

Constructing the Social life of the Kangaroo: A Commodity Study

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I declare that this thesis is my own original work and is in accordance with The Australian National University thesis guidelines for higher degree research.

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Disclaimer: The material presented in this thesis is mine and the opinions expressed are solely my own and do not express the views or opinions of my employer.

Abstract

There is an increasing awareness of the need to match agricultural production systems to their environments and recognition, in the case of the kangaroo, that this animal is well adapted to rangeland ecosystems, encompassing 81 per cent of Australia's landmass. There is also recognition that kangaroo is a healthy protein source, but Australians associate this particular meat with low economic and cultural values. For this reason it has not been widely embraced as part of a healthy and sustainable diet. By following the trail of kangaroo meat from remote Queensland to the supermarket shelf and the menus of European factory workers, a complex web of intersecting factors surfaces to explain the conundrum for the low valuation accorded to kangaroo meat.

Historically kangaroo harvesting has been a very lucrative form of resource extraction when overseas markets have accepted the product. Over many decades, it has also returned healthy profits to those in the kangaroo leather trade and the pet food industry. Interestingly, major profits are to be made for kangaroo meat processors when kangaroo management is not integrated within grazing enterprises, thus negating broad ecosystem benefits. In the face of a lack of domestic demand, particularly from smallgoods processors, and the small number of processor-controlled abattoirs, there is little incentive or government support for rangeland graziers to invest as kangaroo producers. The stories of those involved in the marketing and distribution of kangaroo meat provide insights into multiple aspects of kangaroo meat production and consumption, and the mechanisms through which both the value chain and the institutional responses have been formed. What emerges is the key role played by animal welfare movements in shaping both the government's regulatory approach and the industry's timidity when it comes to promoting itself or its products.

The inclusion of kangaroo in our food supplies is supported by ecologically based arguments relating to the conservation of the Australian rangelands, and the need to reduce carbon emissions. The thesis highlights the need for an institutional response, which can incorporate pluralist objectives. It also identifies a particular approach—designation of origin systems or geographical indications—for product marketing which could re-embed this food into Australia's culinary culture as part of eco-gastronomy. I argue that we need stories that are built around concepts of human identity that symbolise ecological respect and relationships. For a 'conservation through sustainable use' strategy, I suggest that eco-gastronomy could be integral to improving rangelands ecosystems, which would require government reform to the kangaroo industry regulatory systems, including the strengthening of the oversight of quality control. In addition, any regulatory reform will have to secure involvement by the new custodians of the land, rangeland graziers.

This study demonstrates the utility of a modified commodity chain analysis for exploring connections between supply-chain dynamics and ecological systems. In particular the focus on institutional frameworks adopted from the GVC approach was critical for mapping the social with the ecological and identifying the barriers and opportunities for creating more sustainable food systems.

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Introduction

This research is in part an exploration of what Harriet Friedmann has described as ‘a paradox of human species life.’ As she explained:

On one side, humans get food by altering the concentrations and locations of plants and animals. They necessarily alter webs of living cycles and material cycles of air, water and soil. On the other side, since the sixteenth century, many food getting practices have flowed from an illusion of transcendence of these webs and flows (Friedmann 2000: 481).

Understanding of the complexity of relations between the biophysical and human domains is critical for developing sustainable food systems. The emergence of the concept of ‘sustainable development’ is part of what Arturo Escobar has described as ‘a broader process of problematization of global survival,’ a process ‘which induces a reworking of the relationship between nature and society’ (Escobar 1999: 329). The production and consumption of meat now sits at the centre of local and international debates about climate change, food security, environmental sustainability and the type of farming systems required to meet these challenges (Vitousek et al. 1997; Steinfeld et al. 2006; and Rockström et al. 2009). As concerns about climate change and non-communicable disease risks have become prevalent in the community, reduced red meat consumption and plant-based diets have been championed as important strategies for individuals to pursue to reduce individual greenhouse gas emissions (McMichael et al. 2007; Garnett 2009; González et al. 2011; and de Bakker and Dagevos 2012). These same authors also point out the co-benefit of improved nutrition.

Whilst I believe there is an urgent need and a pressing moral imperative to mainstream plant-based diets, I would also argue that there is an equally pressing need to increase our understanding of how food systems are integrated into ecological webs. It is necessary to increase the alignment between the two in order to improve our ability to return to environmentally sustainable ecological limits. It is estimated that a third of the planet’s ice-free terrestrial surface area is inhabited by livestock (Malik et al. 2015: 3). Livestock systems have both positive and negative effects on the natural resource base, public health and economic growth (Malik et al. 2015: 3). While these impacts are varied depending on the interactions between the livestock and the ecosystems in which they are embedded, livestock is estimated to be accountable for significant degradation in rangeland areas (Le Gall 2013).

In Australia, soils are generally not well suited to agriculture (Bastin & ACRIS Management Committee 2008: 1). Only 6 per cent of the land is arable without irrigation and significant areas are prone to problems with salt, sodicity, water logging or acidity (Commonwealth Intergovernmental Working Group for the UNCCD 2002). The rangelands, which are only suitable for grazing, constitute 70–80 per cent of the Australian landmass. In the Australian rangelands reduced productivity as a result of land degradation is a critical problem for the

ongoing viability of farming enterprises. The key cause of land degradation in the rangelands is soil erosion. Damage done by excessive grazing pressure reduces the surface cover necessary to prevent erosion by maintaining the soil in a condition that absorbs rainfall (Department of Environment and Resource Management 2011). Surface cover in the rangelands is affected by both total grazing pressure and by the type of animal that grazes (hoofs and bite) (Environment Australia 1999).

It could be argued that rangeland-farming systems are surplus to the requirement of modes of production and consumption that are focused on intensive agriculture. Some rural economists have argued ‘the presence or absence of food from our rangelands’ does not significantly affect world food production (Robertson 2003: 130). G.A. Robertson provides the example of the 8,885,000 tonnes of beef and sheep meat produced in the Australian rangelands during 1999–2000, which represents only 1.4 per cent of the world’s beef and sheep meat production. However, this narrowly cast food security or food yield perspective overlooks other needs of the human population inhabiting the rangelands. Rangeland economies and communities are both highly dependent on natural resources and they are critical for managing the natural resource base. The question of whether or not rangeland grazing systems make a significant contribution to world food security could be considered subsidiary to the need for sustainable business enterprises that will support both rural community economies and states of resilience and their role in managing the ecosystems of inland Australia.

The aggregate demand for livestock products was projected to be 70 per cent greater in 2015 than it was in 1990 (Le Gall 2013), encouraging continued livestock production in Australia’s rangeland areas. Quite apart from whether this demand fosters human health and prosperity, environmental sustainability questions loom large. Sustainable food production in the rangelands involves understanding and working with the uncertainties of climate, controlling total grazing pressure, and managing invasive species (Natural Resource Management Ministerial Council 2010: 8). One of the major challenges to achieving sustainable production is that rangeland animal producers often find it difficult to capture sufficient profit (Fitzhardinge 2012: 37). This has had a number of ramifications for land management and conservation objectives. In some cases it has driven people to overstocking and other unsustainable practices, while other farmers have looked to diversify their production base and consider how they can earn alternative revenue streams from their enterprise.

Food activists and agrifood scholars concerned with the problems of sustainability have also emphasised the importance of fitting the culinary culture to the specific qualities and distinctive features of a region. Local and regional food movements advocate for the use of plant varieties and animal breeds best suited to the local environment (Wiskerke 2009). In this regard kangaroo has a very specific place-based agro-ecology of production that has been evaluated positively as a sustainable and nutritious food source (Sinclair et al. 1987; O’Dea 1988). For the last 150

years, however, kangaroos have been culled to reduce grazing pressures to produce beef and lamb meat. Production of kangaroo meat sits outside almost all farm production systems and provides no returns to those rangeland graziers who manage these landscapes. This situation continues despite the evidence presented by rangeland ecologists, who have been arguing for decades, that the involvement of rangeland graziers in kangaroo harvesting is critical to how we manage these landscapes sustainably.

The bases for these arguments are varied and include the advantages kangaroo has for:

- reducing the total grazing pressure in the rangelands—the use of kangaroo is a better land management strategy in terms of reducing land degradation and improving vegetation and biodiversity outcomes (Grigg 2002),
- reducing the climate impact of agriculture—as kangaroos are a low-emission meat they are an excellent option for the Australian rangelands, where farmers have few options to reduce the contribution that sheep and cattle make to greenhouse gas production (Wilson and Edwards, 2008), and
- reducing land clearing—there are currently no incentives to retain or restore vegetation that provides cover for kangaroos (Cooney 2009).

Previous research with a focus on kangaroo has looked at institutional frameworks of harvesting (Thomsen 2007), reviewed trials involving rangeland graziers in kangaroo harvesting (Ampt and Baumber 2010), examined consumer preferences in relation to kangaroo meat (Ampt and Owen 2008; Waitt 2014), investigated the cultural significance of kangaroo eating (Craw 2008a and 2008b; Probyn 2011), and explored debates about the place of kangaroo in our agricultural systems (Peace 2011). This study asks what a ‘value chain analysis’ can discover regarding how these separate focal points of interest intersect. By studying the kangaroo commodity chain this research aims to identify both enablers and barriers to shifting towards a closer association between food production and environmental sustainability in Australia’s rangeland grazing systems.

The main finding of the thesis is that the current regulatory framework cannot deal with the complexity of the issue. In this regard the GPN approach was valuable for illustrating the intersections between the operation of the regulatory frameworks and the activities of the other institutional actors. The findings underscore the need for public policy responses that support reflexive governance arrangements for making and shaping of Australia’s rangelands to support sustainable food systems.

Overview

Chapter one considers whether kangaroo meat is an exemplar of a sustainable diet. It provides an overview of the criteria for sustainability, then explores how the kangaroo performs both on

the plate and in the spaces and places of the rangelands, and closes with an overview of how the framework for 'conservation through sustainable use' is employed in commercial harvest processes. Chapter two explores approaches to value chain analysis and details the framework adopted for this study. It goes on to describe the study design and data collection methods and analysis undertaken in the research. This includes details of the sampling method, the study participants and the approach for ensuring ethical standards were given adequate consideration.

In the remainder of the thesis I introduce the findings from my research. Chapter three looks at the cultural and economic values connected to the production and consumption of kangaroo meat. It gives an historical account of the changing values connected with kangaroo in the context of the development of pastoralism in Australia's rangeland area, and the associated changes in the landscape structure and other ecological systems that have occurred across 150 years. Chapter four describes the kangaroo supply chain and how it has grown over the last 60 years. Chapter five explores how well the current supply arrangements work to create recognition for the ecological value of kangaroo. Chapter six looks at the institutional frameworks, rules and regulations for facilitating and managing the commercial kangaroo harvest. The final chapter concludes by analysing the problems that were identified in the earlier chapters, discussing the implications for the government agencies responsible for ensuring that kangaroo is utilised in a sustainable way for rangeland community sustainability.

Kangaroos – ecophysiology and spatial ecology

For those readers unfamiliar with the kangaroo, or for those interested in learning more about the ecophysiology and spatial ecology of the kangaroo, the following section provides some background.

In Australia and New Guinea there are some 70 living species in the sub order of *Marcropodiformes*. These species are currently grouped under three families: *Macropodidae* (kangaroos, wallabies and pademelons), *Potoroidae* (potoroos and bettongs), and *Hypsiprymmodontidae* (the musky rat kangaroos). Within the *Macropodidae* the six largest species are generally accepted as comprising the 'kangaroos'; these include the subgenera *Macropus* (*Macropus*), the group containing the Eastern Grey Kangaroo and Western Grey Kangaroo and *Macropus* (*Osphranter*), the group that includes the Red Kangaroo, the Antilopine Kangaroo and the Euro-wallaroo species. The large kangaroos, which are the subject of this research, include the Red Kangaroo (*Macropus rufus*), the Eastern Grey Kangaroo (*Macropus giganteus*), the Western Grey Kangaroo (*Macropus fuliginosus*) and the Common Wallaby or Euro (*Macropus robustus*). These kangaroos are currently harvested commercially for meat products for human and animal consumption.

The main concentrations of the large kangaroos are in the temperate areas of the Australian Rangelands (Robertson 2003). The rangelands comprise about 81 per cent of Australia; this is

an area where the rainfall is too low or unreliable and the soils too poor to support regular cropping, but where sheep and cattle are extensively grazed (Bastin and ACRIS Management Committee 2008: 1). Populations of large kangaroos in these areas fluctuate widely in response to the rainfall of preceding years: a succession of good rainfall years leads to large increases and drought leads to large decreases (Robertson 2003: 167). It is primarily the availability of green, annual grasses that determines 'kangaroo survivorship and reproductive success in the arid rangelands' (Moss and Croft 1999, cited in Dawson et al. 2006: 46).

To thrive in the extreme climatic variability of the rangelands, kangaroo physiology is designed to deal with extreme heat and high spatial and temporal variations in rainfall. These physiological adaptations are most apparent in the two main 'desert' species, the red kangaroo and the wallaroo. For the red kangaroo the most obvious adaptation is the ability to utilise mobility (Lavery 1985: 58) to move across the landscape in order to find areas, which provide better nutrition. The large powerful hind legs of kangaroos have been compared to springs, or pogo sticks and rubber balls, which all store elastic energy that is effortlessly renewed with every bounce (or hop) (Curtis 2006). Kangaroos have a high density of muscle mass around the pelvis which allows them to sustain high speeds aerobically by hopping (Dawson and Webster 2010; Eldridge, Coulson and CSIRO 2010).¹ Hopping is characterised by biomechanical features, which are economical in comparison to quadrupedal running (Dawson and Webster 2010: 99). This is because hopping supports a marked extension of stride length that enables relatively high speeds to be achieved with comparatively low outputs of energy (Dawson and Webster 2010: 99). This athletic facility allows kangaroos to cover large distances in order to move across arid landscapes relatively quickly, in order to ensure they can access the green pick following rainfall events in some areas (Dawson and Webster 2010; Eldridge et al. 2010).

Environmental physiologists have also found that regulation of water loss from the kidneys of red kangaroos and wallabies is an important part of their ability to survive hot and dry conditions.² The 'red kangaroo may prefer green grass for food' however it will rely at times on the saltbushes (*atriplex* species) which are ubiquitous in the rangelands and contain high levels of salt' (Denny 1985: 57). M. Denny-explains that while animals consuming these plants will need extra water for the secretion of these salts, the red kangaroo is at an advantage because it has a flexible kidney in regard to water and electrolytes. Its ability to filter these substances 'allows the red kangaroo to consume relatively large amounts of these shrubs when required' (Denny 1985: 57). The wallaby on the other hand 'is more restricted in its home range and may have to rely on poor quality herbage but it can conserve more urea in its kidneys than the red

¹ With nearly 50 per cent of body weight comprising skeletal muscle, the kangaroo is among the most muscular of mammals (Dawson and Webster 2010).

² 'Both the red kangaroo and the wallaroo have glomerular filtration rates (GFR), renal plasma flows, and urine flow when hydrated and dehydrated, which are lower than those of similarly sized eutherian mammals' (Denny 1985: 57).

kangaroo and this ability is used to advantage during drought' (Denny 1985: 57). In comparison the eastern grey kangaroo does not have the necessary ecophysiology to manage extreme heat. As a result it uses shade more frequently to manage high heat loads. This restricts the habitat of the eastern grey to where substantial tree and scrub cover is available (Dawson, McTavish, Munn and Holloway 2006: 51).

Kangaroos are also renowned for the way in which their breeding strategies are adapted to drought conditions. These strategies also vary, particularly between the grey kangaroos and the *Osphranter* group, across a range of details, most notably that grey kangaroos are seasonal breeders. An alternative strategy adopted by the red kangaroos and the Euro-wallaroos is to utilise what is known as facultative breeding, which means they can breed continuously in good conditions. To take advantage of good feeding conditions female kangaroos can have young at all three stages of development (at foot, in the pouch and in embryonic development). These large kangaroos also have a range of reproductive states that allow them to respond to periods of prolonged drought, including ceasing ovulation temporarily and embryonic diapause, where the development of a viable embryo is arrested and remains in a state of animation for long periods until it is ready to be restarted (Jackson and Vernes 2010; Dawson and Webster 2010). As a result they can immediately take advantage of good conditions to raise their young. In this respect the kangaroo has a major advantage over placental or eutherian mammals that have to invest large amounts of energy in gestation when food and water are not readily available (Jackson and Vernes 2010: 100).

In short, kangaroos have evolved over millennia in sympathy with their natural habitats. As material in Chapters three and four also reveals, their current ecophysiology has also been shaped by human population practices—both cultural and economic.

Chapter One

Sustainable Food Production in Australia's Rangelands

For several decades a diverse range of people, including culinary leaders and rangeland and nutrition scientists, have been promoting kangaroo as a 'lean' and 'green' product. This chapter discusses how environmental sustainability and food systems are linked and where kangaroo meat sits in relation to these considerations. The definition of a sustainable diet formulated at a scientific conference hosted by the Food and Agriculture Organisation (FAO) and Biodiversity International provides a starting point for this discussion:

Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable, nutritionally adequate, safe and healthy; while optimising natural and human resources (FAO and Biodiversity International 2010: n.p.).

Public Health ecologists have highlighted that human dietary preferences are a major obstacle to maintaining our planet's biological diversity (Rayner and Lang 2012: 231). Biodiversity is 'the variability among living organisms from all sources ... and the ecological complexes of which they are a part' (Rayner and Lang 2012: 233). Protecting biodiversity is a key criterion of a sustainable diet. Biodiversity constantly changes through genetic and evolutionary processes. However, today, modification of the earth's biological resources by human activity is so substantial, that the role of human activity in these processes cannot be underestimated (Vitousek et al. 1997: 495). Therefore while nature reserves and other protected areas are important, the preservation of biological diversity within major forms of land use is vital (Edwards and Abivardi 1998: 239).

In the Australian context one of the most critical areas for biodiversity and wilderness value is known as rangelands. Nearly three quarters of Australia is classified as 'rangelands.'¹ This includes an area of over 5,500,000 square kilometres with extremely low population densities (almost always below one person per 100 square kilometres), and which has primarily been developed for grazing systems. In these areas the management of biodiversity in grazing systems is critical for both the viability of the farm enterprise and ecological management.

In the definition of the sustainable diet given above there are a range of elements listed, and it has been argued that 'the value of "sustainability" is that it gives weight to all, not primacy to one focus' (Lang 2010: 22). While this thesis provides some consideration of all of these elements, the main focus of this chapter is on biodiversity and the impacts of ecosystems. I consider in particular how the 'conservation through sustainable use' model can support the use

¹ For 600 years the term rangelands has been used to describe extensive areas of land that are either grassed or wooded (Grice and Hodgkinson 2002). The term is currently used to describe 'semi-natural ecosystems where cattle and sheep are grazed on the natural vegetation (Harrington et al. 1984, cited in Grice and Hodgkinson 2002: 3).

of kangaroo in a sustainable diet—that is a diet that does not lead to long-term decline of biodiversity (Cooney 2007: 7). In the chapter, I also briefly touch on the relationship between human food preferences and sustainable diets because this topic is frequently raised in the context of this discussion.

Sustainability

The concept of a sustainable diet embeds ‘the notion that the health of humans cannot be isolated from the health of ecosystems’ (Burlingame 2010: 6). A key feature of what a sustainable diet entails is linked to how we understand and engage with sustainability. The concept of sustainable development was introduced in the 1980s with the World Commission on Environment and Development (Brundtland Report) (1987), *Our Common Future*. The Brundtland Report was developed in response to competing tensions between economic development and environmental protection. In the report, sustainable development is defined as: ‘Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs’ (Brundtland 1987: 8).² This definition caught the imagination of both policy makers and academics, including public health practitioners who began ‘closer scrutiny of government actions in relation to environment and health’ (Kickbusch 1989: 267). The benefit of this emerging interest in sustainability was a realisation that something had ‘gone wrong with progress’ (Norgaard 1994 cited in Dresner 2008: 166).

The Brundtland definition however, was open-ended and became subject to very broad interpretations. As Sharachchandra Lélé has argued (2013: 312), ‘although the original definition of sustainable development focused on meeting *needs*, the operational part refocused attention on *growth*,’ leading to an understanding of ‘sustained growth’ as a continuing process of change that is typically linked with growth in material consumption. ‘The difficulty with this is it contradicts the now general recognition that “ultimate limits” [to usable resources] exist’ (Lélé 1991: 609; Meadows et al. 1972). It is for these reasons that the Brundtland definition has been widely judged as inadequate by those seeking to respond to the issues of sustainability. The problem is that it gives the impression that solutions can be found in incremental changes, delivered by technological innovation or minor corrections to the market systems. All of this is underpinned by faith in western science and scientific rationality as the vehicle for solving all societal and environmental problems (Norgaard 1994, cited in Dresner 2008: 166).

A very different understanding of sustainability is generated by those who integrate knowledge of ecological and social systems into their definition of the problem. From this position environmentally sound development will require substantial reform in both market systems and everyday practices and habits of mind. The starting point for this position is that there are

² WCED. 1987. *Our Common Future*. Oxford: Oxford University Press (hereafter Brundtland Report).

physical limits to the human use of materials and energy (Meadows, Meadows and Randers 1992). As Anthony J. McMichael points out in relation to food systems, what is widely misunderstood is that the 'limiting factor is not the rate of increase in production but the capacity of the food-producing systems to remain productive' (McMichael 2005: 707). Most of the macroscopic analyses of current global trends concur in the view that, for at least the past quarter of a century, humans have been living beyond Earth's capacity to supply, replenish and absorb. Hence, we are not only living off the annual 'interest' (or 'dividend') available from nature, but we are also now eating into the planet's natural capital base (McMichael 2005: 707). Resolution of this issue will involve addressing deep-seated values and beliefs about 'the relative importance of various environmental problems' and our respective responsibilities (Hinrichs 2014: 151). As Lélé has argued, the challenge is then to create change in 'the social conditions that influence the ecological sustainability or unsustainability of the people-nature interaction' (1991: 609–10). To do this will require debating core questions of values and ethics, and engaging people in an effort to create a better alignment between production and consumption with ecosystems.

The ecological footprint has provided an important tool for measuring the impact of food production and consumption. In particular footprint analysis has been critical for highlighting that meat production is the leading cause of environmental degradation, destruction of biodiversity and the generation of greenhouse gases (Durning and Brough 1991).³ Mathis Wackernagel and William Rees (1996)⁴ introduced the ecological footprint (EF) concept as a simple measure of the sustainability of a population's consumption (Wackernagel, Chambers and Simmons 2000; Wackernagel et al. 1999). The ecological footprint (EF) measures how much bio-productive area (whether land or water) a population would require to sustainably produce all the resources it consumes and to absorb the waste it generates, using prevailing technology (Lewan and Simmons 2001: 3). It therefore reflects the demand for resources. It compares the level of consumption with the available amount of bio-productive land and sea area and has been designed to show a possible exceedance of any sustainability threshold (Wiedmann and Barrett 2010: 1646). The ecological footprint of meat consumption has provided persuasive arguments for reducing consumption of meat, or shifting to vegetarian or vegan diets. However, as an instrument for translating sustainability into action, the footprint has limitations. A key issue of concern is that the footprint does not present policy solutions that are territorially embedded. As Jeroen van den Bergh and Harmen Verbruggen (1999) point out

³ The livestock sector contributes 14.5 per cent of anthropogenic greenhouse gas emissions (P.J. Gerber et al. 2013). *Tackling Climate Change Through Livestock – A Global Assessment of Emissions and Mitigation Opportunities*. Rome: Food and Agriculture Organization of the United Nations (FAO). Online: <http://www.fao.org/docrep/018/i3437e/i3437e.pdf> (accessed 8 May 2017).

