16 THE DINGO BARRIER FENCE

16.1 Introduction

> Evidence from cameras placed on a dog fence have shown that the fences keep out not only the dogs, but also many kangaroos and other native as well as feral animals. This is of great benefit to the landholder (Wicks et al., 2014, p. 21).

There has never been an ecological impact study on the longest constructed environmental barrier fence in the world – the Australian dingo barrier fence (DBF). This chapter examines the history of the structure; its spatial and temporal impact as revealed through scientific records, media and archival documents. The chapter explores areas of wildlife management and the colonial, racial and cultural dynamics that shape human–animal relations.

The 5,614-kilometer dingo barrier fence was constructed in the 1950s as a part of a strategic approach to pest control, to protect sheep in grazing lands in the south east of the Australian continent, from wild dog attack. The fence operates by preventing the movement of terrestrial wildlife on a continental scale, and is backed up by a 35-kilometer buffer zone, that is regularly treated with poison baits, applied on the ground and aerially. Baiting is used in conjunction with other wild dog pest control methods – steel jaw traps lined with strychnine, bounty schemes and shooting.

'Inside' the fence (to the south-east of the continent) there is a zero tolerance policy towards wild canines, with broad scale land and aerial pest eradication programs employed. The objective has been to eradicate dingoes and wild dogs entirely from these regions.

Invasive animal biologists Allen and West (2013, p. 261) quantify the influence that the dingo exerts on agricultural production in Australia, writing:

> Dingoes are a critical causal factor in the distribution of sheep at the national, regional and local levels. Dingo predation contributed substantially to the historical contraction of the sheep industry to its present-day distribution, which is almost exclusively confined to areas within fenced dingo exclusion zones.

This statement is counteracted by the work of ecologists whose focus is in the resilience and function of the (native) ecosystem as a whole (Bradby et. al., 2013, p. 187):

> Barrier fencing is a management tool from an era where much wildlife was considered 'vermin' with bounties paid for their destruction. Not only is this an archaic concept, its effectiveness and economic benefits are questionable at best and counterproductive at worst.

While both statements are correct within their respective paradigms, this tension between agricultural production, food security, and 'agricultural exceptionalism' runs counter to a growing trend in national interests, including concerns with the preservation of heritage and natural resources. This chapter reviews the history of the DBF; how it originated, why it was constructed, what we know if its impact on dingo populations, native ecology and animal production.

16.2 The DBF

The DBF is a 5614 kilometer long wire mesh and pole structure. It averages around 1.8 to 2.0 meters high and traverses three Australian States. In *Pest Animals, New Solutions to Old Problems*, Penny Olsen (1998) describes the dingo fence as probably the best-known fence in the world – it is certainly the longest. The DBF starts in eastern Queensland, skirts around the western division of New South Wales, and out across South Australia, finally terminating on a rock-face above the southern ocean at the

Great Australian Bight, broadly illustrated in Figure 16:1. The trajectory of the fence line is superimposed over a map of Australia by geographer Griffith Taylor, drawn in 1923 to illustrate calculations of the country's agricultural and population capacity (Cathcart, 2008, p. 222).

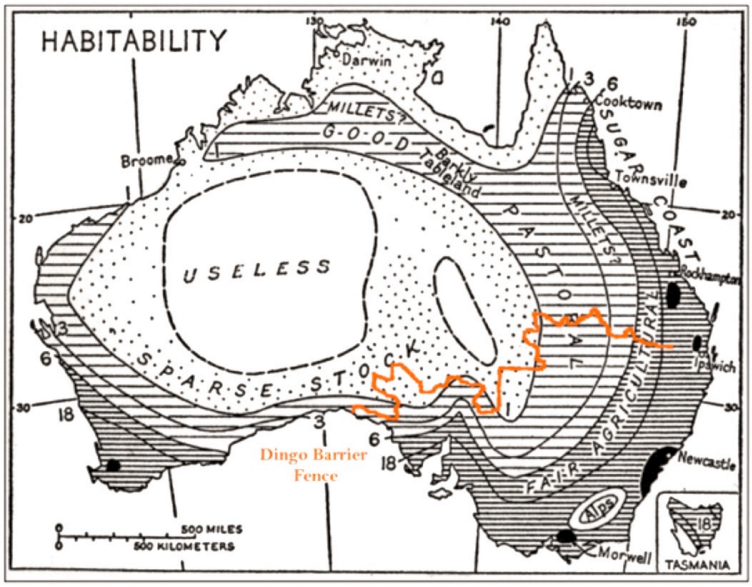

Figure 16-1 The dingo barrier fence (approximate position) placed over the map of Australian agricultural zones by geographer Griffith Taylor 1923.

Archaeologist Scott Cane (cited in Woodford, 2003, pp. 7-8) described the fence as:

> a great unseen and unrecognized symbol of the Australian psyche and landscape–separating the wild from the tamed–desert from pastoral and, in its remoter parts, the first from the third world of Australia.

Sections of the fence were constructed originally as rabbit-proof fences, dating back to the 1880s (Woodford, 2003). They proved an ineffective barrier against rabbits, but useful in limiting the movements of other free-ranging species regarded as pests by the Euro-Australians – dingoes, brumbies, pigs, kangaroos, emus, wombats and camels. Many areas of 'vermin-proof fencing' continued to be constructed throughout the 20th century – see 16:2 for fenced districts across South Australia in 1926. After World War II, the concept was conceived to connect up all of the *outside* fence-lines, to effectively barricade off the fertile farmlands of the south-eastern seaboard from the arid interior (McKnight, 1969).

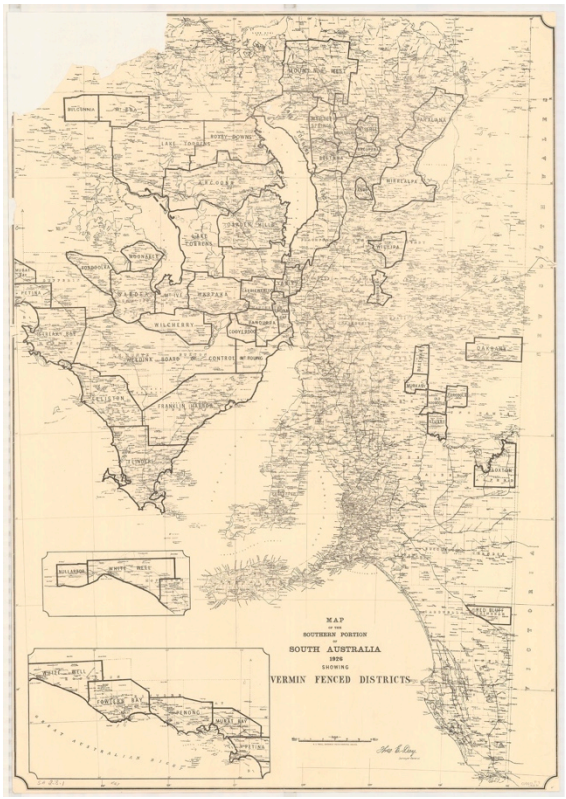

Figure 16-2 Vermin proof districts, South Australia 1926. Source: National Library of Australia.

16.3 Management and Costs

The fence is known as 'The Dog Fence' in South Australia, 'The Border Fence' in NSW and the 'Wild Dog Barrier Fence' in Queensland. It travels through thousands of kilometers of remote landscape, accompanied at its side by a four-wheel drive maintenance track – entirely off limits to the public, though the fence line can be traversed at various intersection points (McKnight, 1969). It crosses five deserts, three inland salt lakes, the Maralinga nuclear site, Woomera rocket range, gas and uranium mine sites. The barrier cuts across lands that belonged to over 23 different Aboriginal language groups prior to European invasion (Figure 16.3), – thirteen extinct and six critically endangered languages (National Indigenous Language Survey (NILS) 2014)

Maintenance of the fence is a full-time occupation for three teams of fence inspectors, at a cost of around $10 million per annum (McLeod, 2004). The main enemies are the elements. Flooding ruptures the fence-lines, saline lakes ruin the wire netting, sandstorms bury posts or join forces with buckbush (*Salsola tragus* or rollypolly) to push the structure over – sometimes providing an arboreal bridge over the wire for

marooned terrestrial wildlife (Woodford, 2003). Ants eat the posts, bush fires send terrified animals crashing into the wire, sand sometimes buries areas of the fence completely. During droughts, thousands of parched and starving animals are killed in stampedes, crushed up against the wire, with the continental barrier preventing them from travelling along semi-migratory paths towards the water sources in the south-east of the continent (Parker, 2006; Woodford, 2003).

