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

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Managing the impacts of over-abundant kangaroos in NSW

A submission to the inquiry into the health and wellbeing of kangaroos and other macropods in NSW

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The management of kangaroos is a complex issue that draws emotive and conflicting opinions from many different sectors within society. Kangaroos are viewed within society in many different ways including as a pest that competes with livestock for forage, a road hazard, an environmental pest and an iconic native animal. I have been conducting studies on the conservation and management of ecosystems in New South Wales for 25 years. During this time, I have documented the impacts that kangaroos are having on ecosystems in New South Wales. My concern is primarily with the unsustainable impacts that high kangaroo populations are having on the environment and animal welfare, particularly in the conservation reserves of western New South Wales. I am also concerned that high numbers of kangaroos are compromising road safety due to collisions with vehicles.

The problem of “too many” kangaroos

It is well acknowledged that kangaroo populations can rise to very high densities across much of Australia because of the removal of their key predator, the dingo, and an increase in the availability of surface water (Newsome 1975; Letnic et al. 2012). Accordingly, there has long been concern that competition for forage by “over-abundant” kangaroos has adverse effects on livestock production (Norbury et al. 1993; Edwards et al. 1996). Consequently, kangaroos are culled on livestock grazing properties in many areas to reduce their grazing impacts (McLeod & Hacker 2020) and in recent years ‘cluster fences’ have been established to exclude kangaroos. However, there is less appreciation that too many kangaroos may jeopardizing the conservation of biodiversity in New South Wales and making it unsafe to drive on our roads at night. Indeed, in the 25 years that I have spent travelling across the state I have been involved in more collisions with kangaroos than I can count and I have seen thousands of animals dead on the roadside.

In Australia’s arid lands, many conservation reserves have been established on former pastoral properties. A key objective of these reserves is to facilitate biodiversity conservation by functioning as refuges from livestock grazing. However, kangaroos often exist at higher densities on conservation reserves than adjoining pastoral lands (Caughley 1987). This situation occurs because kangaroos are rarely harvested within reserves and may benefit from the absence of competition with livestock, the provision of artificial waters, and suppression of dingoes within the reserves and surrounding landscape. Indeed, while populations of introduced herbivores are usually suppressed in conservation reserves, kangaroo populations are typically not managed in conservation reserves because they are native species and their grazing is deemed to be a natural process (Mills et al. 2020).

Many land-managers are concerned that periodic rises in kangaroo populations to very high population densities may be detrimental for ecosystem functioning in both the short- and

long-term. However, few studies have investigated kangaroos' impacts in relation to biodiversity conservation (Barton et al. 2011; Morris & Letnic 2017; Mills et al. 2020). Research conducted to date shows that kangaroos can markedly reduce grass biomass in temperate (Barton et al. 2011) and arid ecosystems (Rees, Kingsford & Letnic 2017; Prowse et al. 2019; Mills et al. 2020; Fisher et al. 2021) and that their effects can extend to reduced production of seeds (Rees, Kingsford & Letnic 2017), diminished soil nutrients and the compaction of soils (Morris & Letnic 2018; Mills et al. 2020). At high population densities, kangaroos can have impacts on ecosystems that are comparable to those typically associated with livestock and rabbits (Fig. 1; Mills et al. 2020). In far-western New South Wales, the impacts of kangaroos on the vegetation can be so severe that they can be seen in satellite imagery (Fig. 2; Fisher et al. 2021)).



Figure 1. Kangaroo proof exclosures at (A) Yathong Nature Reserve and (B) Sturt National Park. The photos were taken during the recent drought in July and May 2018, respectively. There is a dense cover of grasses and forbs inside the exclosures. Outside the exclosures, the vegetation cover has been completely denuded by kangaroo grazing.

In my opinion, the dearth of information on the impact of over-abundant kangaroo populations is constraining the ability of government to develop effective strategies to manage kangaroo populations. Consequently, without a solid base of evidence, conservation agencies are hesitant to develop kangaroo management plans because of the potential for conflict with stakeholders and because they do not have sufficient data available to justify the development and implementation of management strategies. Managers need this information to inform the development of strategies for managing kangaroo populations and so that they can optimize the biodiversity conservation value of their reserves.