⁴ Mathis Wackernagel and William Rees. 1996. *Our Ecological Footprint: Reducing Human Impact on the Earth*. Gabriola Island, BC: New Society Publishers.

this is partly because the footprint does not differentiate between sustainable and unsustainable use of land. To make this distinction requires activity indicators that focus on the processes that contribute to unsustainability such as soil degradation (van den Bergh and Verbruggen 1999: 64).⁵ Nor does foot-print analysis engage with what is culturally preferred or ecologically possible. In many parts of the world where people are dependent on local ecosystems they rely on animals to convert indigestible grass and scraps into the human food chain (Butler 2015: 272). As Val Plumwood (2003: 87) has argued, for a 'biosphere person' it is relatively easy to be a vegan and animal food can be regarded as an unnecessary evil. From the perspective of the more ecologically accountable 'ecosystem person,' who must provide for nutritional needs from within a small, localised group of ecosystems, it is very difficult or impossible to be vegan: in the highly constrained choice context of the ecosystem person some animal-based foods are indispensable to survival (Plumwood 2003). This does not discount the need for the average consumer in developed societies to shift their dietary intake to lower levels of the food chain, but it does highlight that:

[v]egan approaches to food that rely implicitly upon the global market place are thus in conflict with ecological approaches that stress the importance of ecological accountability and of local adaptation (Plumwood 2003: 88).

Food preferences

Throughout history, most peoples have consumed only small quantities of meat and other foods of animal origin (Simoons 1994: 4). Yet meat consumption is pervasive across human societies and increasingly dominates the food ways of societies as levels of affluence increase. The nutrient content of meat is critical for explaining its central role in human diets (Harris 1985: 46). Meat provides essential minerals (iron, zinc, copper and iodine), vitamin B12 and essential amino acids that match our basic nutritional needs. Complete vegetarianism is 'physiologically inadequate for many people due to low absorption of iron and probably zinc' (Butler 2015: 272). On the other hand, there are chronic disease risks associated with a high-meat diet (Walker et al. 2005). Meat is a high-energy food and the high calorific content and abundance of saturated fat are thought to produce excess weight, obesity and dyslipidaemia (abnormally high lipids and fats in the blood). In turn these conditions predispose a human to high blood pressure, atherogenesis and risk of bowel and other cancers (McMichael et al. 2007).

Given the nutritional values that animal products have, one could expect the complete range of meats to be incorporated into the human diet, yet despite meat's value, many animals are deemed inappropriate to eat. It is a characteristic of humans that from the very wide range of

⁵ Jeroen van den Bergh and Harmen Verbruggen. 1999. Spatial sustainability, trade and indicators: an evaluation of the 'ecological footprint'. *Ecological Economics*, 29(1): 61–72.

foods that can be chosen there is a limited selection made and reproduced. This choice has become known as the Omnivore's dilemma (Fischler 1980). Anthropologists and food sociologists have argued that when dealing with this dilemma, food commodities are not consumed for their ecological characteristics, their nutritional properties or their capacity to alleviate hunger pangs. Instead our consumption is based on the cultural values that surround the process by which those values are internalised (Falk 1994 cited in Lupton 1996: 23). In the face of ecological crisis these assumptions and values have become contested.

Meat-eating is part of Australia's national culinary culture—a practice that is taken for granted by most people. But questions about the damaging impact of the livestock trade on the environment, particularly climate change, have problematised the practice of meat eating for many consumers in developed societies. Claude Fischler argues this provides a paradox that operates to increase the anxiety of omnivores. He argues that this anxiety is reflected in the growing demand for 'symbols of nature' which he claims are 'a reaction against, the increasingly serious problems we have in *identifying* our food [emphasis in original]' (Fischler 1980: 945). This corresponds to renewed attention being assigned to the categories of purity and pollution, where the food we fear corresponds to the products of industrialised agriculture and food processing, and the category of purity is assigned to the natural and the organic. Accompanying growing awareness and concern with the externalities of industrialised meat production certain social groups select specific organic, and identifiably sustainable, products. Among these groups are those who identify themselves in social media as kangatarians or vegeroos, who eat only kangaroo meat on environmental, ecological, health and humanitarian grounds. Arguably this is a very small group of consumers and for the broader group of consumers an organic product such as kangaroo meat has not been assigned the category of purity.

Advantages of kangaroo meat

In ecological terms, kangaroo has some distinctive advantages over other sources of red meat. This is primarily because kangaroos, like other Australian marsupials, 'emit negligible amounts of methane from enteric fermentation' (Garnaut 2008: 547; Klieve and Ouwkerk 2007). Table 1 provides comparisons of methane emissions between sheep, cattle and kangaroos. This comparison highlights that as a low-emission meat kangaroo represents an excellent option for reducing the climate impacts of grazing systems in the Australian rangelands. Rangeland graziers have very few options to reduce the contribution that sheep and cattle make to greenhouse gas production (Wilson and Edwards 2008). The integration of kangaroo harvesting into pastoral systems in the rangelands has been recognised in climate-change assessments as an important mitigation strategy for Australia. For example in 2008, Ross Garnaut, a leading Australian economist who has led government reviews of climate change, identified the

kangaroo as a ‘source of international comparative advantage for Australian livestock production’ (Garnaut 2008: 547). George Wilson and Melanie Edwards (2008) modelled the potential for kangaroos to replace sheep and cattle for meat production in Australia’s rangelands, where kangaroos are already harvested. They conclude that by 2020 beef cattle and sheep numbers in the rangelands could be reduced by 7 million and 36 million respectively, and that this would create the opportunity for an increase in kangaroo numbers from 34 million today to 240 million by 2020. They estimated that meat production from 175 million kangaroos would be sufficient to replace the forgone lamb and beef meat production, and that meat production from kangaroos would become more profitable than cattle and sheep when emissions permit prices exceed \$40 per tonne CO₂-e. The net reduction in greenhouse gas emissions would be about 16 tonnes CO₂-e per year (Garnaut 2008).

Table 1. Comparison of environmental factors – kangaroo, cattle and sheep

	Body wt (kg) ^{1,6}	Bone out (kg) ¹	Prime meat (% of wt) ¹	Estimated DSE ^{2,7}	DSE per bone out kg	DSE per prime kg	Methane emission (l/day) ^{3,4,5}
Kangaroo	30	12	18.3	0.35	0.03	0.06	negligible
Cattle	400	130	10.0	8	0.06	0.20	100-200, 500
Sheep	33	18		1	0.06		16

Sources. ¹ Personal communication, George R. Wilson (2012); ² Dept. of Sustainability and Environment. Indicator: LD-20 Total grazing pressure relative to net primary productivity; ³ Johnson and Johnson (1995);

⁴ Leuning et al. (1999); ⁵ Vermorel (1997); ⁶ Cooney et al. (2012); ⁷ Munn, et al. (2009)

From the resource demand perspective kangaroo meat also has additional advantages. Table 1 also shows that the grazing pressure per kilogram of boned out meat for kangaroos is half of that exerted by sheep and cattle. In their Indicator LD-20, the Australian State of the Environment Committee (2006) use Dry (non-lactating) Sheep Equivalents (DSE) to measure the grazing pressure exerted by domestic sheep and cattle as well as native and naturalised grazers (such as the kangaroo) (Bureau of Rural Sciences, 2005). The DSE of a kangaroo is estimated to be somewhere between 0.2 and 0.7 of a non-lactating sheep (Grigg 2002), while beef cattle have a DSE of about 8. If only prime cuts are considered the reduction in grazing pressure is even more significant. This means that the kangaroo is much more efficient at converting vegetation into animal protein and this has been recognised for more than 50 years:

Kangaroos are more efficient than sheep or cattle in converting vegetable food to animal protein and their carcasses provide a considerably higher proportion of edible protein in the form of lean muscle (Australian Conservation Foundation 1967: n.p.).

As a consequence kangaroos place less pressure on pasture and water supplies compared with sheep and particularly cattle.

Kangaroos and rangeland biodiversity

Kangaroo populations are native animals that have evolved with the rangeland ecosystems. Any consideration of their role in these ecosystems must give cognisance to how kangaroo population dynamics were altered following European settlement and continue to be influenced by the management of rangeland grazing systems. Understanding these changes is a prerequisite for policy approaches and management strategies to support biodiversity in these rangeland areas. This section briefly describes how these changes have influenced the dynamics of kangaroo populations. Beginning with the first decades of European settlement there were many observers who wrote about the Australian environment; their accounts have provided evidence of changes that suggest that whilst the populations of smaller kangaroos have declined or become extinct since European settlement the large kangaroos appear to have prospered under the new conditions (Jarman 1995). These observations are supported by scientists (Frith 1964; Kirsch and Poole 1972; Pople 2000; Letnic and Crowther 2013) studying the spatial distribution and abundance of kangaroos.

First, it needs to be acknowledged that when the first settlers moved across the Australian landscape they were limited in their awareness that the environment that they encountered had been shaped by the activities of the Aboriginal inhabitants: 'Australia was declared *terra nullius*, a land of no-one, an empty and unutilised land' (Mattingley and Hampton 1988). It can be argued that the main reason for *terra nullius* was to morally justify the taking of the continent. Along with the conceit that the land was empty, as if uninhabited by humans, was an associated lack of recognition that the Aboriginal people were part of creating the biogeography and that they did it purposefully to manage their landscapes for food (Gammage 2011). New settlers aggressively hunted the kangaroo for both food and sport, seemingly indifferent or oblivious to the complexities of land management that supported the wild game. Even when settler demand for kangaroo meat declined, the kangaroos, like other native mammals, were exposed to great hunting pressure to meet the continuing international demand for fur. Once the high quality of kangaroo pelts was evaluated for both fur and leather, they were soon exported in the thousands to meet European demand (Lavery 1985: 11). 'In the three year period from 1919–1921 the furs of 5.8 million Australian mammals were traded' (Hutton and Connors 1999: 42–43). By the 1920s there was a large industry based on the taking of hides. 'Every capital city had a skin market and associated port from which hides were shipped to Europe and North America' (Lavery 1985: 79). Records during this period are incomplete but from 1935 to 1936, it was reported that 1.25 million red kangaroo skins entered the market (Prince 1984). Already in the mid-1800s the unprecedented demand on large kangaroo populations had taken a severe toll on their numbers. In 1841, John Gould, the renowned ornithologist, wrote:

Short-sighted indeed are the Anglo-Australians. Let me urge them to bestir themselves, ere it is too late, to establish laws for the preservation of the large Kangaroos ... without some protection the remnant that is left will soon disappear (cited in Rolls 1994: 28).

Notably when Charles Darwin went to Bathurst eager to hunt kangaroo, no animals could be found for him to pursue. Darwin speculated at the time that the decrease in the numbers of Aboriginal people could be related at least in part to their difficulty in getting food, as they had to wander much more given the impact of settler hunting (Jarman 1995: 6). Alongside the pressures of hunting, kangaroo populations were also being impacted upon by the introduction of domestic livestock. As pastoralism expanded into the rangeland areas in the 1830s, it was reported that wherever 'cattle and sheep reached, kangaroo numbers fell within a few years' (Jarman 1995: 5). As George Macdonald, Commissioner for Crown Lands for New England, reported to the NSW Legislative Council in 1845: 'The introduction of 500,000 sheep into the original hunting grounds of the district has nearly driven the kangaroo, on which the natives formerly subsisted, beyond its boundaries' (cited in McDonald 1994: 117).

Remarkably, despite a lack of effort to address the situation, the large kangaroos survived this onslaught. In turn some of the land management practices introduced by the pastoralists actively benefitted them and their population numbers rebounded.

Everywhere sheep cropped the grass to the after-fire length the Aborigines had so long prepared for them on small areas. And suddenly all predation was lifted. Skin-getters pulled out because they were getting too few skins. Land-holders stopped shooting because the few kangaroos left no longer damaged crops (Rolls 1994: 28).⁶

The result was a population explosion across southern Australia. By the late nineteenth century, kangaroos occurred in very high numbers in most of Australia's pastoral areas. In an 1863 editorial, the newspaper *Borderwatch* warned:

So much have these animals increased in late years that if measures are not speedily taken against them, they threaten to overrun the district. At present they swarm in every part of it. Many sheep farmers believe they have nearly as much kangaroos on their runs as sheep. We should therefore preach a crusade against Kangaroo (*Borderwatch* 1863, cited Domico 1993: 137).

The response of landholders was orchestrated mass culls. Coursing clubs were formed for the sport of hunting them on horseback. 'To aid in the change a special swift running breed of dog with powerful jaws, the kangaroo dog was developed' (Domico 1993: 137).⁷ When this type of

⁶ Dingoes were hunted and poisoned to small numbers across vast areas of southern Australia. In more remote northern areas, they were difficult to exterminate, so late in the nineteenth century, thousands of kilometres of fences were built across Australia to confine them to the north (the dingo-proof fence) (Rolls 1994).

⁷ The hunting of native animals such as kangaroos with sight hounds is now strictly illegal.

recreational hunting could not achieve the level of eradication being sought by landholders the solution was to introduce a technique in Aboriginal hunting called the battue.

It consisted of an organised round up of the quarry into a dead end fence or pit (a technique widely used in pre-agrarian societies, e.g. the Middle East or Canada). Once the kangaroos were contained in this small area then they could be shot or clubbed to death (Domico 1993: 137).

Using this technique extremely large numbers of kangaroos could be killed. On one property in Victoria over a thousand kangaroos were killed in one day by groups of men with dogs herding hundreds of kangaroos into purpose-built winged yards. 'Here the animals were met by horsemen armed with waddies (short clubs) that killed five hundred, retired for refreshment and then killed the rest' (Domico 1993: 138).

Newspapers recorded the yarding of 3,000 on one day at Geelong, 14,000 in two years at 'Outalpa' in South Australia, 16,000 on 'Oulnina', the adjoining station, over 61,000 in twenty months at Gordon Downs in Queensland, 80,000 in a few weeks at Trinkey Station, near Gunnedah. 'It was a systematic attempt at the extermination of the tripod', wrote one journalist (Rolls 1994: 28–29).

Kangaroo culling in the 1800s in South Australia was so extreme that where there used to be thousands of animals roaming the bush around Adelaide, by late that century none were left within hundreds of kilometres of the city (Curtis 2006: 85).

From the late 1800s the categorisation of kangaroo as a pest was enshrined in legislation. Kangaroos were regarded as such a threat to rural livelihoods that the 'State governments of Eastern Australia enacted draconian legislation requiring the destruction of "marsupials" (meaning kangaroos) by all landholders' (Kirkpatrick and Amos 1985: 77). While some level of government protection was afforded to other native animals, up until the 1920s the kangaroo was still deemed a pest to agriculture and unrestricted harvesting continued in most states.⁸ It was reported that in Victoria in the 1860s and New South Wales in the 1870s there were rapid increases in the density of kangaroo populations. Hundreds of thousands of kangaroos were culled, often thousands at a time, many of them in kangaroo drives:

This was the era of the great kangaroo drives, when pastoralists joined with their neighbours to round up and club to death hundreds or even thousands of kangaroos in a day. Barry McDonald (1994) has collected folk-songs about these drives in the New England district; he suggested that the pastoralists in time of need learned some of their driving techniques from Aborigines, the people they had displaced (Jarman 1995: 9).

The Government also provided support for kangaroo culling through bounty systems, for example, in 1884 the Pastures Protection Board at Tamworth reportedly paid bounties on

⁸ The exception to this was in South Australia where, in 1888, a law protecting kangaroos was introduced (Curtis 2006; Domico 1993).

260,780 scalps of large kangaroos (Jarman 1995: 10). But by 1887 the board decided not to pay any more bounties on kangaroo scalps because of the decline in kangaroo numbers. Peter Jarman explains that the decline in both sheep and kangaroo numbers was the result not only of drought, but also of overgrazing. During the drought the sheep stripped pastures until there was nothing left. When the rains did come, despite the death of nearly two thirds of the sheep in NSW, the pasture did not recover because the seeds and rootstock of the plants had been lost and the soil eroded (Jarman 1995).

The historical accounts provide us with evidence that large kangaroo population numbers fluctuated dramatically in the first century of British colonisation. They suggest that there were fewer large kangaroos initially, and that the large kangaroo populations were severely reduced by settler hunting, and then the fur trade. With the introduction of pastoralism, although initially detrimental, key changes in the landscape followed that favoured large kangaroos. There have been several reasons given for why pastoralism favoured the recruitment of large kangaroo populations. First, stock grazing promotes annual grasses that provide additional resources for kangaroos (especially the Eastern Grey Kangaroo (*M. giganteus*) which is a grass specialist) (Dawson et al. 2006: 51). Second, the reduction of the number of dingoes in pastoral areas by widespread baiting (aerial) and the building of the dingo fences encouraged growth in large kangaroo populations (Fleming 2001). Finally, over the last 30–40 years (into the twenty-first century) there has been an obvious expansion of stock watering in order to enable an increase in grazing across rangelands (Dawson et al. 2004). Combined, these factors were understood to have supported kangaroo abundance (Robertson 2003: 167). However environmental scientists investigating the key factors that impact on kangaroo populations have found that ‘the density of artificial watering points’ is a poor predictor of kangaroo abundance (Letnic and Crowther 2013: 761). Instead the research and analysis of macro-ecological patterns suggest that kangaroo abundance is primarily regulated by the presence of dingoes (Letnic and Crowther 2013: 761). However in the absence of dingoes, kangaroo abundance is then regulated by the fluctuations in plant populations in response to rainfall (Pople 2000; Letnic and Crowther 2013: 761).

While many of the larger species survived and benefitted from the changes in land management, the small species of kangaroos did not fare so well. Under British settlement the smaller animals came under sustained attack from introduced predators, such as the fox and domestic cat along with the loss of their habitat. In fact, ‘Between 1920 and 1960 Australia’s rabbit-sized marsupials disappeared from virtually all the sub-tropical mainland, except forested areas in either the far west or the east’ (Jarman 1995: 18). Pastoralism also disadvantaged the smaller kangaroos and other marsupials, that relied on the shrubs and long leaves of deep-rooted native grasses to provide them with cover. Extensive grazing by livestock and the invasion of rangeland areas by the European rabbit left the smaller marsupials without shelter, exposed to both predation and the sun. The result was that smaller bandicoots and wallabies became extinct or their numbers shrunk dramatically. Not only were these species lost but we have also lost the

important relationships that existed within ecosystems between the smaller macropods and the large kangaroos. For example, the now mostly extinct burrowing bettongs were important 'landscape engineers' (Gammage 2011: 114). The loss of the burrowing bettongs in turn changed the landscape for the large kangaroos, because: 'Their digging made Mulga soils friable, fertile and absorbent, which with the bettong seed storing increased the number and diversity of palatable perennials, attracting kangaroos and other grass eaters onto their warrens' (Gammage 2011: 114n61).

The loss of these perennial grasses and shrubs and the continued grazing by livestock led to soil erosion and soil structure decline, and declining productivity. In these new environments abundance of large kangaroos increases pressure on the biomass and condition of pastures (Prowse, Johnson, Cassey, Bradshaw and Brook 2015). Excessive grazing pressure in the rangelands tends to occur episodically in periods of drought (Queensland Department of Natural Resources 1995). In many rangeland areas the size of large kangaroo populations poses a barrier to the reestablishment and survival of smaller species. This is because abundant populations of large kangaroos overgraze areas and plant species on which the smaller kangaroos depend for survival. To optimise biodiversity outcomes, therefore, requires both understanding of the dynamic interrelationships between native species and the knowledge to mitigate the impact of invasive species.

Conservation through sustainable use

For several decades rangeland scientists have championed a role for the kangaroo in food production to promote conservation of biodiversity in rangeland areas (Grigg, Hale and Lunney 1995; Ampt and Baumber 2006; Baumber, Cooney, Ampt and Gepp 2009; Baumber; Ampt 2010). Internationally there are many examples where wildlife populations are part of well-managed, regulated, sustainable use programs and these are regarded as a central platform for conservation practices internationally (Cooney and Edwards 2009). In these commercial wildlife enterprises the land is maintained for wildlife rather than domestic livestock or cropping so there are significant conservation benefits. Examples include red deer in Scotland, bison in North America, springbok in South Africa and moose management in Finland. Since 1987, when the first proposal for 'conservation through sustainable use' was put forward by Gordon Grigg (1987), there have been calls by rangeland scientists to replace sheep in the rangelands with kangaroos (Ampt and Baumber 2010).⁹ The sheep replacement concept does not suggest a complete substitution of sheep or cattle; rather, supplementation with kangaroos has been seen as important to achieving conservation benefits in these areas by creating

⁹ However, it is important to note that Grigg and scientists advocating 'replacement therapy' are specific in targeting the sheep rangelands, where production is about fibre rather than meat.

incentives to protect habitats favoured by kangaroos and other native species, and by improving the responsiveness of rangeland graziers to implement kangaroo culling in times of drought (Cooney et al. 2009).

There are many divergent definitions of sustainable use, both within the International Union for Conservation of Nature (IUCN) and across other broader constituencies. See Cooney (2007) for a review of the concepts, ambiguities and challenges and the policy perspectives in which the term is employed). Conservation of biodiversity is central to the mission of the IUCN, and this body recognises both consumptive and non-consumptive use of biological diversity are fundamental to the economies, cultures, and well-being of all nations and peoples. In their view, 'Use, if sustainable, can serve human needs on an ongoing basis while contributing to the conservation of biological diversity' (Species Survival Commission, IUCN 2000). As Rosie Cooney (2007) notes, definitions can encompass a range of different positions from supporting sustainable use against unsustainable use or sustainable-use approaches to conservation approaches against strict protection approaches. In Australia the arguments for 'conservation through sustainable use' (CSU) made by Peter Ampt and Alex Baumber (2006), Gordon Grigg, Peter Hale and Daniel Lunney (1995) can be described as 'incentive-driven conservation' (Cooney 2007: 17). The Australian government also supports the use of kangaroo populations if it is sustainable to do so, where control of kangaroo populations further broader conservation goals. Kangaroos are commercially harvested on pastoral properties in the rangelands of Queensland, New South Wales and South Australia. The Australian kangaroo industry is regarded as a highly successful model of commercial exploitation of a wild resource, which has received repeated endorsements from a range of independent authorities including the Ecological Society of Australia (2011) and the Wildlife Preservation Society of Australia (2011).

There is, however, a major problem with the current model of CSU in Australia because, while some people are gaining benefit from the use of the kangaroos, they are not the people who have any control over land/resource management. Put simply farmers are responsible for land management, but the property rights regime excludes them from utilising kangaroos as a resource in their production systems thus undermining any local incentives to use to sustainable levels (Cooney 2007: 17). The prevailing harvesting arrangements do not currently provide any financial incentives for landholder involvement, and this is a key barrier to improving the conservation outcomes that the industry could provide (Cooney et al. 2009). Here Cooney makes the argument that the policy settings need to be changed to 'support use where it generates incentives for conservation' (Cooney 2007: 16). As she and her colleagues suggest, 'Although kangaroos are currently commercially harvested in large numbers the option of reducing stock numbers to boost their production relies critically on land holder involvement' (Cooney et al. 2009). Currently, when kangaroo meat is harvested, this is done to reduce grazing pressure in pastoral enterprises. For rangeland graziers the principle reason for culling

kangaroos is not to utilise an important protein source, but to minimise the numbers of kangaroos, so that the land can accommodate more cattle or sheep.