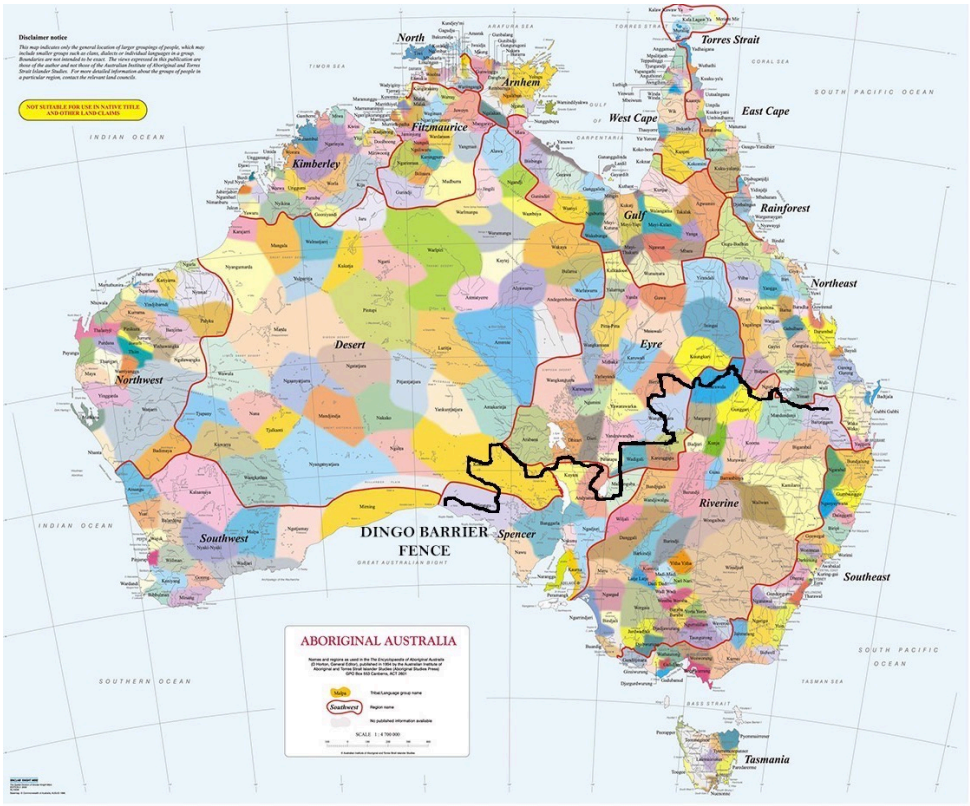

Figure 16-3 Map of Aboriginal languages and the DBF line (Horton, 1994).

The structure is 3374 kilometers longer than the Great Wall of China (Olsen, 1998). Its length is greater than the distance from Los Angeles to New York.

16.4 History

The original fence was almost twice as long as it is today, and was completed in 1959, travelling across 9656 kilometers of rangelands – the Queensland route was illustrated in Figure 16-4. The barrier was described in a report published in the *Sunday Times* in 1960 (*6,000-mile barrier for dingoes*, 1960):

> The world's longest and strangest 'iron curtain' has been completed in

the State of Queensland, an unbroken 3,500-mile fence of timber and wire mesh that runs across plains and mountains, across creek beds, railways and roads. At the New South Wales border it joins another fence that zig-zags down through South Australia to the Southern Ocean – a combined barrier 6,000 miles long.

And all this is intended to keep out dogs, the wild, wolf-like dogs called dingoes which have become Australia's Public Enemy No 1. They represent the greatest single menace to the wool and beef industries apart from drought.

Queensland's fence is long enough to begin in London, sweep around the coast of Spain, and end in Turkey. It encloses pasture lands of almost 300,000 square miles … Queensland officially estimates that it has been losing 500,000 sheep and lambs yearly to the dingoes.

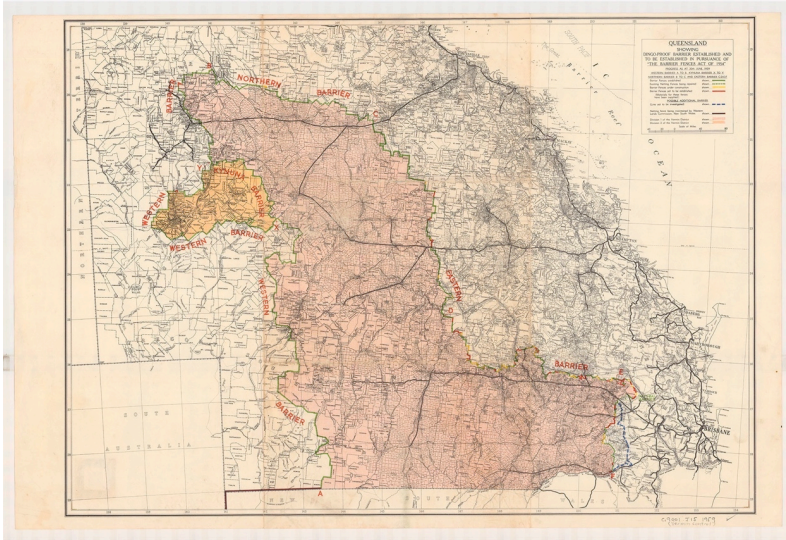

Figure 16-4 The Dingo Proof Barrier in 1959 – Queensland section. National Library of Australia Collection

By 1982 the Queensland stretch of the wild dog fence had fallen into disrepair and $3.6 million was allocated to realign the fence around the south-eastern area of Queensland (*Wild Dog Barrier Fence* 2008). This shortened the fence-line to its existing length of 5,614 kilometers illustrated in Figure 16-5.

There is a zero tolerance policy towards dingoes on the 'inside'– to the south of the fence, to protect the sheep industry from wild dog predation throughout the grazing country of South Australia, the Western Division of NSW and Queensland.

16.5 Legal Status Of The Dingo

The legal status of the dingo differs across state and federal jurisdictions, as is marked on Figure 16-5 – the green areas on the map belong to the National Reserve System (NRS) (see Table 4, pp. 241-42). These are zones that theoretically offer the dingo limited protection as a recognized native species. However, the dingo populations are indirectly affected by predator control targeting other species (fox, cat, wild dogs, wild pigs and other invasive species) – see OEH 2011. Additionally, dingoes are routinely directly targeted in pest control programs within protected areas to prevent predation on vulnerable populations of native species (Wallach, 2011), and throughout Victoria as part of the current Victorian wild dog eradication program, despite their listing as a threatened species in the State (DELWP 2016, DEPI 2013)

