



UNIVERSITY
OF WOLLONGONG
AUSTRALIA

University of Wollongong
Research Online

Faculty of Social Sciences - Papers

Faculty of Social Sciences

2015

Camel country: Assemblage, belonging and scale in invasive species geographies

Leah Maree Gibbs

University of Wollongong, leah@uow.edu.au

Jennifer M. Atchison

University of Wollongong, jennya@uow.edu.au

Ingereth Macfarlane

University of South Australia

Publication Details

Gibbs, L., Atchison, J. & Macfarlane, I. (2015). Camel country: Assemblage, belonging and scale in invasive species geographies. *Geoforum*, 58 56-67.

Research Online is the open access institutional repository for the University of Wollongong. For further information contact the UOW Library:
research-pubs@uow.edu.au

Camel country: Assemblage, belonging and scale in invasive species geographies

Abstract

Invasive species and their impacts have become a focus of global environmental management. Invasive, alien and feral species are understood to represent destructive categories of organisms. However, in the context of contemporary environmental change and uncertainty, the native/alien dichotomy is no longer tenable as the basis for decision-making, and the focus on impacts presents an impasse in environmental management. The differential status of camels (*Camelus dromedarius*) over time and space illustrates the complexity of species management. In this paper we seek to move beyond the native/alien dichotomy, and disrupt the discourse of impacts, through an analysis of camel assemblages in Australia. We draw on assemblage thinking to critique the circumstances under which camels are deemed to belong, or not, and to reveal aspects of the camel story often ignored in its contemporary telling. We present three case studies: first, an historical case of the introduction of camels to Australia; second, camel management through a national-scale culling program; and third, relations between camels and 'weeds' in which camels are deemed simultaneously to belong and not belong. We argue that assemblage thinking disrupts fixed categories, and reveals agency beyond that of individual species, thus contributing to multi-scalar considerations. We find that camel belonging does not emerge from the animal or species itself, but is contingent. Finally, we argue that camel management is currently firmly imagined and enacted at the national scale, but in the context of contemporary environmental change invasive species management must take into account processes and relations across multiple scales.

Keywords

assemblage, camel, country, geographies, species, invasive, scale, belonging

Disciplines

Education | Social and Behavioral Sciences

Publication Details

Gibbs, L., Atchison, J. & Macfarlane, I. (2015). Camel country: Assemblage, belonging and scale in invasive species geographies. *Geoforum*, 58 56-67.

This paper published as: Gibbs L, Atchison J and Macfarlane I (2015) Camel country: assemblage, belonging and scale in invasive species geographies. *Geoforum* 58, 56-67

DOI:10.1016/j.geoforum.2014.10.013

Camel country: assemblage, belonging and scale in invasive species geographies

Leah Gibbs^{*a}, Jennifer Atchison^a, Ingereth Macfarlane^b

* Corresponding author

leah@uow.edu.au

Tel. +61 2 4298 1547

Fax. +61 2 4221 4250

^a Australian Centre for Cultural Environmental Research

University of Wollongong

Wollongong, NSW 2522

Australia

^b David Unaipon College of Indigenous Education & Research

University of South Australia

Adelaide, SA 5001

Australia

Camel country: assemblage, belonging and scale in invasive species geographies

Abstract

Invasive species and their impacts have become a focus of global environmental management. Invasive, alien and feral species are understood to represent destructive categories of organisms. However, in the context of contemporary environmental change and uncertainty, the native/alien dichotomy is no longer tenable as the basis for decision-making, and the focus on impacts presents an impasse in environmental management. The differential status of camels (*Camelus dromedarius*) over time and space illustrates the complexity of species management. In this paper we seek to move beyond the native/alien dichotomy, and disrupt the discourse of impacts, through an analysis of camel assemblages in Australia. We draw on assemblage thinking to critique the circumstances under which camels are deemed to belong, or not, and to reveal aspects of the camel story often ignored in its contemporary telling. We present three case studies: first, an historical case of the introduction of camels to Australia; second, camel management through a national-scale culling program; and third, relations between camels and 'weeds' in which camels are deemed simultaneously to belong and not belong. We argue that assemblage thinking disrupts fixed categories, and reveals agency beyond that of individual species, thus contributing to multi-scalar considerations. We find that camel belonging does not emerge from the animal or species itself, but is contingent. Finally, we argue that camel management is currently firmly imagined and enacted at the national scale, but in the context of contemporary environmental change invasive species management must take into account processes and relations across multiple scales.

Key words

Invasive species; impacts; belonging; assemblage; scale; Australian camel

Highlights

- Environmental management must move beyond a native/alien species dichotomy
- Focus on impacts creates a management impasse; we disrupt the impacts discourse
- Assemblage thinking reveals agency beyond individual species
- Species management should take into account relations across multiple scales
- We must be open to futures that include living with invasive species

1. Introduction

Invasive species have emerged as a focus for global environmental management over the past decade and a half. Fortified by extensive scientific effort, the International Union for the Conservation of Nature (IUCN) and Convention on Biological Diversity (CBD) describe 'invasive alien species' as major threats and direct drivers of biodiversity loss at the global level (IUCN, 2000; CBD, n.d.). The paradigm envisioning invasive species as 'threats', or 'drivers of change', is now entrenched in international and national environmental governance and discourse; it is inscribed in legislation, in public education campaigns, and now plays a part in the public imaginary. Invasive, alien, and in Australia, 'feral' species have come to represent unwanted, even dangerous biodiversity. The term 'feral' has come to signify classes of organisms that are destructive and do not belong, frequently pitted against 'native' species, which are ecologically valuable and do belong. In this paper we use an assemblage approach to illustrate that this apparent binary contains far more complex elements, and argue that the current logic of managing contentious species should be interrogated with reference to objects, processes, relations and discourses across multiple scales.

An illustration of this complexity is the differential status of camels. Globally, dromedaries (*Camelus dromedarius*) exist as a domesticated species, described as 'extinct in the wild' (Wilson and Mittermeier, 2011). They are valued for their labour, meat, milk, wool, and their role in tourism, local economies and social relations, with demand leading to an international market in live animals and meat products (Abbas and Agab, 2002; Kadim et al., 2013). In Australia, with an estimated wild herd in 2008 of one million animals (Saalfeld and Edwards, 2010) (Figure 1), camels are categorised as 'feral' and identified as 'causing significant damage to the natural environment as well as to social, cultural and economic values across their extensive range' (NRMCC, 2010, p1). This differential status demands that greater attention be paid to the circumstances of camels' existence, impacts and categories of belonging.

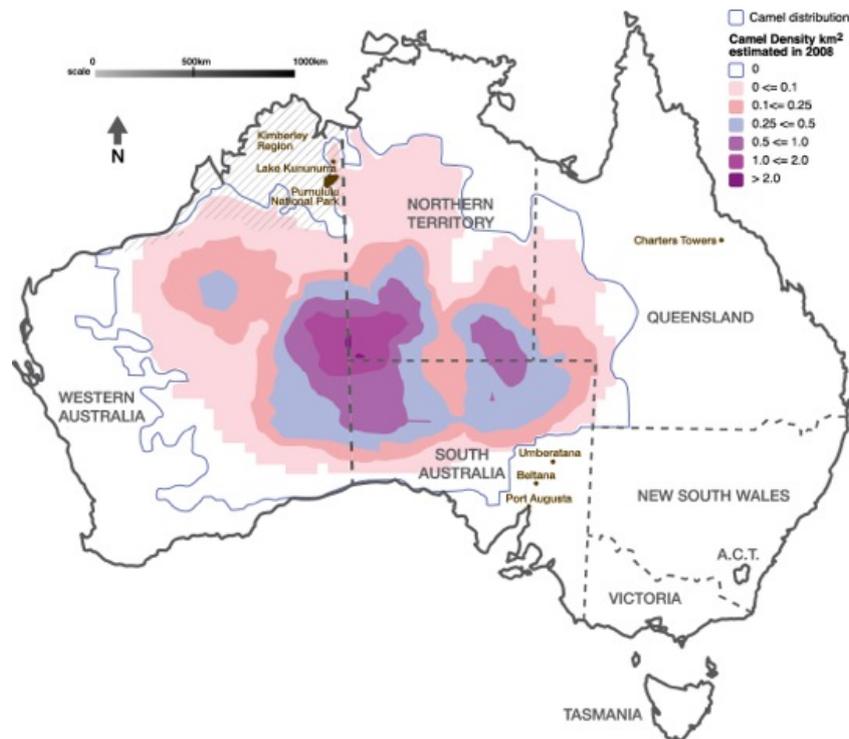


Figure 1: Locality map, with places mentioned in the text, and the 2008 estimated distribution and density of wild camels based on Edwards et al. (2008). These data provided the basis for the federal government's Feral Camel Action Plan 2010.

The logic of alien and invasive species classification and management is the subject of extensive debate across the sciences, social sciences and humanities (e.g. Davis, 2009; Head and Muir, 2004; Larson, 2007; Sagoff, 2005; Simberloff, 2005; Warren, 2007). In a recent high profile article, Davis et al. (2011, p153) urged:

It is time for scientists, land managers and policy-makers to ditch this preoccupation with the native-alien dichotomy and embrace more dynamic and pragmatic approaches to the conservation and management of species – approaches better suited to our fast-changing planet.