There are a number of alternative models proposed for involving rangeland graziers in the supply chain based on kangaroos remaining a wild, free ranging resource. Approaches designed specifically to include rangeland graziers and provide them with a return include:

- requiring commercial harvesters to pay rangeland graziers for access to their land or to their quota (levied per night or per kangaroo),
- rangeland graziers becoming harvesters themselves, and
- rangeland graziers employing kangaroo managers and collaboration between rangeland graziers and harvesters (including a proposed co-op model) (Cooney et al. 2009: 157).

Some of the proposals are relatively recent, and equally the recent downturn in demand for kangaroo meat means it is difficult to determine at this stage what potential they offer. The barriers for rangeland graziers adopting these alternative models are varied but include:

- the relatively low price of the product (Grigg 2002 cited in Cooney et al. 2009: 284),
- supply chain arrangements mean that it is difficult for the landholder to take payment without reducing the returns for 'the harvesters they rely on to control their kangaroo grazing pressure' (Cooney et al. 2009: 284),
- government regulation of the harvest (Chapman 2003 cited in Cooney et al. 2009: 284), and
- cultural identity of rangeland graziers has been linked with cattle and sheep rather than the management of wildlife (Peace 2011).

Drawing on the research undertaken for this study, Chapter five provides further discussion on landholder interests in relation to the operation of the commercial harvest.

Summary

A native animal, the kangaroo has co-evolved with the native vegetation of the Australian rangelands. While a range of proposals has been developed to ensure that kangaroo harvesting is better integrated with land-management practices to support rangeland ecosystems, none of these proposals has to date been supported by government policy or funding. In this absence a range of other options are being pursued by rangeland graziers who need to manage grazing pressures on their properties in order to ensure the viability of their businesses. These approaches are being taken because of the grazing pressure that large populations of kangaroos are exerting, while, at the same time, the development of opportunities that exist for more sustainable agro-ecological systems involving kangaroo culling and management are being neglected.

Chapter Two

A Value Chain Analysis of Kangaroo Meat: Concept and Method

The mapping and analysis of supply chains in food systems is a widely accepted and applied technique in agrifood scholarship. Value chain analysis has been used as a business management tool to enhance profitability, a practical approach for achieving social goals in international development, and is increasingly being adopted by researchers who are seeking to leverage the supply chain towards healthier eating (Hattersley 2013). Sociologists, anthropologists and geographers have also developed approaches to the study of the evolution, development and spatial impacts of commodities. This includes commodity systems analysis from rural sociology, which concentrates on the impacts on farms and rural communities (Friedland 2001), the commodity circuits approach (Cook and Crang 1996) and the approaches known as global commodity chain studies from economic geography. The first part of this chapter provides an overview of the established forms of value chain analysis used in agrifood studies in order to elaborate a framework for conceptualising activity in the kangaroo commodity chain. It then provides the details of the methods employed in this thesis for the study of the kangaroo commodity chain, including the approach employed in data collection and analysis. It discusses the ethical considerations for the research and provides some comments about the relationship between the research and the interests of stakeholders in the kangaroo industry.

Frameworks for studying the evolution, development and social impacts of commodities

Commodity systems analysis

Taking a political economy approach William Friedland (1984) introduced value chains into agrifood studies with his Commodity Systems Analysis (CSA), which provided a methodology for revealing the social relationships behind the production of single commodities and the social and economic dimensions of industrialised agriculture. CSA involved investigating how technical, natural, political and economic resources are integrated and organised into distinctive sets of social relationships connected with the production and consumption of food commodities (Friedland 2001; Dixon 2002). The CSA model directs attention to:

- production practices,
- grower organisation and organisations,
- labour as a factor of production,
- science production and application, and

- marketing and distribution networks (Dixon 2002: 40).

The advantage of the model is that it provides a framework that disciplines the organisation of data collection for identifying ‘the processes underlying the balance of power [and the creation of value] within a food commodity system’ (Dixon 2002: 39). As a framework CSA has undergone continual revision with new research applications for different empirical questions. For instance Friedland revised the model to recognise the importance of scale both in terms of the spatial dimensions of the commodity system, the intensity of social relationships and ‘how state involvement affects a commodity system’ (Friedland 2001: 97). Jane Dixon (1999a, 1999b) and Donna Wright (2005) also provide methodological approaches that demonstrate that it is necessary for CSA to recognise the importance of consumption-sphere activities. CSA subsequently shifted ‘to follow the commodity through to its final denouement when the commodity is “destroyed” in consumption’ (Friedland 2001: 86). CSA studies have explored the structures and strategies of transnational corporations and their relationship with global power structures. Here the CSA model has been employed by political economists to highlight the governance relationship between individual commodity systems and national and international food markets in order to illustrate trends in corporate governance and global order. For example, in the commodity study on sugar *Sweetness and Power*, Sidney Mintz (1985) looked at how ‘*inside meaning*’ or consumer identity was constructed through the cultural connection with privilege and luxury (Mintz 1985:154); while ‘*outside meaning*’ was embedded in the macro-political economic forces ‘of the British empire and the classes that dictated its policies’ (Mintz 1985: 157). In this study Mintz was able to demonstrate that when inside and outside meanings are joined, powerful connections are created between the food commodity and the global order (McMichael 2000).

CSA theorists have been criticised for dividing the world into the micro and the macro approaches that conceal ‘the interactions among a wide variety of political, economic, social, cultural, technological and natural phenomena’ (Busch and Juska, 1997: 689). The CSA approach was also more broadly critiqued for precluding the agency or transformative power of consumers and privileging production through the schematic frameworks of commodity system analysis (Goodman 2002: 272; Goodman and DuPuis 2002). In response to these critiques CSA was revised to integrate the cultural factors in the construction of economic processes (DuPuis 2002). From the 1990s CSA researchers began to focus on the ‘simultaneous mobilization, and entwining, of culture and economic processes’ (Dixon 1999: 156; Hinde and Dixon 2007: 417). To explore how what is normally classified as ‘economic,’ activities or objects are created from a range of other elements that may include consideration of ‘forms of ostensibly non-economic cultural practice’ (du Gay and Pryke 2002: 5). For example in Dixon’s research on the chicken complex in Australia, a broader analysis is undertaken of the processes of exchanging symbolic value between producers and consumers to illustrate the power relationships implicated in food systems (Dixon 2002).

Commodity cultures

The theories of material culture developed by Arjun Appadurai (1986), Daniel Miller (2005) in the mid-eighties—and utilised by Jane Dixon (2002) and Melanie DuPuis (2002)—were critical in directing commodity studies to the significance of consumption. Theories of material culture emphasise the complexities of the consumption practice, and how meaning is constructed in relation to the social and spatial context in which things are embedded (Warde 2005). The critical focus is the production of knowledge around commodities as they move between the different social contexts of production and consumption. According to Appadurai (1986: 41) the ‘production of knowledge that is read into a commodity’ is always different ‘from the consumption of knowledge that is read from the commodity.’ These differences are a function of the social, spatial and temporal distances between consumers and producers (Appadurai 1986: 41). The cultural perspective on the circulation of commodities in social life is useful for posing questions about value-adding processes. Where does this thing come from? What makes its life more or less valuable? Who makes the value and how does the value of the thing change? (Appadurai 1986). Igor Kopytoff (1986) developed this cultural perspective further by delineating important differences between the *cultural biography* and the *social history* of things. The differences have to do with two kinds of temporality, two forms of class identity, and two levels of social scale. The cultural biography perspective, formulated by Kopytoff, is appropriate to *specific* things, as they move through different hands, contexts and uses, thus accumulating a specific biography, or set of biographies (Appadurai 1986: 34). Kopytoff’s theorisation of the commoditisation of the cultural biography of a thing has been useful for commentators looking at how markets are created for other stigmatised meat products such as meat flaps (Gewertz and Errington 2010). By examining how the kangaroo moves in and out of commodity status we uncover, as Kopytoff (1986) suggested, a moral economy that stands behind the objective economy of visible transactions.

The works of Appadurai and the cultural materialists have been used to examine geographies of consumption associated in an approach known as commodity circuits (Bryant and Goodman 2004; Cook and Crang 1996). Commodity circuits provided a way to attempt to integrate cultural and economic enquiry which moved away from the idea, within CSA, that domains are linear and hierarchal to focus instead on the ‘dynamics of relations between moments of production, circulation and consumption’ (Morris and Kirwan 2010: 133). The aim is to grasp ‘the contextual understandings of the meanings attached to goods in different times, places and phase of commodity circulation’ (Hughes, Wrigley and Buttle 2008: 349). This involves exploring how knowledge of different forms is involved with the creation of space, place and nature (Bryant and Goodman 2004). The commodity cultures approach provides a ‘broad linkage of the concepts and concerns of cultural studies and political economy’ (Goodman and Bryant 2009: 348).

Starting from processes of commoditization and associated narratives of development allows the researcher to go 'forward' into the processes and meanings of consumption as well as 'backwards' along the powerful socio-economic and ecological networks of production and development (Goodman and Bryant 2009: 361).

There are four different types of knowledge associated with commodity circuits: geographical images which link the product to emotion or sensation; realist knowledges about the realities of commodity production; knowledge that is derived from discursive associations between commodity and wider ideas; and debates and knowledge about where and when to eat the food (Crang 1996: 53).

These types of knowledge are employed by the producers in promotional activities and are also utilised by consumers in the acts of consumption (Morris and Kirwan 2010). It is a useful model for the current study because it offers the opportunity to look how individuals in the commodity circuits negotiate both meaning and relationships.

Global commodity chains

The global commodity chain framework, developed by economic geographers to examine industry restructuring in the context of globalisation, is now established across the social sciences (Coe 2012). Like commodity systems analysis, global commodity chain approaches, focus on power from conception to end (Gereffi 1994). These approaches examine which actors have the power in the value chain, to set prices, and control financial, material and human resources (Gereffi and Humphrey, 2005). The framework augments commodity systems analysis by exploring the 'interconnectedness and uneven development of the world economy' (Coe 2012: 389). Global commodity chain research includes a body of work beginning with global commodity chains (GCC) (Gereffi 1994), global value chains (GVC) (Gereffi and Humphrey 2005) and global production networks (GPN) (Henderson et al. 2002). These heuristics all share a common analytic focus on 'the globally coordinated inter-organisational relationships that underpin the production of goods and services, and the power and value dynamics between them' (Coe 2012: 390). There are four generic dimensions common to all global commodity chain analyses, these include: input-output structure; geography; governance; and institutional context (Coe 2012: 390). Governance is understood as the process of setting, communicating, and ensuring compliance, to the parameters of the supply chain that are shared by actors elsewhere in the chain (Gibbon, Bair and Ponte 2008). Understanding the characteristics of lead firms and their role in determining and distributing value across the chain is key to the analysis. The lead firms are multinationals or large retailers usually based in developed countries. These firms 'play a significant role in specifying what is to be produced, how and by whom' (Gereffi et al. 2001: 1). The governance characteristics of GPNs are viewed as contingent and variable over time with production shaped by the wider social and institutional context rather than functional characteristics of the network itself (Coe 2012: 390). More recent applications of the

GVC approach have integrated some of these GPN elements. For example the ‘institutionally enriched’ GVC approach explores the role that institutions have in shaping the value chain (Hattersley 2013). This more recent focus on the mechanisms whereby institutions interact with value chain governance is a critical area for current research. For example Jeff Neilson and Bill Pritchard (2009) included in their analysis of tea and coffee plantations in South India a focus on how the mechanisms of chain governance are counterposed against local institutional forces. Their work highlights that through an iterative nexus, the institutional environment and the value chain governance are continually co-produced.

Conceptualising the kangaroo commodity value chain

Drawing on the insights from commodity cultures and the GVC literature on governance, in particular Neilson and Pritchard’s (2009) contribution, this research applies a value chain analysis to examine the kangaroo meat sector. While kangaroo meat is first and foremost the subject of this value chain analysis, the study also asks what a commodity chain analysis can tell us about sustainable food production. By studying the kangaroo commodity chain this research aims to identify both enablers and barriers to shifting towards a closer association between food production and sustainability in Australia’s rangeland grazing systems. The study undertakes a production-orientated analysis, while there is an attempt to develop the discussion in relation to consumption. This primarily relies upon secondary sources and earlier studies and is historical in orientation.

Method

To reflect the cultural economy embedding of all commodities this study begins with an historical overview of how the culinary position of kangaroo meat has changed since European settlement of Australia began. It then describes the full range of activities from farm to fork that bring the kangaroo product from conception to end use. The steps in this value chain analysis include identifying:

- the key actors in the chain and their activities and relationships within the chain,
- the types of knowledges they employ,
- the organisational, financial, technological and regulatory (dis) incentives to supply and demand, and
- which characteristics and (dis) incentives can be addressed to realign the chain with sustainable food production.

Case study selection

While the harvesting of large macropods occurs in several Australian states, my focus in this research is on the supply chain associated with kangaroo meat obtained from southwest

Queensland. The decision to base the case study around Queensland was because Queensland has the highest number of red kangaroos (which are also regarded as providing the best meat) and the largest harvest of kangaroos. The data collection and research followed the harvesting of kangaroo meat from one locality in southwest Queensland, through production and distribution networks both in Australia and overseas. Below I describe the places and people on this pathway and the rationale for why they were included in the study. Some caution is needed in generalising interpretations from this case study to Australia as a whole. The first is that Queensland, New South Wales, South Australia, West Australia and Tasmania all have different sets of regulations for managing the commercial harvest. The second is that the culinary position of kangaroos is also varied within Australia. South Australia has a much stronger tradition of eating kangaroo; it was legalised in that state first, and there has also been a niche market for the product, which is illustrated by it being sold in the central Adelaide Markets, a key produce market for inner city 'elites,' and the highly successful smallgoods processor Barossa Fine Foods.

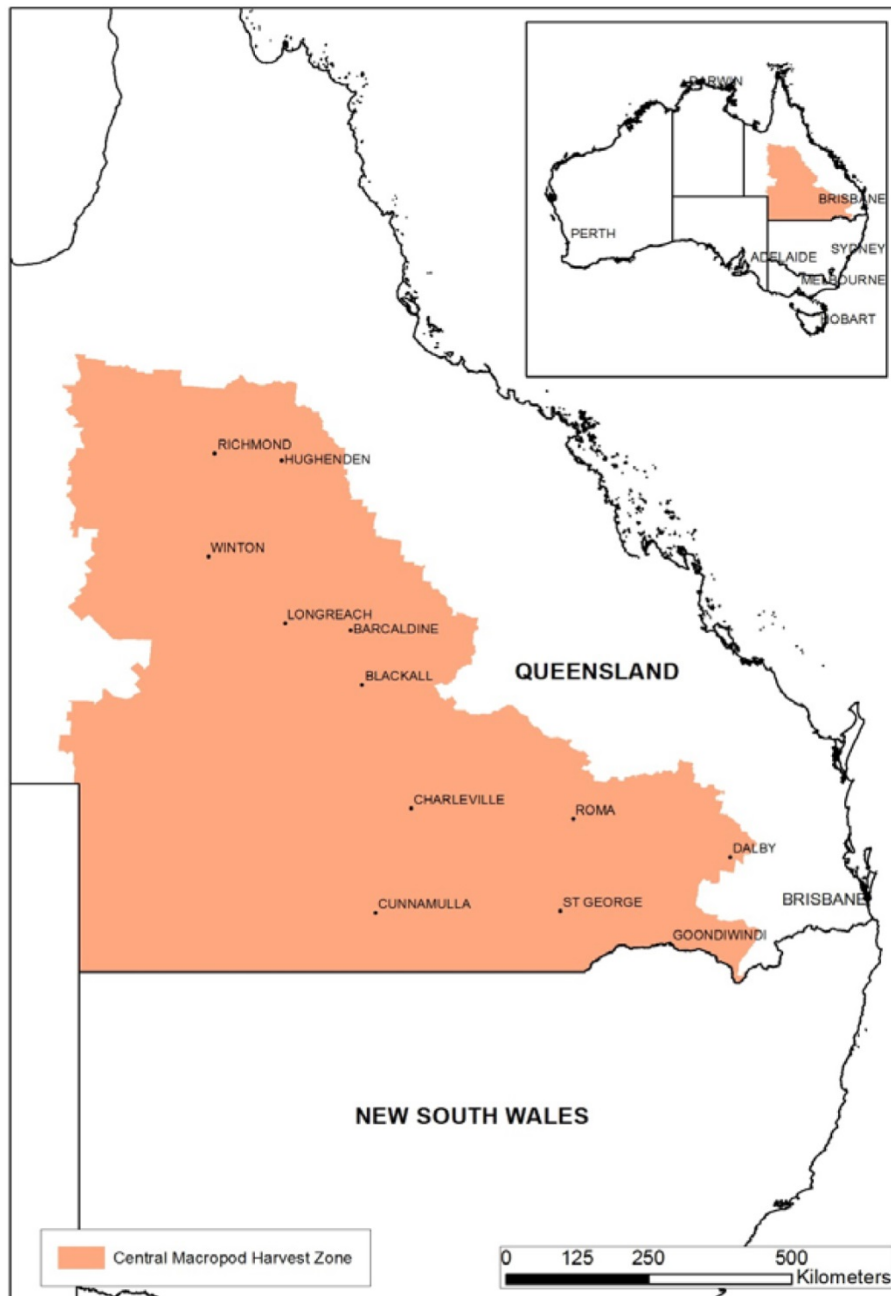
The central harvesting zone

In Queensland harvesting is permitted within defined boundaries, known as the harvesting zones that correspond to the Local Government Area boundaries.¹ The central harvest zone includes the Local Government Areas of Balonne, Barcaldine, Barcoo, Blackall, Tambo, Bulloo, Flinders, Goondiwindi, Longreach, Maranoa, McKinlay, Murweh, Paroo, Quilpie, Richmond, Western Downs and Winton. It also corresponds roughly to the South West Queensland natural resource management area boundaries (see Map 1).

In the heart of the central harvesting zone is Charleville, which is where I stayed during my fieldwork which involved travelling west to grazing properties near Eromanga and Quilpie and then to east Morven and onto Mitchell. Charleville was chosen as a base for the fieldwork because it is typical of many towns where kangaroo harvesting operations are based: land use in the surrounding countryside is predominantly for agriculture, primarily grazing and more residents are employed in agriculture, fishing and forestry than any other industry. From there I interviewed rangeland graziers, harvesters, field depot operators and a meat processor about producing kangaroo meat.

Another reason for selecting this region was the existence of a cooperative established between groups of rangeland graziers who are working with a natural resource manager and a rangeland scientist to implement a collaborative harvesting model to provide high quality kangaroo products to the domestic market.

¹ The zones were revised in 2012 to align with the LGA amalgamations. See Queensland Government. 2016. Harvest quotas and zones. Online: <http://www.qld.gov.au/environment/plants-animals/wildlife-permits/macropods-quotas/> (accessed 13 May 2017).



Map 1. Showing central macropod harvest zone

Source. Designed and made by © Sandra Walpole

Data collection methods

In this study I have attempted to provide a layered and reflexive approach to data collection. I do this primarily by using material from a range of sources, but also by spreading data collection across the supply chain over a two-year period to allow individual experiences being studied to be viewed in terms of processes of change and to bring out discrepancies between ‘normative prescriptions’ and ‘everyday practices’ (Burawoy 1998). The main form of data collection was narrative and semi-structured interviews that allowed for an exploration of people’s interpretations and experiences in relation to the kangaroo. Secondary data sources also

provided important background and contextual information to assist with understanding both the events and people's approaches. This included rangeland science, academic histories as well as internet research, reports from environmental and food advocacy organisations, government reports and policy documents. On the basis of these data collection methods the thesis does not claim to provide a nationwide 360 degree perspective. The small number of interviews that were conducted provides some limited observation of supply chain operations, rather than a comprehensive commodity chain analysis. Nevertheless the material has provided a basis for exploring the utility of the commodity chain analysis in relation to sustainability and for suggesting areas for future investigation.

Interviews

The empirical material presented in the following chapters comes from qualitative interviews conducted with individuals in the kangaroo meat supply chain and other relevant stakeholders. Whilst I was in the field I also made notes which recorded my observations of the events and other features of my experience. These field notes were recorded at the end of each day.

Sampling and recruitment

In-depth interviews were conducted with people who are involved with harvesting and processing kangaroo meat from the southwest Queensland region, and with the distribution of that meat for both domestic and international supply. A purposeful sampling strategy was adopted to ensure that the selected participants in this study strategically illustrate a range of perspectives. The three key participation groups were:

1. Participants in the kangaroo supply networks including:
 - the Kangaroo Industry Association representative,
 - rangeland graziers,
 - harvesters,
 - field depot operators,
 - meat production and processing managers, and
 - distribution network operatives, including meat traders in Australia and overseas.
2. Staff in government agencies with responsibility for regulation and policy in the Queensland State government including:
 - Department of Primary Industries staff, and
 - Department of Environment staff.
3. Knowledge producers, which includes those working towards creating more sustainable food production and provisioning, both in terms of land management for food

production and culinary culture and dietary guidelines. For example participants in this group included:

- scientists concerned with conservation through sustainable use,
- people working in Natural Resource Management in the NGO sector,
- dietary advisors involved with nutritional guidelines, and
- the chief scientist at the RSPCA.

The final sample of 21 semi-structured interviews included four rangeland graziers, three licensed harvesters (including two field depot operators), three meat processors (this included a local processor, a Queensland processor and a South Australian processor), two of these plants had stopped processing kangaroo meat in the last few years, five meat distributors (two in Australia and three in Europe), one smallgoods manufacturer, two scientists, two Queensland government officers and one natural resource manager from a non-government organisation.

Wherever possible, interviewees were chosen to provide information that illustrated a range of situations: in the case of rangeland graziers variety was sought between farm sizes and landscape characteristics, while kangaroo harvesters were chosen to include those who supplied different companies. Meat processors included both a local company and a South Australian company that receives a major share of its product from the area. The major meat processing company in Queensland declined to be interviewed but one of the two companies responsible for their meat distribution participated in the study.

Initial interviewees were identified through internet searches of key industry reports and media articles. Subsequent interviewees were identified through a snowball sampling technique, where initial interviews led to the identification of other key stakeholders for interview. Contact was initially made by phone or email (and no untoward pressure was used to recruit participants). Once contact was made, if tentative interest was indicated, potential participants were emailed an information statement. The information sheet clearly explained the purpose and nature of the research and a request to contact the researcher either by phone, email or letter. A follow-up phone call was made to set dates and times for interview.

The interview process

Because the primary goal of the interviews was to learn about the knowledge, perspectives and values employed by the different actors along the supply chain, I used a semi-structured interviewing technique. Gaining rapport with the interviewee is critical for success when using less structured interviewing. The literature suggests a range of techniques that interviewers can use to build the trust and confidence of interviewees, many of which emphasise aligning oneself in terms of cultural cues with the dress and speech of interviewees (Fontana and Frey 1994). My own approach was to give a very clear account of the goals and motivations that brought me to

this research. Given the range of people I was interviewing and the number of contested issues relating to the production of kangaroo meat, I felt that it was important for the interviewees to have an accurate understanding of what motivated my interest in the research and how I was planning to use the data. Every interview began with an explanation of my interest in the subject and what I hoped to learn through the research. I also provided a brief explanation of what I had learned from my research so far.

Almost all participants were very eager to speak about their role/s in the industry or the issues they have with kangaroo harvesting and production. Some interviewees shared stories of frustration and angst as they retold these experiences. Because I was interviewing people who were at times expressing fierce resentments towards other interviewees, it was very important to ensure that, whilst I might empathise, I refrained from aligning myself with their position. At times this was challenging and at times and I found myself seeking clarification from interviewees to better understand something I had heard in previous interviews.

Participants elected where the interviews took place, and with one exception they were conducted at the person's place of work; for farmers this was also the home. All interviews were recorded and transcribed. Interviews typically took an hour, although some took longer when interviewees included lots of anecdotes to illustrate their answers. At the end of the interview some time was usually spent in informal discussion.