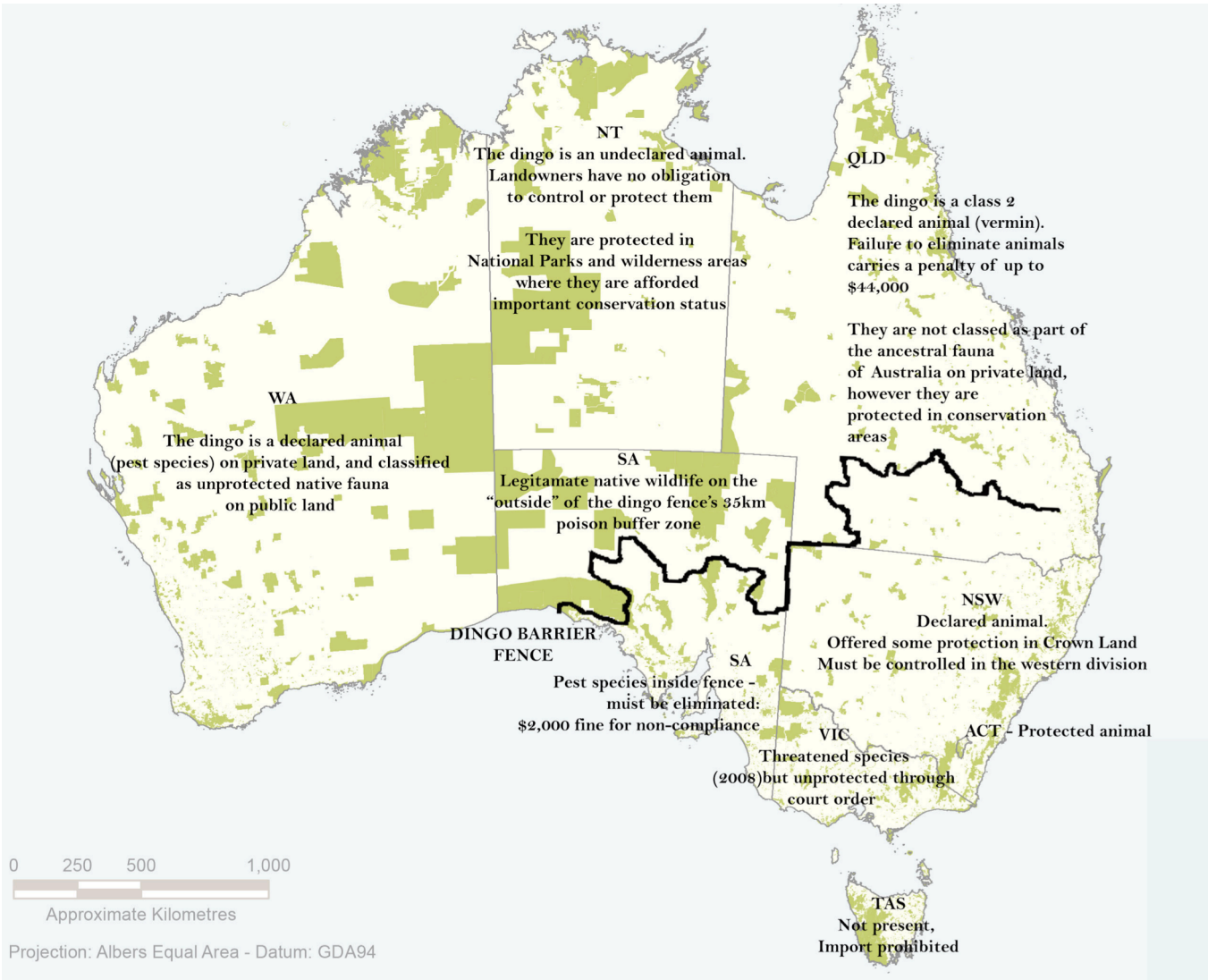

Figure 16-5 Legal status of the dingo across Australian State and Federal jurisdictions

Table 4 [a] Legal status of the dingo across Australian States and Territories.

State Territory	Government department	Act	Ruling	Legal requirements
Queensland	Primary Industries and Fisheries	*Land Protection (Pest and Stock Route Management) Act 2002.*	The dingo is a 'class 2 declared animal'. They are recorded as not being a part the ancestral fauna of Australia, and posing a significant risk to the economy, environment and social structure of Queensland society.	Landowners are required by law to eliminate class 2 pests from their properties, failing to do so can incur penalties up to $44,000.
	Department of Environment and Resource Management	*Queensland Nature Conservation Act (1992)*	The dingo is defined as 'native wildlife' and is protected as a natural resource within National Parks and other protected areas.	Human animal interactions are monitored, taking remedial action as required (culling animals habitually close to human spaces).
Western Australia	Agriculture Western Australia	*Agriculture and Related Resources Protections Act (1976)*	Dingoes (and hybrids) are declared animals, and populations have to be controlled by law, but this is confined to livestock areas. The law is enforced by Agriculture Western Australia (AGWEST), and the Agriculture Protection Board (APB). Dingoes can be kept in captivity only under a strict permit system or in approved institutions.	
	Department of Conservation and Land Management	*Western Australian Wildlife Conservation Act (1950)*	Dingoes are classified as unprotected native fauna, but they are not usually hunted without permission in conservation areas.	
South Australia	Animal and Plant Control Board	*(Agricultural Protection and Other Purposes) Act (1986)*	Dingoes and hybrids are 'proclaimed' pests in the sheep zone south of the DBF. Dingoes must be controlled in this zone and they can only be kept in authorised zoos and wildlife parks.	North of the DBF, the dingo is regarded as a legitimate wildlife species and although unprotected, is afforded a level of protection by the South Australian Dingo Policy, through imposing restrictions on dingo control beyond the 35-kilometre baited buffer zone north of the Dog Fence. Conservation in the northern zone is in the form of restrictions to groundand aerial baiting, and reduced bounty schemes.
New South Wales	NSW Agriculture; Rural Lands Protection Board	*Rural Lands Protection Act (1998)*	Demands the eradication of wild dogs including dingoes, who are classified as noxious pests and land owners must suppress or destroy them by law.	
	NSW Agriculture; Rural Lands Protection Board	*Wild Dog Destruction Act (1921)*	Includes dingoes in the definition of 'wild dogs', where land owners must control the populations, but the law is restricted to the western part of the state.	
		The Companion Animals Act (1998)	Dingoes can be kept as pets, no permit required but this does not include the western region.	
	National Parks and Wildlife Service	*National Parks and Wildlife Act (1974)*	Lists the dingo as unprotected wildlife, but they are granted full protection in National Parks and nature reserves under the wild dog policy.	
		Threatened Species Conservation Act (1995)	Recognises the dingo as a native species since the population was established before the European colonization.	

Table 4 [b] Legal status of the dingo across Australian States and Territories.

State Territory	Government department	Act	Ruling	Legal requirements
Australian Capital Territory		*Nature Conservation Act 1980*	The dingo is a protected species	
		Nature Conservation Act 1980	Control of dingoes and other wild dogs on private lands is allowed subject to a permit authorizing the killing of a protected species. This is issued by *Environment ACT.*	
Northern Territory	Parks and wildlife Commission		Undeclared animal with land owners having no obligation to control or protect them.	
	Department of Natural Resources, Environment and the Arts	*Territory Parks and Wildlife Conservation Act (2000)*	The Dingo is a protected native wildlife, with important conservational value.	Responsible management of dingoes is carried out under the Parks and Wildlife service, with 1080 baiting used as the principle control. This is distributed by vehicle and aircraft, in fresh meat baits, around known water points, roads and tracks. The number of baits is restricted to 30 at any one location. Dingoes are considered to survive in reasonable numbers and it is legal to kill them when they pose a threat to livestock.They are afforded 'full legal protection' and penalties apply for unauthorized possession, interference or killing of dingoes- carrying fines from $5,500 for the individual, to $27,500 for a body corporate. (Sections 55 to 63 of the Act)
Victoria	Department of Primary Industry (DPI)	*Catchment and Land Protection Act (1994)*	Wild dogs and dingo hybrids are classified as established pests, control and eradication is the responsiblilty of individual land owners. Dingoes are declared unprotected on all private land in Victoria	1st October 2011 the DPI introduced a bounty scheme for foxes and wild dogs, $10 per fox and $50 per wild dog scalp). This was increased to $100 per wild dog scalp from 2014-2015. Current eradication
	Department of Sustainability and Environment	*Flora and Fauna Guarantee Act 1988*	Victoria listed the *Canis dingo* as a threatened species, October 2008	
		Wildlife Act (1975)	The dingo is technically protected on public land however this was reversed in most areas by exemption under court order. The dingo is unprotected on all private lands in Victoria, and unprotected in public lands within 3 kilometers of private land boundaries.	To allow for the protection and conservation of dingoes in remote areas, as well as provide for the legal control of wild dogs, dingoes have been declared unprotected under the Wildlife Act 1975 across most of the state. Note: the dingo is 'unprotected' so that wild dogs can be eliminated, preventing hybridization.
Tasmania	Department of Primary Industries, Parks, Water and Environment	*National Parks and Wildlife Act (1970)*	Dingoes are recorded as not present in Tasmania at European arrival, and are believed to have never colonized the Island. They are forbidden in Tasmania.	
		Nature Conservation Act 2002	The Dingo is a restricted animal, prohibited from introduction to Tasmania.	

16.6 Importance of the Fence to the Sheep Industry

The role of the DBF in protecting the sheep industry is considered vital (Allen & Sparkes, 2001; Allen & West, 2013). Construction and maintenance of barrier fencing has been a key strategy in the management of pest species since the 1880s (*Queensland Parliament Paper No:2*; 2015). This has been supported by enthusiastic reports from government and industry stakeholders. Allen & West (2013, p. 264) examined the distribution of sheep populations in 2013, and established that "the viability of sheep grazing in rangeland areas is completely dependent on the absence of dingo predation". In recent years, however, the barrier fence appears to have exerted little influence on the distribution of dingo populations across the rangelands both inside and outside of the barrier fence as shown in Figure 16:6. Allen & West (2013, p. 263) wrote:

> Despite all the subsequent efforts to keep the exclusion zone free of dingoes, they are presently distributed across almost all rangeland sheep production areas in eastern Australia.