The native/alien binary is the source of polarized debate (Larson, 2007; Shackelford et al., 2013; e.g. Sagoff, 2005; Simberloff, 2005). Seeking a way forward, Shackelford et al. (2013) propose a 'middle-ground' based on caution about non-native species and impact assessment. Others argue for a focus on the potential of a species to cause 'harm' or 'damage'. Notwithstanding the fact that categories 'animal' and 'species' are debated (Lorimer 2012), and that the term camel itself subsumes genetic and morphological difference, defining these categories, and implementing appropriate policy, is not

straightforward (Larson, 2007; Sagoff, 2005; Warren, 2007). Despite the nuance of these scholarly debates, the native/alien binary 'not only persists but is being reinforced in national and international conservation policy' and public discourse (Warren, 2007, p440).

In Australia, feral species management is highly political, attracting significant resources in eradication and public education programmes (e.g. NRMCC 2007; 2010), but the zeal goes beyond this. Feral species management (like acclimatisation before it) is part of a project of nation-building, and has come to be understood as inherently, unquestioned and unquestionably good (see Head, 2012). Scholars have invested considerable effort undoing ideas of a pristine stable nature, and in Australia this has included questioning biotic nativeness (Head, 2012; Trigger et al., 2008). Yet the work of unsettling this paradigm, and moving beyond the limited conceptual tool of a native/non-native binary, has not yet translated into practice.

Documenting ecological change is a profoundly important task for science, and many scientists recognise that the ecological effects of non-native species are contingent (Davis et al. 2011; Shackelford et al., 2013; Simberloff, 2005). However, maintaining terms like 'invasive' and 'feral' risks losing sight of broader transformational processes, of which single species are but a part. As Hobbs and colleagues have argued in their discussion of 'novel ecosystems', these processes of transformation require 'significant adjustment of our beliefs' and serious consideration of 'a more dynamic and flexible approach to deal with an increasingly uncertain future' (Hobbs et al., 2009, p604). Global transformation and the many possible multinatural futures (Lorimer 2012) demand new ways of thinking about and living with species like camels.

In this paper, we contribute to a growing body of social science that interrogates entrenched approaches and opens new dialogue in invasive species thinking and management (Atchison and Head, 2013; Larson, 2011; Robbins 2004; Robbins and Moore, 2013). We examine three different assemblages involving camels in Australia, and consider the material, relational and discursive circumstances within which camels have come to belong, or not. Our paper proceeds as follows: in the next section, we discuss camel impacts, conceptual approaches to ideas of impact, belonging, agency and scale, and examine how assemblage thinking gives us purchase on present conditions and future possibilities. Then, we present three case studies that consider very different camel assemblages. The first is an historical textual analysis of the introduction of the camel to Australia; a case that disrupts familiar teleological narratives and instead focuses on the ways an 'Australian camel' was created and then dismantled. In the second case we discuss the development of culling as a contemporary management response to the problem of camel impacts, outlining efforts to

count the Australian camel population, identification of material damage caused by camels, development of a discourse of impacts and crisis, and the emergence of culling as inevitable management response. Third, we focus on the materiality of camel practices of selective browsing and grazing, as they relate to land managers' ideas of control. The three case studies are based on policy and document analysis. In addition, the final case draws on field research undertaken in the Kimberley region in 2011 investigating weed management practices. Twelve interviews were conducted with state government agency officers, regional managers, contracted Aboriginal trainees and rangers, local and state community environment groups and a pastoral station manager. In both the historical and contemporary cases camels transition through or become and cease to be part of different assemblages, and as a consequence the conditions of their belonging change. We show that conceptually and practically, management must move beyond categories of 'feral' and 'invasive' to consider more explicitly the multi-scalar contingencies of camels.

2. Camel assemblages: impacts, belonging, distributive agency and scale

Feral animals and invasive plants are part of a now well-documented story of degradation in arid and semi-arid Australia; a scientific account of environmental damage and biodiversity decline (NRMCC, 2007). Damage attributed to camels is spatially and temporally variable, but is reported to involve extensive and significant environmental, economic, social and cultural effects (Edwards et al., 2010). Recorded impacts include damage to vegetation through selective grazing and browsing; trampling of wetlands and waterholes as animals drink; competition with native and stock animals for food, water and shelter; damage to industrial and community infrastructure, including fences, yards, watering points and sites of cultural significance; stock loss due to broken fences; nuisance and safety hazards in residential areas, roads and air strips; and risk of carriage and spread of disease (Edwards et al., 2010; NRMCC, 2010; Vaarzon-Morel and Edwards, 2010).

In addition to the science of impacts, a *discourse* of impacts – and of destructive invasive species – has emerged in the context of global environmental management (e.g. IUCN 2000). During the final decade of the twentieth century an international discourse of biodiversity conservation, coupled with a suite of initiatives at a range of scales, saw the prioritisation of biodiversity protection and mitigation of identified threats; for example, the international Convention on Biological Diversity, and in Australia, the Environmental Protection and Biodiversity Conservation (EPBC) Act and

National Heritage. 'Impacts' are enlisted in these documents to provide a powerful critique of environmental change, and a rationale for management strategies.

Focus on impacts has arguably led to a good deal of positive change, but the impacts discourse is problematic. In her critique of the concept of 'human impacts' Head (2008, p374) draws attention to key ways in which 'the metaphor of human impacts has come to frame our thinking and circumscribe debate about what constitutes explanation'. In particular, 'emphasis on *the moment of collision between two separate entities* (the 'impact')' favours explanations that depend on simple correlation rather than mechanisms of connection. An instance of impact 'assumes a *stable natural baseline ... in which only one variable is changed*'. Both, she argues, are inappropriate for complex, dynamic systems. She questions the '*vener of simplicity and elegance*', and asks what explanatory purchase we are losing 'by confining our causal explanations' (2008, p374, italics in original).

The discourse of invasive species impacts mirrors that of human impacts, and is equally problematic. Eradication of camels is neither feasible nor the aim of current management strategies (Edwards et al., 2010; NRMCC, 2010); as such it is imperative that we find ways of conceptualising and practically living with camels. At present however, the impacts discourse presents an impasse; it is difficult to imagine a place for camels in Australia because we cannot see past the impacts attributed to them. Moving beyond impacts allows us to reframe a discussion about the future of species, ecosystems and social relations; in particular, investigating the material, relational and discursive circumstances within which camels have been and are deemed to belong (or not) provides a way forward.

The question of belonging in Australia is 'frequently configured around geographical origin, divided into periods before and after European colonisation, and tied to notions of ecological restoration' (Gibbs, 2014, p215). Concepts of nature and nativeness permeate the politics of belonging. Yet in the context of contemporary environmental change and uncertainty, fixed ideas of belonging no longer work. Altered landscapes demand new modes of thinking and interaction (Gibbs, 2014; Head, 2012). Ideas about belonging in Australia are marked by the uncanny (Gelder and Jacobs, 1998) – by histories and contemporary realities of Indigenous-settler relations (Gelder and Jacobs, 1998; Read, 2000; Rose, 2004; Sullivan, 2011) – and by contested concepts of nationhood and nature (Gibbs, 2009; Head and Muir, 2004; Lavau, 2011; Smith, 2011; Trigger et al., 2008. See also Ginn, 2008; Jazeel, 2005), all of which are predominantly framed at the national scale.

Attending to ‘camel assemblages’ disrupts fixed notions of impact and belonging, and presents an avenue for reimagining the place of camels in Australia, and in social relations across multiple scales. For Robbins and Marks (2010, 177) assemblage thinking ‘represents a shift of research attention to the embodied, grounded and material aspects of social relations’, therefore ‘shifting modes of explanation’. It does so by paying attention to the constellation of things and processes surrounding an object or agent (Anderson et al. 2012; Bennett, 2010; Robbins and Marks, 2010). But assemblage emphasises the capacities of both matter and interactions, which are geographically and historically contingent (Anderson et al., 2012). It prioritises forming and reforming of relations, and invites ‘a rethinking of agency in distributed terms and causality in non-linear, immanent, terms’ (Anderson et al. 2012, 186). In this sense, assemblage thinking is ‘committed to process-based ontologies that challenge conventional explanations by focusing on materially diverse configurations’ *and* on ‘the open-ended unfinished nature of social formations’ (p175). It involves a ‘reconstitution of the social that seeks to blur divisions of social-material, near-far and structure-agency’ (Anderson and McFarlane, 2011, 124). As such, assemblage provides a conceptual tool for analysing changing social relations involving humans and nonhumans.

One of the aims of assemblage thinking has been to decentre human agency (Bennett, 2010). In this paper we seek to decentre *camel* agency; we shift the focus from the impacts of camels as sole cause of damage and environmental impact, towards understanding the effects of bundles of objects, processes and relations. Here, we follow Bennett’s assertion that:

The notion of a confederate agency does attenuate the blame game, but it does not thereby abandon the project of identifying (what Arendt called) the sources of harmful effects. To the contrary, such a notion broadens the range of places to look for sources (2010, p37).

Thinking through camel assemblages provides additional places to look for sources of effects, harmful and beneficial. A focus on impacts goes some way in this goal, but not far enough in seeking agency and effects beyond individual species. Our analysis looks to other associations of materials, processes, relations and places: policies, arid landscapes, vegetation, packs and straps, racialised bodies, discourses of nation. In doing so we demonstrate that belonging is contingent upon shifting assemblages; it is not a precondition of camels themselves.