Interview topics

Interviews were wide ranging, but included a focus on the barriers to increasing the value of kangaroo meat and the relationship between current kangaroo harvesting practices and environmental outcomes. The people interviewed were in a range of different roles in the industry, and also included people from outside the industry, because of this diversity the interviews were built around the following generic topics:

- the development of the industry,
- production techniques for kangaroo harvesting, storage, processing,
- knowledge about the distribution and promotion of kangaroo meat products,
- participants' values and motivations; this includes how they differentiate and value kangaroo in relation to different sets of social and or ecological relations,
- key goals (where applicable) that they have now in relation to kangaroo harvesting, processing and/or distribution of kangaroo meat, and the constraints and pressures they face,
- the operation of rules and regulations in relation to ecological systems and product development, and relationships between actors involved in production,

- participants' perceptions of their networks, their positions and their ability to create change,
- cooperation and collaboration within these networks,
- the ways that positions or perspectives have changed over time,
- the effects of their choices,
- what they regard as the most significant factors affecting production and consumption of kangaroo, and
- what the key changes in kangaroo meat networks have been—why have these been significant and what enabled this change to occur?

Data analysis

All interviews were fully transcribed by the researcher, over a period of nine months following the interviews. Both transcripts and notes taken through the interviews were read and re-read through the data collection and interview process.

Early in the data collection process it became apparent that accounts provided by the interviewees relating to different parts of the value chain were representing different but overlapping areas of knowledge. The first step in the data collection process was to build on this pattern. Here I understood the interview data to be representative of different kinds of knowledge sets, historical, ecological, technical and commercial. Overall these knowledge areas, in combination with secondary data sources, provided a basis: for explicating the culinary history of kangaroo meat and the development of the commercial harvest in Chapter three; for developing a description of the structure of the value chain in Chapter four; and for outlining the regulatory frameworks in Chapter six.

In addition to these broad knowledge areas, there were a small group of key concepts and issues that emerged across the interviews. These concepts and issues included: product value, regulatory failure in relation to both product quality and land management, and a lack of cooperation and trust between players within the value chain. As more data was collected these concepts were refined and relationships between these concepts were developed. Initially the transcribed data was analysed using *Nvivo*, to identify themes and relationships.

I then decided to adopt a 'narrative inquiry' approach (Hunter 2010). From this point the analytic process was closely linked to the writing process. I began with two of the key concepts or issues: first the regulatory failures in relation to meat hygiene and sustainable development, and second the value of kangaroo meat. I then adapted a horizontal process of analysis. I wrote up the findings for these themes for all the interviewees using this horizontal process of analysis. This involved writing up a summary of each interviewee's account in relation to the concept, primarily in his/her own language and highlighting key quotes for use in the text of the

thesis. I identified the key elements of these themes and the relationships between them across all the accounts provided. I present my analysis of the material on finding value in Chapter five and the issues raised in relation to regulation in Chapter six.

Issues with mistrust, lack of cooperation and power were additional themes that could have been explored in greater detail, but were not. This decision was made in part because these issues were difficult or even risky to address. It involved analysing data on sensitive topics provided by interviewees about other interviewees, that depicted the later in highly negative ways. I chose not to directly explore these accounts, because I was concerned it would inevitably raise questions about their reliability. Even so some of these issues are interwoven with other issues analysed here and therefore they are represented albeit less directly.

Ethical considerations

The planning, collection and analysis of the data for this study were subject to ethical considerations. This included obtaining approval from the Australian National University Human Research Ethics Committee and implementing a privacy protocol. Informed consent was obtained from all participants and this included making the participants aware that the results of the research would be made available in public documents including academic publications and the researcher's dissertation. I also alerted participants to the possibility that while they would be de-identified in the findings, given the small size of the industry it is possible that someone might be able to attribute comments reported in this research to them. I undertook to provide them with the opportunity to consider their comments in the light of this possibility and to request they are not reported (see Appendix 1).

Chapter Three

A Culinary History of Kangaroo Meat and the Emergence of an Industry

People who came here and caught kangaroos and ate them because that was all there was, they worked out rough ways of cooking it but because it was considered to be poor man's fare, like rabbits in England. They brought rabbits to Australia—underground mutton—but only poor people ate rabbits in Australia, and only poor people ate kangaroos. Because the well to do would eat lamb beef, mutton, so roo was relegated to be dog food and if you were still eating kangaroo you were poor. And because the cooking methods generated for roo were mainly based upon other meats as soon as you could afford to buy the original you automatically went back to it because it was always the original and still the best (Grazier one, South Central Queensland, April 2012).¹

You know—one of my customers is the Australian Embassy, and sometimes I make deliveries to the Ambassador—the two last ambassadors allowed the kangaroo at the table; which was not the case for the former ones. And one day I made the delivery and there were these guards and they asked me what do you have in your bag and they just laughed and said 'you know in Australia we give that to dogs' and I thought that's typical and I have got this picture now. To Australians it's a pet food; and it's a sub class food – like dog, like Aborigine, so this is the image given by this kind of meat and this is probably the main handicap of the meat (European meat wholesaler three, France, August 2012).

In trying to understand why kangaroo has not graced the plates of the average Australian diner more regularly, the need for an historical examination of this commodity is inescapable. How did the present situation come to be? Why did our enthusiastic consumption of kangaroo in the early days of settlement fail to establish kangaroo meat as a national food? This chapter examines the historical life of the kangaroo commodity. It starts with an overview of kangaroo in Australian culinary history, then turns to the emergence of the commercial kangaroo industry and the kangaroo products that have been developed for different markets, both overseas and in Australia. It then looks at what we know about the consumption of kangaroo in Australia since the 1980s.

In this chapter, I rely on the research and analysis of historians who have looked at the changing role of kangaroo in culinary culture during the early years of Australian settlement.² To describe the emergence of the modern kangaroo industry and the uses that kangaroo has had in international markets, I use both reports in the grey literature and the interviews that I conducted for this research with meat processors and traders both in Australia and overseas. I have relied on both my interviews

¹ To protect the privacy of the interviewees I have listed them by location and number.

² This chapter does not discuss the long culinary history that kangaroo has in Aboriginal nations. This is referred to only briefly in Chapter one.

and existing research and media reports to provide an account of more recent consumption. I bring the chapter to a close with a discussion of the dissonance between cultural identity and the consumption of kangaroo in Australia.

Pre-European settlement

For over 40,000 years the kangaroo was an integral part of the economy and culture of Aboriginal Australians (Lourandos 1997). ‘Aboriginal people hunted kangaroo as an important protein source and continue to do so in many parts of the country’ (Thomsen 2007: 2). Through the use of what is now known as ‘firestick farming’—seasonal burning of small areas of vegetation at certain times of the year—Aboriginal Australians encouraged the growth of certain plants to provide food for kangaroos (Archer, Grigg and Flannery 1985). In this sense fire was used as a horticultural tool primarily to create grass but also ‘to promote, protect or restrict plants, or lure game’ (Gammage 2011: 176). Historical records of the early settlers provide a detailed picture of the way in which firestick farming created the landscapes that were found at settlement.

On the Maranoa (Queensland), Mitchell explained that in winter ‘the natives availed themselves of a hot wind to burn as much as they could of the old grass and a prickly weed which, being removed, would admit the growth of a green crop, on which the Kangaroos come and feed and are then more easily got at’ (Gammage 2011: 168n67).

Fire, grass, kangaroos, and human inhabitants all seem dependent on each other for existence in Australia; for any one of these being wanting the others could no longer continue ... But for this simple process, the Australian woods had probably contained as thick a jungle as those of New Zealand or America, instead of ... open forests (Mitchell 1848: ch. 10).

Kangaroos were harvested with spears, sticks, boomerangs and nets. Often people and dingoes (introduced to the continent about 4000 years ago) ambushed them. Skins were used as cloaks and waterbags, sinews for binding, bones for barbs and spear tips and teeth for decoration and ‘a large carcass cooked in an earth pit could provide a feast for a group comprising several families’ (Archer, Grigg and Flannery 1985: 8).

Hunting was regulated through Aboriginal law based on totemism, taboos and prescribed responsibilities—this provided restrictions on where and when hunting and gathering could occur and by whom (Collins, Klomp and Birkhead 1996). A person with a kangaroo or wallaby totem was given responsibility for that animal’s welfare throughout their lifetime (Curtis 2006). Song lines provided important guides for the passing down of knowledge about the totem beings and their ecological associations. In a study of major totem sites along a red kangaroo song line west of Alice Springs, Newsome demonstrated that totem sites coincided ‘with the most favourable habitat for the species’ (Newsome 1980: 332).

Further, whenever the red kangaroo ancestor flew through the sky or went underground, it avoided an unfavourable habitat. No one told Newsome this – his informants invariably spoke in spiritual terms. But they knew: they were describing the land from a red kangaroo viewpoint, and they banned hunting at its major sites. The song line decreed a clear conservation imperative: in bad seasons roo have refuges, but when in good seasons their number build up and some move out, they can be hunted (Gammage 2011: 135).

Through their detailed knowledge, Aboriginal people used fire to work the country managing the vegetation and in turn the animals. Their ecological philosophy underpinned by their spiritual beliefs ‘compelled people to care for all their country’ (Gammage 2011: 135). Through the application of these rules, wildlife utilisation was managed to avoid the tragedy of the commons (Thomsen 2007: 23).

Colonial diets

With the arrival of the first European settlers, the food histories of Aboriginal Australians immediately became entwined with the food histories of the new migrants and everything changed. In the first instance the macropods were of great interest to the Europeans. The diversity of species in the superfamily of *Macropodoidea* enthralled nineteenth-century scientists who collected specimens to send back to Europe for study and exhibition. Kangaroos were different from anything previously seen by Captain Cook’s crew and they were quick to search for comparisons with animals they already knew, such as greyhounds or mice:

One of the first Europeans to see a kangaroo was probably Diego de Prado y Tovar, a Portuguese Mariner who accompanied the explorer Torres after whom the Torres Strait is named. In 1606, Diego and Torres were sailing along the southern coast of New Guinea when a strange animal (possibly a Dusky Pademelon, *Thylogale brunii*) was brought aboard the ship. Inspired by scientific curiosity, Diego commented on the unusual nature of the animal’s tail and testicles, but then, overcome by baser instincts he ate the object of his studies. Yet whatever the sailors called the new-found animals, without exception they ate them! (Jarman 1995: 4).

This first meeting between European and kangaroo was followed by many similar interactions. It seems taxonomy was generally followed by consumption of the newly found animals (Jarman 1995). The settlers in the newly established colonies of Tasmania (Van Diemen’s Land) and New South Wales had a great appetite. Given plentiful references in the accounts of early explorers to both ‘new and unusual kangaroos as well as comments about their culinary nature’ (Archer, Grigg and Flannery 1985: 105). Just about ‘anything that moved was boiled, baked, fried or roasted to see if it would suit European tastes’ (Garden 2005: 75). In the late eighteenth century the kangaroo, along with waterbirds, particularly ducks, were considered the best eating and the kangaroo moved quickly from being an object of scientific interest to a staple food for both the early colonists and explorers

(Domico 1993; Garden 2005: 75). Whilst waiting for domestic stock numbers to build up, hunting kangaroo was popular both for sport and as a source of fresh meat (Garden 2005).

The killing of birds and animals was a traditional part of British culture – for food, because they were ‘pests’, or for pleasure. It was simply accepted that animals and birds were lesser creatures, or had been created by God for human use. In Australia, the colonists continued existing customs of slaughter though at an increased rate because of the different conditions (Garden 2005: 75).

No doubt part of the attraction for consumers was that kangaroo meat was much cheaper than imported salt pork, which was also often an inferior product after months on a ship. In 1796 kangaroo was sold for six pence a pound in Sydney compared with imported salt pork, which cost one shilling per pound (Santich 2009). The popularity of kangaroo meat was not just for those with a restricted budget. Even Governor Arthur Phillip served kangaroo on 4 June 1788 when he celebrated the King’s birthday (Rolls 1994: 28). George Bennett, an English visitor to Australia in the 1830s, described the mass appeal of the kangaroo:

That part of the Kangaroo most esteemed for eating is the loins and the tail, which abounds in gelatine, furnishes an excellent and nourishing soup, the hind legs are coarse, and usually to the share of the dogs. The natives (if they can be said to have a choice) give preference to the head. The flesh of the full-grown animal may be compared to lean beef, and that young to veal ... the colonial dish called a steamer, consists of the flesh of the animal dressed, with slices of ham. The liver when cooked is crisp and dry, and is considered a substitute for bread; but I cannot coincide with this opinion (Bennet 1834 in Jackson and Vernes 2010: 195).

Noting that early recipe books tended to have more recipes for kangaroo than other indigenous animals, Barbara Santich (a leading historian of Australian gastronomy) claims that kangaroo was the preferred choice of game because of its ‘close resemblance to familiar meats,’ such as venison and hare (Santich 2009). Santich described the consumption and cooking of kangaroo in the first century of the colonies as the ‘rise of and demise of the kangaroo steamer’ (Santich 2009: 155). She describes the kangaroo steamer as the ‘antipodean equivalent of “jugged hare”’ (Santich 2009: 158). The recipe for jugged hare dates to 1747, where it is listed in *The Art of Cookery* by Hannah Glasse. Santich reports that the recipe involved diced hare larded with ‘little Slips of Bacon,’ seasoned and placed in an earthenware jug with ‘a blade or two of mace, an onion stuffed with cloves and a bundle of sweet herbs’ (Glasse 1747: 71). The dish was cooked by closing the jug securely then placing it in a pot of boiling water to cook for three hours (Santich 2009). According to Santich, this recipe was ideal for the resources available in the colonies at the time. Kangaroo meat was a perfect substitute for hare, cooked with small quantities of imported bacon over the open fire or at the hearth. First recorded in 1820 along with roo tail soup and kangaroo chops, Santich claims the steamer was eaten throughout most of the nineteenth century at both domestic tables and in hotel dining rooms.

The appetites of early settlers made heavy demands on local kangaroo and wallaby populations. As she explained:

During the first years of settlement in Van Diemen's Land, convicts were issued a ration of 8 lb. of kangaroo meat per week, and in six months the settlers (including convicts) ate 15,000 lb. of kangaroo haunches and tails. Even in the 1840s, kangaroo meat was sold in Hobart when supplies of other fresh meats were scarce (Santich 2009: 117).

Following the expansion of pastoralism, rather than being viewed as a source of food, kangaroos were beginning to be seen as pests that were competition 'to the production of "real" food (mutton) and income' (Santich 2009: 122). Large kangaroos were soon resented for the damage they inflicted on crops and fences and regarded as competitors with domestic stock for precious grass (Domico 1993). No longer valued for food, the image of the kangaroo moved from food resource to nuisance. As beef, pork and mutton became readily available, eating native species largely disappeared (Garden 2005: 75). Once food could be more readily transported across the country by rail, and gas ranges replaced open hearths, the kangaroo steamer and kangaroo meat in general disappeared from Australian kitchens (Santich 2009). Kangaroo meat was replaced by mutton on wealthier farms and an increasingly urbanised population turned to the dainty dishes of French cuisine as the 'epitome of civilised living' (Santich 2009: 119). 'The kangaroo had represented the hardship of the early pioneering. By the mid-1800s eating kangaroo was associated with being a poor farmer' (Domico 1993: 136). Santich argues that as our understanding of what it means to be Australian changed, so did our concept of Australian cuisine. Kangaroo was once incorporated into our culinary culture with pride, as it represented the success of white Australians in living off the land through exploiting natural foods. However it was also closely associated with the hardships of the bush-pioneering days. In the case of the steamer, Santich writes that while the dish had been symbolic of the potential of the land that they were discovering, 'it had facilitated the transition from an old culture to a developing one' and was no longer required when pastoralism was established (Santich 2009: 123).

Here is the clue to the disappearance of the steamer: people no longer valued kangaroo, no longer appreciated the meat. If they went on a hunt it was purely for the sport. History shows that a dish, born out of a certain spirit of place and time, passes away when the environment (cultural and physical) and values that supported it are no longer present (Santich 2009: 122).

The emergence of the commercial industry

Although the demand for kangaroo meat had declined in the late 1800s the kangaroos, like other native mammals, continued to be exposed to great hunting pressure to meet the continuing international demand for fur. 'In the three year period from 1919–1921 the furs of 5.8 million Australian mammals were traded' (Hutton and Connors 1999, cited in Thomsen 2007: 25). By the 1920s there was a large industry based on the taking of hides. 'Every capital city had a skin market

and associated port from which hides were shipped to Europe and North America' (Lavery 1985: 79). Records during this period are incomplete but in Brisbane alone it was estimated that 300,000–400,000 kangaroo skins were sold. By 1935–36, it was reported that 1.25 million red kangaroo skins entered the market (Prince 1984). The main consumer of this raw resource was a specialised kangaroo tanning industry located on the east coast of the United States. For decades the American industry effectively controlled the Australian industry (Livanes 1971: 69). One kangaroo processor reported that for many years the laws in Queensland at the time 'made it virtually impossible for Australian tanners to obtain supplies of Queensland skins unless they obtained them from firms associated with the American tannery industry' (Livanes 1971: 69).

The processing of kangaroos for meat started initially with wholesale butchers stripping the meat from the carcases of the kangaroos left by skinners, to supply local pet shops (Fox 2008 cited in Lunney 2010). In the 1950s local pet food shops were a feature of many small towns in Australia connected with knackeries and they added kangaroo meat to their offerings. These shops had a visibility in country towns that pet food suppliers today do not have in the same way, and they became critical in the creation of associations between pet food and roo meat in the memories of older Australians.

Until the 1950s, trade in kangaroo meat was very slow (Poole et al. 1984). However, the introduction of myxomatosis in the late 1950s and the mass disappearance of rabbits from the landscape provided an opening for more vigorous trade in kangaroo meat (Poole et al. 1984). Up until the introduction of myxomatosis there had been a significant rabbit industry for several decades. The closures in this industry meant that there were a large number of unused chiller boxes in southern inland Australia. 'By the 1950s over 450,000 skins were harvested annually' (Hercocck 2004: 76). In the 1950s kangaroo harvesters began receiving orders for 'roo butts' (the lower half of the carcass which contains most of the kangaroo's muscle) from the wholesale dealers who were looking for alternatives to rabbit. Innovative rabbit industry operators then adapted these chiller boxes for the previously unused meat of kangaroos, a strategy that 'proved highly successful in commercial terms' (Kirkpatrick and Amos 1985: 85).

In these early years kangaroo processing was reported to be 'chaotic' (Fox 2008 cited in Lunney 2010: 389), 'with huge piles of rotting kangaroo torsos by the roadsides.' In the absence of any inspection or certification services provided by the Department of Primary Industry, the quality of the products produced was extremely poor. Firsthand accounts from the time include one where the witness said he saw a load of butts delivered to a premise in West Ryde where they were processed with tomahawks so that the bones broke.³ Then the mutilated butts with the skins still attached were

³ Theo Livanes, the son of a rabbit chiller operator, observed these events (he then told Allen Fox who passed the information to Daniel Lunney, who published it in 2010).

pressed into cartons ready to be frozen before they were shipped to Europe. On another occasion at Bollon in South West Queensland, the same person recalled seeing:

A 12 foot chiller being used to store carcasses direct from the licensed harvester. The roo butts were then skinned and boned on a door laid on two 44-gallon drums, in the open air. The meat was then packed into cartons and returned to the chiller in which carcasses were held (Lunney 2010: 389).

Lunney reports that by the mid-60s the practice of 'butting' the kangaroos was over, and 'the skin was again the most valuable single product' (Lunney 2010: 390). Kangaroo tanneries were then established in Australia and demand for skins was much higher than the demand for meat.

Consequently in these early years of the commercial industry, large amounts of kangaroo meat were left unused. For example, in 1965 'not more than 35.6% of kangaroos harvested were used to produce meat' (Livanes 1971: 70). Even once the meat industry was well established, the profitability of meat processing was dependent on processors selling skins to kangaroo tanneries. So from the early days of the commercial meat industry there was a confluence in economic and cultural values for kangaroo meat. The practices of production were structured around finding markets for an abundant resource, which was a by-product of the fur industry. The low economic value was quickly translated into low cultural value, perpetuated by the practices of production and lack of any visible cultural references in the local markets.

Export trade

From the late 1950s international markets become an integral part of the story of kangaroo meat consumption. Kangaroo meat was produced for export, into markets where the provenance of the meat was ignored in favour of the generic qualities it offered as low fat game meat. The first exports took place for a brief period from 1955–1969. During this time kangaroo meat was exported for human consumption as 'game meat' (Hercocock 200: 76). The quantity of meat and skins exported for the period 1960–61 to 1985–86 are shown in Figure 1 (Kangaroo supply chain) (Hercocock 2004: 76).

At this time the Australian state laws precluded the sale of kangaroo meat for human consumption and there were no regulations to govern the preparation of game meat. It was not until 1981 that regulations governing game-meat processing for export markets were introduced (Woodward 1982). Despite this, in 1956 the first shipment was sent on consignment to England as a substitute for rabbit meat; however it was not able to find a market (Lunney 2010: 388). Later that year a market in West Germany was developed when a trader buying rabbit from a Sydney warehouse saw cases of kangaroo meat and decided he could find a market in Germany (Lunney 2010: 388). From then West Germany began importing kangaroo as game meat for human consumption. Shortly after, kangaroo tails were exported to the USA and the list of countries slowly expanded. In West Germany the kangaroo butts were used initially in the production of baloney. In the USA the tails were used to produce soup. The initial trade to Germany was relatively short-lived because, by 1964, the market

had been lost due to problems with product quality (Lunney 2010: 388; Kirkpatrick and Amos 1985). The German authorities closed the trade because of contamination by plant matter and soil and salmonella infection, brought about by poor standards of processing (Shepherd and Caughley 1987: 209). At this point new regulatory systems were also introduced in order ‘to lift standards in the industry’ (Lunney 2010: 393). As time passed issues with quality followed by attempts to introduce better regulatory controls to improve quality become a repeated theme for the industry (this is discussed further in the next chapter).

In Europe kangaroo was being used to produce baloney by salami- and sausage-makers. It was a cheap meat, and there was no reference to kangaroo in their labelling:

In the 50s and 60s it was not sold as kangaroo in the market over here. And there was a newspaper article and the media picked it up and said kangaroo was being sold here into the market in Europe into sausages and at that point it was not even fit for human consumption in Australia. So they said Australia is sending pet food over here to Europe and we are eating it. So that more or less stopped the product (European meat wholesaler one, Germany, August 2012).

When labelling rules changed, the salami- and sausage-makers stopped using kangaroo because they had to declare it. One of the meat distributors I interviewed in Europe, whose family was selling kangaroo meat into West Germany during this period, said, ‘Given the choice, consumers didn’t want it’ (European meat wholesaler one).

Assimilation of kangaroo into international culinary traditions and tastes

After several years, exports to Europe resumed and since then kangaroo meat has been sold into restaurants across Northern and Eastern Europe and served in various game dishes. Some kangaroo has also been sold through the major supermarkets in Germany and Belgium. The most widely eaten dish—wild game goulash—is a traditional dish in many European countries. It is served with a brown sauce, potatoes and cabbage. The dish is a mixture of two or three species: typically 90 per cent kangaroo meat and 10 per cent deer (venison). It is eaten mainly during winter, ‘when people know it’s getting colder outside and they are looking for heavy meals – traditionally that’s when game is available and that carries on until February’ (European meat wholesaler one). This dish is very popular and widely available and sometimes consumers are offered a choice between game species including kangaroo. In Europe, game meat traders use their knowledge of local traditions and taste to match the product with local cuisine. In the words of one wholesale meat trader:

To sell kangaroo it has been important to make a regional approach because all regions have their own specificity; you can’t talk really about French cuisine, but need to think more about local cuisine. For example there is someone in France doing a kangaroo salami and they sell it very well in the centre of France. And in Corsica it is a red dry sausage they make it with donkeys and pork and wild pig and kangaroo ... My customers were 60–70 per cent women, the ones buying through the internet were

women. So I began asking and they responded, 'Well my father or my husband was or is a hunter,' so they wanted to try another meat. So it's very cultural and involved with past practices (European meat wholesaler three, France, August 2012).