Increased broad-scale distribution of poisoned bait across rangeland areas both sides of the barrier has been undertaken in response (IACRC, 2016).

16.7 Case Study: The Western Division, NSW

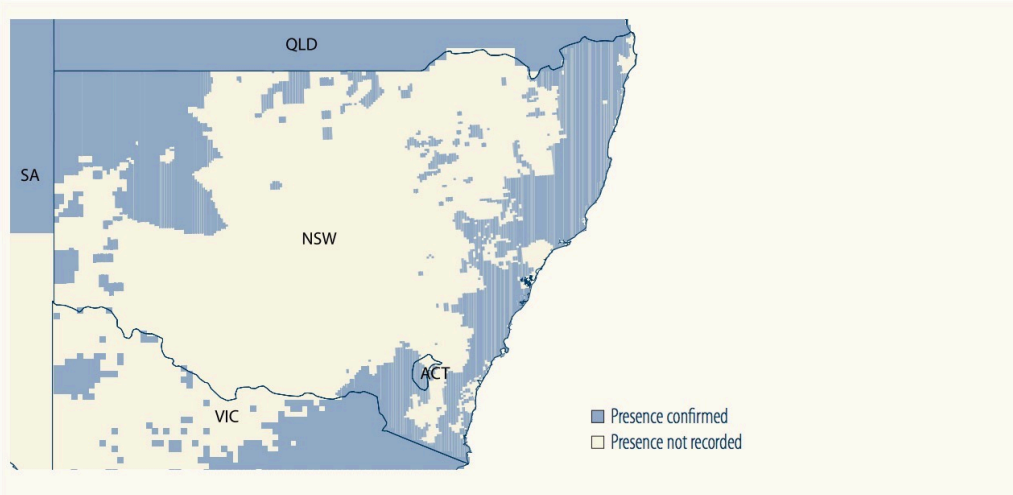

Figure 16-6 Wild dog presence in the Western Division as assessed in 2009. Source: Invasive Animals Cooperative Research Centre and the Department of Primary Industries.

One of the longest standing sections of the DBF follows the north-west corner of NSW, fencing in a large section of the district known as the Western Division (Figure 16-6). The changes that have taken place within this region over the past 175 years provide a detailed spatial and temporal record of impacts on arid zone ecology since the area was first settled in 1841. In a study of the extinctions of mammals in the Western Division, Lunney (2001, p. 52) recorded that by the time of Federation in 1901, many of the native species of the region were already gone:

> Of the 61 native mammal species present in the Western Division at the time of European settlement, 24 are now extinct and 17 of the remaining 37 are threatened ... Of the 24 extinct mammals, 14 were last seen before 1881, the year the rabbit was first seen, and one species was last seen in 1883 when the rabbit plague had just begun …
>
> Fencing of huge paddocks, including the construction of vermin proof fences, was undertaken on a tremendous scale, and by the late 1870s and 1880s most of the grazing land in New South Wales was fenced … (Lunney, 2001 p. 57)

The first wire rabbit proof fences were advertised for sale in the Argus Newspaper in 1854 (*Powell*, 1854, p. 8):

> ONSALE by the undersigned— [Walter Powell, Wholesale stores, Swanston St Melbourne]
>
> 40 tons galvanized fencing wire
>
> 10 do rabbit-proof wire fencing…
>
> Machine wire, fly wire, tinman's wire and fittings…

This was five years before rabbits were officially recognized as becoming problematic following Thomas Austen's introduction in 1859 (Chapter 13.7). Strychnine was widely available by this time (Chapter 13.6).

The Argus published the following extract acknowledging the connection between the loss of the dingo and Aboriginal hunters, with the resulting explosion in herbivores (*A Kangaroo Battue*, 1867, p. 7):

> Since a small remnant left of the aborigines have given up the chase and hang about the townships and depend on whites for food, and the shepherd kings have destroyed the dingo, kangaroos have an immunity

> from their natural enemies, and their numbers have of late years increased to such an extent on some of the stations in the western district as to render it necessary that means should be devised for reducing the number.

The article describes a community drive involving 60 to 70 equestrians that rounded up kangaroos, and headed the animals into a large stockade. The kangaroos unpredictably had turned and charged on the horsemen, a large number escaping. In three such round-ups, an estimated 4,000 kangaroos were 'dispatched' with stock whips and waddies. The article was so popular it was reproduced in numerous publications in Australia and overseas, from *The Argus* to the *Manchester Guardian.*

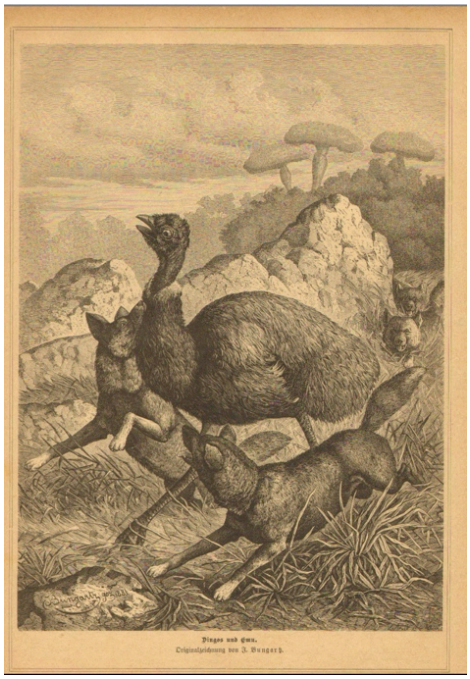

Figure 16-7 Dingoes hunting emu, 1881, German art print. Source: Collection of J Philip

The paucity of value assigned to native wildlife is reflected in the historical records of carnage. Garden recorded (2005, pp. 79-80):

> The death toll from the pursuit of "pests" was immense. Keith Hancock examined the annual reports of the chief inspector of stock in the Monaro region of New South Wales and found that, from the 1880s to 1900, they contained astonishing tallies of slaughter. In most years, wallabies and kangaroos were killed by the millions; kangaroo rats in hundreds of thousands; possums, bandicoots, paddymelons, and crows in scores of thousands; and wombats in the hundreds. The killing was sustained and indiscriminate, and all aimed at saving crops and pasture.

There is a subtle change in the depiction of the dingo around the late 1800s, perhaps a nostalgic reflection, with some acknowledgement of their role in the balance of nature'. Figure 16-7 *Dingoes hunting emu* 1881, and Figure 16-8 *Wild dogs watching kangaroos by moonlight* from 1888, present a new narrative that emerged, distancing the dingo from the wild dog eyeing up the sheepfolds of the 1860s (Figure C, p. 201). There were calls at this time to make rabbit proof fencing compulsory, and to adopt landscape wide approaches to the eradication of vermin. There were even some calls to relax wild dog destruction, however, as demonstrated by the party of poisoners employed in the 1890s to clear entire landscapes for livestock production (see *Australia*, Chapter 12), it appears that complete eradication was considered the best the course of action by the State governments at the time.

Figure 16-8 Wild dogs watching kangaroos by moonlight, Samuel Calvert 1888 Source: State Library of Victoria

In the heat of summer, 1890, the NSW Government constructed a rabbit-proof fence along the boundary of South Australia – from the Murray River up to the Queensland border, a distance of 553 kilometers (*Rabbit proof fencing on the border*, 1890, p. 5). Here it joined the Queensland Barrier fence that had been commissioned along the NSW border in 1886. The following decades record heated arguments across the fence lines, regarding the upkeep of the barrier and who was responsible for paying for it. This has been a constant source of conflict for the DBF. Smith (June 23, 1954) wrote:

> South Australia was not interested in maintenance, but in 1906 it was proclaimed a barrier fence and all three states had obligations to maintain it … In some parts due to sand 'blowout' three fences have

been erected one on top of the other, which means 19 ft 6 inch – 13 ft underground and 6 ft 6 inches above.