Australian feral camel management strategies currently deploy the ‘national’ as the self-evident scale of the camel ‘problem’ and its solutions, set within an international discourse of invasive species and impacts. But this scaling should not go unquestioned. Rather, modes of relating to

camels in Australia should consider specific conditions in particular local places, circumstances of camels in other parts of the world, and processes and relations that play out across scales of the body, the local and the global. We conceive scale as relational (Howitt, 1998); as sets of practices and discourses (Moore, 2008). Conceptualising scale in this way ‘impels us to account for the processes through which specific scalar configurations solidify in consciousness and practice, and the effects these developments have upon social, political and cultural relations’ (Moore 2008, p214). For Robbins and Marks (2010, p191) ‘assemblages can be tools for critical decision-making, laying bare the roots of poorly conceived policy and so making space for alternatives’. We argue that thinking through camel assemblages has the potential to reveal alternative camel futures; an aim given significance by the differential status of camels globally, and the near-certainty that camels – along with many other species – will remain part of the Australian landscape.

3. ‘A thoroughly Australian camel’

The commonly told story of camels in Australia runs something like this: camels are imported and deemed useful until surpassed by a better technology – the motor vehicle. The animals are released into the bush, where their population explodes and spreads across the continent, causing significant ecological and social damage. In response, culling is instituted (e.g. Commonwealth of Australia, 2010). Here we seek not to re-write this story, but to illustrate that other things are happening at the same time; other materials, relations and discourses that have mostly been written out of the story as it is commonly recounted.

... we will avail ourselves of a hint ... as to the benefit which these colonies, in the absence of roads and other easy means of conveyance, would derive from the introduction of the camel. ... especially in New Holland, so deficient in streams and lakes, an animal so patient of thirst, and so capable of transporting large burdens from considerable distances, could not fail to be most useful to the settler (*‘Sydney and Hobart town news’*, 1835, p612)

Public advocacy for the importation of camels into Australia begins at least as early as 1835. Camels would provide a robust, reliable and inexpensive form of transport for exploration and exploitation of the roadless arid interior, due to the combination of their biophysical characteristics and those of the continent’s inland landscapes. Advocates argued for camel importation as an ‘experiment’,

based on successful efforts in the US and Italy ('Introduction of the camel', 1858). If these out-of-Asia camels could be successful, so too could Australian imports.

Advocacy for camels reflected and reinforced a growing understanding and acceptance of the Australian inland as variable and unpredictable, based on experiences of expeditions prospecting for access routes and viable agricultural land and water. Exploration was the route to expansion and development: 'The explorer is not far ahead of his fellow-colonists' (Hardman, 1865). The failure of horses in Benjamin Babbage's 1858 exploration of northern South Australia (SA) was cited as evidence for the advantages of camels: 'the horse is quite unfit for exploring expeditions into an arid country, ... our only hope of penetrating the interior successfully will be in the employment of animals in every respect adapted by nature for such a purpose' ('Introduction of the camel', 1858, p2; see also Madigan, 1937; Winnecke, 1884). Adaptations include its need to consume water infrequently, and its ability to withstand extreme heat and extreme changes in temperature. In addition, it finds a wide range of plants palatable, and is physiologically adapted to negotiating the stony and sandy surfaces of desert environments.

The earliest 'experiment' in using a camel for exploration was by SA pastoralist John Horrocks in 1846. He was funded by public subscription, demonstrating the genuine public interest in camel use. In a small northerly expedition, he took the only camel in the colony ('Local intelligence', 1846) 'to test the qualifications of these animals for traversing the deserts of Australia' ('Domestic Intelligence', 1846, p2 S). In this case, the camel was successful, 'spoken of in high terms of eulogy' ('Camels in Australia', 1858, p2), but Horrocks was not. Unused to handling his camel, he was accidentally shot by his own gun when the camel moved. The question of who were appropriate camel handlers was profound, and runs deeply through attitudes to camel importation.

Drought in 1862 increased demand for the remedy camels might provide, and the first large importation was negotiated by pastoralist and venture financier Thomas Elder and his Indian-based business partner Samuel Stuckey (Stevens, 2002). The 124 riding, draught and pack camels arrived in Port Augusta, SA with 31 cameleers from Kandahar, Kabul, the Sindh and northern India, and were established at Elder's stations at Beltana and Umberatana in northern SA (Stevens, 2002; Jones and Kenny, 2007). These were the first of an estimated 6000 camels imported by Australian and later Afghan entrepreneurs, until the last shipment in 1907 (Stevens, 2002, p22). They established a flourishing transport network between inland stations and mines, railheads and ports, carrying wool, grain, ore, stores, fencing equipment, bore pipes, even pianolas (Jones and Kenny, 2007). Demand for the animals and their capacities was high and widespread.

Prior British colonial enterprise in the Middle East and India had given Australians direct or reported experience of camels as part of a cultural assemblage of arid land economies and mobility. However, while camels and associated cultures were evidently suited to deserts, they were intractably alien and un-British and hence non Anglo-Australian too. Camel advocates admitted that ‘... stockowners and others may feel diffident in embarking in a speculation so foreign to their habits and preconceptions’ (‘The introduction of the camel’, 1858, p2). A number of colonists had fought in the Anglo-Afghan wars and the Indian mutiny (Stevens, 2002), which gave them respect for camels and lack of respect for the people of those regions (Elder, 1894). Camels and their handlers were from the outset objects of Orientalist ambivalence for the Anglo-Australian populace.

Cameleers belonged to four distinct cultural and linguistic groupings – Pashtun, Baluchi, Punjabi and Sindhi – and came mainly from the arid areas of Afghanistan and present day Pakistan, but were known collectively in Australia as ‘Afghans’ (Jones and Kenny, 2007; Stevens, 2002). They came equipped with deep experience and the necessary standard equipment – nose-pegs, reins, leg hobbles, saddles, tackle, and skillful systems of roping loads onto pack camels’ backs. The designs of the 1860s riding- and pack-saddles they brought to Australia were copied by local harness makers, and continue to be used today (Jones and Kenny, 2007).

However, the cameleers were always on the outer. Their clothes, language, adherence to daily Islamic prayer, and food and alcohol taboos marked them out. Men wore turbans, loose clothing decorated with embroidery, and jewels and gold. The camels too had colourful adornment – bells, and rugs with tassels and beads (Stevens, 2002) (Figure 2). An article depicting cameleers on the ship to South Australia shows them as outlandish; a recognisable ‘Orientalising’ move to mock and ridicule, common in pictorial and text descriptions of the time (Stevens, 2002, p251). ‘The appearance of the camel drivers lolling about the decks was quite novel, as some of them showed up in gorgeous array, while others were but a very small remove from the full dress of our early parents’ (‘Another shipload of camels’, 1884, p7). The cameleers lived in tents at first, but from the late 1800s bought smallholdings outside townships, and built corrugated iron huts. They planted date palms and fruit trees, and every such ‘Ghantown’ had a mosque, usually of corrugated iron (Stevens, 2002). ‘Ghantowns’ were always isolated physically and culturally from the rest of an outback community. They were generally literate, but not many could speak or read English (Stevens, 2002).

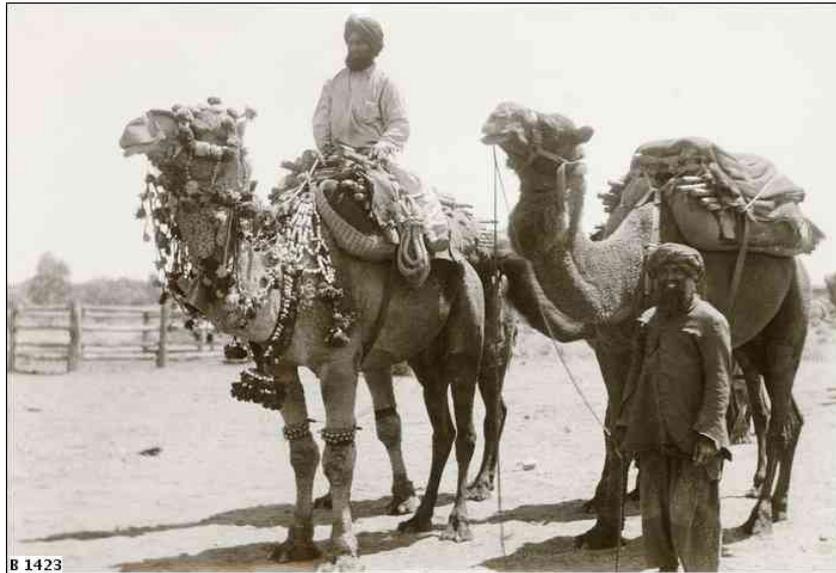


Figure 2: Afghan handlers and camels, Northern Territory c. 1890 (State Library of South Australia, B1423).

The culture of camels was part of an assemblage of materials, practices and relations incontrovertibly associated with non-European identity and alien ways; it was deemed at best exotic and colourful, at worst dangerous and dirty. Disinterest through to hostility were expressed towards cameleers; their experience was required, but ‘never the men themselves’ (Stevens, 2002: 12). The colonies wanted what camels could do, but were ill at ease with the animal itself – infamous for frightening horses, competing with stock for water, and breaking down fences (Stevens, 2002; McKnight, 1969) – and particularly with their ‘attendants’. Consequent attempts to decouple camels from their material and social relations took two forms: one was emphasis on the special qualities of the Australian camel; the other abuse, vilification, sometimes violence (Stevens, 2002), encouraged by the racial discourse of the time.

As the exploration phase passed, inland landscapes, climate and demands became increasingly normalised as familiar places where people made livelihoods through pastoralism, agriculture and mining. Cameleer Herbert Barker describes how a riding camel allowed him to locate land for sheep grazing in marginal country, which was in turn made economically viable by the relatively cheap cartage provided by draught camels. In this way, ‘camels were bringing faraway places nearer’ (Barker, 1964 p3). Lives in these ‘hard places’ became increasingly acceptable, and the Anglo-Australian inhabitants were anxious to prove themselves capable of inhabiting the continent themselves (Hains, 2002). With camels they could do so.