South Africa also replaces kangaroo for other game meats. It is produced to meet the local preferences for a pink sausage like a luncheon or Mortadella, and also used in Boerewors.

The South African sausage is very, very lean and they put antelope in that, they put everything in that and that's what the locals like. It's extremely lean, it would be a lot leaner than our sausages and it actually has pieces of meat in it (Australian meat wholesaler and processor four, Brisbane, April 2012).

According to the Australian meat processors and traders interviewed, the key to the interest in kangaroo meat is the skills and knowledge of the producers of smallgoods. This Australian meat trader describes the production of goods using kangaroo by processors of smallgoods in South Africa:

The majority of the people who own them [smallgoods processing companies] are old Europeans, the Germans and Dutch and there is one big one in Cape Town, he is Portuguese. So they actually know more about small goods than the people here, they make much better small goods than we get in Australia much, much better. So they know how to use it, they are used to using water buffalo and it's a bit similar. Like for them it's just another game meat. So it goes in with all the other game meat, the buffalo, the antelope and it's really nice actually – I have eaten it quite regularly when I go over there. But it's quite spicy so you wouldn't know what's in it and they don't tell you. It's got a lot of nutmeg in it. But it's lovely (Meat wholesaler and processor four, Brisbane, April 2012).

Another Australian trader reflected on the Russian market thus:

The highest consumption kangaroo meat per capita reached was through the sausage makers of Eastern Russia. The first shipments of kangaroo meat to Russia were in 1998 and very quickly Russian markets expanded exponentially to become the major consumer of kangaroo manufacturing meat. This was a period of Russia being deep in recession and with the Soviet Union basically falling apart and in the eastern part of Russia they had a problem producing enough meat protein domestically so they were reliant on imports and the market was starved for protein. Kangaroo meat could be obtained very, very, very inexpensively compared to beef of a similar quality (Meat trader one, phone interview, July 2012).

Kangaroo meat was sold mainly into Primorye and distributed in the Far East of Russia (Kolchina 2009 in Samoylov 2010: 28; KP-Vladivostok 2005). Between 2001 and 2008 Russia was importing up to 20,000 kilograms per annum of kangaroo meat to create sausages. There are over 110 varieties of sausage in the Russian market, and they used kangaroo to make:

a Berliner type of a large sausage or they made Frankfurters, with a relatively low fat content and it was non-smoked. Like an American hot-dog type of thing; it is an ideal raw material for that product. They sold it through shops and they sold it through canteens – there would not be a school or a university or an institute that doesn't have a canteen of some description and this was the type of cheap product that everybody eats in Russia. It is a big deal; it is almost a staple of life (Meat trader one, phone interview, July 2012).

Russian officials regarded the product favourably because it did not compete directly with locally produced meats (Bakharev 2009 in Samoylov 2010: 28). The market was restricted to eastern Russia for a number of reasons relating to scale and freight costs.

It only went to Eastern Russia because the freight component added 30 cents a kilo to get it across Russia. There is also a lot of cheap beef that comes out of Western Europe and a strong lobby group that maintains the beef supply and puts a block on other options. The other reason is that the factories in Eastern Russia are small compared to the factories in Western Russia. The kangaroo industry can't supply a large enough volume under contract to those really big ones in Western Russia for them to warrant doing it because they have to change their recipe and a different type of sausage to use a different type of meat and things like beef are the only meat that can supply the numbers they require of silversides or shoulders or whatever cut it is – that's the other main reason why it hasn't taken off in Western Russia (Meat trader one, phone interview, July 2012).

Although some overseas consumers made the choice to eat kangaroo, it seems many consumers believed they were eating something else. In 1981, the discovery of horse and kangaroo meat in boneless beef packs exported to the USA instigated a Royal Commission into meat substitution in Victoria by Justice Woodward. The commission found that in many US markets consumers were unaware not only that they had been eating meat produced for pet food but that this meat was kangaroo (Woodward 1982: 169).

The invisibility of kangaroo meat emerged as a key theme in several of the interviews conducted with meat processors and traders both in Australia and Europe. It was stated repeatedly that kangaroo meat has been substituted for other meats without the knowledge of the consumer. In some countries this is permitted, for example in South Africa it is used in sausages and meat rolls but 'It's not sold as roo though. In South Africa as long as something is fresh you don't have to have a label, so you find the roo meat will end up in the Boerewors' (Meat wholesaler and processor four, Brisbane, April 2012).

On the other hand in Europe, where labelling requirements were introduced in the 1960s requiring product labels to state contents, it appears opportunities have emerged to circumvent these requirements through the restaurant trade. Because restaurant food does not come packaged, there is an opportunity to substitute a product of similar quality for a more expensive cut. Traders reported that many consumers, particularly in Eastern Europe, do not necessarily know that they are eating kangaroo when they consume dishes like wild game goulash. This typically provides a cost advantage for the importing meat trader and at the same time the Australian exporter receives a higher price than they would on the domestic Australian market.

European meat processor and wholesaler (B): Kangaroo meat is still used as a goulash in certain countries. They get blocks of meat put it through a dicer and they are making cubes of it and they sell it as goulash, mostly in Eastern Europe.

European meat processor and wholesaler (A): But not as kangaroo meat.

European meat processor and wholesaler (B): No, no, no, they use 90% kangaroo meat and then they put 10% of deer and they sell it as deer goulash or as wild goulash. So people don't know they eat kangaroo, people don't know at all. And why do they use this kangaroo meat in this game goulash? Because it is so much cheaper; it's all about price. But people are not aware that they are eating this cheap meat that is also good. Actually it is good meat. But they don't know, they think they eat deer (Belgium, August 2012).

The experience of Russian consumers was also less than transparent. In around 2005 it was reported in the media that the sausage producers in the Far East of Russia were using kangaroo meat as a substitute for the more expensive beef (KP-Vladivostok 2005). 'In an apparent contravention of the law, it was revealed that smallgoods' labels did not contain information on the use of kangaroo meat' (Samoylov 2010: 28). However, as one of the Australian meat processors explained, although the product initially was not labelled and people were unaware that they were eating kangaroo, the smallgoods producers eventually made this clear. Then Russian consumers were apparently willing to accept kangaroo as an ingredient because the product was good.

Interviewer: With the Russian market, were the people buying the sausages aware that they were eating kangaroo?

Meat trader one: Eventually they were.

Interviewer: So at the beginning they weren't?

Meat trader one: No.

Interviewer: How did they become aware?

Meat trader one: The newspapers.

Interviewer: And what were they prompted by?

Meat trader one: Human-interest stories – you know – things like that. I don't think the reaction was a negative one. It may not have been a hugely positive one, but most people accepted they had been eating it and they liked it and the product was good. I don't think it impacted adversely. And you see Russian labelling laws are very, very opaque; you know, difficult to understand and people don't adhere to them. And besides, it really wasn't our problem and rightly we don't get involved in that part (Phone interview, July 2012).

Game meat traders in Australia who were interviewed did not consider it is necessarily their responsibility whether game meat dealers or retail outlets overseas correctly label the product as kangaroo. For example, kangaroo tail can be used in Chinese and Korean recipes for ox tail soup.

The Chinese make a nice soup out of the bone ends. It's in China now, it gets smuggled in, legally you are not allowed to see it there yet – when that happens it will be a potentially big market but they have been talking about it a lot ... They [Chinese consumers] love the bone end type of product. Looking at beef and kangaroo tails – they are very similar but there is probably more meat on kangaroo. But with

this here they are all joined by cartilage and so if you get a knife you can actually just cut them in pieces and that's what they do, throw them in their stews and that's how they do it with beef tails (Wholesaler and processor four, Brisbane, April 2012).

This product currently arrives in China by what is referred to as the 'grey market.' These tails go first to places like Thailand, Vietnam and Hong Kong before being repacked and sent to China. 'Kangaroo is still sent as meat, but that meat may not be identified as kangaroo' (Manager of the Macropod Business Centre, April 2012). I witnessed this firsthand. During one interview a Queensland meat wholesaler indicated that if I waited a little longer I could meet a buyer from Hong Kong but that they understood the final destination was to be China.

Queensland wholesaler and processor four (b): The Chinese client is coming in in about twenty minutes. We are selling him some tails, and it is going into Hong Kong but it will end up in China. He is picking up the documents; the container is in Hong Kong now. The restaurants are using it for ox tail soup. We can legally sell to Hong Kong; that's all we need to know. After that if they want to shift it on, it's not our concern. They eat a lot of beef tails in Northern China and Korea ... so these are just a substitute for beef tails (Brisbane, April 2012).

The trader explained that in the case of China the issue is not that they expect there will be an aversion to eating kangaroo. On the contrary, from their knowledge and experience they foresee that Chinese consumers would be willing to accept this substitution and they have seen strong interest in kangaroo products from Chinese consumers.

Wholesaler and processor four (a): The Chinese are a bit different. They think there are some powerful qualities of the kangaroo in the food that they should have that will make them extra horny. We used to do kangaroo powders – we still sell it to a company that makes powder. They dry it, and it goes into a tablet for virility ... The issue with labelling in this case is that it is being imported illegally and therefore cannot be identified as kangaroo (Brisbane, April 2012).

One country where kangaroo is delivered under the correct label is Papua New Guinea (PNG). PNG, which is just to the north of Australia, is another small but established market for kangaroo manufacturing meat. Consumers in PNG are familiar with kangaroos because they have tree kangaroos (there are several species, almost all under threat of extinction as a result of hunting). 'They use the meat in their variation of sausages, which is more a precooked saveloy up there. But once again it's a product that they are used to handling; the locals know what to do with it' (Wholesaler and processor four (a)).

National identity and eco-conscious consumers: The re-emergence of kangaroo on the domestic plate

In 1980 the South Australian government was persuaded to change the law and allow human consumption of kangaroo; and it became available in all states from 1993 (Jackson and Vernes 2010).

To begin with it was a very small market that grew slowly. When human consumption became legal in Victoria and Queensland in 1996, domestic consumption began to steadily increase as kangaroo steaks and other kangaroo meat products became available in supermarkets of cities across Australia. According to the meat processors I interviewed, restaurants were the key pathways for increasing the numbers of people being introduced to kangaroo. During this period, along with kangaroo there was a broader re-emergence of indigenous animals in Australian culinary culture. Celebrity chefs and food writers promoted emu and crocodile, but most particularly kangaroo, as being part of a distinctively Australian culinary culture linked to our national identity.

The celebration of indigenous meats in culinary culture in the 1980s and 90s can be seen as indicative of a change in the central discourses, which determine how Australian animals are understood and treated. According to Adrian Franklin, a leading environmental sociologist in Australia, a shift occurred in Australian culture, which saw a move away from the prevailing aesthetic derived from the English landscape that devalued Australia's natural resources and indigenous animals, to a re-evaluation of what the uniqueness of this place says about who we are (Franklin 1996: 45). Franklin describes this as a shift from a time in which 'Indigenous Australian animals were both exploited and loathed, to the period where our identification with the unique Australian biota has been part of Australia's process of separating from our British heritage' (Franklin 1996: 45). Andrew Lattas (1997) points to the way Australians have sought to construct a national identity from the uniqueness of the Australian flora and fauna. Franklin argues this symbolism provides a way for us to anchor our identity to place, with a link between 'good citizenship and conservation-mindedness' (Franklin 1996: 49). Working in the ecological humanities, Charlotte Craw has explored nationalism in relation to indigenous native foods and suggests that the narrative of kangaroo consumption contributes to building our national identity. Craw argues that statements like the one below from a leading Australian celebrity chef and cookery book writer, Stephanie Alexander, are part of our postcolonial settler society anxieties around belonging and identity: prompting us to use native foods to define a dish as Australian and and create our identity as Australians (Craw 2008:).

However the use of ecological rationales to legitimate and motivate consumption of kangaroo have been critiqued for failing to ask important questions about 'what it might mean to belong, and whom "here" might belong to' (Craw 2008: 92). In this regard, current narratives about eating kangaroo can be regarded as failing to acknowledge Aboriginal Australians or represent their perspectives (Craw 2008). This failure overlooks the lack of participation by Aboriginal people in the harvesting of kangaroos, and the place-based rules and management practices through which Aboriginal people were connected to kangaroo populations.

This national symbolism is clearly present in the way the food media and our national institutions promote kangaroo meat as part of our culinary culture and in the placement of indigenous meats on the menus in tourist venues. The Australian Government continues to work in partnership with the

Kangaroo Industry Association of Australia to sponsor ‘tasting events,’ where kangaroo is pitched to invited media. The burgeoning Australian food media outlets also continue to feature well-known Australian chefs and food writers championing the tastes and qualities of kangaroo. Nevertheless, as the head chef, Nick Filsell, of Red Ochre Grill, an Adelaide restaurant that specialises in indigenous foods, explains. ‘Kangaroo is a bit of a novelty meat, like crocodile and emu. Most local people wouldn’t have it at home’ (Dunlop 2013: n.p.). The majority of customers in Red Ochre Grill are tourists and other out-of-town visitors. The socially produced meaning of kangaroo eating here is about newness, difference, and an independent Australia. It seems that in these instances eating kangaroo becomes more like performance—without foundations in everyday practice. While in the early days of settlement kangaroo found its place as part of the steamer, in contemporary society it has not attached itself into any particular dish or occasion. This remains a missing link to a cultural dimension for kangaroo consumption.

Without a culinary practice that attaches meanings and value to the meat, kangaroo is likely to remain unfamiliar. The largest published study of consumers’ responses to kangaroo supported this proposition. The main barrier to eating kangaroo cited by survey respondents was that they believed kangaroo had a ‘lack of normality as a meat for regular human consumption’ (Ampt and Owen 2008: iii). It remains the case that today most people in Australia do not eat kangaroo or regard it as a main staple. You can also see that this lack of familiarity, in terms of taste and smell, cooking methods and acculturation, means kangaroo meat resists the processes of commodity fetishisms, which dissociates the meat product from the living animal and provides that void in meaning that allows us to associate meat with cultural practices and symbols. It is this unfamiliarity that makes people stop and think and reflect on the product and then pause for thought. They consider what they are eating, which then tends to highlight both the picture of the kangaroo that they hold and the process of death and dismemberment.

There are a number of other factors that confront those seeking to position kangaroo as a culinary symbol of Australian national identity. For many people *Skippy* is the reason—the connection to kangaroos as a pet or friend like creature. For others it is the position of kangaroo in the national emblem.⁴ Then there are objections raised about the taste, smell, and challenges in cooking kangaroo.

Iconic status of kangaroo in animal liberation movement

Where identity politics has played a role in the fortunes of the industry is in relation to animal rights activism. The kangaroo has been and remains an important icon for the animal liberation movement and the commercial harvest has been the target of a number of animal rights campaigns, both in

⁴ Australia is not the only nation where citizens eat its national symbol; other examples include Botswana, Eritrea, Solomon Islands, Grenada and Peru.

Australia and overseas (Thomsen 2007: 38; Lien 2004). As a result of these campaigns, markets for kangaroo products to Britain, Europe and the United States have been closed on a number of occasions. Probably the most significant instance in terms of market access occurred in the USA, where a media campaign was launched against the import of kangaroo products in the mid sixties. The crucial article was a piece that appeared in the American journal *Sports Illustrated* (Kraft 1965) entitled ‘Goodby [*sic*], kangaroos.’ In the article the reporter described desolate landscapes in the inland of Australia devoid of any visible presence of kangaroos and also portrayed kangaroo harvesting as depraved and contemptible: ‘But the most spectacular Australian crime against wildlife, the one for which all Australians will be judged most harshly by present and future generations, is the mass murder of its kangaroos’ (Kraft 1965: 78).

The key tenet of the article and subsequent lobbying was that the commercial harvest threatened kangaroos with imminent extinction. On the basis of these concerns, in 1971, California, which is a major market for kangaroo products (particularly leather), placed a ban on kangaroo imports. In 2007 a moratorium on the ban allowed imports to resume; the future of this market is currently under consideration by US policy makers. The arguments made by those groups lobbying against the continuation of imports are still based on the notion that kangaroos are endangered. For example in a recent report in the Californian press, a representative from the Humane Society of America told the reporter: ‘There’s mounting evidence that kangaroo populations are crashing’ (White 2015: 1).

This report supports the perspective of my interviewees who believe that these campaigns have been highly effective in creating the perception in America that kangaroos are a threatened species. ‘They have done a great job there – a lot of people I have spoken to think kangaroos are as rare as koalas’ (Wholesaler and processor four (b), Brisbane, April 2012).

Scholars have also noted that efforts made by animal rights groups against the commodification of kangaroo typically draw on images of kangaroos that have resemblances to humans, for example their upright position and the pouch of the female kangaroo. These references are then used to portray adult kangaroos as a protective and caring (Lien 2004). This perception is supported through images of kangaroos in children’s literature (e.g., *Dot and the Kangaroo*) and television (e.g., *Skippy*) that depict the kangaroo as an intelligent, caring and loyal friend who deserves the same status and rights as humans (Lien 2004: 184–86). A campaign using this image by the animal rights group Viva was highly successful in removing ‘roo’ meat from the British supermarket shelf in 1999. Then in 2002 Viva launched another campaign, this time against Adidas to stop them using kangaroo leather. In 2006 football hero David Beckham, who was paid millions of pounds to promote Adidas products, announced he had changed to synthetics after years of wearing kangaroo football boots. At the time PETA reported: ‘David switched to a synthetic model after watching a video of baby kangaroos being ripped out of their mothers’ pouches and beaten to death’ (PETA 2007). Adidas and Nike moved away from the leather as a result of the adverse publicity they received from a campaign by animal

rights activists, although they actually only ceased their use of kangaroo for a brief period. According to representatives of the kangaroo tanneries, 'Adidas is now totally back in it' and Nike is also proactively developing kangaroo leather products because 'essentially their consumers want it' (Leather producer, phone interview, May 2015).

There are a number of observations that have been made about animal rights activism in relation to kangaroo. The first is, as Marianne Lien (2004) observed, that none of the major campaigns have been mobilised directly against the kangaroo industry. Instead, transnational corporations (supermarkets, airlines and shoe manufacturers) have been the main targets of the campaigns. Lien argues that a critical aspect of success for these campaigns is that they provide an experience of victory for consumers against transnational companies. Because selling kangaroo products is not an essential part of their business, 'a corporate decision to comply with the campaigners' demands can be made at a low cost, or even represent an opportunity for boosting the company's image' (Lien 2004: 191).

It was mentioned by several interviewees that campaigns to oppose kangaroo harvesting typically generate high levels of financial support for animal rights agencies. They pointed out that this ability to attract financial support has allowed the movement to prosecute the industry through the courts, maintain an active presence lobbying politicians and corporate actors and lead the debate in academic forums (for example, see the privately funded Think Tank for Kangaroos (THINKK), University of Technology Sydney).⁵

Product marketing and acceptance

Within the kangaroo industry it is a well-established truth that 'the animal liberation movement has always been a problem for the industry and still remains one' (Meat trader one, phone interview, July 2012). Interviewees also reported that over time the challenge presented by the animal rights lobby has evolved. Twenty years ago the environmental benefits of kangaroo meat were less widely known and there was less public acceptance. Today, although there is more knowledge about and acceptance for the product, there is a perception that the animal liberation movement is possibly a little more aggressive towards the industry than it was 15 years ago. Meat processors, traders and harvesters interviewed for this research reported they have been the subject of attacks in the media which question their character and morality, and they are the target of hate mail which is often abusive and threatening. So there is a very high level of awareness of the arguments that are made by the lobby and across the whole industry.

The central tactic adopted by the kangaroo industry to respond has been a defensive strategy designed to meet the concerns elicited by animal rights campaigners amongst government agencies involved in

⁵ *THINKK: The Think Tank for Kangaroos*, University of Technology Sydney. Online: <http://thinkkangaroos.uts.edu.au> (accessed 9 May 2017).

negotiating market access, the buying agents of major supermarket chains and other traders in overseas markets. On occasions the KIAA organises public relations exercises designed to demonstrate that the killing and processing of kangaroos is humane and sanitary, whilst also providing information about the sustainability of the commercial harvest.

They report that the difficulty is that defending the techniques they use to slaughter kangaroos has not always been effective in developing public acceptance for kangaroo meat. As Adrian Peace noted, the evidence is that these exercises seem to bring more controversy rather than less (Peace 2011). When these exercises bring the direct evidence of hunting and butchery to the public eye this challenges the consumer's connection not just with kangaroo consumption but also with meat eating more broadly. As Stephen Mennell observed, even among people who eat meat there is a feeling of repugnance around the killing of animals for food based on its 'uncivilised nature' (Mennell 1985: 307). The result is that there has been little money invested in marketing kangaroo meat (and this also relates to the lack of alignment of interests in the sector, as Chapter 6 discusses in further detail).

Summary

The chapter has traced the rise and fall of the kangaroo within Australia's culinary culture over the last 250 years. This material demonstrates that despite the image of kangaroo meat as a marginal or unfamiliar food, it is widely consumed unwittingly through the circuits of international game meat markets. In many cases kangaroo meat is simply a cheap substitute. Game meat traders have found value for kangaroo in its ability to replace other meats for cooking dishes that are known and accepted. Whether domestically, or in international markets, the kangaroo is rarely valued for its own qualities. Despite the low cultural value that the product has in international markets, these markets along with the leather markets have determined the arrangements of the commercial kangaroo industry.

There has however been some change in the domestic situation over recent years. At the end of the twentieth century kangaroo re-emerged onto restaurant plates and supermarket shelves. There is a growing number of people who make the choice to eat kangaroo because they are informed about its superior ecological adaptation to the Australian landscape, and some even elect to be Vegeroos or Kangatarians. It remains unclear as to whether this consumption celebrates consumer choice of novel foods or whether it demonstrates a connection with local food systems and ecologies.

Chapter Four

The Kangaroo Commodity Chain

In this chapter I will describe the key players in the kangaroo commodity chain, and the processes involved in producing and distributing kangaroo meat. Although standards may have been improved and new technology introduced for producing kangaroo meat, I discovered that the steps in the process have essentially not changed since the industry was first developed. The process starts with harvest in the field, followed by transportation to a field depot, where cold storage is provided until there are enough carcasses for a truck to collect and transport the load to the factory for processing. Together with meat traders, the processors then organise the distribution of kangaroo meat into both domestic and overseas markets for both human and animal consumption. My overview of industry operations is based on information provided by individuals in the kangaroo commodity chain who were interviewed for the purposes of this thesis. Additional sources included industry and media reports and information from government documents and websites. From these accounts, I provide a description of the steps involved in producing kangaroo meat and the challenges that are presented for different players in this network

The key actors in the chain

I begin here with a description of the central players. The present-day kangaroo commodity chain includes rangeland graziers, licensed harvesters or harvesters, field depot operators, meat processors, tanners and fur processors, meat merchants, and canners and manufacturers of kangaroo products (primarily skin products but also some smallgoods: sausage and salami). Transportation is also a feature of the supply chain, with kangaroo from South West Queensland shipped to South Australia—home to Macro Meats, the biggest processor supplying in the domestic market—from where meat products are then shipped across the country and the globe. At the end of the meat supply chain there are delicatessens, stall owners at local markets, restaurants and the big retailers who all sell directly to the consumer. Figure 1 provides an overview of the kangaroo supply chain.