Figure 16-9 "The rabbit pest: two sides of a netting fence." Cobar, New South Wales 1905. Source: State Library of New South Wales At Work and Play 02766

Environmental historian Don Garden (2005), featured the 1905 photo, Figure 16-9, of rabbit-proof fencing, in the *Australia, New Zealand, and the Pacific : an Environmental History*, as an illustration of the propaganda supporting the barrier fencing industry in the early days of Federation. Garden (2005, p. 74) recorded:

> This image was intended to demonstrate the effectiveness of rabbit-proof netting fences by showing the contrast between a paddock eaten bare by rabbits and adjacent area protected from them. However, the picture may not be so clear. Desperate rabbits might well be able to cross such a low fence, so one suspects that overgrazing by sheep was part of the reason for the loss of vegetation.

Additionally, a level of overgrazing can be attributed to the lack of predators controlling the movements and population size of the herbivore populations (native and introduced see Figure 16-10, and Appendix 6 detailing dingo influence on functioning ecosystems), as described by Colman et al. (2014, p. 1):

> The disruption to species-interaction networks caused by the irruptions of herbivores and mesopredators that frequently accompanies the loss of apex predators can trigger regime shifts that result in the reorganization of species assemblages … and has been identified as a key driver of biodiversity loss. Consequently, restoration of apex predator populations and the ecosystem services they provide has been highlighted as a critical imperative for the conservation of biodiversity …

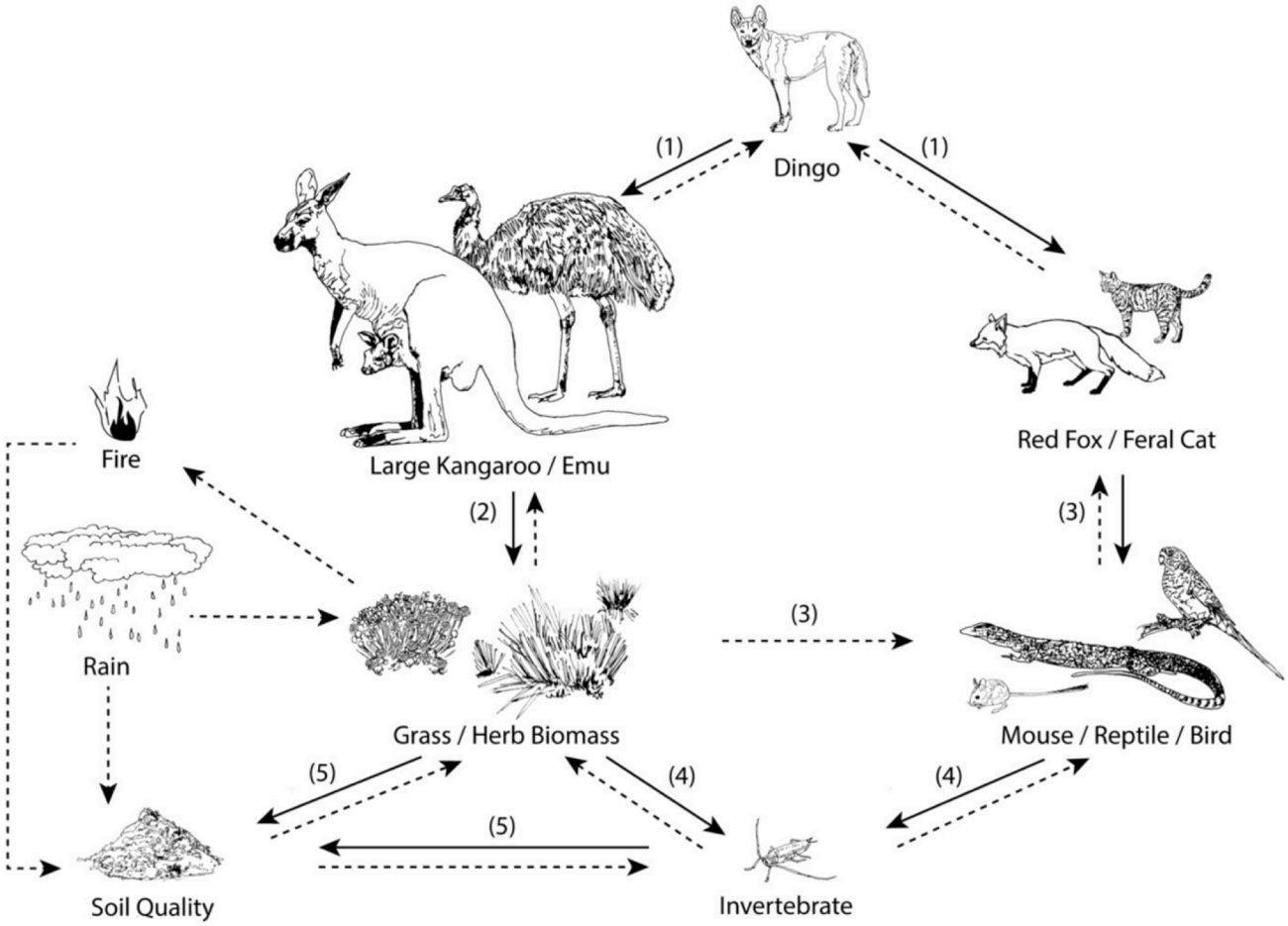

Figure 16-10 Trophic regulation: interactions associated with dingo predation, modeled on projections for Sturt National Park, in the corner region of the Western Division (numbers in parentheses represent the predicted sequence of events). Source: Newsome, Ballard, Crowther, et al., 2015

The Western Division has remained a largely leasehold, sparsely populated region (Olsen, 1998). The area recorded a boom in population in the 1950s, with the release of myxomatosis settling the rabbit plague, and the market recording high wool prices. Graziers were encouraged to take up remote leases. Areas abandoned during the war were resettled, fences repaired, and ground and aerial baiting waged war on the dingo (Chapters 13 and 14). The cautionary history was traced by Olsen (1998, p. 207):

> … by the mid-1960s, beset by drought, extensive fires, a partial recovery of the rabbit population and falling wool prices, many properties were no longer viable. In 1980, there were less than 8 million sheep left in the Division but land clearing continued … It wasn't until the passing of the National Parks and Wildlife Act 1967 and the setting

> aside of Sturt National Park, that wildlife was widely and seriously considered. The report of the Select Committee in 1984 noted that 52 per cent of native mammal species were believed to be extinct in the Division and a later study identified six extinct bird species and a further 103 bird species in decline in the region.

16.8 How High Can a Dingo Jump?

There is one critical consideration that has been notably absent from historical and contemporary reports on the DBF. That is the lack of consensus on the height of the fence itself, indicating a curious lack of interest in the agility of the stated target species, the dingo.

There is just one published record of agility trials, specifically testing the effectiveness of dingo barrier fencing. The trials were conducted in the 1950s by N.W.G. Macintosh at the University of Sydney as part of his study on the genetics and biology of the dingo—a collaboration between the Department of Comparative Anatomy, and the Graziers Federal Council who were, at the time, on "a drive to exterminate the dingo" (*"Yellow Dog" Marauders Increasing. Dingoes are causing heavy sheep losses*, 1953). Macintosh ran agility trials on three generations of dingoes raised by his department on campus. The researchers recorded their behavior, growth patterns, agility and temperament. The results of the trials were outlined in an article published in 1954 (Reading, & Macintosh, 1954, p. 170):

> With a movie camera, Dr. Macintosh has recorded as wide a range of dingo movements as are possible under artificial conditions. For the man on the land's point of view, one of the most important movement questions is, how high can the dingo jump? …[Macintosh] believes 8ft. 6inches is not too high a figure, and that the conventional 7ft. dog proof fence would not be sufficient to keep out a determined dingo.

There are other archival accounts recording the exceptional agility of the dingo. The following was recorded in 1871 *(Australian Natural History*, 1871, p. 13):

> The dingo is remarkable for power, agility and grace. A tame one which was being hunted, reached his kennel long before the hounds, fairly outrunning the whole pack, and during the chase was seen frequently to clear a three rail fence at a bound; even with a heavy chain he could jump six feet off the ground.

Another account was published the year the DBF was completed in *The Bulletin*, 23 September 1959 (*Dingoes*, 1959):

> Barrier fences are doubtful blocks. They may keep some dingoes out but they are definitely not 100 per cent secure. I chased a dingo into the corner of a dingo-fence one day. The fence-netting, with three wires on top, was 6ft. high, and the dingo went right into the corner. I was thinking what I would do with the three quid – but I didn't get the money. The dingo just climbed up the netting, slipped through the top wires and trotted away. He seemed in no hurry, looking back a couple of times, and then made off. I don't think it was the first time he had scaled a dingo-fence.