Camels bred prolifically in government depots in SA and Western Australia for use by police, fence patrols, survey work, and prospecting expeditions (Stevens, 2002). At these depots there was 'unanimous agreement the camels bred locally were generally superior to imported camels' (McKnight, 1969 p35). There was a parallel insistence that Europeans could handle camels as well as the 'Afghans': 'Europeans can deal with camels, if necessary, as well as Asiatics ... The camel and the camel driver, in fact, may become as thoroughly Australian as the bullock and the bullock driver' ('Camels for Australia', 1866, p4). To be 'Australian' in this instance was not to be indigenous, but to be part of the economy, as bullocks were. Acceptance and admiration of the camel's utility became the condition for belonging, and decoupling camels from their cultural material trappings, and thus their alien status, made a 'thoroughly Australian camel' a possibility.

What is often forgotten in the telling of the camel story in Australia is that the ambivalence towards camels and cameleers was part of a broader anti-Asian sentiment, which underpinned the White Australia policy of the late 19th – early 20th centuries. Then NSW Premier Henry Parkes asserted that the newly forming Commonwealth needed a policy that would 'cement society together' by 'the same influence of language and religion and same national habits of life' (in Willard, 1923). Physical and cultural 'whiteness' were ideals considered critical to Australian national identity (Kendall, 2007; McGregor, 2011), and became enshrined in the *Restriction of Immigration Act 1901*—the first Act passed by the Federated government. Non-European labour was to be feared (Kendall, 2007), and the legislation fed hostility towards 'Afghan' workers.

The proviso that the colony would benefit from the camel 'in the absence of roads', in the advocate's statement quoted above, is telling. By 1912, Arthur William Piper, President of the Royal Geographical Society of Australasia, South Australian Branch, stated with confidence that modernity had fully arrived in Australia:

we have cablegrams and telegrams coming across Australia every moment. We know that one can ride, drive, motor, or cycle from one end of the continent to the other, and never a day be without water (Royal Geographical Society of Australasia, 1912, p37).

Despite a sense of gratitude on the part of those who knew camels at first hand, modernity undermined their indispensability. Herbert Barker (1964, p176) reflects that 'what was unexpected was the way even the most conservative of station owners took to motors readily'. This 'motor revolution' left the cameleers 'in a state of bewilderment'. Trucks went through sand, as camel transport did (and bullocks and horses did not), but trucks were quicker. Importantly, trucks were

not alien. They were modern, and could be proudly, not ambivalently, embraced in the project of building the new nation. The results of this change were far-reaching. With work rare, and the once economically valuable camels now unsalable, cameleers had to reduce their costs. They pastured their camels on common land around townships, or allowed them to ‘trespass’ on station property. When work contracts ran out altogether, they were forced to let loose their named, respected, cared-for camels (Barker, 1964; McKnight, 1969).

By 1925, the South Australian Assembly debated a *Destruction of Camels Act*.

A few years ago camels were of great value in opening up the outside country, and in doing carrying work. The introduction of motor transport, however, has caused a very considerable lessening in the demand for camels, and owners of these beasts have allowed them to wander about particularly on unfenced country – in some cases on fenced land – to the detriment of lessees, who are unable to deal with them in any way. ... The Bill is introduced for the purpose of giving the necessary powers to landholders to destroy camels found to be trespassing on their land (Parliamentary Debates SA, 1925, p2149).

Some parliamentarians expressed regret, nostalgia and gratitude for the services of the indispensable camel. One member of Parliament said ‘It is pathetic to think that only a few years ago these ships of the desert were the salvation of the back country, while today they are treated as vermin’ (Parliamentary Debates SA, 1925, p2214). Another recognised that ‘To people in most parts of the world it might seem an extraordinary thing that legislation should be passed authorising what some might call the wanton destruction of the ship of the desert, but these camels have been doing incalculable harm in the northern pastoral areas’ (Parliamentary Debates SA, 1925, p2196). The SA Chief Secretary joked about shifting blame onto the camels: ‘we hope by this legislation to remedy the evil, and to hump the burden off our own shoulders on to the camels that are responsible for so much destruction on Government reserves’ (Parliamentary Debates SA, 1925, p2196). These comments foreshadow a new status for the Australian camel.

4. Culling camels

A recurring image of camels at a waterhole, taken from the air: camels stand on the edge of the waterhole and surround it; dead and dying bodies—tens of bodies—fill the waterhole entirely

(Figure 3). Presentation of this image seeks to communicate the problem of feral camels in Australia: the large numbers, the destruction of valuable waterholes, the scourge these animals represent, and the solution to the problem. But the image invites us to question the circumstances leading to this scenario.



Figure 3: Camels – including dead and dying bodies – around a waterhole at Docker River, Northern Territory. Photo: R. Bugg 2007.

The number of camels across central Australia was estimated in 1966 at 15-20,000, and the population was expected to decline (McKnight, 1969). Following the release of animals during the 1920s and '30s, camel numbers were not monitored (Saalfield and Edwards, 2010). In 1976 McKnight described camels as 'Friendly Vermin'; in their small numbers they presented no significant problem. However, a broad-scale aerial survey of kangaroos between 1980 and '83 (Short et al., 1988) opportunistically counted camels and put their number at 43,000 (Saalfield and Edwards, 2010). Since this initial quantitative assessment several aerial surveys systematically assessed the abundance and distribution of camels across the continent. Surveys and modelling in the first decade of the 21st century (using various methods) suggested a sharp rise, with estimates of 300,000 in 2001 (Edwards et al., 2004), 730,000 in 2006 (Ward et al., 2006, cited in Edwards et al. 2010), and approximately 1 million by 2008 (Saalfield and Edwards, 2010). The 2008 figure was revised down to 600,000 in 2013 (Ninti One Ltd, 2013, p57), demonstrating the uncertainty and difficulties of estimating the population size. This is the largest herd of wild camels in the world.

Recognition of population increase stimulated a focus on camels' impacts, consistent with the broader discourse of biodiversity conservation and environmental impact, discussed above. Camels went from a species of little concern—illustrated by their absence from culling programs in the Northern Territory, despite reported large numbers (Parliament, 1991)—to a major subject of study. Research undertaken by the Desert Knowledge Cooperative Research Centre (DKCRC) (e.g. Edwards et al., 2008), and published in a special issue of the CSIRO *Rangeland Journal* (Edwards et al. 2010), find that the population has increased rapidly, and environmental, economic and social impacts are now identified, visible and deemed to be increasing in extent and severity. Based on the 2008 population estimate of one million animals, the Federal Government allocated \$19 million in 2009 to manage impacts of feral camels (Vaarzon-Morel and Edwards, 2010), and developed a National Feral Camel Action Plan (hereafter 'the Plan') in 2010 (NRMMC, 2010) in line with the Australian Pest Animal Strategy (NRMMC, 2007). Camels have also been included in a list of 'Key threatening processes' under the EPBC Act (TSSC, 2013), and are identified by the Australian Pest Animal Strategy as an 'Existing Pest Animal of National Significance' (Commonwealth of Australia, 2011). These listings feed a discourse of crisis, and firmly establish the national as the scale of both problem and solution.

Prior to these developments, camel management was ad hoc. The new national Plan provides a unified vision: 'Comprehensive, coordinated and humane management of feral camels and their impacts that maintains and promotes the biodiversity, agricultural assets and social values of our rangelands for all Australians' (NRMMC, 2010, p3). Notably, recent research finds that camel impacts are density dependent (Edwards et al., 2010); 'it is the increasing and unsustainable densities of feral camels that have created negative impacts, not the presence of feral camels per se' (NRMMC, 2010, p6). The aim of the Plan is not to eradicate camels—their existence and persistence is taken as a matter of fact—but to manage the animals and their impacts, through humane techniques, for particular ends.

Although the camel remains the same material being through its period of habitation in Australia—*Camelus dromidarius*—what has clearly changed is the conditions within which it exists. New circumstances create a new camel assemblage: continent-scale population and density (Spencer et al., 2012); recorded impacts on ecological features and functions, social and cultural sites, livelihoods and community infrastructure (Edwards et al., 2008); and a growing number and range of people and communities expressing concern over reported impacts, including pastoralists, conservation reserve managers and Aboriginal people (Vaarzon-Morel and Edwards, 2010; 2012; Zeng and Edwards, 2010). Notably, several studies have found that Aboriginal people hold camels and other

introduced species to 'belong' to country (Rose, 1995; Trigger, 2008). Many Aboriginal people have worked closely with camels, or have family ties with early cameleers, and retain a sense of responsibility toward the animals. But a number of Aboriginal communities have in recent years expressed concern over damage to cultural sites, landscapes and community itself (Vaarzon-Morel, 2010; Vaarzon-Morel and Edwards, 2012). Landholders in the Anangu Pitjantjatjara Yankunytjatjara and Ngaanyatjarra Lands, where camel densities are high, have adopted land management and economic development projects involving mustering and sale of camels as meat (Ninti One Ltd, 2013). Weighed down by their numbers and impacts, camels no longer belong, and the nation, it seems, must respond urgently.