Kangaroo meat processors are the dominant actors in the chain and the characteristics of the processors and the changes that have been occurring within this group provide an important context for understanding the operation of the supply chain. The number of processors and the size of their enterprises have been continually changing as the industry develops. In the early decades, there was a small group of small to medium-sized businesses involved in the processing of kangaroo meat. Alongside that group were several small processors scattered through rural towns. These small operators would, in turn, sell to the bigger players. A key industry player in the 1990s was Wild Game Resources, during this period many of the smaller

processing plants operating in Queensland either delivered to Wild Game Resources, or supplied pet food companies or greyhound owners. When the Russian market came online between 1998 and 2008, the industry experienced a boom period because of the higher price that this market paid for kangaroo meat for manufacturing. As a result, several of the smaller companies could elevate their operations and start exporting. This required that processors had large pools of cash in reserve, because they needed to cover the costs from delivery at the field depot, then processing costs, and shipping to the overseas port before receiving payment. Processors also needed to have the funds to cover the costs if traders chose not to buy containers.

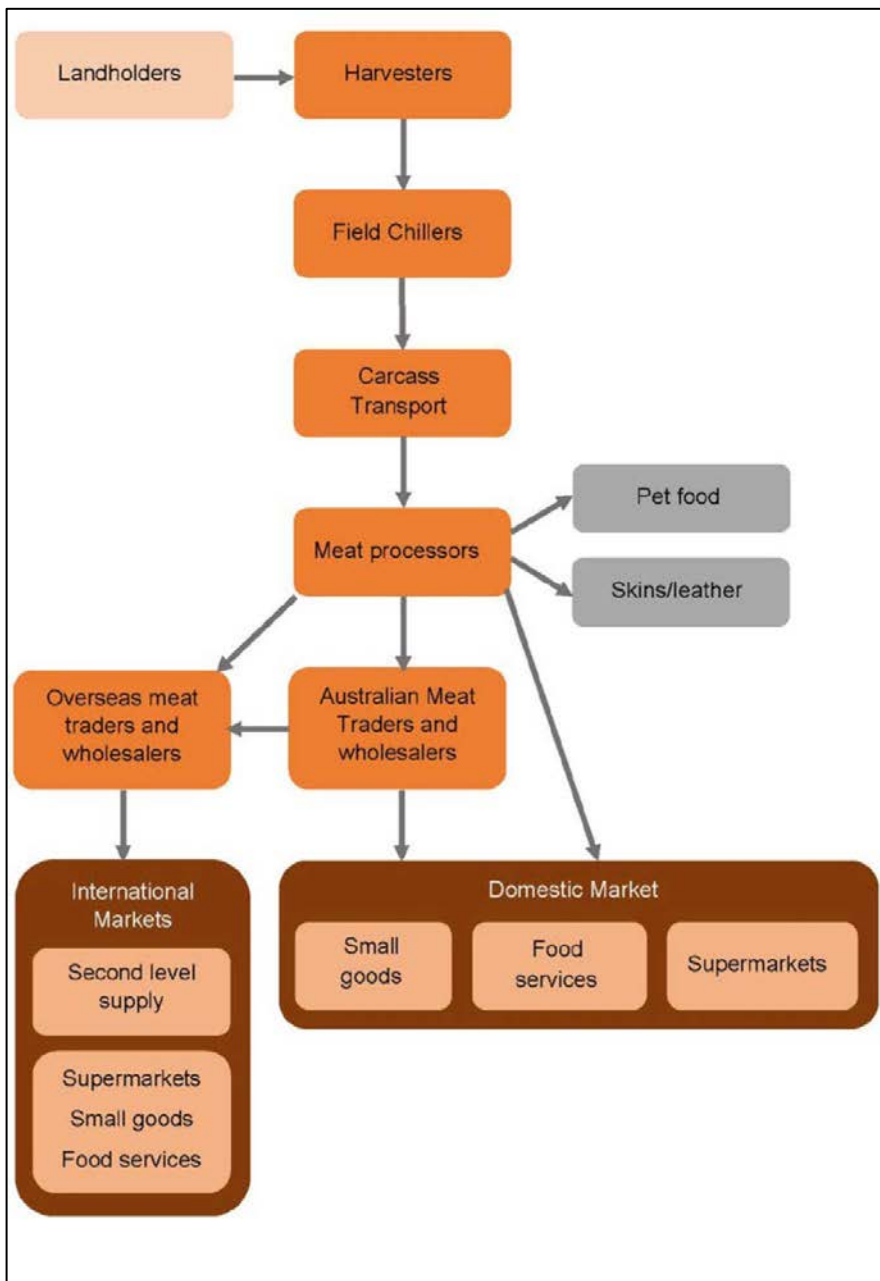


Figure 1. Kangaroo supply chain

Source. Created by Michelle Young from information provided by informants

As Harvester One explained:

Because your price going from Australia to overseas – you need to be able to buy all your product, process it, then put it on a boat and get paid as the boat leaves the port, or when it lands at the port over there, and if they don't buy it when it gets over there. But it could be many hundreds of thousands of dollars out of pocket (Harvester one, South Central Queensland, April 2012).

With the demand created by the Russian market, new investment went into both existing processing works (Wild Game Resources employed up to 80 staff while the Russian market was operating), and new facilities, for example:

- The United Game Processors (UGP) factory in Charleville was built to supply a whole frozen carcass to meet the demand from the Russian market. This processing plant was built with funding from overseas investment.
- Overseas Game Meat (OGM) was a small company that expanded rapidly because of the growth in exports to Russia. Located in Nerang, Queensland, OGM opened in 1981 and by 2003 was packaging and exporting kangaroo and wild boar meat with an AUD12 million turnover and wages of AUD2.5 million (employing 80 people) (Hansard 2003: 2,426).
- Australian Meat and Game started in 2001 (located in Dry Creek, Adelaide, with a significant share of their supply from Queensland), and upgraded an existing processing facility for additional production.

In 2009, the Russian authorities suspended all imports of kangaroo meat. At the time, Russia was the key export market for kangaroo meat, consuming between 58–70 per cent of exports (Kelly 2010 cited in Samoylov 2010). The ban was imposed by Russia based on food safety concerns following the detection of coliform and salmonella bacteria by Russian Veterinary and Phytosanitary Surveillance officials. By 2010 kangaroo exports plummeted to 2,920 tons, worth AUD11.7 million (USD12.3 million).

Initially processing continued, but then meat processors could no longer afford to keep stockpiling manufacturing meat, because they could not sell it at a price sufficient to cover the costs of production. Because the industry was so reliant on the Russian market its closure led to significant job losses and major industry restructuring, with many meat processors finding they could no longer continue to operate. These closures included companies that had been operating in the industry for years as well as businesses established in response to demand from Russia. For example, all three of the companies listed above closed shortly after the Russian market closure, and Wild Game Resources went into administration in 2013.

Following the contraction of the Russian market only two major processors have survived on the east of Australia. These two companies are Game Meat Processing (GMP) and Macro Meats.

Game Meat Processing (GMP) is a Queensland-based company. In 2011 GMP was operating three game meat processing facilities, producing various human consumption and pet food products. This included processing 15—17,000 tonnes of kangaroo meat (Wells 2013; Stern 2011). GMP's business model is to export higher quality kangaroo meat cuts. These products include boned meat and filleted steaks, packaged simply as high quality game meat. GMP also sells manufacturing meat into export markets when the price is right, for example the Russian market. The remainder of the carcass is used in their pet food products, both fresh and dry. The VIP Group of companies, which includes GMP, were privately owned by Christina and Tony Quinn. Over the last decade, VIP grew through the acquisition of several other independent processing companies. The company employs around 600 people. Despite a high Australian dollar in recent years and reliance on 20 per cent of their sales from exports, in 2013 the global pet food magazine *Pet Food Industry* listed VIP's turnover at AUD324,450,000 (Beaton 2015). In 2015, the majority share of VIP petfoods was sold to a private equity firm for AUD410 million (Thompson et al. 2015). These figures provide an indication of the returns being achieved by one of the major firms in the value chain.

Macro Meats - Gourmet Game is a South Australia-based company established in 1987. While the company also produces pet food products, the main thrust of the business has been to introduce and increase the consumption of kangaroo meat in the domestic market through the major supermarket chains and the food service industry. Macro Meats also exports frozen and chilled kangaroo meat products. Macro Meats remains the only kangaroo processor who has distribution across the big chain stores in Australia. In the early 2000s Macro Meats expanded and modernised its processing plant in South Australia and in the period of peak production employed approximately 260 people. At the time of the research Macro Meats had approximately 165 chiller sites in Queensland, New South Wales and South Australia, and was purchasing about 46 per cent of the kangaroos they processed from Queensland, about 42 per cent from New South Wales, with the balance from South Australia. To begin with Macro Meats operated for some time using kangaroos from South Australia and then began looking for supply from Queensland because there was a lack of both kangaroo harvesters and animals in South Australia. Macro reported that they had 1,200-plus field harvesters delivering kangaroos to their field depots.

The value chain in operation

A large part of managing rangeland-grazing enterprises in the south west of Queensland involves pursuing economic goals in production environments that are ecologically complex and are subject to extreme variations in climatic conditions. Since colonisation there have been continual changes in both the way these landscapes are managed and the landscapes themselves. Like many other rangelands internationally, there is debate about the management of rangeland vegetation in Australia. These debates relate to issues of the utility or function of woody

vegetation for landscape management, and the management of grazing pressures from domestic livestock, kangaroos and feral animals (particularly goats and pigs).

Harvesting

Harvesting refers to shooting wild kangaroos grazing on farmland. The key players are known as professional licensed harvesters or licensed harvesters. Harvesting also involves graziers, in a very limited way. They must provide written consent for kangaroos to be taken from their properties. Graziers refer to landholders who graze animals on their lands. The ongoing management of grazing pressure is central to running pastoral grazing enterprises in the rangelands. This includes the ability to control the grazing pressures exerted by wild kangaroo populations. The difficulty for the graziers is that while they can actively manage the numbers of domestic cattle as conditions change, their ability to manage kangaroo populations to reduce total grazing pressure is much more limited. The accepted method of managing kangaroo populations is either through harvesting by the commercial kangaroo industry or shooting under damage mitigation permits obtained from the Queensland Government. The graziers rely on the availability of licensed harvesters to manage the population numbers but typically have little involvement with this process, and do not direct the harvesting process in any way. There are claims both from graziers interviewed in this study and in other forums that at present the commercial harvest fails to limit the grazing pressure kangaroos exert on pasture. From this perspective kangaroo population densities are undermining their land management practices. This landholder describes the difficulty involved in allowing new grass shoots to develop to maturity.

Environmentally this is the worst thing about roos. If it's dry and you have storm then you get all this fresh shoot coming up. As a commercial woolgrower or beef producer, the last thing you do is put stock on that, you keep stock away from that. You let it grow, then seed and whatever. You keep everything else on the dry country as long as you possibly can and let it grow to its full potential, so you get the seed heads and that sort of thing. The roos come in, they literally come in about 2 or 3 weeks after it rains. They know – obviously they can smell it raining – and they know it takes that long for things to start to get up. And then they come in and devastate it (Grazier one, South Central Queensland, April 2012).

At the time of this research the pastoral areas of South West Queensland had received high rainfall in the preceding two years and there were large numbers of kangaroos in evidence. Graziers interviewed were concerned that the spikes in the numbers of kangaroos would prove problematic once drier times returned. All the rangeland graziers interviewed stated that the grazing pressure from kangaroos had been growing over the years. One possible explanation, which all the graziers I interviewed referred to is that this is the result of the commercial harvest adopting a male biased harvesting policy (some interviewees also referred to the problems

related to the removal of older male kangaroos). The regulations governing the harvest of kangaroos do not include directions or instructions relating to sex bias in harvesting. Nevertheless, the kangaroo processing industry has introduced male-biased harvesting as a self-regulating measure to address the welfare of joeys in the pouch and at foot. Whilst there are agreed methods to manage the welfare of joeys in the pouch, it is established that even if they are healthy and steady on their feet, the young at foot become distressed when separated from their mother and the majority of animals will not survive (Macleod and Sharp 2014). It appears that frequently the joeys at foot are not disposed of by harvesters either because they do not see them, or some shooters (this is less likely with professional shooters) see the animal looks healthy and believe they may survive so they do not like to shoot them (Macleod and Sharp 2014). As one harvester told me:

And I could never quite understand why it [the male-only industry directive] was there, until finally this year they told me at a kangaroo meeting, its predominantly to make it mostly male so they don't have this huge joey population being euthanised at slaughter (Grazier two, South Central Queensland, April 2012).

This approach had been operating largely informally for several years but was formalised with adoption by the kangaroo industry of a male-only intake in early 2014.¹ The result is that that most kangaroos that are harvested are males and animals of a minimum size of around 16 to 17 kilograms.

From a landholder point of view this approach defeats the purpose of the commercial harvest. In the words of one landholder, 'the kangaroo industry is farming kangaroos... they are leaving their breeding stock there' (Grazier four, South Central Queensland, April 2012). In the assessments of the graziers, I interviewed, the impact of a male bias harvesting practice fails to reduce population numbers and therefore does not assist their objectives in managing total grazing pressure. Their evaluation is supported by research examining the results of harvest rate and sex ratio combinations. This research found that 'if the goal of management is to minimise the impact of kangaroos on forage availability, a harvest that includes a female bias and a high annual harvest rate will be favoured' (McLeod, Hacker and Druhan 2004: 20). Conversely, if the goal of management is to achieve a high yield, and minimise the effect of harvesting on kangaroo populations then a male bias strategy is preferred with a slightly higher harvest rate (McLeod et al. 2004).

One of the graziers I interviewed had decided to stop harvesting on his property. This grazier, whose family has 75 years of history on the property, reported that nothing was done on their landholding in the way of kangaroo management from 1937 until they first had professional

¹ In February 2014, KIAA announced that the industry had adopted the male-only policy to improve the sustainability of the commercial kangaroo industry. The policy addresses the welfare implications for the dependent young of females.

licensed harvesters on their property in the early seventies. In his view, it is significant that they then had a plague of kangaroos in 1980 with licensed harvesters taking 9,000 kangaroos for the commercial market over a period of nine weeks predominantly in two paddocks. It then became very dry and thousands more kangaroos died from starvation on their property. With the return of better seasons kangaroo numbers regenerated and they always had licensed harvesters on their land, not taking large numbers but always taking the large males. In 1990–91 again they had plague populations and by 2002 they described the kangaroo population as horrific with the arrival of drought and showed me photos of dying kangaroos that they took at this time. In 2007, they were back to their ‘normal’ annual rainfall and the whole process started again with the numbers regenerating and when it became dry in 2009 it was devastating—again there were thousands of small kangaroos. In both 1993 and 2002 this interviewee applied for damage mitigation permits to shoot kangaroos, and he described a situation where they would shoot a few thousand or 10,000 and then basically another 10,000 would move in. Other graziers relayed experiences on their own properties that were very similar. They also talked about the impact on the land, the suffering of the animals and the psychological impacts they experienced when animals were dying from starvation (Figures 2 and 3).

This grazier was adamant that commercial harvesting on their property had only made the situation worse, because in his view the selection of large, male animals was creating plague numbers of smaller roo. These are untested assertions but from an ecological perspective, they raise questions about the way in which the kangaroo harvest is regulated. As I learned later, the processors also favour the culling of large males, as it is more cost efficient to get meat off large animals than smaller ones.

Arrangements with rangeland graziers vary; in a few cases the licensed harvester is provided with a house on a large property and will primarily shoot kangaroos across that property. In other cases, they may have two or three or even up to five or six properties that they regularly visit. For other licensed harvesters, it may be a more casual arrangement that involves ringing around rangeland graziers to ask for permission to shoot on their properties. This is important because some rangeland graziers have more than one licensed harvester working on their properties so they need to be careful not to come across each other at night.

The way in which licensed harvesters cover the land also varies; within these broad acre properties there can be up to 50 kilometres of roads. Licensed harvesters typically will shoot 100 metres on each side of the road, which means their coverage of the property might be only around 2 or 3 per cent. It is much less common for licensed harvesters to drive off road, following the migration paths of kangaroos.



Figure 2. Starving kangaroos in South Central Queensland, during the drought of 2002

Source. Image supplied by graziers. South Central Queensland, April 2012



Figure 3. Dessicated bodies of kangaroos that starved in South Central Queensland, during the drought of 2002

Source. Image supplied by grazier in South Central Queensland, April 2012.

Visits to individual properties depend on the markets, whether there are animals at the right weight and whether the quota has been met. When there is demand, licensed harvesters will visit properties once or twice a week and as demand falls off then visits are reduced. For full-time licensed harvesters, the challenge is to balance the requirements of the landholder with market demand. This licensed harvester describes the situation in the following way:

I used to always try to get to them once a week but obviously it doesn't happen every week lately. I am pretty lucky because most of my places are from 25 km to 70 km out of town. But some of these fellas are travelling 180 km a night to shoot roos. But I have sort of had these places for years and originally I did only have four places and I could always make a living off the four places. But then when the market did get really big, when the money went to \$1.30, and everything

was going so big. And there were so many fellows wanting to be licensed roo harvesters, because the money was good and easy, well it was hard to keep, you had fellas trying to get onto your country as well. So then I started sharing two or three of my places. So it made it hard for me to make a living on just four, so I went and got a couple more, but now that the industry has gone back to where it is now, I have got them all back to myself again now. So it's hard to service seven of them (Field depot operator and harvester one, South Central Queensland, April 2012).

Licensed harvesters work only at night. The optimal time for shooting is on still and overcast nights; at these times kangaroos are much quieter than when the moon is bright and the wind is blowing. Shooting at night also has the advantage that this is the coolest time of the day so it is much better for transporting the kangaroos on the trucks at this time.

If you drove around the bush in the daytime you'd be lucky to get close enough to any of them to shoot them. Because as soon as they see you coming or hear you coming, then they are gone (Field depot and harvester one, South Central Queensland, April 2012).

The harvester then moves the animal to the handling rack and proceeds to search for other animals. An evening of shooting will typically return between 30 and 50 kangaroo carcasses. Licensed harvesters also hunt pigs and other feral animals (see below for further explanation of the connections between kangaroo harvesting and feral pigs (wild boar)). As part of my fieldwork I participated in a trip. This involved driving 30 kilometres from a small country town to meet a licensed harvester on a property one night. This harvester lived on the property and was employed full time to manage the kangaroos. The following is an excerpt from the field notes that I took on that evening.

As we moved through the paddocks the harvester moved the spotlight on the top of the rig quickly from side to side looking for kangaroos on the horizon. Once he sights them he assesses their size, sex and condition and uses the spotlight to put the light in front of them, which encourages the roos to fall back there in the dark. Then he moves his light back on the edge of them and prepares to shoot. The harvester's ute has a special bar fitted to the side of the door for the rifle to rest on and the harvester uses his lens to get an accurate view before taking a shot. Death by headshot is instantaneous and the animal drops as the other roos hop off.

There was then an urgency for the harvester to find the dead animal to continue the bleeding out process; this began with the head shot, but needed to be followed immediately by a cut to the neck in order to relieve pressure in the carcass. It took a few minutes to find the dead animal in the darkness of the fields but then the harvester quickly made a slit in the leg and hung her up on the hook at the back of the truck to begin the bleeding process. He checked the pouch for a joey. Then pulled a little hairless pink creature from the pouch and decapitated it with a sharp knife; this was done while it was still on the teat. The mother kangaroo was then eviscerated to remove the guts which were left in the field. The harvester shot another two females before shooting a male kangaroo and each time he shot a female he was clearly frustrated because he was only intending to shoot males (Field notes, Mitchell, April 2012).

Although harvesting attracts both full-time and part-time licensed harvesters, the field depot operators interviewed said that since the closure of the Russian market kangaroo shooting appeared now to be shifting towards a part time income earner. 'This town would have only 15 to 20 full time licensed harvesters, but you could have anything up to 100 licensed harvesters that work on the council or the railway and shoot on the weekend' (Harvester one, South Central Queensland April 2012). The motivations and goals of part-time and full-time licensed harvesters are quite different. Part time licensed harvesters often regard shooting as more of a recreational pursuit and their primary interest is in hunting wild boar, but they will shoot kangaroos while in the field more as an offshoot of pig hunting, to earn additional revenue. For the individuals working part-time, shooting kangaroos provides an income, but they typically have other revenue streams and are not dependent for their livelihoods on the money they make shooting kangaroos. According to one field depot operator:

If they have a good council job where they make their wages during the week and then go and shoot one or two nights of the weekend, then if it rains, it doesn't worry them. They have just got their shire job or the railway job that they go to. And they don't get to go shooting on the weekend (Field depot operator and harvester one, South Central Queensland, April 2012).

Full time licensed harvesters on the other hand rely on the income they receive from shooting and are much more committed to delivering a regular supply of carcasses. This regular supply is vital for the processing plants who need to plan the delivery of kangaroo meat to the markets.

Storage, supply and transport

At the end of a night's shooting, the licensed harvesters deliver the kangaroo carcasses to chiller boxes, known as field depots. In kangaroo harvest zones, most country towns will have several chiller boxes. Each of the chiller boxes will be dedicated to supplying a particular processing company. In Charleville, for example, there were four companies buying kangaroos from the town, each with a dedicated field depot. One was delivering to South Australia, another to a Queensland company near Brisbane, another to a plant in New South Wales, and the fourth was a local pet food processor that ran his own chiller box. Known as depot operators, the people who manage the chiller boxes are also licensed harvesters. Each depot operator will have several other licensed harvesters who deliver kangaroo carcasses to them. The field depot operators of these chillers coordinate with licensed harvesters to bring in a certain number of carcasses which they store before trucks arrive to pick up the contents of the chiller box. The field depot operators manage the storage of the carcasses until the processors pick them up; this includes recording the temperature of the carcass. This is done by putting temperature-recording equipment (data loggers) into the carcasses on arrival at the field depot. One field depot operator explains the procedure he follows to provide the meat processor with a record of the carcass temperatures:

I take those temperature recorders out of the roos when I load them onto the truck and bring them home and download the information onto the computer and e-mail that off to the factory. And then take the data loggers back and put them back into the fresh roos. So I just store the roos for roughly anywhere from 3, 5 to 7 days; normally I get a truck every seven days maximum (Field depot operator and harvester one, South Central Queensland, April 2012).

While depot operators all work on a commission basis, field depots typically operate in one of two ways. The first group owns their own chillers and pays for their own power supplies and equipment. This group receives a bigger percentage than the second group who do not own the site, or pay any additional costs. The second group just manages the product while it is there on behalf of the company.

One of the difficulties depot operators face is that they must regulate the supply of carcasses to meet the demands of the processors. The first challenge is the provision of a regular supply in changing weather conditions. Flooding makes it difficult for field depot operators to ensure that the supply of kangaroo carcasses meets the processor's demands. Harvesters prefer not to shoot if the weather is poor, so when the weather is good they all go out shooting and bring back as many carcasses as possible.

The shooter is very dictated to by the weather – if we get bad weather for a week straight, nobody shoots many roos. But if we get good weather for a week straight, then they will shoot a lot of roos. So it is a very hard thing to control and to try and get that constant supply (Field depot operator and harvester one, South Central Queensland, April 2012).

Supply is buoyed by having more licensed harvesters than needed delivering to each of the field depot operations. This helps the processors maintain supply, but when demand from the processors drops off then there is insufficient demand to use all the carcasses produced and the harvesters must wait until the chillers are empty before they can go to work again. During this fieldwork, there was not enough demand to be able to provide everyone in Charleville who wanted to shoot with an opportunity. The closure of the Russian markets was identified as the major reason.

