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SHEEP, DINGOES AND KANGAROOS: NEW CHALLENGES AND A CHANGE OF DIRECTION 20 YEARS ON

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ABSTRACT

Predation and competition are two primary forces limiting the extent to which sheep can be grazed in the Australian rangelands, particularly in Queensland. Dingo predation has been non-existent in much of the sheep zone since the localised eradication of dingoes in the early 1900s. Competition with kangaroos has been ever-present, but was previously managed (to some extent) by the commercial kangaroo harvesting industry. However, changes to dingo distribution and kangaroo densities and harvesting over the last 20 years have meant that dingo predation and kangaroo competition again threaten viable sheep production in the rangelands. Dingoes have increased their distribution and density in almost all sheep grazing areas and contemporary lethal control efforts are not preventing the decline of sheep. Loss of valuable international markets and moves to now harvest only adult male kangaroos means that the kangaroo harvesting industry produces little relief from kangaroo grazing pressure (given that kangaroo population growth is little affected by removal of adult males; see Finch et al. *this volume*). New approaches to dingo and kangaroo management are sorely needed to salvage and restore the production of sheep in the rangelands. In response, the installation and use of pest-proof fences is rapidly increasing in Queensland and other areas, facilitating, for the first time in nearly a century, the localised eradication of dingoes and the suppression of kangaroos to manageable numbers within fenced areas. We describe these challenges and opportunities for one site in particular (Leander Station), and offer a sheep grazier's perspective on past and future use and management of problematic wildlife in sheep production zones.

Keywords: *Canis lupus dingo*, *Macropus* spp., wild dog, wildlife use, wool industry.

INTRODUCTION

Livestock grazing is a globally significant use of land for producing food and fibre for the world's growing human population. It occurs over about half of the Australian continent, where beef cattle (*Bos indicus* or *B. taurus*), sheep (*Ovis aries*) and goats (*Capra hircus*) are

grazed in large, extensive herds (Allen 2011; Fleming *et al.* 2012; Pople and Froese 2012). Livestock producers have battled with native wildlife – and vice versa – ever since livestock were brought to Australia (Fennessy 1962; Rolls 1969). Two primary mechanisms underpinning this conflict are predation and competition. Many wildlife species were viewed as significant predators of livestock and many others were viewed as competitors. Early attempts at managing this conflict revolved around what could be described as ‘kill everything’ policies. However, native wildlife are now more highly valued by Australians and what were previously thought to be ‘significant impacts’ have turned out to be not so significant after all, for most wildlife species. Today, most contemporary conflicts between rangeland grazing livestock and native wildlife only revolve around dingoes and other wild dogs (*Canis lupus familiaris*) and various species of macropods including kangaroos (*Macropus* spp.) and other wallabies – Australia’s largest native carnivores and herbivores.

This is particularly the case in the mixed grazing lands of central Queensland. Sheep were the first livestock species brought to the region, followed by goats and cattle (Bauer 1962; Allen 2011). In association with the discovery of artesian water and the proliferation of artificial water sources, wild dogs and kangaroos quickly became a problem for livestock. In response, livestock producers fenced themselves in, and then eradicated wild dogs and suppressed kangaroos inside these fenced areas or ‘cells’. A national wild dog barrier fence (or ‘dog fence’ or ‘dingo fence’) was established, and livestock producers then got about the business of producing livestock by the early 1900s (Allen and West 2013). Conflict between wild dogs, kangaroos and livestock became somewhat negligible or manageable for many decades throughout the rest of the century. The development of a kangaroo harvesting industry in the mid-1900s (Livanos 1971; Kirkpatrick and Amos 1985; Robertshaw and Harden 1989) assisted livestock producers, to some extent, by further reducing kangaroo competition with sheep for vegetation. However, changes to sheep, wild dogs and kangaroos were afoot, and livestock producers were about to face some significant challenges heading into the 21st century.

In this chapter, we describe these changes to sheep, wild dogs and kangaroos and how they have affected sheep production over the last 20 years at Leander Station (-23.305609, 144.059930), just outside Longreach in central Queensland. We briefly review significant events in the region, and how livestock producers have responded to these events. Our aim is to briefly describe our experience and summarise some of the lessons learned in the hope that it will assist others to better produce livestock in an environmentally sustainable way.