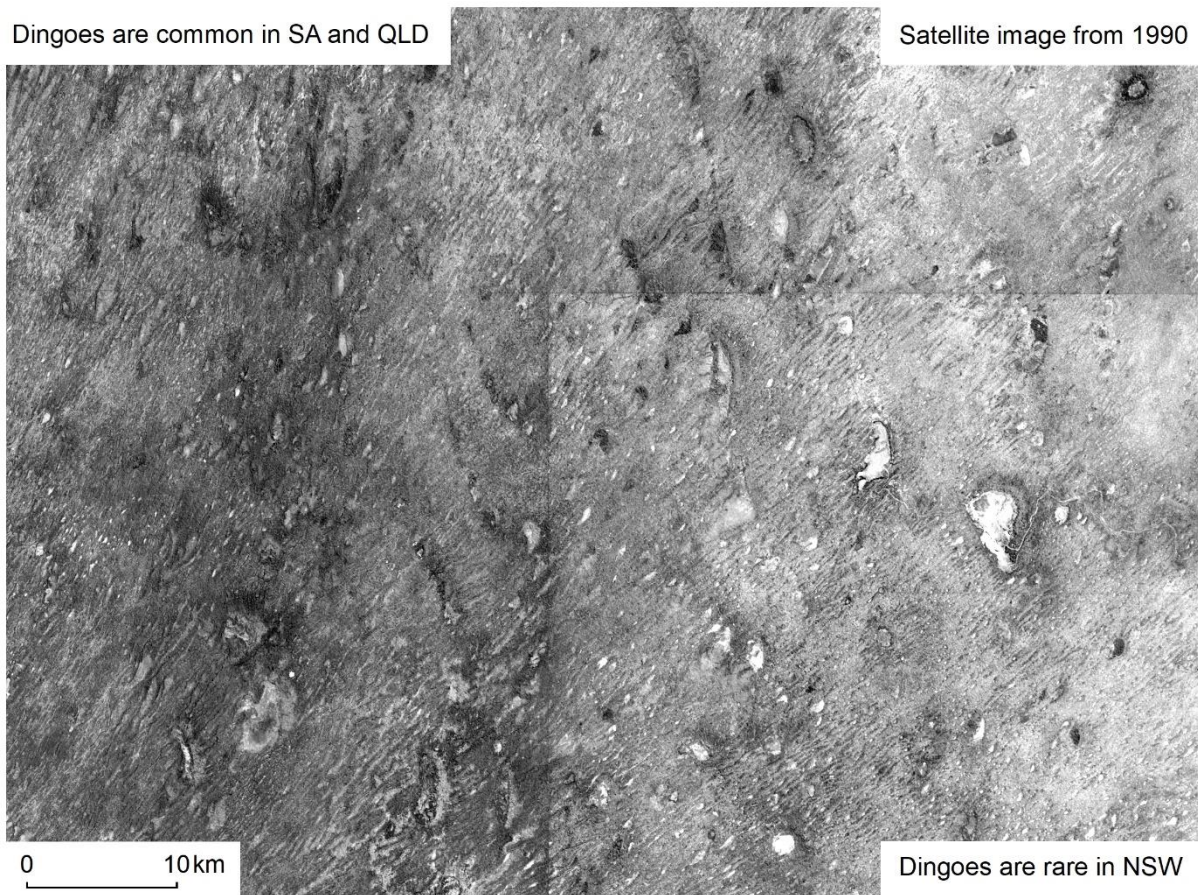


Figure 2. Satellite image showing Sturt national park in far-western NSW and adjacent areas in Queensland and South Australia. The landscape in Sturt National Park is lighter in the image, because the vegetation has been denuded by kangaroo grazing. The landscapes across the borders in Queensland and South Australia have few kangaroos and more ground cover vegetation because dingoes keep kangaroo populations in check.

How should we manage kangaroo into the future?

During my career I have seen no evidence nor have I been anywhere in New South Wales where kangaroos (red, eastern grey kangaroos, western grey kangaroos, euros) or large wallabies (red necked wallaby and swamp wallaby) could be considered to be in danger of extinction. In fact, across the far-west of the state, one of the main problems for the environment and safe road travel is the fact there are too many kangaroos.

The chief reason for the over-abundance of kangaroos is that their chief predator, the dingo, is rare across most of the state due to intensive persecution and in response the breeding of kangaroos is largely unchecked. Dingoes have strong suppressive effects on kangaroo populations because they prey primarily on juvenile kangaroos, which limits the recruitment of kangaroos into the population (Shepherd 1981). Commercial harvesting of kangaroos is much less effective at controlling kangaroo populations because it targets larger kangaroos particularly males. As a result, a large proportion of breeding age females remain and consequently there is a steady influx of juveniles to replace the kangaroos that are harvested (Letnic et al. 2021).