I have sent 300 roos out of my sight in the last 11 days because the factory is full. They are full and they can't process so they can't get a truck here to pick them up. ... We really need Russia to come back, and for the factory in Charleville to start, just to take the pressure off. At the moment that's why I am full because we have got too many roo shooters for the amount of roos that they can process (Field depot operator and harvester one, South Central Queensland, April 2012).

Roos that this field depot operator does not accept will either be supplied to another field depot operator or delivered to the local pet food processing. It was not made clear during the interviews what happens if all of these outlets are at capacity, however it was clear this was something that they clearly sought to avoid.

The depot operator has to manage the expectations of his licensed harvesters against the demand from the processors, while at the same time ensuring that he can earn his income from his own shooting.

I'm involved in two sides of it, because I'm on the site manager side of it and I'm also shooting myself. I have six roo shooters or eight roo shooters I'm trying to keep happy, like I'm trying to give them enough nights so that they can go and earn a living and I want to keep enough nights for myself to go and earn a living. So that sort of is the only pressure that I cop out of it (Field depot operator and harvester one, South Central Queensland, April 2012).

Under different circumstances when demand is higher, field depot operators then must manage the pairing of kangaroo and feral pig. As several participants interviewed for this research explained, hunting feral pigs is the main interest of many part-time licensed harvesters. For these individuals harvesting kangaroos provides an additional opportunity to earn money, whilst they are engaging in pig hunting. The result is that regardless of whether there is demand for feral pig, depot operators are under pressure to take delivery of the feral pigs, to obtain their supplies of kangaroo. As Meat processor two explained: 'And if you have got a guy that comes in that has one pig on his truck and 50 kangaroos on there if you don't buy the pig he will take his kangaroos to the next person who does' (Meat processor two, South Central Queensland, April 2012).

To maintain production at certain levels, kangaroo processing plants need to have chiller boxes distributed across different geographic areas. This allows them to make sure that when it is flooding in one area they have licensed harvesters delivering kangaroos from somewhere else in the country unaffected by the weather pattern. To run a large kangaroo processing business involves operating 150–200 chiller boxes, and employing around 1,200 harvesters. Managing incoming supply is essential for any kangaroo processing enterprise, but particularly for the company marketing the product into domestic retail supply chains. As one processor told me, 'I cannot go to a supermarket and say this week I have got it and next week I haven't. Then I will, then I won't. Because the supermarket will just get rid of you' (Meat processor three (a), Adelaide, May 2012).

The foregoing material illustrates that technology plays a very little role in the kangaroo production system. It is, in many ways, the antithesis of Fordist industrial production systems. The kangaroo production system is not geared to controlling or managing weather conditions, the bio-physiology of the animals, and the environmental conditions. It is in many ways a modern form of hunter-gathering which is totally unsuited to modern supply chains which require around the clock, predictable supplies. In this way, it is much harder for this commodity to join in capitalist circuits.

The kangaroo carcasses harvested in South West Queensland are transported by trucks either to regional processing plants or over 1,500 kilometres to South Australia. Refrigeration of the

carcasses is critical for maintaining product safety. The technology now exists for field depots and trucks to relay temperature information of the carcass via wireless, 3G or hard-line to the monitoring factory. However, at the time that this research was conducted it had not been implemented in transportation systems. This technology offers potential for improvements in product quality because if the refrigeration unit on the truck shuts down for any period, this will provide the processor with the necessary information to determine whether the product is within its parameters for cold chain temperature management.

Processing

Kangaroo carcasses are delivered to the processing plant a week to 10 days after harvest. At the kangaroo meat processing works the preparation of meat and skin products begins. The kangaroo carcass is first prepared for skinning, then skinned, and washed. Once the skin has been dealt with the meat is then either jointed or boned out, and packed for distribution. On arrival at the processing plant the carcass receives its first mandated inspection pre-dressing. Before the animal is weighed, a meat inspector or quality assurance manager (typically ex Australian Quarantine Inspection Service (AQIS)) checks each carcass to see if the information on the relevant tags (from both the company and the state government) is completed correctly, then a visual check of the carcass is made to ensure it is to standard (including ensuring that the only gunshot wound is to the head).

They check the viscera and they check for any details and they check the tag and on top of that when the animals come in we swab a certain percentage of the animals internally to look at the micro hygiene of the animals (Meat processor three (a), outer Adelaide, June 2012).

Any carcasses that are not to standard are then given a post mortem examination by the AQIS veterinary officer. Macro Meats report that in addition to this check, once the animal is skinned they then do random testing on a daily basis.

Prime cuts

Prime cuts like rump and fillet are produced by the meat processors for both sale in retail outlets and distribution to restaurants across Australia. The South Australian based company Macro Meats is the only processor that produces kangaroo steaks and mince for the major supermarket chains in Australia. The other kangaroo meat processors also supply kangaroo into retail businesses in the domestic market but to a much lesser extent and this is distributed through small independent outlets. Macro Meats now supplies most of the supermarkets in metropolitan Australia with a range of prepared kangaroo meat cuts. For this purpose, the Macro Meats developed a packaging system that gives the fresh meat a long shelf life. Macro Meats produces a range of ready to cook products for supermarket outlets that consumers can place directly in the pan for very quick and easy meals. This includes marinated steaks, kebabs and mini roasts.

Until recently most retail cuts have not been labelled to identify the characteristics of the animal which affect the qualities of the meat for example size, age, species or region of origin.

Consequently, prime cuts were highly variably in appearance and quality. However, in 2014 Macro Meats introduced a Paroo range, which delivers a premium fillet.

The industry reports strong demand in Australia for prime cuts of kangaroo meat; in the words of the KIAA representative:

Australians now eat a lot more kangaroo than they do Duck, and ...an enormous amount more kangaroo than they do venison ... The industry, within the constraints of Australian meat consumption patterns, is actually doing very well but to step up from there, to a position where it could take a significant proportion of the amount of meat that we export, is a complex political marketing mountain (KIAA representative, Tasmania, January 2012).

The challenge for meat processors is that to produce the prime cuts for which they have demand they must also find buyers for the manufacturing meat at a price that meets the costs of production. In 2011 when the interviews for this research were conducted the kangaroo industry had more demand for prime cuts from the domestic and international market than it could satisfy. This was primarily because they did not have markets for the manufacturing meat (trim) and therefore could not afford to process and supply the demand from the prime cut markets.

The sweet cuts in the kangaroo are only about 15–20 per cent of the body weight. The rest is manufacturing meat. You cannot keep on stockpiling manufacturing meat. Unless you can sell the manufacturing meat you cannot produce anymore fillets, so you are choked. Look I sold 20 tonnes of manufacturing meat last week and I sold it at a price that I know that I can't produce it at, and the person who wanted it sold was desperate because the plant was at a standstill. That person had more manufacturing meat than he knows what to do with and he can't produce fillets and rumps unless you can get rid of the manufacturing meat (Wholesaler and processor one, Brisbane, April 2012).

Manufacturing meat, or trim, comprises 80 per cent of the meat produced from an animal and has a much lower market value than the prime cuts. In all meat industries trim represents a significant proportion of total yield but it is higher with kangaroo. It is also usually the hardest product to move. Because of the volume, the profitability of any meat-processing sector depends on the price it receives for the manufacturing meat. The high ratio of trim meat in kangaroos heightens this equation.

The main uses for manufacturing meats are in minced meat products, small goods manufacturing and pet food processing. Because it is low in fat (but high in protein), kangaroo meat absorbs flavours readily and it can also absorb water, so it is expandable meat. This quality makes it ideal for use with other lower grade meats in small goods manufacturing. 'The leaner it is the more you can dilute it with other things. So therefore kangaroo meat had about a 12.5–15 per cent advantage over beef in terms of the economics of producing some types of sausages'

(Wholesaler and processor one). In small goods processing it is particularly well suited for making sausages but also for products such as pies, mince and prepared meals like lasagne.

The main issue here is increasing the uptake of manufacturing meat product by the small goods industry in Australia. From the mid-1990s until today, the limiting factor on the amount of kangaroo consumed by Australians has been the lack of acceptance of manufacturing meat domestically (Ampt, 2011). The difficulty that kangaroo processors have faced is that the general perception by small goods processors in Australia is that kangaroo is a small niche market that has image problems. These companies have avoided kangaroo because of the risk of negative publicity (Ampt, 2011).

There are a handful of niche producers who use kangaroo primarily to make small goods, such as salami and prosciutto, and kangaroo jerky. The only producer of any scale is the South Australian company Barossa Fine Foods, who manufacture about 100 kilos a week of kangaroo product. Barossa Fine Foods supplies over 150 delicatessens in Australia. This product represents a very small portion of their weekly output, which is upwards of 28 tonnes. Because of their location in South Australia the company relies on producing smaller volumes of a larger product mix to achieve the volume. Their business model involves using meat from a diverse range of animals because it helps to mitigate risk because if there are input cost fluctuations it is spread out over several different species. One of the managers of this company explained why kangaroo is a good value proposition for their business:

We think the products taste pretty good and we have developed recipes around that. So we use trim (manufacturing meat) and that gets used in the pepperoni and the Mettwurst sausages and then we use topside fillet for the smoked kangaroo (Smallgoods processor, outer Adelaide, June 2012).

From their perspective kangaroo offers the opportunity to meet the demand for lower fat small goods products, rather than it being presented as ‘green’ product. ‘It is definitely more about what’s in it for the consumer than what is in it for the animal or the environment’ (Smallgoods processor). In this case kangaroo is being selected for the value proposition that the quality of the meat offers for consumers, as the manager of the smallgoods company explained:

I mean, the mark-up on kangaroo is fantastic because we are able to benchmark against other game meat; venison and all those meats that are more expensive. So kangaroo you can at least put in the ball park and make good money off it (Smallgoods processor, Outer Adelaide June 2012).

Given the value that this company and other small goods producers in other countries find in kangaroo meat, the question remains why other small goods producers in Australia would not adopt the meat. One explanation is that the rapid consolidation occurring in small goods industries also means that the clear majority of their products are mass-produced to meet the demand by supermarkets for an increasingly narrow range of products. ‘We have approached and spoken to pie manufacturers – they are all keen to begin with and then they start doing their

sums and everything, and it is niche ... so they lose interest there' (Meat processor three (b), outer Adelaide, June 2012).

If Australia did not have labelling requirements then it is believed that kangaroo meat would be used in sausage production and other small goods.

But if you actually have to state what percentage of kangaroo it is and if people see that then they step back. If it wasn't for that we would sell every kangaroo bit we could because it really is a good meat for manufacturing (Wholesaler and processor three (b), outer Adelaide, June 2012).

With intense competition for space in supermarket shelves, the major supermarkets will not give consideration to niche products like kangaroo, so it is only through the delicatessens and food service outlets that kangaroo small goods are being consumed. Given that the numbers of small goods producers operating in the Australian market is reported to be declining, and production is being increasingly concentrated in a handful of producers, this represents an added challenge for using kangaroo for small goods production.

Shelf space in a supermarket sense is very, very competitive and the large smallgoods companies know that they have to stick with their biggest categories ... come in with a niche product like kangaroo and it's really not a goer (Smallgoods processor, outer Adelaide June 2012).

The lack of interest by Australian small goods processors means that kangaroo manufacturing meat is used domestically only by pet food companies. This has left the meat-processing sector looking to export markets for higher value uses, 'because that has been where the money has been' (KIAA representative). Historically demand by pet food producers for kangaroo has been and still remains critical to the viability of the industry. Both the major processing firms produce pet food, although the scale of pet food production is very different because the VIP company is a major player in the international pet food market with much greater market penetration.

Kangaroo tails

Kangaroos tails are large and this presents a problem for transportation and processing. Tails take up a lot of space in storage and require more time to process so it is usually more convenient to leave them in the field. 'It's easier to lop them off in the bush. It's too much hassle and it's expensive' (Wholesaler and processor three (b)). Today if meat wholesalers receive orders for tails they then must put in a specific request. These orders are made to meet demand from Asian markets, or when they receive requests to provide Aboriginal communities who want the whole tails with fur to cook on fires. Another key consumer of kangaroo tails are the mud crabbers, 'who use it because it's a hardy bait.' And there is further demand from 'other wholesalers to use in soups and to butchers who slice it up frozen with the bandsaw and put it out as tails to go into soup and stuff' (Wholesaler and processor three (b), outer Adelaide, June 2012). One meat trader interviewed in Australia said that in the past there was also demand

from canneries to make kangaroo tail soup, but this operation closed when beef tails became too expensive to use in canning. ‘It was a big operation. We used to sell a lot to Sydney when tails were around that \$2.50–3.00 level, but now tails are into Asia at \$5.00–6.00 so the canning process is just too expensive, so it all closed’ (Wholesaler and processor three (b)).

Kangaroo skin

Kangaroo skin represents a significant percentage of the animal. From the 1960s a niche industry developed for kangaroo skins based on the unique qualities of the leather, particularly its fine grain and high tensile properties. Kangaroo leather is used in both fashion apparel and high performance applications (e.g. premium soccer boots, motorcycle garments and gloving, firefighting gear and military combat items). While it is a by-product of the meat industry, the money paid for skins to the meat processors is an important component of their revenue. Today there are two main companies involved in processing kangaroo skins that are both based in Australia. AI Topper and Packer Leather have approximately 70–80 per cent control of the raw material in the kangaroo leather industry. AI Topper is primarily a hide processing and trading business but it also runs a line in kangaroo leather and works closely with Packer Leather who are the only kangaroo tannery in Australia. The kangaroo fur and leather segment of the supply chain is relatively small, with less than a dozen players involved, but they are distributed across the world. Kangaroo skin products are delivered by the tanneries to the supply chain in three forms, including: pickled skins which have been taken by several countries including China and Japan, but the main market is Italy where they are used in the fashion industry; salted fur products which are primarily sent to Turkey, which is the major player in the garment fur industry; and finished leather. Although pickled skins generate the most export earnings of all kangaroo skins and furs, the market for finished kangaroo leather is becoming more sophisticated and there is a growing export trade.

Distribution of kangaroo products

Since 1969, kangaroo meat has been exported to more than 70 countries, many of which still receive kangaroo imports today. In 2008, Australian kangaroo meat exports totalled 10,010 tons—worth AUD36.4 million (or USD38.4 million) (Kelly, 2010, pers comm., cited in Samoylov, 2010). Annually kangaroo meat exports for human consumption averaged around 12,000 tonnes over 2005–2008, falling to around 6,000 tonnes in 2009, (Payne 2010). Pet food exports constitute 1,000 tonnes annually. From 2009 to 2015 the value of kangaroo exports hovered around AUD21 million.

Both Macro Meats and GMP export the quality cuts overseas including a small amount of chilled exports that are air freighted. In some cases, the meat processors deal directly with overseas game meat traders, small goods producers or restaurants, while in other instances they

use wholesale dealers to find buyers. For example, GMP markets all their human consumption meat through a local Queensland meat wholesaler, Naturally Australian Meat & Game . This company has both a domestic and international distribution network and is a major distributor of kangaroo meat.

For this study, I researched one supply chain into Europe and what follows is a description of this segment of the value chain. Europe has a long history of eating game and there are several family businesses that have historically been involved in the game meat trade. Three European meat traders were interviewed and each had a different business model. The first ran a family business dealing in the wholesale game market.

You can say the people involved in the game market, and know the market, are traditional companies that are handed over by generations. My uncle ran this business, I started with him and then I took over, it's a similar story with many other companies being started by grandparents. I think once you are in the game business it's not likely that you go away very quickly, because there is a lot of knowledge and connection. You may switch into the traditional meat business but most of the people in this industry are connected and many of them will turn up again (European meat wholesaler, Germany, August 2012).

The European traders are well known and connected to the small group of wholesale meat dealers and kangaroo meat processors in Australia. One of the European meat traders interviewed described how the network coordinates the supply to maintain market stability.

There are only a handful of companies in Australia, so you know more or less who to deal with. The same with the exporters or producers from Australia ... they must have the knowledge that you do not expand the markets, that you don't suddenly sell in Europe to 10 people. With more competition people will undercut prices – it never goes up it always goes down (European meat wholesaler, Germany, August 2012)

This dealer reported trading to approximately 15 different wholesalers across Austria, Switzerland, Germany, Belgium, Netherlands, France, Czech Republic, Denmark and Sweden. These wholesalers in turn sell on to restaurants. The other way that kangaroo meat reaches European consumers is through supermarket chains and multinational catering companies. According to the European meat traders interviewed, catering companies tend to make large orders for kangaroo once or twice a year. For example, a large supermarket like Carrefour would buy 10–20 tonnes of kangaroo meat, and have it delivered marinated in honey for Christmas time. A catering company such as Sodexo, who runs the restaurants of many company sites, hospitals, schools, universities and military facilities globally, would purchase a large quantity of kangaroo meat 2 or 3 times a year. This would usually be used to prepare a seasonal meal. As the French trader and retailer explained:

And what they do is that every year they make a forecast (plan) for their menus for example and they say, this year we are going to make three menus with kangaroo meat and that is 60 tonnes of meat and so we are going to find on the market 60 tonnes of meat. [Sodexo has] ... a big French

division and they are looking for the meat around the world and if they find ... Then they will buy two or three containers but that's in one or two shots per year (French trader and retailer, France, August 2012).

One of the things that differentiates the distribution of kangaroo from other game products is the limited number of cuts that have acceptance in the market. While the European traders will take wild boar from Australia on a natural fall basis (the whole carcass) they only accept particular cuts of kangaroo including manufacturing trim, boneless legs or individual prime cuts depending on what they think they can move.

Overseas markets for feral pig meat have been in existence for several decades, the main market being Europe where the product is marketed as Australian wild boar. The supply chains for feral pigs (wild boar) and kangaroo are closely intertwined. Licensed harvesters for kangaroo also shoot feral pigs, and feral pigs are delivered into the same field depots and then delivered to the same meat processors as kangaroos. Within this relationship there are both synergies and tensions. First, in relation to European markets wild boar has provided an entry point for the distribution of kangaroo meat. European distributors were initially taking wild boar, and were asked to include kangaroo as part of their shipments. One distributor describes how this unfolded in his business.

I am now in the business over 16 years and we have been dealing with kangaroo regularly since 14 years. And it has been growing since then. The reason we began was because we do quite a bit of wild boar from Australia. And the producers over there they ask us if we can't use some kangaroo ... but it was for us not the kangaroo it was the wild boar that was always the interesting part, that was the link, we needed a lot of wild boar so we needed to source wherever we could get it from and the kangaroo was just the bit we had to take so that we would get the boar (European meat wholesaler, Germany, August 2012).

Attaching kangaroo meat to the sale of wild boar provided an opportunity to expand human consumption and expose European consumers to kangaroo meat.

Knowledge about kangaroo products and their demand in European markets is continually developing. Game meat wholesalers buy specific cuts in bulk and split the meat down into smaller lots of for delivery to different European markets. The key thing that traders in Europe must know about how to trade kangaroo is which cuts are available and the specification of the cuts. By providing specifications of all the different cuts they can provide clients with the knowledge they need so they can use the product.

Each market has its own habits and mentality. So, for example, Czech is taking kangaroo tails, bone in, they don't go for a loin fillet ... they don't eat lean meat cuts there. Whereas if you go to Switzerland they are looking of the high value cuts because they are used to much better quality food so they are prepared to spend money on it. So there you can go with the loin fillets. In Germany it's more the volume item where you can sell quite a bit of boneless legs or the leg cuts

because it's a different price structure to the loin fillets but it is still a good lean meat. So if you know which market can take which item that is the key to our business (European meat wholesaler, Germany, August 2012).

The German meat trader reported that as customers become acquainted with one type of kangaroo cut he then sees increasing interest from customers in other product categories of the kangaroo.

So customers who may have begun by taking boneless leg for manufacturing purposes, nowadays are also asking, 'Can you offer us rump or topside?' In principle I say the market can expand ... the only issue will be looking at price ... kangaroo is always in competition with other game items (European meat wholesaler, Germany, August 2012).

In these markets the value of kangaroo lies in its facility to substitute for known game meats. Thus, kangaroo meat is always priced against these other game meats, particularly red deer, whose familiarity sets the price at which kangaroo must sit below. In addition, novelty and convenience compete, as this meat trader explained:

Getting people to try an exotic item requires novelty but if the price is the same as a known item the restaurant doesn't want to explain to people what they have to eat. They just want to make a quick turnover (European meat wholesaler, Germany, August 2012).

The material above suggests that in Europe eating kangaroo is enabled by culinary cultures suited to accepting new game dishes. Europeans have long-standing culinary traditions that work with different cuts of game meat and distributors have used those pathways to expand their markets. Returning to Australia where there is no such tradition, the pathway to consumers for kangaroo is still being established.

Australia's restaurants and the food service industry are regarded as key drivers of consumption. Both Macro Meats and the other processors supply kangaroo meat to the food service industry and premium fillets are now a regular item in many Australian cafes and restaurants. However, as the industry spokesperson explains, gaining entry to Australian restaurants can be difficult, even with strong interest from chefs:

If you go to a restaurant on the mainland and talk to them about using kangaroo – often the chef will be wildly excited about it, but his manager will say no it won't sell I am not interested in it. But if they put it on the menu it does sell (KIAA representative).

In 2009 Mark Ellis surveyed 209 people involved in planning meals in a range of eating outlets across Sydney, Melbourne and Brisbane metropolitan areas (Ellis 2009). The results of this survey were that kangaroo was cooked in 17 per cent of outlets, but regarded as a novelty choice for customers, with increased consumer acceptance still needed.

The failure of kangaroo meat to be adopted into a mainstream cuisine, sits in contrast to the way the meat is adopted by European consumers as another option in their tradition of eating game

meats. In this respect, it seems clear that cultural culinary traditions and identity are critical for developing an acceptance of kangaroo meat that extends beyond its novelty value.

Summary

Since the establishment of the commercial industry in kangaroo meat, the organisation of the supply chain has witnessed continual change, with various impacts on kangaroo populations and grazing pressures in the rangelands. For example, the harvesting period changed significantly when the demand from meat markets for year-round supply became a key driver for harvesters. Prior to this, skin-licensed harvesters had been active primarily in the cooler months. Meat-licensed harvesters also were more limited in the extent of their geographic range, because they needed to put their carcasses into a chiller. Concentrations of licensed harvesters in smaller areas thus tended to put more pressure on kangaroo populations in particular areas (Livanes 1971: 70). Within the meat-processing sector, in the early days the industry was a small, regionalised cottage industry that was largely unregulated. With the expansion of international markets in the 1990s there was a surge of growth and investment in the number and size of meat processing establishments. Following the closure of the Russian market in 2009 there remain only two major processors operating on the east coast of Australia (there are still several very small operations who supply pet food). These remaining larger establishments (GMP and Macro Meats) have made significant investments in upgrading the technology and standards of their operations. But there have also been changes in the number of field depot operations. Reduced prices and demand for the product have seen the number of harvesters decline and harvesting is reported to be becoming more reliant on the part-time licensed harvester. From the point of view of meat-processing companies, this creates instability because it makes it difficult to achieve reliable supply. Many harvesters use their licence to supplement other income streams, which means, if the conditions get too tough or the kangaroos are less accessible, they choose not to shoot. From the point of view of the meat processors, this is exactly when they need the harvesters to work harder to maintain supply. The industry has lost full-time licensed harvesters for a range of reasons including lower prices (a high Australian dollar), the mining boom, and the ten-year drought, which saw agricultural production in the rangelands decline.