CHANGES TO THE WOOL INDUSTRY OVER THE LAST 20 YEARS

Perhaps the greatest single change to the Australian sheep industry in the last few decades was the collapse of the wool reserve price scheme during the early 1990s (Bardsley 1994). This led to major structural changes to the industry and an overall steady decline of sheep numbers across Australia, but particularly in Queensland (East and Foreman 2011). Some in the industry thought it was a disaster and others welcomed the change to the free market. There initially was a drastic fall in prices until the stockpile was sold off, and then there was a gradual recovery. In hindsight, the collapse of the scheme was the catalyst for great change and innovation in the industry, which was sorely needed. The end result has been that only genuine, dedicated wool growers and breeders are still in the industry. There has also been a huge change in wool quality and quantity (cut-per-head) through more objective measurement, genetic input through artificial insemination, and better feeding regimes. Combined, these have generally resulted in a bigger-bodied animal that produces a greater quantity of higher-quality wool.

In concert with a decline in sheep numbers, many older people abandoned sheep grazing and moved into other livestock enterprises, particularly beef cattle grazing (Hewitt 2009).

Younger people left the agricultural sector completely, precipitated by higher wage earning potential in other sectors, notably mining and other resource industries. Local shearing teams disappeared, seeking more reliable shearing opportunities in other states where sheep declines were not as pronounced. With less sheep also came less on-farm employment opportunities; permanent farm and shed staff were now out of work. In general terms, farm staff which once comprised full-time owners, managers, shearers, musterers, wool classers and rouseabouts, are now instead characterised by 'mum and dad' operations and temporary contract labour. Across the community, this reduction in available on-farm employment opportunities led to fewer families, and hence reduced need for teachers, doctors, mechanics, retail providers and other community services. A tried and proven formula for negative regional growth is reduced sheep numbers = reduced employment opportunities = reduced human population = reduced regional growth, and this has been the experience in central and western Queensland over the last 20 years.

While the positive changes have put the sheep industry in a strong position, albeit with much lower sheep numbers, there also have been some great additional challenges to arise from wild dogs, kangaroos and drought.

CHANGES TO WILD DOGS OVER THE LAST 20 YEARS

The wild dog barrier fence has been a principal non-lethal component of Australia's wild dog control strategy for about 100 years (Holder *et al.* 1893; Glen and Short 2000; Fleming *et al.* 2001; Yelland 2001). It came about after sheep producers each fenced themselves in and eradicated wild dogs, and then the outer boundary of the fenced areas was fortified and labelled 'the dog fence' (Yelland 2001). This outer boundary once extended into north Queensland, protecting the Mitchell Grass Plains bioregion (including Leander), where sheep had been sustainably produced for many decades subsequent to the localised eradication of wild dogs within this zone in the early 1900s (Bauer 1962; Allen and West 2013). However, the fence boundary was realigned when the government decided to continue funding the maintenance of only the southern and not the northern section of the fence in 1982 based on grazing industry support. Since that time, wild dog numbers have steadily increased within this 'formerly inside/protected, but now outside/unprotected' northern zone, forcing a steady transition from sheep to cattle production (Allen and West 2013, 2015). This has been particularly clear around Aramac, Muttaborra, Winton, Longreach, Barcaldine and Blackall (Allen and Sparkes 2001). Wild dogs now occur in all areas of Queensland, both inside and outside the former and current alignment of the wild dog barrier fence, and a parliamentary committee is presently examining the management of the barrier fence, its effectiveness, and whether or not it should be expanded (Queensland Government 2015).

As described above, wild dogs were seldom seen in the region around Leander 20 years ago. They have become much more common now, to the point where their presence is no longer discussed as an unusual occurrence, but rather a regular feature of the landscape. Wild dogs were first reported around Longreach about 10 years ago. Early anecdotal reports described seeing 1–5 wild dogs at a time, which increased to reports of 15–20 dogs at a time, usually around water sources. Frequent wild dog attacks on livestock likewise increased, and many sheep producers left the industry because of it (Curtis 2009; Hewitt 2009; Rowe 2010; East and Foreman 2011; Wicks *et al.* 2014).