An additional problem with fencing off the desert is the challenges of the terrain itself (*Dingoes*, 1959):

> Another factor against the dingo check-fence is that when those western rivers come down in flood they are miles wide, so miles of netting get washed away. The netting catches any debris and the weight of the water behind it pulls it right down. It is sometimes weeks before it can be effectively repaired, and dingoes pass through while the fence is down.

Despite its shortcomings, the fence when used in collaboration with baiting and traps, was considered the best method of combat at the time (see p. 244), though not before trying other lethal options as is detailed in the following section.

16.9 Biological Agents

The success of the myxomatosis virus that had decimated both the rabbit population and the rabbit industry in 1950, initiated the call for research into a similar biological agent that could be deployed against the dingo. This formed the basis of the research collaboration between N.W.G. Macintosh and the Graziers' Federal Council. Attempts to find a safe biological control that would not jump from the dingo to the domestic dog eventually proved an impossible undertaking, but not before trying. A presentation to the CSIRO conference in Cloncurry 1952, reported that tests had been made with distemper and mange, without practical results (Anon., 1952, Macintosh archives).

In a further account, published on 31 March 1956 in the *North Queensland Register* (Ratcliff, 1956), the officer in charge of the CSIRO Wild Life Section, Mr. F.N. Ratcliffe, reported to the Graziers' Association that tests had failed to find a safe and reliable method of biological extermination. Distemper did not spread widely enough to have any impact, and also failed in trials to have a high mortality rate. Other canine infections clearly could not be used with any safety, promise or advantage – sarcoptic mange, canine hepatitis, rabies, North American salmon poisoning disease of dogs; these infections could rapidly spread to the domestic dog population due to their "virtually identical biology", and so this ruled out any introduction (Ratcliffe, 1956).

16.10 The Public Voice

It is generally agreed that by far the most effective method of pest control in Australia has been the application of aerial and ground baiting with 1080 compound. While aerial baiting did not result in a significant 'body count' of dingoes after the baiting (see Chapter 15), the immediate reduction in predation on livestock, and the long term changes in the composition of regional ecological systems, were sufficient to support the past 70 years of repeat applications. However, it was concern from the public that curtailed even more broad-spread use of poison. Breckwoldt (1988, p. 240) records that in 1956 the public was confronted by media reports:

> A newsreel film of the day shows baits being shoveled out of a DC-3 accompanied by an earnest voice reading a dramatic script on the farmer's fight against the killer warrigal.

It was public objection that prevented a blanket approach to environmental poisoning, Breckwoldt explained (1988, p. 241):

> The image of the countryside being saturated with planeloads of meat liberally laced with 1080 has forced a change in policy towards 1080 in most parts of Australia.

Fencing was seen as a more humane way to control pest species, and by 1959 the entire length of the single barrier fence had been completed. The height was between 0.8 and 1.5 meters shorter than recommended by Macintosh. It appears a compromise was reached; the effective partnership between barrier fencing and controlled application of land and aerial poison *together*, offered the most effective (and publically palatable) method of eradication – with steel jaw traps lined with strychnine placed

along the fence-line for extra back-up, and bounty schemes in specified areas (Woodford, 2003). As with known extinction events, populations that have been subjected to multiple perturbations to their environment are the ones to suffer most, and it is the multiplicity of impacts that is often the recipe for irreversible changes to the ecosystem. The current wave of extinctions worldwide can be attributed to habitat fragmentation and destruction, lethal species controls, disease, pollution, and the invasion of alien species as a result of human assisted migrations (Foreman, 2004, p. 3). So while there is no conclusive data showing how the dingo populations are affected by these controls, no single method appears to be affective, as reported by Macintosh (Reading & Macintosh, 1954, p. 170). However, contemporaneously applying multiple controls to a specific region, produces the desired results – predation on sheep is greatly reduced, and the interventions prove economically beneficial. The affect to the biota, from all reports, is too difficult to measure.

16.11 N. W. G. Macintosh

After two decades of studying the dingo, Professor N. W. G. Macintosh had a change of heart towards the dingo, and expressed his concern at the continuing dingo–human conflict. In an interview with George Blaikie (1970, p. 5), Macintosh stated that his research had discovered that many of the allegations made against the dingo had no scientific credibility (1970, p. 5):

> The evidence even suggests he is the grazier's friend because he acts as a predator of rabbits, plague proportions of marsupial mice and feral rats. What's more, the dingo cheerfully cleans up dead animals, thus discouraging the breeding of blowflies that can hardly be called the farmers friend. Only on occasion does the dingo appear to attack lambs and, perhaps calves.
>
> Professor Macintosh warns that in trying to knock out the dingo we may well be upsetting the balance of nature – an extra risky thing to do.
>
> He points out that man has blindly turned his rage against a wide range of creatures he had labeled as pests – wedge tailed eagles, dingoes, wombats, goannas, bandicoots, emus, red kangaroos and sharks.
>
> "We have attacked such fish, flesh and fowl with open seasons, bounty payments, and highly organized extermination campaigns. Now we are discovering that some creatures regarded as pests are actually a most

> potent factor in the balance of nature and that people on the land have deprived themselves of an asset rather than a liability and spent a great deal of money in the process" claims Professor Macintosh.

16.12 The Impact Statement

While there has never been an environmental impact statement on the DBF, there have been acknowledged impacts. These include loss of connectivity, loss of seed dispersal and genetic transfer, mesopredator release, and loss of terrestrial wildlife – sometimes numbering into the thousands, in times of drought, flood or fire. I have examined a number of these impacts as presented in published records, reports and environmental studies, and will outline the main areas of concern as follows.

Newsome et al., (2001) reported finding evidence of the 'fence affect' on populations of kangaroo and emu each side of the environmental barrier, with problematic numbers of herbivores on the 'inside', shielded from predation in areas where dingoes have been eliminated. This is counterproductive for the grazier's, as increased herbivore populations compete for resources with livestock.

The fence-line also affects the floral communities, by arresting genetic transfer across borders (Bradby et al., 2014, p. 183):

> The Emu is an important seed disperser and can have strong influences on the diversity of vegetation by carrying many seeds long distances. The germination of some seeds is also helped by their passage through the Emu's gut. Chalwell and Ladd (2005, p. 446) note that for many areas "…the restriction of the range of Emus as a result of agricultural development, a key seed disperser has been lost".

James Woodford (2003) recorded first hand accounts of the structure's impact on the terrestrial wildlife, as he travelled the entire distance of the fence-line in 2002 (2003, p. 13) writing:

> At its beginning on the cliffs the Dog Fence is a remarkably simple barrier—shoulder-high posts slung with wire mesh. Every few hundred meters there were emu and kangaroo-shaped indentations in the netting, where one of the animals had slammed into the wire at full flight. The force of these collisions, at least for the first few dozen times I saw one happen, made me wince. Sometimes the creatures would crash through

> but most often they quickly bounced back, and in a flurry of fur or feathers would run off in the opposite direction with the gait of a feral muppet. On other times they broke their necks or limbs trying to cross the barrier Mostly, though, they ran or hopped along the fence until, exhausted, they could travel no further.

Emus travel up to 50 kilometer per hour (*Emu*, 2016). These are high impact collisions. On the movements of Emus encountering the 1170 km long State barrier fence in Western Australia, Bradby et. al., (2014, p. 182) reported:

> Emus will travel up to 1000 kilometers. When these southward-moving Emus reach the Barrier Fence, they have been shot, poisoned or left to starve in the tens of thousands …

Meryl Parker wrote of the DBF and the invisibility of the structure due to its remote geography (2009, p. 111):

> The fence was built in stages from the early twentieth century to exclude dingoes from sheep-farming areas and it exists today … its cruelty is writ large across the land like a grotesque scar. Philip Holden travelled the length of the fence in 1989 and wrote about the experience in *Along the Dingo Fence*. He describes the dying and suffering birds and animals caught in its wires; the wombats and echidnas shot because they make holes in its netting, and the kangaroos, denied access to food, water and new breeding partners (201, 158). Stressed kangaroos attempt to jump the two meters high fence. If they fail, the wires tighten on a front or back leg and they hang and die (Holden 82). When there is a prolonged drought, the fence becomes a final resting place for thousands of thirst-maddened animals; a monument to the colonial urge to control even the ancient migratory paths of native animals.
>
> There are few texts about the fence or the sad atmosphere of death which surrounds it. It is somewhere out there, beyond our sight and knowledge, like the "deeply hidden secret" of slaughterhouses (Scholtmeijer 148) which are usually situated away from residential areas (Serpell 196).