The population of kangaroos in western New South Wales fluctuates enormously through time due to climate driven variation in the availability of food. During droughts, thousands of kangaroos starve and it is in these times that they have particularly marked impacts on the environment (see Fig 1). While it is important to note that many kangaroos starve during droughts, a large number of kangaroos, particularly smaller individuals, survive the drought and are able to commence breeding soon afterwards. It is important to know also, the numbers of kangaroos in areas without dingoes in western New South Wales is always far greater than in areas just across the border in South Australia and Queensland where dingoes are common, even in times of drought (Fig. 3; Pople et al. 2000; Fisher et al. 2021).

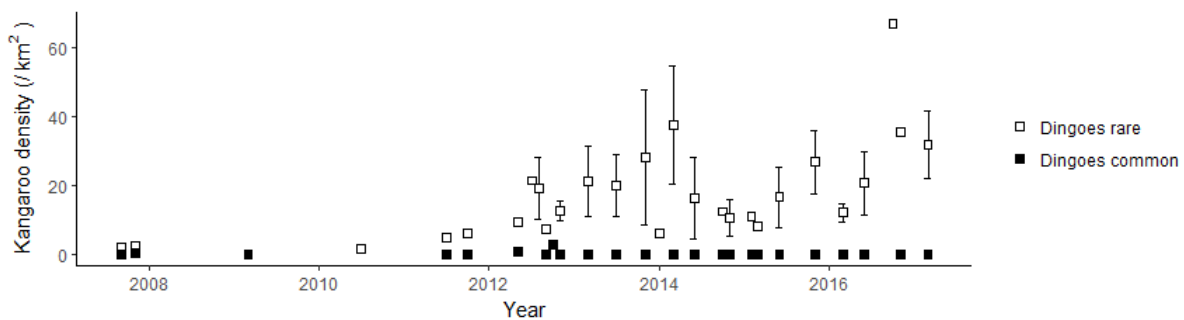


Figure 3. Population density of kangaroos in western New South Wales (light squares) where dingoes are rare versus adjacent areas where dingoes are common (dark squares) in Queensland and South Australia between 2007 and 2017. Numbers of kangaroos are always much higher in NSW (even in the presence of commercial harvesting) and fluctuate through time (figure adapted from Fisher et al. 2021). Fluctuations occur because animals die from starvation during droughts and are recruited into the population during periods of wet conditions when food is readily available.

While it is clear that dingoes can effectively curb kangaroo populations and their impacts on the environment, dingoes are unlikely to be the answer for the kangaroo “problem” in New South Wales. This is because dingoes are a major pest to the sheep industry. A more feasible approach that would also have better animal welfare outcomes would be to change the practices used for kangaroo harvesting/culling.

The current kangaroo harvest is managed to make the harvest sustainable through time from the perspective of maintaining a relatively large population of kangaroos. It does this in practice by removing larger, predominantly male, kangaroos which as described above maintains a large number of breeding-age females in the population and does not limit recruitment of juveniles. From an environmental perspective, the kangaroos could be managed more sustainably by shifting the focus of harvesting to females. This would

effectively reduce the population and would provide benefits for biodiversity conservation and farmers who are impacted by kangaroos' impacts on the landscape. It would also make road travel safer and would mean that less kangaroos die during droughts because there would be more forage available for them because the grazing impact of the total kangaroo population would be reduced. However, such a strategy would require careful management of quotas as it would have considerable impacts on the kangaroo harvesting industry. This is because harvesting enough kangaroos to make harvesting economically viable would become more difficult.

In summary, more kangaroos does not mean better outcomes for the environment or animal welfare. The high numbers of kangaroos in New South Wales is having damaging impacts on the environment and over-population of kangaroos means that thousands of animals starve during droughts. Current practices for harvesting kangaroos, are maintaining relatively high numbers of kangaroos, in fact much higher numbers than would occur if their natural predator, the dingo, was present. A more environmentally sustainable strategy would be to shift the focus of the harvest to smaller animals and removing a greater proportion of breeding-age females from the population. Having less kangaroos, would mean that there is more food and habitat for other animals, less impacts of kangaroo grazing on plants and soils and also there would be more food available for kangaroos during droughts so less animals would starve. Another benefit is that there would be less collisions between kangaroos and vehicles. However, such a shift would require careful management to ensure that farming/ environmental objectives, animal welfare objectives and the objectives of the kangaroo harvesting industry were achieved.

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