Matter and processes – including camel bodies, breeding and feeding patterns, waterholes, fences, aerial surveys and models – come together to produce a range of effects. But the dominant outcome of the contemporary feral camel assemblage is a national culling program. Sanctioned killing had previously taken place at a local level, as described above, but the Plan presents the first call for national scale 'integrated management'. Management strategies are divided into non-commercial methods, including aerial and ground-based culling and exclusion fencing, and commercial methods, such as harvesting for meat for pet food and human consumption, live export, and potential markets for dairy products and oil. The Plan assesses advantages and disadvantages of each 'control method', as do most management strategies. For example, an emerging commercial camel industry is acknowledged, but it is reported to take only a small number of animals – 5000-6000 – per year. Significant barriers to creating viable economic enterprises are presented at each turn; not least the distances, remoteness and mobility of camel populations. Producing camels for markets is described as involving estimated losses of \$20-\$60 per head (NRMMC, 2010, p17)¹. The Plan effectively negates the possibility that a commercial camel industry might contribute in a meaningful way to overcoming identified problems of feral camel impacts. This leaves the national culling program – and in particular, 'shooting to waste' – as the inevitable solution.

Related documents reinforce killing as the key management technique. The Australian Pest Animal Strategy (NRMMC, 2007) lists 'killing or removal' first in its list of 'most useful pest animal control methods'. The Australian Government (Commonwealth of Australia, 2010) describes a proposal by Ninti One Ltd, the commercial arm of DKCRC, 'to remove 670,000 camels over four years and another 500,000 camels in the following four years, to reduce the density of feral camels to less than 0.1 animals per km² over their range'. The final report of the Australian Feral Camel Management

¹ This compares to a reported cost of \$25-\$150 per head for aerial culling (Ninti One Ltd, 2013, p65).

Project (Ninti One Ltd, 2013) describes 160,000 camels 'removed' between 2010 and 2013 to achieve the target density, equivalent to a population of approximately 300,000. The difference between the 2013 figures and 2010 proposal is attributed to an overestimate in the 2008 population and population projection figures, a likely increase in mortality in 2012 due to drought and fire, and ground culling and mustering by pastoralists as camels pass through their properties. Control by killing has become the teleological strategy for managing feral camel impacts. But we contend that this response does not emerge from the camel. The discourse of impacts, specifically of large herbivores, existed before camels were branded with it, as did the logic that leads from impacts to culling. Other animals have been managed through culling programs (e.g. Parliament, 1991), and this pre-existing discourse and practice set the stage for managing camel impacts through killing camels.

Recent scientific research brings into question the efficacy of culling as a strategy for managing camel impacts. Spencer et al. (2012) find that Australian camels represent a single population, and use 'extraordinary large areas' within arid environments. Animal eradication or sustained population reduction is found to be feasible 'only in the face of very low re-invasion potential' (p1255); that is, in instances of small, discrete populations. In a single large, highly mobile population, reinvasion is extremely likely, therefore negating the effect of culling efforts. The authors suggest 'a paradigm shift in the tactics applying eradication to all mobile pests inhabiting unpredictable environments' (p1261); an argument consistent with Davis et al. (2011, p153), who urge we 'embrace more dynamic and pragmatic approaches ... better suited to our fast-changing planet.' This work opens possibilities for Australian camel futures. If the core objective of camel management is minimisation of impacts, not eradication of a species, then other strategies such as 'asset protection', and drawing on knowledge of where and when camels congregate, may be more effective than culling.

Returning to the waterhole, camel bodies provide a significant but indirect focus of feral camel management. Camels produce undesirable effects through their grazing and browsing practices, tendency to trample wetlands, quantities of water they can consume, destruction wrought by their strength, and successful breeding. These bodily effects are the focus of management. Yet *dead bodies* are strangely marginalised in the Plan. Death is both the aim and end point of the feral camel management strategy. The language of 'removal' permeates policy and discourse, but camels are most often not removed. Following aerial culling, dead bodies remain in the landscape. They persist physically and conceptually. What is removed is *live* camels. Culling produces a lot of dead bodies, with local effects. Some of the dead will lie where they are shot. Maimed camels frequently seek water, and die in or beside waterholes, which can subsequently become fouled. Where dead bodies are concentrated, they must be managed to combat disease and odour. Dead bodies attract and

artificially benefit scavengers in ecosystems. Absence of live camels provides opportunities for other animals—individuals of introduced and native species—to thrive (as noted in the Plan [NRMMC, 2010]), and for other camels to ‘re-invade’ (Spencer et al., 2012). This last point aside (opportunities for other animals), the material aftermath of death is absent from management plans, and is also rendered conceptually absent.

The Plan emphasises ‘humane management’, but locates the question of ethics in the moment of death. Notwithstanding the significance of humane killing (see Coventry et al. 2010), and debates about the efficacy of its regulation² (see Boom et al. 2012), this is not the only site of ethical consideration. For example, the Anangu Pitjantjatjara Yankunytjatjara Executive Board supports commercial use of camels but holds a firm stance against ‘shoot to leave’ (Ninti One Ltd, 2013), representing an ethical stance toward camels and life different to that represented by the Plan.

In his critique of killing for conservation, van Dooren (2011, p290) argues that ‘exclusive ecological imaginaries’ provide:

justification, and hence a sense of moral comfort, about killing those that don’t ‘belong’.

There is a wholesale declaration that these lives are not legitimate lives within the context of contemporary ecologies, and as such that their deaths are not only condoned (as they often are in legislation), but also in an important sense demanded for the sake of any genuine conservation.

Romanillos (2011, p2543) urges greater attention to death within geography, and especially ethical geographies of the nonhuman. Drawing attention to the ‘powerful legacy of Heideggerian thought’ and anthropocentric notions of finitude, he asks: ‘how is one to respond to deaths that are not—philosophically, legally, politically—counted as deaths?’ These questions are relevant in the context of feral species management, and point to the limits of current ethical discourse in this field.

There is compelling evidence that camels currently present ecological and social problems in Australian landscapes. However, if culling is to be a management response, then the death demanded must be examined more closely. Putting dead bodies into the feral camel assemblage

² Each control method in the Plan is subject to Codes of Practice and Standard Operating Procedures for mustering, transport and slaughter, consistent with the Plan’s ‘humane management’ strategy (NRMMC, 2010). Note however, that Codes of Practice are subject to critique; e.g. see Boom et al. (2012) on regulation of Codes for killing.

illuminates more of the 'feral camel' problem, and reveals material and ethical implications of culling as a management strategy.

5. Camels and weeds

... most people don't know what a weed is. Most people look at Lake Kununurra and see there's all this greenery there and the bottom 20 kilometres of Lake Kununurra riparian zone is just a weed patch but people see this lush tropical greenness and think, wow. Or people down in Purnululu National Park driving along the main roads, the main tourist track, that's all eroded camel country, full of weeds, but they wouldn't know. They don't know what they're looking at ... (Andrew, conservation ranger, WA)

In remote north Western Australia, camels and weeds go together. As Andrew, a State government conservation ranger explained to us, 'that's all eroded camel country, full of weeds'. Andrew has been managing conservation estates in this part of the eastern Kimberley for over 20 years. Although he would not describe himself as a weed expert, his knowledge of the country and accumulated ecological change that has taken place recently is undeniably detailed and nuanced. We initially approached Andrew to ask about his experience of managing weeds. As we were to discover however, weeds 'go together' or are often associated with camels. In this part of the Kimberley – the arid and remote south eastern area – camels and weeds go together quite literally; camels contribute to the spread of various invasive plant seeds as they carry them in their hair and gut and disperse them in their dung (Hogan and Phillips, 2011). In this way camels and weeds contribute to the material constitution of each other; as places become more heavily infested with weeds, they provide habitat and forage for camels. Provision of habitat for feral animals is one of the most common problems described by weed managers when discussing threats or impacts posed by weeds.

Underlying Andrews' admission about weeds and camels 'going together' is recognition, or perhaps resignation, that camels have *come* to belong in certain kinds of degraded environments. Managers expect to find feral animals and invasive plants together in damaged or eroded country, especially in more remote places beyond human control. New, or novel, ecological assemblages (Hobbs et al., 2009) require a particular kind of 'fit' or belonging to take hold and persist. The enduring nature of many introduced species, and expansion of their populations, itself implies that conditions are right

for that species. But while we might think of these relations as a certain kind of ecological fit, it is not a sense of belonging that sits comfortably with the people responsible for their management. A palpable sense of loss and regret endures in these descriptions; loss of biodiversity in new novel ecological assemblages, and loss concerning the ongoing degradation of the physical environment. Underlying this is also a recognition that camels occupy and assert themselves in spaces beyond human control, where humans have been ineffectual, or where it has been logistically beyond human capacity to act upon them.

In this camel assemblage there is an apparent contradiction of belonging situated simultaneously within an assemblage of weeds, camels, people and degraded land. Here we focus on the material relations between camels and plants through the camel's eating practice. We are interested in the circumstances under which the behaviour of selective grazing and browsing might be understood as contributing to degradation, or repairing degradation, in different contexts. We briefly discuss a contrasting but related case from the literature in which domesticated camels are used as a management tool to graze invasive plants in Queensland (QLD). A crucial dimension in these cases hinges upon the degree of control people feel they have over the processes taking place, and the way in which some surrender of control might contribute to a more open, possibly more sustainable, future.

However uncomfortable a sense of belonging might be for Andrew in describing camels and weeds, for many land managers across Australia's north, managing new combinations of species is the new normal. While dramatic climatic variability and fire have long been part of the repertoire, managers increasingly have to find ways of dealing with new and expanding populations of introduced and/or native animals, in many cases across large and remote rural properties.

