that they cannot do anything about it. They have been told to turn a blind eye. In recent times I have been told

"We've been told by Ministers we can't do anything about it, and you should get more proactive and do something about it yourself if you want it done because we don't get paid enough money to do something about it."

The CHAIR: Are you saying that it is within the NSW National Parks and Wildlife Service? That is where the compliance officers sit? I understand there used to be, before July 2013—I think the number that I have been given is three compliance officers who were specifically in relation to kangaroos. After July 2013 the compliance officers were the compliance officers who have to look at native vegetation, threatened species and what have you. They are the compliance officers who sit within, you are saying, the NSW National Parks and Wildlife Service and they are responsible for investigating any of these allegations about inhumane culling and everything that is occurring?

WITNESS B: What I have been told by the kangaroo management program, commercial, is that they have nothing to do with it. The drop tags are issued by National Parks and Wildlife, and they have the compliance over it. But there is no compliance over it, as I said.

The CHAIR: Your submission states:

I have reported kangaroos being illegally culled by landholders, poisoned by landholders with urea in water troughs, run up against barrier fences and shot from helicopters and absolutely nothing is done about it.

You are reporting that. Is there a hotline? How do you report it?

WITNESS B: In the case where I have done it,

" So, wherever it has happened, it has been reported to that particular National Parks and Wildlife office that deals with that area, and there have been many reports that have gone into many, many, many National Parks and Wildlife offices throughout the State, and nothing gets done.

The Hon. PENNY SHARPE: I apologise because this is probably a very basic question: Are the commercial aspects of compliance dealt with by Local Land Services [LLS]? Which department oversees that?

WITNESS B: Which department oversees the commercial industry?

The Hon. PENNY SHARPE: Yes.

WITNESS B: They have their own compliance officers within the industry who do chiller reports and go around checking chillers, and if there have been any regulations broken or if they go—they regularly go into kangaroo chillers to make sure the animals have been head shot, that the animals are tagged correctly, that the cull of species for the tag that goes on the animal is correct. They pick out animals in the chiller that—

The Hon. PENNY SHARPE: Sorry to interrupt; I just want to be clear. So, that is DPIE, is it? Or is it LLS? Which part of government is overseeing the commercial compliance?

The CHAIR: DPIE.

WITNESS B: The department of environment and climate change and water.

The CHAIR: Just to butt in there: That has been renamed. It is the Department of Planning, Industry and Environment. Does that sound right to you ?

WITNESS B: That is correct, yes.

The CHAIR: Do you think the compliance regime that DPIE undertakes—DPIE is the new department and that is the acronym for the Department of Planning, Industry and Environment. I have some information here

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that the compliance is undertaken—I assume this is for the commercial—by the regional staff. This is what I was talking about: that they do native vegetation and threatened species and the kangaroo management plan. There is one inspection per year for chillers and three per year for dealers. Is that correct?

WITNESS B: That would be correct, yes.

The CHAIR: What is the compliance showing with the commercial industry in terms of your view? Do you think that is all okay or are there issues there as well?

WITNESS B: The compliance with the commercial industry is very good because there are so many checks that they can do to make sure that you are doing the right thing. When you harvest an animal in the field, you have only got so many tags to harvest and you have only got a certain period of time to harvest them within. There is a time period when the tags expire. So just say, for instance, that I had 100 tags to harvest with and I had only shot 97 of those animals, when those tags expire those three remaining tags have got to be sent back to the commercial program and the 97 animals that I have shot during that four-month period—there is usually a four-month expiry date on tags—when they go in the chiller, they are inspected basically by an officer of the department of environment and planning as you say, not necessarily every time but at some stage.

The chiller operator does a kangaroo return for the species and what the shooter put in. The shooter does a kangaroo return. The company does a kangaroo return to national parks. It is pretty hard. The shooter is not going to go out into the paddock with 100 tags and shoot 200 kangaroos because he cannot sell them. That is what he is there for. If the farmer gets 200 tags, he could shoot 2,000. Where is the compliance or the ability to be able to have compliance in that situation?

The CHAIR: From your perspective, what would you like this Committee to recommend in terms of the non-commercial culling situation of kangaroos that is going on?

WITNESS B: I think the whole of the industry—long story short, if there are 100,000 landholders in New South Wales that have 30 hectares or more, they would be all entitled to go and get drop tags and harvest them if there was no commercial industry. If 100,000 landholders decided to go and shoot, or the New South Wales farmers federation decided, for instance, that we are going to have an annual cull because there is no such thing as a commercial industry, 100,000 people get 100 tags. If you spread that out over the average size of the properties, that is 10 million kangaroos that could be culled in a week.

To my way of thinking, the commercial industry has to be a sustainable industry for the population, it has to be as humane as it possibly can be and the non-commercial industry should either be tied into it so that the program then becomes a sustainable resource program and the culling program should not exist unless the commercial side of it cannot utilise the product or get to them. Because if a farmer lives so far away and you cannot get there, then there is a possibility that culling should be allowed. But under most circumstances, there should always be a way to utilise that product and culling should only be—and a harvester will only harvest animals to a certain level and he has an acceptable level. Whether a farmer has an acceptable level or not, I am not quite sure.

The Hon. MARK PEARSON: Why do you cut the heads off the kangaroos after you have shot them?

WITNESS B: Generally it has always been that the head has come off the kangaroo and that is because the processors are so tight, they do not want to pay for it. That is the real truth of it. In some cases—I will admit that I can see the point that you are getting at—it could be perceived that it is to hide low shots, but that is not the case at all. It was only ever brought in because the processors are too tight. If the head weighs a kilo and they are paying a certain value for it, they say, "Why should we buy something that we can't sell or can't use?" But I do take the point that it could lead to deception if someone wanted to be deceptive—yes, it could.

The CHAIR: The identification of male and female kangaroos, we have heard some evidence about that today in terms of how difficult that is in terms of a commercial kangaroo shooter. How do you determine that? Is it difficult?

WITNESS B: Did you say what a male cull—

The CHAIR: How do you determine which is a male kangaroo and a female kangaroo when you cannot shoot the female kangaroos, for example?

WITNESS B: That is all about experience. I could take you out into the paddock, and I would be happy to at any time, and you could show me 500 kangaroos and I could drive you through and from 200 metres point out the males and the females. But that has come from 40 years of on-ground experience. I know that when the male-only cull came in, there were many, many, many harvesters who had difficulty being able to differentiate

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between male and female. So there were a lot of females that were being killed and left on the ground through lack of knowledge and ability to be able to differentiate between the sexes.

The CHAIR: I thank you very much for agreeing to appear before us in this confidential session. I understand it is a very difficult thing to do, to talk about your industry to a committee like this, so I wanted to thank you for making the time. If Committee members have any additional questions for you, if you are happy to take those we will submit them via the secretariat if that is okay.

WITNESS B: No problem. Thank you very much for that.

(The witness withdrew.)

(Evidence in camera concluded.)