The response to this was a renewed increase in lethal wild dog control; wild dog shooting, trapping and poison baiting is now common in the region. Wild dog bounties were paid decades ago as they were being eradicated (Anon. 1952) and, after a long period where bounties were not paid (because wild dogs were gone), bounties are now commonly paid once again despite their known ineffectiveness (Hrdina 1997; Harris 2016). Poison-baiting of

wild dogs with 1080, or sodium fluoroacetate, was first introduced to Australia in the 1970s. It was quickly adopted and was considered a very effective strategy at reducing wild dog numbers. The 'formerly inside, now outside' region in central Queensland now applies the greatest amounts of wild dog baits anywhere in Australia (Allen *et al.* 2015). But this reliance on lethal control has not prevented the decline of sheep numbers (Allen and West 2013). This is not because 1080 baits no longer kill wild dogs – they do, but unlike the period immediately after its advent, baiting programs are now seldom coordinated well, too few people participate, and bait placement and preparation techniques are not optimal. In other words, a high degree of spatiotemporal variability in wild dog control effort undermines the effectiveness of baiting strategies at the scales needed to suppress wild dog populations and impacts (Allen *et al.* 2013), leading to persistence of wild dogs and their predation impacts. The real and perceived risk to working dogs, the relative lack of wild dog impacts on cattle and cattle producers (Fleming *et al.* 2012; Allen 2014; Allen 2015), and the declining proportion of sheep producers are the primary reasons given for lack of participation in wild dog control (Thompson *et al.* 2013; Wicks *et al.* 2014; Ecker *et al.* 2015). There were also anecdotal reports that sub-lethal dosing was causing a change in wild dog behaviour to the point where adult wild dogs were teaching pups and juveniles to avoid baits.

Many of these same issues were experienced a century ago, and the 'Royal Commission appointed to inquire into certain matters relating to rabbit, dingo and stock route administration' (Payne *et al.* 1930) heard that:

The main reason for putting a price on a dingo's head was to enable the sheep industry to be extended. Yet all sheep owners in outside districts have to erect dog-proof fences to protect themselves. It is roughly estimated that there are more than 20,000 miles of such dog-netting fencing in Queensland today. If a dog gets inside the netting, so great is the damage he may do that a sheep owner has been known to offer bonuses up to £50 [>A\$4,600 in 2012 values] for his destruction. The protection of the Dingo Board is of little avail. Each sheep owner must protect himself.

Accordingly, and in addition to the increased use of lethal wild dog control techniques, sheep producers are once again protecting themselves and increasing their use of exclusion fences as a non-lethal technique to prevent migration of wild dogs and other pest species from neighbouring lands. These fences are constructed around individual properties or small groups of properties and are commonly referred to as 'cluster fences', which are again facilitating the local eradication of wild dogs in association with lethal control (Perkins 2013).

CHANGES TO KANGAROOS OVER THE LAST 20 YEARS

When the kangaroo industry was at its peak some time ago (Pople and Grigg 1999), kangaroo harvesting on livestock properties went some way towards lowering total grazing pressure. During the last 20 years, however, kangaroo numbers have increased to unmanageable levels and are approaching their highest recorded densities despite continued commercial harvesting and routine culling approved under 'damage mitigation permits' (EHP 2015). This increase in kangaroo numbers is likely due to good seasonal conditions in the late 2000s coupled with a decline in the size of the commercial harvest due to the loss of overseas markets for kangaroo products.

These conditions meant that many professional and semi-professional kangaroo shooters simply could not make sufficient income, so they permanently left the industry. Kangaroos shot in the field are delivered to cold-storage facilities or 'boxes' spread throughout the harvest region, and the decline in the industry meant that the boxes started to open irregularly and shooters had no guarantee they had anywhere to deliver the harvested

product. Minimum acceptable carcass weights also increased and females were also no longer accepted due to concerns over the welfare of orphaned juveniles. Only males >25 kg are now accepted by the boxes. Excessive rainfall between 2009 and 2011 also meant that shooters could not access kangaroos for long periods, and when they could, the boxes were often closed. Drought then followed the floods, and even though a lot of kangaroos were culled, there were still large numbers bogging in mud and perishing in drying dams. For some unknown reason, many kangaroos stayed, did not migrate to other areas, and perished. Thus, drought came at a time of overabundant kangaroos, a lack of kangaroo shooters, and a diminished market for kangaroo products, where the price paid per kilogram was the equivalent or less than that received 20 years ago. This produced a 'perfect storm' for substantial competition impacts on livestock production, which is still raging.

The reality and extent of the kangaroo problem became quite clear on Leander when the property was completely destocked in 2014, yet large numbers of kangaroos were still overgrazing the remaining vegetation and perishing of thirst and/or hunger. When driving along the road at night time, it is not unusual to hit a kangaroo every 15 minutes, on average, in places throughout the region.