Parkinsonia (*Parkinsonia aculeata*) has been a Weed of National Significance since the lists' first inception in 2000 (Thorp and Lynch, 2000). Growing as a woody tree up to 10 meters, *Parkinsonia* forms dense infestations along watercourses, across floodplains and wetlands. The seeds have an extremely hard and durable coat and survive for many years (Cochard and Jackes, 2005). Seed dispersal is aided by large seedpods that float, carrying seeds away from the parent plant. Seeds generally require wet conditions to germinate, and rain or flooding commonly stimulates mass germination events (Cochard and Jackes, 2005).

Introduced as a garden ornamental and shade tree in the late nineteenth century, *Parkinsonia* is now present in over 1 million hectares in WA, the Northern Territory and QLD, and is also found in

NSW and SA. This is thought to be a small fraction of *Parkinsonia*'s possible extent (Deveze, 2004). The species is considered to present a range of environmental, economic and social threats, particularly where it forms dense, impenetrable thickets along watercourses. As well as restricting access for people and livestock, dense 'infestations' reduce other vegetation growth, including native biodiversity and pasture (Deveze, 2004), in turn reducing ground cover and exposing soil to erosion. A range of techniques is employed to manage *Parkinsonia* including mechanical control, application of fire and herbicide treatment. These techniques are variably successful, but depend on persistent follow up work to treat germinating seedlings.

In response to the range of problems presented by *Parkinsonia*, a small group of landholders in QLD began experimenting with different grazing techniques in an effort to control dense infestations. Well within the control zone, John and Rhonda Lyons of Wambiana near Charters Towers had tried to control *Parkinsonia* unsuccessfully, using a range of techniques (Deveze et al., 2004). Dense infestations on the Lyons property had begun to reduce grass cover and topsoil, in turn reducing productive grazing capacity and consequently farm income. The property owners tried cattle to browse the plant in various paddocks, and herbicide spraying. In 1999 they purchased a herd of 'quiet' camels after learning that the animals would graze 'just about anything'. Since then they have progressively built their herd to over 200 animals maintaining high densities of stock and rotating them across the property's paddocks. This has proved so successful that they continue to invest in further camel stock in preference to cattle. There are now estimated to be over 5000 camels managed on properties across QLD contributing to weed management in different contexts (Edwards et al., 2010).

A key factor in the success of the Lyons' grazing experiment lies in camel browsing practice; particularly their capacity to selectively graze and browse. It is worth unpacking this behaviour further because it is this specific feature that is also implicated as a significant threat to biodiversity in other contexts. Camels are understood to be generalist feeders, mostly browsing and grazing preferred species, but able to eat a broad range of plant species and vegetation types (Iqbal and Khan, 2001). Although flexible, camels will preferentially eat particular species, including to the point of damage, defoliation and suppression of germinating seedlings (Dorges and Heuke, 2003). As discussed by Edwards et al. (2010) in areas of central Australia several studies have demonstrated that camels contribute to local decline of particular plants; in some cases this might conveniently include species deemed undesirable, but it may also include plants such as Quandong and native apricot, which are culturally important for Aboriginal people (Dorges and Heuke, 2003). As described above, most studies (e.g. Edwards et al., 2010) report that these impacts are density dependent.

Although damage is incurred at different densities in different contexts, it is densities above 0.3 camels/km², together with selective feeding behaviour, that leads to significant damage. The effect of density is reproduced in fenced or confined spaces, where camel browsing pressure increases as animals regularly return to preferred plant species (Dorges and Heuke, 2003).

In the case described above, camels are explicitly stocked at rates that encourage this damaging behaviour. Camels not only feed on the plants, they also 'pull branches down, breaking and weakening them, making them more susceptible to bio-control insects like borers' (Deveze, 2004:36). As well as defoliating plants, ecological examination verifies that camels effectively reduce flower set, and in turn seed production (McKenzie et al., 2006). Here the same feeding behaviour or practice at high stocking densities is understood to have a positive effect because the animals are grazing an invasive plant; indeed this 'application' of camel grazing preferences and high stocking densities is described by Edwards et al. (2010, p51) as the 'only environmental benefit attributable to camels'. In this context the behaviour produces a positive value and outcome for the humans involved; a reduction over time in the density and survival of *Parkinsonia* and an economic value from the stock used to graze them.

We argue that the outcomes of camel behaviour are not predetermined by their status as non-native or feral, but are contingent upon the context in which behaviour is practiced and the range of other actors involved. Depending on the species they are grazing, stocking densities, and the ability of people involved to orchestrate behaviour, the same capacity of camels to selectively browse specific plants is problematic in some contexts, but in others has the potential to produce a constructive outcome reducing mono-cultural stands of *Parkinsonia*.

A key impasse in Andrew's acknowledgment of camels belonging in the Kimberley concerns the new relations that camels and weeds together have now established. While their enduring presence suggests a kind of ecological fit, camels and weeds have been inserted onto a background of a native ecology. Andrew maintains a sense of loss for what has changed and what has disappeared, but our contention is that this sense of loss is reinforced by recognition that new relations are being formed and new combinations of living things are developing beyond his control. As someone charged with conserving the Kimberley environment, the challenge for Andrew remains to reconcile the degree of influence (rather than control) he might have over these processes of change. Counterintuitively for the Lyons in QLD, in handing over the job of weed management to the camels, they now feel more in control of what is happening on their property. Rather than just fitting in a bit of weed spraying when they have time, the Lyons suggest that with less human labour the camels produce more

visible and measurable change because of their capacity for consistent and durable effort. In relinquishing the application of control techniques, human energy more effectively orchestrates or directs the processes taking place. The point here is not to suggest that this technique should be applied more widely; possible applications for wider use have been reported elsewhere (Vitelli, 2000; Dorges and Heuke, 2003). Rather, our aim is to highlight how categories of value do not self-evidently flow from camels themselves, but are contingent upon assemblages of objects, processes, relations and discourses that come together in particular places and times.

6. Conclusions

The concept of assemblage reveals aspects of a story often ignored. In two instances, the things forgotten are also some of the most difficult and confronting to encounter. First, it is troublesome to recall that settling camels in Australia was part of a colonial project of nation-building, that camels came with cameleers, materials and practices, and cameleers became the focus of racial vilification and racist policy. The unfamiliar animal could be accepted for a time due to its utility; in particular its strength and physiological adaptation to arid landscapes. But the assemblage of which it was a part could not. Afghan cameleers, decorative equipment and clothing, and cultural practices rubbed up against discourses of the time, making this camel assemblage unacceptable. Ideas about nation and ethnicity contributed to an understanding that camels do not belong. But nothing is gained by simplifying complex and painful histories; these are histories that continue to influence contemporary views about the place of camels in the Australian nation and ecologies. Debates about species belonging must move beyond simplistic, time-bounded stories that reinforce geographical origins and neat periods pre- and post-colonisation. Second, it is also confronting to consider that death does not 'remove' camels, and that dead and dying bodies have agency. They produce lingering, locally specific material and ethical consequences, which need to be part of more open and accountable conversations about invasive species. Despite the focus on the damage caused by *Camelus dromedarius*, camel bodies are largely overlooked. Further, culling and 'removal' is not a one-off procedure; camel management will require a variety of repeated practices and funding.

The Australian feral camel problem is imagined, measured and presented as a national issue. But the national should not be accepted as the self-evident scale for management strategies and interventions. Moore (2008, p214) draws attention to 'the ways in which scalar narratives, classifications and cognitive schemas constrain or enable certain ways of seeing, thinking and acting'.

Camels and camel management need to be understood in the context of processes and relations across multiple scales; the focus on the national is currently blinkering camel management, and relevant issues that exist across scales. In particular, the scales of the body, the local and the global are currently overlooked in camel management, but present possibilities for conceptualisation and action. For example, Spencer et al. (2012) suggest a focus on local impacts and management through asset protection, and in so doing they disrupt the apparent 'naturalness' of the national scale. Zeng & Gerritsen (2013, p1212) acknowledge that 'commercial harvest ... could generate economic benefits to some stakeholders, such as Aboriginal communities, and reduce local camel populations in targeted areas'. Their point is highly relevant in light of Spencer et al. (2012); however, camel management documents largely present local action as marginal in the face of a national problem. In contrast, weed management projects in QLD highlight the relevance of specific local circumstances for developing alternative relations.

The near-exclusive focus on the national scale also renders invisible the global context of camels. Dromedary camels in Australia comprise the only existing wild population in the world. In other places, where camels are part of local ecology, economy and culture (LPPS, 2005), camel populations are declining dramatically³ (Elias and Abdi, 2010; LPPS, 2005; Vijn et al., 2007). Decline is primarily attributed to increasing pressure on pastoral lands and livelihoods from large-scale commercial agriculture and other development, and neglect of camels in policy and development programs. Such change has implications for sustainable use of arid lands, and is reported to contribute to political and economic marginalisation of pastoral communities, and growing vulnerability to drought, food insecurity, famine and poverty (Elias and Abdi, 2010; Kakar et al., 2011; LPPS, 2005; Nori and Neely, 2009). Thinking more creatively about Australian camels may enable constructive engagement with some of these challenges. Australia currently exports small numbers of camels – as meat and livestock – around the world, including the places from which they were originally imported (pers. com. Australian Camel Industry Association). The fact of this small export industry, and the broader global context, highlights how species belonging does not follow a linear and uni-directional progression in time and space. Strategies that exclude these considerations and exist solely at the national scale are inadequate.

