

Supplementary questions and answers – Dr Benjamin Allen

Question 1

On p22 of the June 11 hearing transcript, you refer to “many of Australia's animals, including kangaroos, are what we call “boom and bust” species.” Can you tell us what the reproductive rates of the different species of kangaroos are? At what age do they reproduce, what are juvenile mortality rates, how many young do females rear in their lifetimes?

Answer: There are over 50 species of kangaroos and others macropods in Australia, and I am not going to provide this information for all of them here; I do not have the time. The answers are also not static – they vary between species, times, places, and many other things. But all of this type of information can be easily sourced from the many good scholarly books on kangaroos, including but not limited to the following:

- Caughley, G., Shepherd, N., Short, J. (Eds) (1987) 'Kangaroos: their ecology and management in the sheep rangelands of Australia.' (Cambridge University Press: Cambridge)
- Coulsen, G., Eldridge, M. (Eds) (2010) 'Macropods: the biology of kangaroos, wallabies and rat-kangaroos.' (CSIRO Publishing: Melbourne)
- Hacker, R., McLeod, S. (2003). 'Living with kangaroos: a guide to kangaroos and their management in the Murray-Darling Basin.' (NSW Agriculture: Orange)

There are also countless scientific journal articles on the subject which are easily accessible through a simple search in 'google scholar'. In general, this literature indicates that kangaroo populations can increase quite rapidly under the right conditions, such as after rain, or those conditions found within cluster fences (i.e. freedom from predation, reduction in disease, provision of artificial water etc.). For example, populations of the harvested kangaroo species can double every 3–5 years under good conditions, and can halve even faster under poor conditions (see the various harvest quota reports in each State for more details).

Question 2

Your research into exclusion cluster fencing indicates that there are no downsides for the wildlife that are caught within them; have you factored in the risks to the genetic diversity of the entrapped populations?

Answer: This is an incorrect characterisation of my research. As I explained in question time, there are a variety of impacts (good and bad) that manifest in a variety of ways (good and bad) for different species, and these impacts are also scale-dependent. Some animals will experience negative impacts, whereas others will experience positive impacts, and this can change from place to place and time to time. Some individuals may also experience negative impacts at the same time their larger population and species experiences positive impacts. For kangaroos, there can be some downsides at the individual level and at small scales, but at a population level over large scales the data suggests that kangaroos experience net positive impacts from cluster fencing. So there are 'downsides', but the 'upsides' are typically much greater.

Decision-makers should also not forget that approximately 100 years ago each property in the 'sheep zone' of southern and eastern Australia (approximately 25% of the continent) was fenced

with kangaroo-proof netting fencing, there was state-sanctioned bounties on kangaroos, and kangaroo killing was unfettered and indiscriminate for almost all macropod species. There was also over 150 million sheep, whereas today there are approximately 70 million sheep. Yet even under those conditions the larger kangaroo species (e.g. grey kangaroos, red kangaroos, walleroos) could not be reduced to levels low enough to threaten their populations. In contrast, though populations in some specific areas may have been reduced (e.g. urban areas, cropping areas), across broader scales their populations have increased to the point where we now have millions of kangaroos in the sheep zone and they have been sustainably harvested for decades. These realities do not suggest that kangaroo conservation is compromised by the return of cluster fences, as is supported by the empirical data in my submission to the committee.

And yes, we are interested in genetic outcomes of cluster fencing. But with limited funds we have prioritised investigating the effects of cluster fencing on the genetic health of threatened species with high site fidelity like yellow-footed rock-wallabies, and not the abundant and mobile non-threatened species like the larger kangaroos.

Question 3

Can you confirm if you have read any overseas studies on the adverse impacts of fencing in wildlife? Can you comment on the issues these studies have identified; habitat fragmentation, limited access to resources, altered migratory paths, elevated stress levels, injuries when trying to cross the fences, starvation when entangled, death, and separation of young from mother?

Answer: Yes, I have read plenty of Australian and overseas studies on the effects of fencing on wildlife, and only recently completed a global literature review summarising information on the subject; my comments on these issues can be found within that article:

- Smith, D., King, R., Allen, B.L. (2020). Impacts of exclusion fencing on target and non-target fauna: a global review. *Biological Reviews* 95, 1590-1606.

But as I stated during the hearing, like all other interventions, fencing can have both positive and negative outcomes at the same time. So while the negative impacts listed above may well occur, a vast range of positive impacts also occur. Given this, those interested in the broader effects of interventions (such as fences) should prioritise consideration of the *net* effects, and not just the negative effects, because negative effects might exist while the net effects are overwhelmingly positive (as is the case for kangaroos).