THE CURRENT SITUATION

Around the Longreach region at present, wild dog numbers continue to increase, kangaroo numbers remain very high, and the sheep industry continues to decline. However, investment in pest-proof fencing is increasing, lethal control activities are happening, and there is increased interest and optimism in turning the situation around. Stakeholders are beginning to realise that localised pest-proof fences give land managers greater control over multiple aspects of land management including predation, competition, land/vegetation condition and enterprise mix. By the end of 2016, at least 39 publically subsidised cluster groups in western Queensland were completed or under construction, including over 6,700 km of perimeter fencing to protect a combined area >43,000 km² (mean = 1,125 km²; range 165–3,650 km²). Numerous privately funded cluster fences were additional to this.

On Leander specifically, prior to destocking we had already realized that increasing wild dog predation was affecting our viability, and increasing kangaroo competition reduced our ability to manage total grazing pressure. In effect, we were being pushed into a position where we had to destock because of predation and competition approximately 12–24 months before others (who had already fenced, and had negligible predation or competition impacts) had to destock because of drought. We felt we only had two options: 'sell out' or 'fence in'. After researching all our options and seeing success within other fenced areas, we decided to erect a privately funded pest-proof fence around Leander in conjunction with a neighbouring property. We have a non-written agreement between us to maintain the fence so that it remains pest-proof. The fence was completed in early 2016.

We are now in the process of removing the last few wild dogs within the fence, and we are doing what we can to do likewise for foxes (*Vulpes vulpes*), feral pigs (*Sus scrofa*), feral cats (*Felis catus*) and feral goats, as well as reducing kangaroo numbers. We have partnered with a university to scientifically evaluate our management approaches against economic and environmental objectives. We well know the benefits of controlling total grazing pressure from previous experience (Clark and Cottam 1995). So, we are quite confident that we will again be able to run a viable and sustainable sheep operation while simultaneously increasing faunal and floral biodiversity; the historical changes we have described to sheep, wild dogs and kangaroos simply mean that fences are now also required to do it.

LESSONS LEARNED AND FUTURE DIRECTIONS

Changes to sheep, wild dogs and kangaroos in the region have required adaptation by livestock producers, who have learned some bitter-sweet lessons over the last 20 years, as follows:

- First, wild dog predation impacts on sheep cannot be reduced to levels low enough to enable viable sheep production by relying only on lethal wild dog control methods. In theory, coordinated lethal control can sustainably eliminate wild dogs (Hone *et al.* 2010); but in practice, the conditions required to achieve this almost never happen (Payne *et al.* 1930; Allen and West 2013).
- Second, and given the first lesson learned, the additional use of non-lethal wild dog control tools are mandatory if sheep producers are to have any hope of successfully managing wild dog predation and kangaroo competition. Pest-proof fencing and/or livestock guardian dogs (van Bommel 2010; Allen *et al.* 2016) presently offer the greatest promise in this regard. Fences eliminate migration and allow lethal control to better manage (pest *and* livestock) animal abundance on the inside.
- Third, the kangaroo harvesting industry now provides almost no benefit to livestock producers. Put another way, the kangaroo harvesting industry does nothing to reduce kangaroo numbers or competition with livestock (EHP 2015; but see Finch *et al.* this volume). This may be viewed as a good thing for those with kangaroo conservation concerns, but the obvious overgrazing impacts and the inability to rest or spell paddocks indicates that this single-species focus compromises overall biodiversity values in mixed-use or shared landscapes. Moreover, livestock producers receive no income from producing the kangaroos that others harvest and receive payment for.
- Fourth, decision-makers will listen and respond if sufficient information is presented to warrant a change in direction. Progress is often slow, but positive change can occur if the right information is rigorously produced and appropriately disseminated. This has been observed in recent cases of public investment in cluster fencing, removing 'red tape' around access to poison, and development of additional control tools.

Given the value of hindsight and the lessons being learned at present, we anticipate a renaissance in the use of pest-proof fencing throughout the sheep zone over the next 20 years. We expect that this will facilitate localised eradication of wild dogs in the near future, as it did in the historical past, and that it will also enable greater control of other pest animal species for the benefit of livestock and biodiversity alike. What remains to be seen is exactly how this will happen. It could happen in a rather piecemeal fashion as it has over recent years, or, if done with sufficient planning and resourcing, it could happen in a more coordinated way to more rapidly obtain the widespread and multidisciplinary benefits available. We hope it is the latter, and we encourage the continued interest in fences for wild dog, kangaroo and livestock management in agro-ecological landscapes.

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