A focus on 'camel assemblages' reveals processes and relations beyond the individual animal and species, which are currently marginalised in management strategies. Management should take into

³ A 50% decline is reported over a ten-year period in Rajasthan (LPPS, 2005); 80% over 30 years in parts of Ethiopia (Elias and Abdi, 2010).

account more than the camel. It does so to an extent through a focus on ‘camel impacts’, rather than camels *per se*. But we argue that the impacts discourse does not go far enough; it maintains a regime under which all agency to cause negative effects is with the camel, thus ‘conflat[ing] bundles of processes’ (Head, 2008) and matter. Our argument is that categories of belonging and of value do not self-evidently flow from a species itself. The labels and categories we apply to camels and other species effectively work in policy and management to foreclose other possible relations, including those in which species may be able to belong in relations with humans and others. In this regard assemblage thinking illuminates a wider scope of possible relations, including relations that have practical utility in species management. Given that it is not the aim of management to remove camels altogether, our conversations must include how we are to co-exist with camels into the future. To simply tolerate the camels that escape culling programs—the unkillable camels—is a hopeless scenario. Instead, we must illuminate and develop other possible relations in which Australian camels might belong.

Acknowledgement

We acknowledge the State Library of South Australia for permission to reproduce Figure 2, Afghan handlers and camels, Northern Territory c. 1890 (B1423), and the Department of the Environment for permission to reproduce Figure 3, Camels around a waterhole at Docker River, Northern Territory, Photo: R.Bugg, 2007. Our case study on weed management practices was funded by the Australian Research Council Laureate fellowship grant to Prof. Lesley Head (FL0992397). We thank the field participants who generously gave their time. Our thanks also to David Clifton for producing Figure 1, Locality map, and to Thom van Dooren and Shaun McKiernan for constructive comments on a draft.

References

- Abbas, B., Agab, H., 2002. A review of camel brucellosis. *Preventive Veterinary Medicine* 55, 47-56.
- Anderson, B., Kearnes, M., McFarlane, C., Swanton, D., 2012. On assemblages and geography. *Dialogues in Human Geography* 2 (2), 171-189.

'Another shipload of camels'. 24 September 1884. *South Australian Register*, p7.

<http://trove.nla.gov.au/ndp/del/article/43815256> (Last viewed 27th January 2014).

Atchison, J., Head, L., 2013. Eradicating bodies in invasive plant management. *Environment and Planning D: Society and Space* 31 (6), 951-968.

Barker, H., 1964 [1995 edition]. *Camels and the outback*. Hesperian Press, Carlisle.

Bennett, J. 2010. *Vibrant matter: a political ecology of things*. Duke University Press, Durham and London.

Boom, K., Ben-Ami, D., Boronyak, L., 2012. Kangaroo Court: enforcement of the law governing commercial kangaroo killing. THINKK, the kangaroo Think Tank, University of Technology Sydney.

'Camels for Australia'. 27 January 1866. *South Australian Register*, p4.

<http://trove.nla.gov.au/ndp/del/article/41022497> (Last viewed 27th January 2014).

'Camels in Australia'. 19 May 1858. *South Australian Register*, p2.

<http://trove.nla.gov.au/ndp/del/article/49771625> (Last viewed 27th January 2014).

CBD (Convention on Biological Diversity), n.d. Invasive alien species.

<http://www.cbd.int/invasive/default.shtml>. (Last viewed 17th June 2013).

Cochard, R., Jackes, B., 2005. Seed ecology of the invasive tropical tree *Parkinsonia aculeata*. *Plant Ecology* 180, 13-31.

Commonwealth of Australia, 2010. Camel Fact Sheet. Australian Government, Department of Sustainability, Environment, Water, Population and Communities.

<http://www.environment.gov.au/biodiversity/invasive/publications/pubs/camel-factsheet.pdf> (Last viewed 17th June 2013).

Commonwealth of Australia, 2011. Feral Animals of Australia. Australian Government, Department of Sustainability, Environment, Water, Population and Communities.

<http://www.environment.gov.au/biodiversity/invasive/ferals/> (Last viewed 7th September 2013).

Coventry, J., Edwards, G., Zeng, B. 2010 The odyssey of managing feral camels and their impacts—is there an Achilles' heel? *Australian Zoologist* 35, 251-264.

Daniels, T., Bekoff, M., 1989. Feralization: the making of wild domestic animals. *Behavioural Processes* 19, 79-94.

Davis, M., 2009. *Invasion Biology*. Oxford University Press, Oxford.

Davis, M., Chew, M., Hobbs, R., Lugo, A., Ewel, J., Vermeij, G., Brown, J., Rosenzweig, M., Gardener, M., Carroll, S., Thompson, K., Pickett, S., Stromberg, J., Del Tredici, P., Suding, K., Ehrenfeld, J., Grime, J., Mascaro, J., Briggs, J., 2011. Don't judge species by their origin. *Nature* 474, 153-154.

Deveze, M., 2004. National Case Studies Manual Parkinsonia. Approaches to the management of parkinsonia (*Parkinsonia aculeata*) in Australia. Queensland Department of Natural Resources, Mines and Energy.

'Domestic Intelligence'. 11 July 1846. *Supplement to the Sydney Morning Herald*, p2 S.
<http://trove.nla.gov.au/ndp/del/article/12888378> (Last viewed 27th January 2014).

van Dooren, T., 2011. Invasive species in penguin worlds: An ethical taxonomy of killing for conservation. *Conservation and Society* 9 (4), 286-298.

Dorges, B., Heucke, J. 2003. Demonstration of ecologically sustainable management of camels on Aboriginal and pastoral land. Final report to the National Heritage Trust on project number 200046.

Edwards, G., Saalfeld, K., Clifford, B., 2004. Population trend of camels in the Northern Territory, Australia. *Wildlife Research* 31, 509-511.

Edwards, G., Zeng, B., Saalfeld, W., Vaarzon-Morel, P., McGregor, M., (Eds) 2008. Managing the impacts of feral camels in Australia: a new way of doing business. DKCRC Report 47. Desert Knowledge Cooperative Research Centre, Alice Springs.

Edwards, G., Zeng, B., Saalfeld, W., Vaarzon-Morel, P., 2010. Evaluation of the impacts of feral camels. *The Rangeland Journal* 32, 43-54.

Elder, T., 1894. Narrative of a tour of Palestine in 1857, W.K. Thomas & Co. Printers, Adelaide.

- Elias, E., Abdi, F., 2010. Putting pastoralists on the policy agenda: land alienation in southern Ethiopia. International Institute for Environment and Development, London.
- Gelder, K., Jacobs, J., 1998. *Uncanny Australia: sacredness and identity in a postcolonial nation*. Melbourne University Press, Carlton South.
- Gibbs, L., 2009. Just add water: colonisation, water governance and the Australian inland. *Environment and Planning A* 41 (12), 2964-2983.
- Gibbs, L., 2014. Arts-science collaboration, embodied research methods, and the politics of belonging: 'SiteWorks' and the Shoalhaven River, Australia. *Cultural Geographies* 21 (2), 207-227.
- Ginn, F., 2008. Extension, subversion, containment: eco-nationalism and (post)colonial nature in Aotearoa New Zealand. *Transactions of the Institute of British Geographers* 33, 335-353.
- Hains, B., 2002. *The ice and the inland: Mawson, Flynn and the myth of the frontier*. Melbourne University Press, Carlton.
- Hardman, W. (Ed.), 1865 [1984]. Introduction. In Stuart, J. *Explorations in Australia: the journals of John McDouall Stuart during the years 1858, 1859, 1860, 1861 & 1862 (Facsimile ed.)*. Hesperian Press, Carlisle, Western Australia.
- Head, L., 2008. Is the concept of human impacts past its use-by date? *The Holocene* 18 (3), 373-377.
- Head, L., 2012. Decentring 1788: Beyond biotic nativeness. *Geographical Research* 50 (2), 166-178.
- Head, L., Muir, P. 2004. Nativeness, invasiveness, and nation in Australian plants. *Geographical Review* 94 (2), 199-217.
- Hobbs, R., Higgs, E., Harris, J., 2009. Novel ecosystems: implications for conservation and restoration. *Trends in Ecology and Evolution* 24 (11), 599-605.
- Hogan, J., Phillips, C., 2011. Transmission of weed seed by livestock: a review. *Animal Production Science* 51, 391-398.
- Howitt, R., 1998 Scale as relation: musical metaphors of geographical scale. *Area* 30(1), 49-58.

'Introduction of the camel'. 6 July 1858. *South Australian Register*, pp2-3.

<http://trove.nla.gov.au/ndp/del/article/49784582> (Last viewed 27th January 2014).

Iqbal, A., Khan, B., 2001. Feeding behaviour of camel, review. *Pakistan Journal of Agricultural Science* 38 (3-4), 58-63.

IUCN (International Union for the Conservation of Nature), 2000. Information Paper: IUCN Guidelines for the Prevention of Biodiversity Loss caused by Alien Invasive Species. Fifth Meeting of the Conference of the Parties to the Convention on Biological Diversity, Nairobi, Kenya, 15-26 May 2000.

Jazeel, T., 2005. 'Nature', nationhood and the poetics of meaning in Ruhuna (Yala) National Park, Sri Lanka. *Cultural Geographies* 12, 199-227.

Jones, P., Kenny, A., 2007. *Australia's Muslim Cameleers: pioneers of the Inland 1860s-1930s*. Wakefield Press and South Australian Museum, Adelaide.

Kadim, I., Mahgoub, O., Faye, B., Farouk, M., 2013. *Camel meat and meat products*. CABI, Oxfordshire, Boston.