Question 4

Can I confirm that to date, yours is the only study on the wildlife impacts of cluster exclusion fencing that has been conducted in Australia?

Answer: As far as I am aware, the collaborative work that I and my colleagues are currently involved in are the only empirical studies on the impacts of contemporary cluster fencing on wildlife. This work involves multiple agencies and people, but is centred on cluster fences in western Queensland (which is where 95% of the cluster fences are presently located). For the information of the committee, the following sources describe some of the results of this work that I have been personally involved in around cluster fences, their humaneness, and their effects on kangaroos and other wildlife:

- Allen, B.L., West, P. (2013). The influence of dingoes on sheep distribution in Australia. *Australian Veterinary Journal* 91, 261-267.
- Allen, B.L. (2017) FOFI5M: Taking threatened species recovery to the next level. In 'Restore, Regenerate, Revegetate Conference - February 2017. Armidale'. (Ed. R Smith) pp. 1-2. (University of New England: Armidale)
- Allen, B.L. (2019) 'Relationships between kangaroos, grass and livestock, Australian Rangelands Society Conference.' Canberra. (Australian Rangelands Society: Canberra)
- Allen, B.L., Castle, G., Allen, L.R., Smith, D. (2021) Wildlife population trends within and around pest-fenced areas of western Queensland: not much ado about something. In '18th Australasian Vertebrate Pest Conference. Online'. (Centre for Invasive Species Solutions: Canberra)
- Allen, B.L., Hampton, J.O. (2020). Minimizing animal welfare harms associated with predation management in agro-ecosystems. *Biological Reviews* 95, 1097-1108.
- Allen, B.L., Smith, D. (2019) 'Trends and issues associated with pest-proof netted fencing across south-eastern Australia, Australasian Wildlife Management Society Conference.' Darwin. (Australasian Wildlife Management Society: Darwin)
- Clark, P., Clark, E., Allen, B.L. (2018). Sheep, dingoes and kangaroos: new challenges and a change of direction 20 years on. In 'Advances in conservation through sustainable use of wildlife.' Eds G Baxter, N Finch, P Murray. pp. 173-178. (University of Queensland: Brisbane)
- Hampton, J., Hyndman, T.H., Allen, B.L., Fischer, B. (2021). Animal harms and food production: informing ethical choices. *Animals* 11, 1225.
- Smith, D., Allen, B.L. (2019) The expansion of exclusion fencing in central-western Queensland. In 'Proceedings of the Australasian Wildlife Management Society. Darwin'. (Australasian Wildlife Management Society: Canberra)
- Smith, D., Allen, B.L. (In press). Habitat use by yellow-footed rock-wallabies in predator exclusion fences. *Journal of Arid Environments* xx, xx-xx.
- Smith, D., King, R., Allen, B.L. (2020). Impacts of exclusion fencing on target and non-target fauna: a global review. *Biological Reviews* 95, 1590-1606.
- Smith, D., Lethbridge, M., Allen, B.L., Andrew, R. (Submitted). Inter-colony movement within rock-wallaby metapopulations and its management implications. *Journal Journal* xx, xx-xx.
- Smith, D., Waddell, K., Allen, B.L. (2020). Expansion of vertebrate pest exclusion fencing and its potential benefits for threatened fauna recovery in Australia. *Animals* 10, 1550.

Question 5

Does it concern you that the exclusion fencing in Queensland has essentially confined kangaroos in unregulated private wildlife parks with the animals are entirely reliant on the good will and ability of the landholders to manage their welfare?

Answer: What concerns me is that kangaroo management policies often assume that kangaroos are free-roaming, when this is not the case in fenced areas.

Similar to other states, in Queensland the *Nature Conservation Act* and subordinate legislation assumes that kangaroos are free-roaming wildlife and hence provides provisions for such protected wildlife to be managed under a range of circumstances (e.g. kangaroos can be sustainably harvested, controlled for damage mitigation etc.). But consistency with other Acts and policies is often lacking, and livestock-related legislation allows landholders to erect fences which prohibit free movement of

kangaroos and other wildlife without any meaningful assessment or mitigation of environmental impacts. This is dissimilar to fences erected for mining or resource extraction, for example, which are subject to stringent environmental assessment and requirements. I am not opposed to livestock producers being able to erect fences that control the movement of wildlife, but related wildlife management policies should account for the presence of fences in the environment.

Communication and cooperation between different government departments is also not always as up-to-date as it could be, which can then lead to situations where the implementation of kangaroo harvest policy falsely assumes that all wildlife is free-roaming, and applies the regulations accordingly. Obviously in the case of a fenced property, some species (i.e. kangaroos) are no longer free-roaming, which creates the potential for excessive 'legal' removal of kangaroos through a variety of means. In some States there is various pieces of legislation that allow kangaroo management to be implemented in a way that does account for the existence of kangaroo-proof fences in the environment, but it concerns me that these management tools are not being adopted, applied or enforced at an acceptable rate.