The effect of continental scale barrier fencing on ecosystem function, has been exacerbated by the removal of the keystone species as illustrated in Figure 16-10, leading to a breakdown in ecological integrity (Foreman, 2004). The bodies of animals

killed at the fence line additionally have been routinely laced with poison, lethal to the dingoes that fed on the carcasses (Woodford, 2003), preventing (Ripple et. al., 2014):

- maintenance of ecological resilience and biodiversity
- disease control
- carbon sequestration

N. W. G. Macintosh stated "the dingo served a useful role as a predator on such pests as rabbits, marsupial mice, feral cats and as a remover of carrion" (Elkin, 1978, p. 54) so it can be argued that poisoning animals scavenging on carcasses is a particularly problematic approach to the management of natural resources.

There is also a body of research available on the positive effects of canine predators on vegetation communities, and to the health of water systems, as demonstrated through the reintroduction of wolves in Yellowstone Park (see Jones, 2010: *From Big Bad Wolf to Ecological Hero)*

Projections on the long-term feasibility of livestock production in the arid zone arguably provide a strong argument against the future viability of retaining the barrier fence, and this will be discussed in the following final section of this chapter.

16.13 Climate Change in the Rangelands

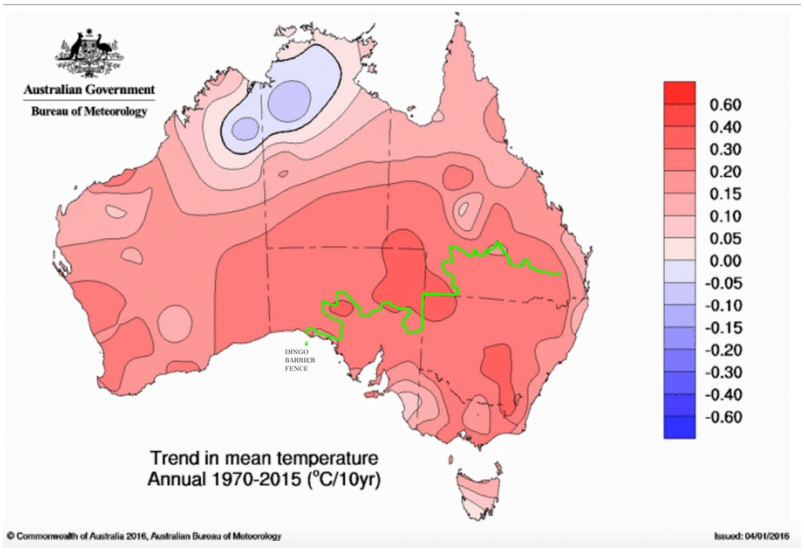

Figure 16-11 Rising temperatures and the impact of climate change on the arid zone. Approximate position of dingo fence overlaid in green. Source: Bureau of Meteorology

The arid zone is an environment highly vulnerable to climate change, indicated by the rising temperature zones highlighted in Figure 16-10. Already this area of Australia has experienced challenging years recently, with increasingly unpredictable weather patterns, higher temperatures and extreme flood events. Anthropologist of disaster, Catherine Rigby, writes of the *Angry Summer* of 2012-2013:

> The heat was so extreme in the "red center" of the continent, so-called for the ruddy pigment of the desert sand, that a new color had to be added to the temperature map.

A series of reports were produced by the CSIRO in 2014 from findings of the 'Rangelands Cluster Project' – this concerns the entire area that the DBF traverses in the center of the continent (see Figure 16-1). Seventeen documents were published, titled *Australian rangelands and climate change*, containing individual reports on fire, drought, rainfall variability, dust, native species, invasive species and pastoral production and adaptation. The last two reports are particularly salient to my thesis, relating to changes in land use in the Rangelands. This directly affects dingo populations, listed in the invasive animals document (not the native species report). Pavey, & Bastin wrote (2014, p. 18):

> The distribution and abundance of dingoes within the Rangelands Cluster is predicted to increase in response to both climate change and changes in rangeland management ... The management changes are twofold. Firstly, there is a growing appreciation of the positive impacts of dingoes on ecosystems and of the need to manage them appropriately as a keystone species (eg. Ripple et al 2014). Second, dingoes are persecuted most heavily in sheep-grazing regions. The extent of sheep grazing in the rangelands of Australia is declining steadily, as is is in other parts of the world (Forsyth et al. in press) and as this happens the need to control dingoes will decline."

Similarly, in the report on pastoral production and adaptation, Bastin, Stokes, & Forrest, wrote (2014, p. 4):

> appropriate transformational change [in the Rangelands cluster] will probably require a fundamental shift in the current thinking (paradigm) about how rangelands are managed towards a more conservative risk-based approach to the use of natural resources.

They also caution about taking a short term approach to these issues (2014, p. 10)

> Systemic and managed/facilitated change that achieves regionally stronger and more resilient pastoral business in the face of projected climate change is preferable to ad hoc, enterprise-level application of management tactics that address short-term vulnerabilities to climate variability..."

To look at future prjections for the DBF, I ran a number of climate change models, examining the projections across the rangelands. I used the CSIRO ACCESS1-0 computer modeling (this is recommended as a conservative interface) and found a projected increase of temperature of 1-2 degrees in springtime within 10-15 years (Figure 16-11), and large disruptions predicted for rainfall in the same timeframe (Figure 16-12). Other models were more extreme.

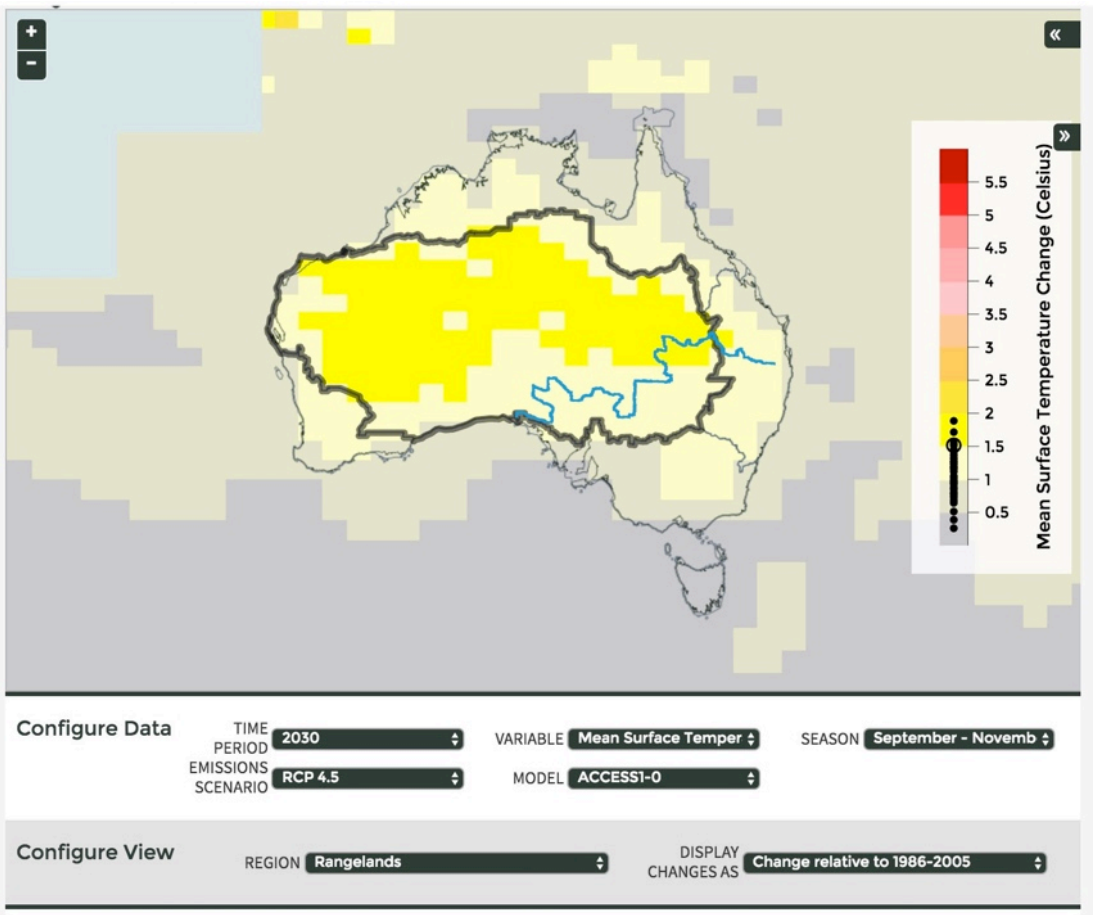

Figure 16-12 ACCESS1-0 climate change modeling for 2030 in the rangelands, September-November predicting a rise of 1 to 2 degrees along the Dingo Barrier Fence-line (approximate position marked in blue on map)