Kakar, A., de Verdier, K., Youna, M., 2011. Rapid change of strategy is necessary for development of dromedary camel pastoralism in the Cholistan desert of Pakistan *Pastoralism: Research, Policy and Practice* 1(3), <http://www.pastoralismjournal.com/content/1/1/3>.

Kendall, T., 2007. *Within China's orbit?: China through the eyes of the Australian Parliament*. Parliamentary Publications, Commonwealth of Australia, Canberra.

Larson, B., 2007. Who's invading what? Systems thinking about invasive species. *Canadian Journal of Plant Science* 87(5), 993-999.

Larson, B., 2011. *Metaphors for environmental sustainability: defining our relationship with nature*. Yale University Press, New Haven.

Lavau, S., 2011. The nature/s of belonging: performing an authentic Australian river. *Ethnos* 76, 41-64.

'Local intelligence'. 15 July 1846. *South Australian Register*, p3.

<http://trove.nla.gov.au/ndp/del/article/27453314> (Last viewed 27th January 2014).

Lorimer, J., 2012. Multinatural geographies for the Anthropocene. *Progress in Human Geography* 36, 593-612.

LPPS, 2005. Saving the camel and peoples' livelihoods: building a multi-stakeholder platform for the conservation of the camel in Rajasthan. Proceedings of an International Conference held on 23–25 November 2004 in Sadri. Lokhit Pashu-Palak Sansthan, Sadri, Rajasthan, India.

Madigan, C., 1938. A review of the arid regions of Australia and their economic potentialities. Presidential address to Section P, Geography and Oceanography, ANZAAS, Wellington, New Zealand, Government Printer.

Marris, E., 2011. *Rambunctious Gardens: saving nature in a post-wild world*. Bloomsbury Publishing, New York.

McGregor, R., 2011. *Indifferent inclusion: Aboriginal people and the Australian nation*. Aboriginal Studies Press, Canberra.

McKenzie, J., Pattison, M., Campbell, S., Vitelli, J., 2006. The effect camels have on the ability of *Parkinsonia* (*Parkinsonia aculeata* L.) to set seed. Proceedings of the Fifteenth Australian Weeds Conference, 886-889.

McKnight, T., 1969. *The camel in Australia*. Melbourne University Press, Carlton.

McKnight, T., 1976. *Friendly Vermin: a survey of feral livestock in Australia*. University of California Press, Berkeley, Los Angeles, London.

Moore, A., 2008. Rethinking scale as a geographical category: from analysis to practice. *Progress in Human Geography* 32, 203-225.

Ninti One Ltd, 2013. *Managing the impacts of feral camels across remote Australia: final report of the Australian Feral Camel Management Project*. Ninti One Limited, Alice Springs.

Nori, M., Neely, C., 2009. The tragedy is on, the tragedy is over: pastoral challenges and opportunities for conservation agriculture. 4th World Congress on Conservation Agriculture. New Delhi, India. 329-338.

NRMMC (Natural Resource Management Ministerial Council), 2007. Australian Pest Animal Strategy: A national strategy for the management of vertebrate pest animals in Australia. Commonwealth of Australia.

NRMMC (Natural Resource Management Ministerial Council), 2010. National Feral Camel Action Plan: A national strategy for the management of feral camels in Australia. Commonwealth of Australia.

Parliament of the Commonwealth of Australia, 1991. Culling of large feral animals in the Northern Territory, Report by the Senate Select Committee on Animal Welfare. Canberra.

Parliamentary Debates South Australia, 10 December 1925, vol 2.

Read, P., 2000. *Belonging: Australians, place and Aboriginal ownership*. Cambridge University Press, Cambridge.

Robbins, P., 2004. Comparing invasive networks: cultural and political biographies of invasive species. *The Geographical Review* 94(2), 139-156.

Robbins, P., Marks, B., 2010. Assemblage geographies. In: Smith, S., Pain, R., Marston, S., Jones, J. (Eds) *The Sage Handbook of Social Geographies*. Sage, London, pp. 176-194.

Robbins, P., Moore, S., 2013. Ecological anxiety disorder: diagnosing the politics of the Anthropocene. *Cultural Geographies*. 20(1), 3-19.

Romanillos, J., 2011. Geography, death, and finitude. *Environment and Planning A* 43, 2533-2553.

Rose, B., 1995. Land management issues: attitudes and perceptions amongst Aboriginal people of central Australia. Report for Central Land Council, Alice Springs.

Rose, D., 2004. *Reports from a wild country: ethics for decolonisation*. UNSW Press, Sydney.

Royal Geographical Society of Australasia, 1912. John McDouall Stuart's transcontinental expedition. Royal Geographical Society of Australasia, South Australia Branch. 14, 29-47.

Saalfeld, W., Edwards, G., 2010. Distribution and abundance of the feral camel (*Camelus dromedarius*) in Australia. *The Rangeland Journal* 32, 1-9.

Sagoff, M., 2005. Do non-native species threaten the natural environment? *Journal of Agricultural and Environmental Ethics* 18, 215-236.

Shackleford, N., Hobbs, R., Heller, N., Hallett, L., Seastedt, T., 2013. Finding a middle-ground: the native/non-native debate. *Biological Conservation* 158, 55-62.

Short, J., Caughley, G., Grice, D., Brown, B., 1988. The distribution and relative abundance of camels in Australia. *Journal of Arid Environments* 15, 91-97.

Simberloff, D., 2005. Non-native species *do* threaten the natural environment! *Journal of Agricultural and Environmental Ethics* 18, 595-607.

Smith, N., 2011. Blood and soil: nature, native and nation in the Australian imaginary. *Journal of Australian Studies* 35 (1), 1-18.

Spencer, P., Giustiniano, D., Hampton, J., Gee, P., Burrows, N., Rose, K., Martin, G., Woolnough, A., 2012. Identification and management of a single large population of wild dromedary camels. *The Journal of Wildlife Management* 76 (6), 1254-1263.

Stevens, C., 2002. *Tin Mosques and Ghantowns: a history of Afghan camel drivers in Australia*. Paul Fitzsimons, Alice Springs, 2nd edition.

Sullivan, P. 2011. *Belonging together: dealing with the politics of disenchantment in Australian Indigenous policy*. Aboriginal Studies Press, Canberra.

'Sydney and Hobart town news'. 5 December 1835. *Perth Gazette and Western Australian Journal*, p612. <http://trove.nla.gov.au/ndp/del/article/640637> (Last viewed 27th January 2014).

'The introduction of the camel'. 5 October 1858. *South Australian Register*, p2. <http://trove.nla.gov.au/ndp/del/article/49785250> (Last viewed 27th January 2014).

Thorp, J., Lynch, R., 2000. The determination of weeds of national significance. National Weeds Strategy Executive Committee, Launceston.

TSSC (Threatened Species Scientific Committee), 2013. Advice to the Minister for Sustainability, Environment, Water, Population and Communities from the Threatened Species Scientific Committee (the Committee) on Amendments to the List of Key Threatening Processes under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), effective from 26 February 2013, <http://www.environment.gov.au/node/14591>

Trigger, D., 2008. Indigeneity, ferality, and what 'belongs' in the Australian bush: Aboriginal responses to 'introduced' animals and plants in a settler-descendant society. *Journal of the Royal Anthropological Institute* 14 (3), 628-646.

Trigger, D., Mulcock, J., Gaynor, A., Toussaint, Y., 2008. Ecological restoration, cultural preferences and the negotiation of 'nativeness' in Australia. *Geoforum* 39, 1273–1283.

Vaarzon-Morel, P., 2010. Changes in Aboriginal perceptions of feral camels and of their impacts and management. *Rangeland Journal* 32 (1), 73-85.

Vaarzon-Morel, P., Edwards, G., 2010. From beast of burden to symbol of the desert/feral animal: the metamorphoses of the camel in central Australia. *Dialogue: Academy of the Social Sciences in Australia* 29 (10), 5-17.

Vaarzon-Morel, P., Edwards, G., 2012. Incorporating Aboriginal people's perceptions of introduced animals in resource management: insights from the feral camel project. *Ecological Management & Restoration* 13 (1), 65-71.

Vijh, R., Tania, M., Mishra, B., Bharani Kumar, S. 2007 Genetic diversity and differentiation of dromedarian camel of India. *Animal Biotechnology* 18 (2) 81-90.

Vitelli, J., 2000. Options for effective weed management. *Tropical Grasslands* 34, 280-294.

Ward, B., Ward, C., Withnell, N., Bishop, C., Kay, W., Everett, M., Paterson, W., Piirto, G., 2006. Aerial survey conducted from Telfer Mine site of the Rudall River National Park and its surrounds to assess

feral camel densities. Draft Report, Department of Environment and Conservation, Western Australia.

Warren, C., 2007. Perspectives on the 'alien' versus 'native' species debate: a critique of concepts, language and practice. *Progress in Human Geography* 31, 427-446.

Willard, M., 1923 (1967 2nd edition). *The history of the White Australia Policy to 1920*. Melbourne University Press, Carlton.

Wilson, D., Mittermeier, R., (Eds) 2011. *Handbook of the Mammals of the World, Volume 2: Hoofed Mammals*. Lynx Edicions, Barcelona.

Winnecke, C., 1884. Mr Winnecke's explorations during 1884. *SAPPP I2* (39), 1-14.

Zeng, B., Edwards, G., 2010. Perceptions of pastoralists and conservation reserve managers on managing feral camels and their impacts. *The Rangeland Journal* 32, 63-72.

Zeng, B., Gerritsen, R., 2013. Inadequate contribution of commercial harvest to the management of feral camels in Australia. *Journal of Environmental Planning and Management* 56 (8), 1212-1224.