Question 6

In a dry season, what restrictions if any, prevent a landholder from turning off watering points within the exclusion fencing to reduce competition for resources with their cattle and sheep?

Answer: It is my understanding that all landholders – whether they be livestock or crop producers, indigenous organisations, governments or NGOs – in all States and Territories are not obliged to provide water (or feed) to any animals other than their owned/managed livestock. For example, if none of a farmer's sheep, goats, cattle or horses etc. are being grazed in a particular paddock, then they are not required to provide water to that paddock.

Given the recent return of cluster fences, this obviously creates a situation whereby landholders can fence a paddock, remove livestock, and then turn off all artificial water sources, resulting in widespread mass deaths of water-reliant wildlife species such as kangaroos and others. Indeed, I have heard anecdotal reports of this happening. Removal of artificial water sources per se is not the issue; it is standard practice for most government-managed national parks and/or private conservation reserves to remove or close artificial water sources, and governments for many years have actively capped bores and removed water sources used extensively by wildlife. Rather, it is the combination of exclusion fencing followed by removal of water sources that can create a serious welfare issue for many wildlife.

Options to resolve this issue include giving landholders express authority to utilise or manage kangaroos as some form of 'livestock', or somehow giving landholders responsibility over the wildlife on their lands. Forcing landholders to maintain water infrastructure in the absence of domestic livestock is contrary to many wildlife conservation management objectives and government water security programs, and would be considered unacceptable. Prohibiting landholders from erecting fences to protect their livestock from predators is also contrary to the objectives of animal welfare legislation that requires landholders to protect their stock from the serious welfare impacts of predation, and would also be considered unacceptable. Resolution of this issue must somehow be found within the management or use of kangaroos and other wildlife, and not livestock or livestock infrastructure.

Fortunately, there are good precedents and excellent examples of appropriate approaches to this issue in other countries. These include South Africa, where the erection of a fence essentially means that landholders then own, are responsible for, and can utilise the wildlife within their fences. In Texas in the USA, the erection of fences essentially means that landholders become responsible for the wildlife within them, and are permitted to use or manage them. Namibia also permits use of wildlife provided landholders can demonstrate the sustainability of that use (i.e. landholders are required to count wildlife populations and show that their harvest of them is sustainable, before being granted permission to harvest them). Though some of the specific details vary between each of these examples, the common feature amongst them is that landholders are enabled by governments to utilise the wildlife on their lands (i.e. buy, sell, harvest etc.), and hence become responsible for their welfare. This approach is overwhelmingly good for wildlife. In these and many other countries where such approaches are used, wildlife populations are growing, recovering and doing quite well. But in countries (like Australia) where landholders are not responsible for wildlife and wildlife are characterised as the enemies of livestock or of no real value beyond their intrinsic value, many wildlife species continue to be poorly managed and conserved, and continue to decline.

Question 7

On p4 of your submission, Figure 2 shows that kangaroos have no effect on ground cover in areas where kangaroos are free from predation. Do you agree that this strongly supports the evidence of other experts that kangaroo grazing has little to no effect on vegetation ground cover in the rangelands?

Answer: This is an incorrect characterisation of my research, and a misinterpretation of Figure 2. I do not believe that kangaroos have no effect on vegetation. Kangaroos are Australia's largest native herbivore, they are widespread and common, they can reproduce quickly, and their numbers have increased substantially given the many post-European landscape changes that favour kangaroo population growth (e.g. land clearing, waterpoint installation, predator removal). Given these facts, to believe that kangaroos have little to no effect on ground cover is both nonsensical and unfounded.

Figure 2 does *not* show that kangaroos have no effect on ground cover; Figure 2 shows that ground cover is essentially identical inside and outside cluster fences, and that the re-emergence of cluster fences has not changed this trajectory in the last 8 years. Kangaroos are only one of several major herbivores that contribute to the results shown in Figure 2; others include goats, sheep, cattle and rabbits, which can each have substantial impacts on vegetation. On many individual farms, kangaroos have been nearly removed entirely and then replaced with livestock, so we would never expect ground cover data (like that shown in Figure 2) to show any improvement. On many other farms, kangaroos have not been removed and no additional livestock have been grazed, so again we would not expect ground cover data to show any improvement. We would only expect to see improvement in ground cover data where herbivores are removed and not replaced with some other herbivore, but this is not the case for cluster fences.