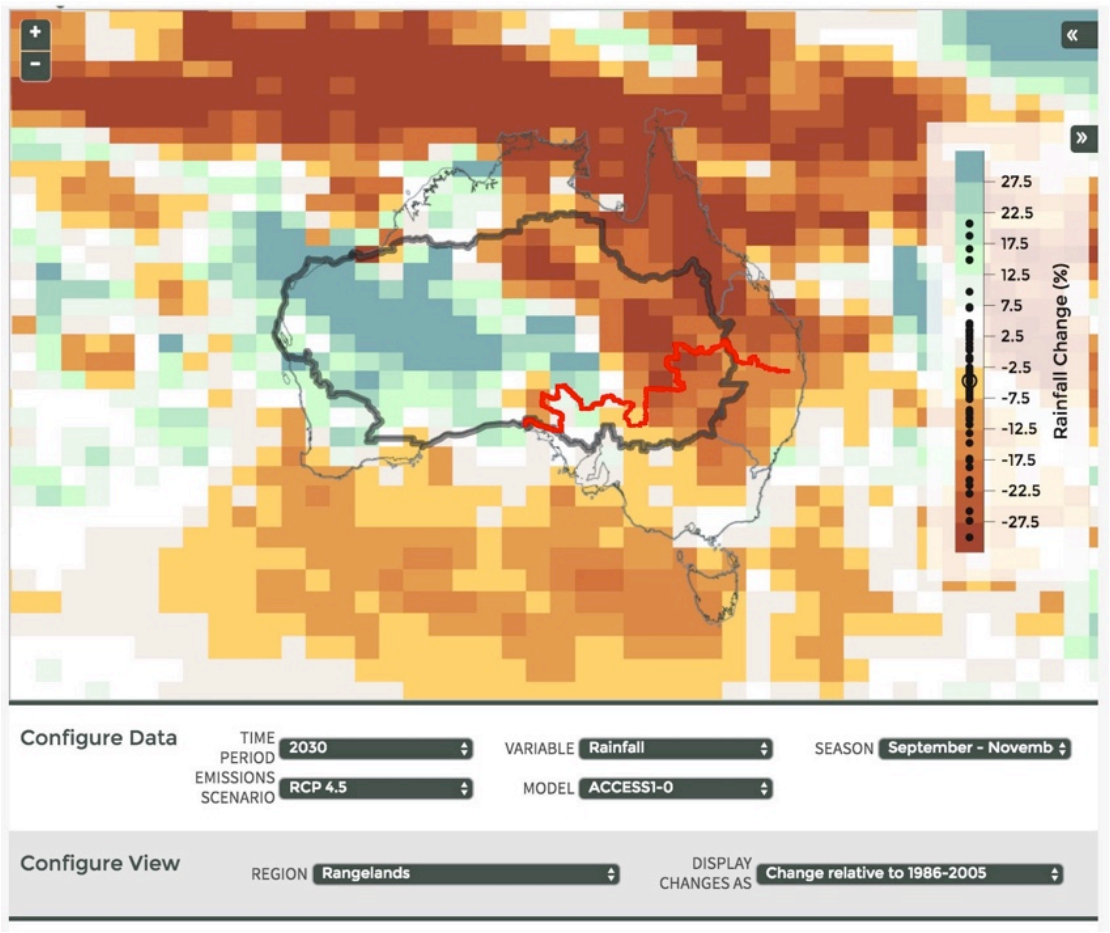

Figure 16-13 ACCESS1-0 climate change modeling for 2030 in the rangelands, September-November predicting changes to rainfall along the Dingo Barrier Fence-line (approximate position marked in red on map)

These predictions have transformative implications for existing rangeland management. They suggest that sheep raising in the rangelands will be unviable within the next 10 to 15 years. This is due to the susceptibility of the animals to heat stress, impacts of feed supply, the inability of sheep to reproduce in a climate any more extreme that current conditions (Bastin, Stokes, & Forrest 2014). The CSIRO reports suggest transformational change is already underway. In *Pastoral production and adaptation* (Bastin, Stokes, & Forrest, 2014), these changes are outlined (my summary):

> 1. Raising sheep in the arid zone is already decreasing around the world and this trend will continue. The recommendations for adaptation to climate change in the Australian rangelands, are to make a transition to beef, goat, donkey or camel stock. Eventually the reproductive rate of the sheep will be affected, and need for increased water sources etc. will make sheep farming in the arid zone unviable.
>
> 2. Camels, donkeys, feral horses and feral goat populations are likely to

> be unaffected or increase with climate change
>
> 3. Dingo populations are expected to increase due to less population controls. Their influence on the environment is projected to be increasingly positive.
>
> 4. Feral cat and cane toad populations will decrease in response to rising temperatures.
>
> 5. Fox populations are likely to decrease due to the increase in dingo populations.

What the projections suggest is that it will be unviable economically to retain (maintain) the Dingo Barrier Fence in the near future. The reasons for this are three-fold, firstly, if graziers move to larger stock as suggested, the threat to sheep is no longer problematic (also donkeys make effective guardian animals, so a move towards mixed-livestock operations would be advantageous while sheep production is still viable). Secondly, the market for sheep products is predicted to continue falling, due to technological advances that have reduced the demand for wool products and other market forces (see Table 1, p. 208, & Table 3 p. 232), and thirdly, with the increase in flood events, dust storms and generally unstable weather patterns, the projected cost of fence maintenance would rise substantially from the existing $10 million per annum budget, and there is no indication that the market could support this increase.

This is particularly problematic. It is not known what the impacts of the Dingo Barrier Fence have been on native ecology for the past 60 years, consequently it is difficult to predict the impacts that will occur when the structure is removed. This is an interesting and timely area for research, and the title of the Australian Rangelands Society conference for 2017 "Transition to Transformation", reveals that for the region, significant change is already a reality (ARS 19th-biennial-conference, 2017). There is no research currently being conducted into climate change and the future of the DBF. CSIRO climate scientist and author of the invasive animals report, Chris Pavey wrote (personal correspondence, 4 October 2016):

> If the barrier fence is removed, I expect that it would not be a negative event in the long term. Animals would be able to move across the fence and it would impact mostly those individuals closest to the fence. The fence does not actually separate species as far as I am aware. That is, all species in Australia that are hindered by the fence do occur north and

> south of the fence. I believe that the biggest impacts will be social.

Lead author of the Rangelands Climate Report, Ian Watterson, wrote of my preliminary predictions on the unviability of the DBF, with a Rangeland temperature increase forecast for 1-2 degrees within 10-15 years, (personal correspondence, 15 September 2016):

> …your comments on Rangelands look very reasonable to me, and I'm surprised to not find any mention of the DBF in the documents. Given the variability of our climate, we wouldn't try to make projections of change in the coming decade, but at times the environment can be impacted more rapidly (thinking of the barrier reef).

16.14 Conclusion

When James Woodford drove along the dingo fence line, he travelled for two weeks before sighting a dingo in 2002. In 2011 there was not one dingo scalp handed in, to collect the $10 bounty for the zone outside of the NSW dingo fence. Woodford noted also that no-one would ever suggest removing the Dingo Barrier Fence, because that would be "political suicide" (Woodford 2003). He describes the extreme nature of the landscape in this region, as he approached the end of his journey (p. 203):

> Everywhere around me was evidence of drought … all grass was gone, and every animal I saw was sickly and weak … The animals I was passing near Windorah were dying. I was no longer afraid to overtake emus as they ran along the fence but I felt guilty knowing they were expending their last reserves to escape me. The most pathetic sight was the countless emus who lost their powerful fluid gait, and now ran as unsteadily as a day-old foal. They would all die on the fence.

When the fence is gone, the desert animals will be free to move south to water, this will transform the future for the dingo – and tellingly, it changes everything.