This instability highlights the highly unsophisticated and unpredictable nature of the industry in comparison to other meat industries. In many respects this comes about because you cannot create kangaroo farms that follow Fordist principles. You can have goat, rabbit, deer and other game farms but not kangaroo ones.

Chapter Five

Creating Markets and Finding Value for Kangaroo Meat in the Quest for Nutritional Health, Gastronomy and Biodiversity

This chapter considers why we, in Australia, have not given greater recognition to kangaroo meat products given its nutritional values, culinary potential and ecological value. It considers the factors that determine how the supply chain finds use and creates value for kangaroo meat. The analysis presented in this chapter relies primarily on the information provided in the interviews conducted for this research. The material uncovered, points out the ways that the dynamics of the supply chain have operated to limit the value of kangaroo meat.

Challenges for marketing kangaroo meat

In 2008 the Rural Industries Research and Development Corporation (RIRDC) study (undertaken by Ampt and Owen) also undertook market research to understand consumer attitudes to kangaroo meat. The RIRDC study found that there was a need for the industry to generate consistent messages to all stakeholders. The study researchers recommended that the industry promote kangaroo as a uniquely Australian resource that is managed through careful harvesting, is humane and sustainable, and is good for the environment (Ampt and Owen 2008). In addition the RIRDC study found that culling for pest management attracted strong emotional responses and created images for consumers of poor quality control. On this basis it was argued that the industry needed to distance itself from connotations of pest control.

Despite these recommendations, although the Kangaroo Industry Association of Australia (KIAA) has put some effort into raising the profile of the product with the restaurant industry, various other initiatives included developing a Roocipes book and running a competition to name kangaroo meat products. The industry has never developed an integrated public marketing campaign for its product, in the way that other Australian meat industries have done. ‘The problem that the kangaroo industry has always suffered is that it never markets itself – it has hidden in the shadows and tried to stay low’ (Meat processor two, South Central Queensland, April 2012).

Several interviewees explained that this was primarily because historically most of the kangaroo industry has relied on either domestic pet food manufacturers or export markets to accept the meat, therefore, within the industry, there has been limited interest or need in working together to market the meat within Australia.

One of the difficulties that the industry encounters is how to position the product in relation to free range and organic produce: currently the kangaroo is not recognised under either of these certification systems. For those interested in promoting the natural and healthy aspects of the

meat, this is highly frustrating. One of the meat processors I spoke with framed it in the following way:

Out here where you have a billion acres the only restriction on that animal is the distance the animal has to walk to get food ... How can it not be organic? What is kangaroo if it is not free range, natural and healthy – it's not mediated, it is not handled until the kangaroo shooter comes along one night (Meat processor two, South Central Queensland, April 2012).

Kangaroo is a wild food, and it can be argued, as the interviewee above has done, that both organic and wild foods are working explicitly with ecological and biological processes. However as Agrifood sociologist Guthman (2014) has asserted organic food is celebrated because it meets the ideal of 'farming in nature's image.' Organic food production represents a challenge to the industrialised food production system, in the form of small-scale locally centred farms that build and maintain alternative knowledge and production systems (DuPuis and Goodman 2005: 359). Technically Kangaroo meat cannot meet organic certification standards because kangaroos range across areas with multiple types of land use. Kangaroo meat can also be seen as peripheral to the ideals of organic food because management and harvesting of kangaroos is not part of the alternate knowledge and practices that are championed by organic farmers.

It remains the case that Kangaroo can still be marketed on the basis of its ecological specificity. However it is still essentially unknown whether promoting its green label credentials can raise the value of 'roo' in Australia as it has not been adequately tested. The experience of Macro Meats, the main meat processor supplying the major supermarkets, suggests that this will be difficult. For example, when Macro Meats initially attempted to promote the eco-benefits of kangaroo meat through labelling on their products, they were met with opposition from one of the major retailers. So the information about eco benefits was then removed from the packaging.

We used to do a label on our product. Good for you, Good for the environment. And then underneath we explained why, because of methane gas and all that. We got pulled in by one of the big supermarket chains to say take it off and they said, 'We can't sell a product in the supermarket that is criticising other products. We sell 50,000 times more of that than we do of your product, take it off.' And I had to take it off (Meat processor three, outer Adelaide, June 2012).

Because positioning kangaroo as a conservancy product raises issues with other meat products, the kangaroo processors have had to think about how they can market kangaroo on the basis of other characteristics. Recently Macro Meats has been trying to change the perceptions of kangaroo being a cheap cut by releasing and marketing a new range under the label 'Paroo Premium Health Brand.' The Paroo range represents an attempt to differentiate the quality of kangaroo meat provided to restaurants according to the size, region and type of animal, in much the same way as we might eat an Angus steak or Bangalow pork.

We don't call it red kangaroo and we don't call it all that because you know what – we will we get attacked again. Because then the activists will say you are killing all the red kangaroos. So we have brand names that we call it. So we know what it means, we have certain brand names which will be the better kangaroo[to differentiate]from what I call the standard kangaroo or what I would consider the lesser kangaroo which we would use for manufacturing meat or pet food, or whatever else (Meat processor four, outer Adelaide, June 2012).

It is also difficult to market the environmental benefits of kangaroo without bringing conflicting messages into the view of consumers. If we start from the premise that eating is connected to the construction of identity—that food must be good to think (Fischler 1980: 945), the environmental benefits are likely to be limited in their appeal to those consumers who identify with 'green actions.' Here the green consumers' willingness to embrace kangaroo meat reflects their identification with eating responsibly because of their concern for the environment. However, even within the community of those who desire to eat wisely for the planet, there are obstacles to seeing kangaroo meat in these terms. For at least some of these consumers, the fact that kangaroos are harvested in areas where domestic livestock continue grazing and land clearing may also take place is 'in conflict with the concept of a net gain to the environment' (Chudleigh et al. 2008: 10). A further difficulty for marketing kangaroo meat on environmental reasons is that if you discuss the need to use kangaroo meat so that populations are managed in balance with the environment, then you start introducing negative connotations that are associated with animals that are abundant, that is 'pests,' which are generally understood to be eaten 'only at times of outright necessity, and even then their consumption provokes a sense of disgust' (Peace 2011: 7).

Alternatively, campaigns utilising identity politics to promote the elimination of meat are very effective. Animal rights campaigns have a simpler and more attractive message to sell than the much more complex understanding required to appreciate the benefits that kangaroo can offer. As Michel Callon, Cécile Méadel and Vololona Rabeharisoa (2002) have argued, goods are defined by the qualities attributed to them and these must be invented and articulated in terms that consumers can relate to. This involves destabilising consumers from existing routines and aligning the characteristics of a good with some interest on the part of a consumer (Callon, Méadel and Rabeharisoa 2002: 205 cited in MacDonald 2013: 21). The challenge for kangaroo is the fact that their efforts in marketing, which have been focused around the use of the gourmet chef to champion the product, are frequently drowned by images of the kangaroo looking defensively into the licensed harvester's headlights. In the struggle to get a signifier accepted, it is very difficult for the complexity of ecology to work in the way that animals' suffering and rights can and do. This is particularly evident in the context of changing practices and attitudes towards meat consumption.

Contestation between cheap and high quality meat

This research uncovered a significant element of tension that exists between meat processors who depend on throughput of volume and those wholesalers/retailers who wish to create higher value products. Two European companies interviewed for this thesis had been working successfully to raise the profile of kangaroo meat in Belgium and France. High quality assurance is critical for any company trying to increase the value of kangaroo product going into supermarkets and restaurants. A case in point is a Belgium-based company who sell fresh filets and steaks into supermarkets and restaurants as a high quality product. The company has been steadily increasing sales by providing information to consumers at the point of sale, engaging the support of well-known chefs, and creating attractive packaging for the product. They advertise a range of attractive qualities about kangaroo meat including health benefits, but their major selling point is that it is a natural product: 'First of all it is pure nature – it comes out of the enormous spaces in Australia – you can't get more natural than a kangaroo' (European Meat wholesaler and processor (a), Belgium, August 2012). From the perspective of this company a key problem is a lack of investment by the supply chain in creating and marketing a quality product.

In general the whole kangaroo industry is volume driven, it is not quality driven. They can improve a lot on quality but what they want to do is process as much as possible and put it in a box and put it in a container (Belgium wholesaler and processor three (a), Belgium, August 2012).

However, they claim that their efforts are constantly undermined by the quality of the product that they receive. The independent laboratory testing they have undertaken on the meat indicates it has unacceptable levels of bacterial contamination, and/or is very poorly butchered. Similarly, for these European distributors, their concern is that they have worked extremely hard to put kangaroo on the market and promote it, but given their knowledge about the food safety issues they are very vulnerable to another supplier bringing kangaroo meat through and having quality issues emerge which will spread to their own products.

There is a major conflict between those who are trying to develop the value of the meat and those who are selling the meat cheaply.

So the problem is that you have in Europe two kinds of kangaroo meat. One is good quality, good cut, brought to the people with pleasure and with love and with good intention and the others who sell it cheap, cheap, cheap to get it going through (European wholesaler and meat processor (a), Belgium, August 2012).

These statements concur with what other meat wholesalers reported about price being the advantage that the meat has for those buying it for game goulash, which is how it is most frequently consumed in Europe:

So why do they use kangaroo meat in the game goulash? It's because it's all about price. People are not aware they are eating this cheap meat which is also good, they don't know – they think we eat deer (European Meat trader, Germany, August 2012).

According to these interviewees, this focus on cheap meat supplied in volume means that their suppliers are not interested in the issues that they raise in relation to butchery standards and meat quality. They have had a number of shipments from one of the major processing companies with low standards in relation to butchery (inability to de-membrane effectively) and very high bacteriological counts.

What happens is that when we get goods from xxxx and we send an email saying, 'Look, these are the bacteriological results, this is the problem.' And they say to us, 'You are the ones that always complain because with other sales we don't have any problem.' But the problem is that the other ones buy cheap, cheap, cheap, cheap goods to get it going through, so you have in fact in Europe two kinds of kangaroo meat, one good quality, good cuts, well packaged and brought to the people with pleasure (European wholesaler and processor (a), Belgium, August 2012).

Creating a higher value for kangaroo meat is critical before consumers accept it as a nutritious food and before kangaroo management can be integrated with traditional grazing to deliver ecosystem benefits. The experience of a company, as expressed by the interviewee above highlights that it is possible to create greater demand for high value kangaroo products, but to sustain these markets will require more attention to quality at all levels of the supply chain.

I don't have competitors; I have colleagues. My only competitor is bad quality. I have worked so hard to put this type of meat on the market, someone else comes out with another product, bad quality and people try it for the first time and its bad quality, even rotten, and they don't like it and it takes me 20 years to convince that customer to try it again (European wholesaler and processor (a), Belgium, August 2012).

The example illustrates the tension that exists between meat processors who depend on throughput of volume and those wholesalers/retailers who wish to create higher value products. Marketing a quality premium product requires telling a story that connects to place and makes the product good to think about. Investing in building the provenance and reputation of a product is highly risky if the supply chain is not developed to ensure the food safety requirements are met across the supply chain. The lack of investment by the industry in the development of these types of marketing campaigns raises questions about whether there is a commitment to raising the value and provenance of the product in the domestic market.

It has been widely reported (Peace 2011; Ampt 2006) that the association between kangaroo meat and pet food may have distorted the image of kangaroo meat for domestic consumers. Why, then, have we not seen new images and been told new stories about the qualities of the meat? Aside from a few celebrity chef promotions, there have been very few attempts by the kangaroo industry to market kangaroo meat products into the domestic market. The difficulty

seems to be that marketing a quality product requires telling a story, and as one of the interviewees said, ‘the element missing is the story’ (Meat processor two, South Central Queensland, April 2012).

Potential for geographical indications to create value for kangaroo meat

One approach that could be considered in developing the value of kangaroo meat is the use of geographical indications. These ‘designation of origin systems’ create the links between the characteristics of the land as well as human interventions, such as cultivation, breeding or fermentation (Bérard and Marchenay 2006). There is evidence from both overseas and Australia, that geographical indications have the potential to build a dynamic that provides for a diverse range of grounds for action (Bowen and Mutersbaugh 2014; Ray 1998; and Van Caenegem 2014). It may offer an opportunity to support the involvement of landholders in the commercial harvest and to build the quality and value of the product, by building links with land stewardship and conservation.

It has to be acknowledged that many parts of Australia might struggle initially to use cultural markers as a resource. For example fostering the *terroir* of somewhere like the ‘Channel Country’ in South West Queensland could be difficult because many Australian consumers are essentially disembedded from these landscapes. Foods labelled ‘Barossa foods,’ ‘Yarra Valley’ or, most famously, ‘Tasmanian foods’ have come to resonate with middle-class consumers, but it is unclear whether the geographies of the inland can achieve the same status. Nevertheless it is worthy of attention because it could offer the opportunity for groups of rangeland graziers in specific areas to build the esteem and reputation of the products produced on their land. In this way it could connect the knowledge and practices of agro-ecology to the consumers. For producers in the rangelands this would not need to negate the existing narratives relating to beef and lamb production—it would be about expanding these narratives. Geographical indications could provide opportunities to create new identities and practices. In the past the separate position that the kangaroo industry occupies relative to other livestock industries presented a barrier to the promotion of kangaroo meat. Geographical indications has the potential to provide a pathway for negotiating the issues relating to competition. The key concept here is related to the processes through which farmers manage these grazing systems where animal products of all types—beef, lamb, goat and kangaroo—are grown in native pastures alongside a range of other fauna and flora. Integrated land-management practices on a broader scale than at the individual property level are required to protect the productive functions of these landscapes for the future. To achieve this is going to require a range of different policy frameworks and settings. Certification for geographical indicators could offer a pathway for rangeland graziers to work together, and to build narratives about the connections between food production and the ecological systems in those landscapes.

Summary

Despite many arguments about the low value of kangaroo meat related to taste or quality, the evidence suggests that kangaroo is happily consumed in a range of different cuisines internationally, but less so in Australia particularly with respect to manufacturing meat, which represents a significant proportion of the animal. The advantages that kangaroo meat has for manufacturing small goods have been recognised by manufacturers across the world, particularly in places with a history of artisan production. The difficulty is that kangaroo is often adopted by these producers on the basis of price. So despite the value that it has in creating a high quality product, its nutritional properties and its advantages in terms of environmental externalities, the key marketing advantage is as cheap meat. It is sold opportunistically into markets as demand arises for substitutes to the standard meats used in that country's traditional meals.

For this reason I argue that past and future returns from offshore markets inhibit any industry interest in the connections between eating kangaroo and eating sustainably. In addition, the powerful lobby groups responsible for marketing animal foods such as beef and lamb have a vested interest in concealing the advantages that kangaroo meat has over other products in relation to ecological concerns.

Chapter Six

Regulatory Frameworks in Action

This chapter considers the implications of the current regulations relating to the commercial harvest of kangaroos for biodiversity management and the sustainability of rangeland enterprises. The first half of the chapter provides an overview of the legislation and regulatory frameworks governing the commercial kangaroo harvest. It is divided into two subsections: Commonwealth regulatory frameworks governing management plans and export; and State government regulatory frameworks which enable the management plans to be operationalised. The remainder of the chapter explores how the interests of other key actors in the chain influence the operation of the regulatory framework. The regulatory framework outlined in this chapter cannot be understood fully without recourse to an historical perspective. This chapter begins with that historical detail in order to shed light on the drivers behind the development of the regulatory framework. The chapter is based both on interviews with individuals within the kangaroo supply chain and information from government documents and websites.

Antecedents of the current regulatory framework

The key driver behind the establishment of the commercial kangaroo industry was pest control. The kangaroo industry provided the self-funded pest control mechanism that was considered necessary to reduce the grazing pressure caused by high populations of kangaroos in the rangelands (Pople and Grigg 1999, cited in Thomsen and Davies 2005: 1239). In the 1950s kangaroo populations were reportedly in very high numbers but, by 1964–65, drought and overharvesting caused a crash in the numbers. Following the rapid reduction in kangaroo numbers, Australian governments moved to introduce a licensing system to regulate trade (Fox 2008 in Lunney2010: 390). Whilst initially farmers were concerned with competition for feed between kangaroos and cattle, over time the rationale for killing kangaroos changed as farmers became increasingly aware and concerned with land degradation. Hence ‘they shifted their characterisation of the kangaroo as competitors with sheep to “direct causative agents in land degradation”’ (Grigg 1987: 11). The result was an ongoing conflict between kangaroos being seen as a destructive pest by farmers and as a valuable resource for meat processing industries. It is noteworthy that at the time of the industry’s emergence, white Australians had scant knowledge of wildlife management or ecology and the notion of managing kangaroos on a sustained yield basis was very forward-thinking for its time. As Daniel Lunney explained:

There was very little known about the indigenous wildlife, certainly very little which related to the dynamic inter-relationships of living systems apart from an intuitive understanding built upon

more or less random experiences and observations, many of which were recorded in works such as 'Furred Animals of Australia' by Ellis Troughton [1943] (Lunney 2010: 387).¹

As Lunney has documented it was a small group of people in NSW who introduced a range of ideas that have remained influential until the present day. These policy ideas were put forward by, for example, members of the Fauna Policy in NSW, and were influenced by the ideas coming through from the American Conservation Foundation, who drew links between kangaroo conservation and sustainable use (i.e. in a similar way to the use of wild game in Rhodesia). This group of public officials advocated for government support to stabilise the industry in order to make it profitable in the long term as a mechanism for controlling population fluctuations (Lunney 2010: 392). The framework that they developed provided the basis for the current harvesting arrangements described below. However in many respects I would argue that the current arrangements fail to deliver on this vision because the commercial industry is essentially separate from land management.

Regulatory framework of the Commonwealth: Trade and biodiversity impulses intersect

The kangaroo populations under harvest in Australia are a common pool resource under state control (Cooney et al. 2012: 157). 'In all states and territories of Australia the Crown is either explicitly recognised in legislation as owning all wild animals, or this is implicitly accepted in practice' (Cooney et al. 2009: 285). The management and commercial harvest of kangaroos is the responsibility of state and territory governments, while the Australian Government manages the export of the commercial harvest. Like many other areas where law making is divided between state and commonwealth governments there is also tension relating to the management of kangaroo populations. The Commonwealth has no direct control of wildlife management, including kangaroos. In order to expand its jurisdiction into this area the Commonwealth invokes its external affairs power to create legislation for the welfare of kangaroos that are subject to international export.²

In 1984 the Commonwealth introduced legislation that requires the states to develop management programs that are approved by the Federal Environment Minister (Pople 2004). Only kangaroos harvested in the parts of Australia that have kangaroo management plans can be used for commercial purposes. Substantial parts of Australia do not have these plans; in these cases although kangaroos can be culled their carcasses cannot be commercially utilised. The provisions around sustainability and animal welfare concerns were strengthened in 1999 with

¹ For more information about the history of kangaroo management in NSW see Lunney (2010).

² *Environment Protection and Biodiversity Conservation Regulations, 2000, Statutory Rules No. 181*, 2000 made under the Environment Protection and Biodiversity Conservation Act 1999, Commonwealth of Australia.

the introduction of the *Environment Protection and Biodiversity Conservation Act*. One of these provisions is the National Code of Practice (commercial and non-commercial) for the humane shooting of kangaroos and wallabies (Department of Environment, Heritage and Arts 2008). This code outlines the minimum standard practice for shooting kangaroos so that the animal is killed in a way that minimises pain and suffering.

The Commonwealth legislation requires kangaroo management plans to demonstrate how the size of the population will be assessed; how they will ensure conservation of kangaroos over their existing range, the way commercial use will be regulated, and how they will ensure compliance with the regulations. In the management plans, licensing and quotas are proposed on the basis of population reviews. The management plans are then required to demonstrate that harvesting does not have a negative impact on either the species or the ecology of the species.

In addition to its 'overview role' the Commonwealth has a direct regulatory function in relation to the export of kangaroo products. The Department of Agriculture provides assistance with exporting goods from Australia and issues export permits under the *Export Control Act 1982*. Under the Act, kangaroo meat intended for export must be prepared at registered premises that are inspected by the Australian Quarantine and Inspection Service (AQIS). To ensure quality and compliance with the requirements of importing countries, kangaroo products must also be inspected. A breach of government regulations relating to the export of kangaroo meat may lead to fines of up to AUD250,000 or imprisonment for up to ten years or both. The assistance that AQIS provides to exporters also includes help with quarantine barriers and the preparation of government health documents.

Regulatory framework of the State: Management of the commercial harvest in Queensland

The Queensland government's stated objective for the administration of the harvest in Queensland is to operate in accordance with the International Union for Conservation of Nature (IUCN) Recommendation 18.24,

the ethical, wise and sustainable use of some wildlife can provide an alternative or supplementary means of productive land-use, and can be consistent with and encourage conservation, where such use is in accordance with appropriate safeguards (IUCN 1990: 2)

Harvesting of kangaroos in Queensland is regulated by the following key pieces of legislation: the *Nature Conservation Act 1992*, the *Animal Care and Protection Act 2001* and the *Food Production (Safety) Act 2000*. The *Nature Conservation (Macropod) Conservation Plan 2005* (subsidiary legislation to the Nature Conservation Act) sets out the requirements for regulating the commercial harvest. This legislation specifies a number of requirements, but the key elements are the harvest zones, the quota, the conditions on the harvest notice period, as well as

certain conditions on the commercial license.³ To ensure that the legislative requirements of both State and Commonwealth governments are met, the department responsible for managing kangaroo populations prepares a five-yearly plan. The goal of the Wildlife Trade Management Plan for Export—Commercially Harvested Macropods 2013–17 is ‘to provide for the sustainable use of macropod species covered by the plan, in accordance with the principles of ecologically sustainable development’ (Department of Environment and Heritage Protection, 2012). These principles are defined in the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

In Queensland, the Macropod Business Centre, which is located in the Department of Environment and Heritage Protection, is responsible for the development of the management plans and administration of the harvest. The Department of Natural Resources and Mines has responsibility for leading industry development and animal welfare and biosecurity issues. The other Queensland government agency that has a major role in the oversight of the harvest is Safe Food Production, a statutory body established under the *Queensland Food Production Safety Act 2000*, which reports to the Queensland Department of Agriculture and Fisheries. Accreditation through Safe Food Production Queensland is required to produce and process any meat product in Queensland. In relation to kangaroo meat, Safe Food Queensland implements the compliance with the national standard for the production and processing of meat under the *Food Standards Australia New Zealand Act 1991* (Cth), Australia New Zealand Food Standards Code – Standard 1.6.2 - Processing requirements for meat.

The Queensland Government also has the authority under the *Nature Conservation Act 1992* to permit non-commercial culling in order to minimise damage or loss of property. Damage mitigation permits provide ‘shoot to let lie’ tags, generally these carcasses do not enter commercial trade (although there are some exceptions). In Queensland the number of macropods that can be culled under a single permit is 1000; this can be applied to one species or spread across several species. This quota is set to ensure that there is fair and equitable access to the quota set by the Nature Conservation (Macropod) Conservation Plan 2005 for damage mitigation.⁴

There are three commercial harvest zones in Queensland. The harvest zones are then broken into 22 monitoring blocks in which surveys are conducted using line transect methodology from

³ For the current Quota Submission for Commercially Harvested Macropods in Queensland, see Queensland Government, Harvest quotas and zones. Online: <https://www.qld.gov.au/environment/plants-animals/wildlife-permits/macropods-quotas/> (accessed 17 May 2017).

⁴ Department of Environment and Heritage Protection. Information Sheet Wildlife management, Assistance for landholders: Managing macropods to minimise property damage. Online: <https://www.ehp.qld.gov.au/licences-permits/plants-animals/documents/is-wl-dmp-landholder.pdf> (accessed 17 May 2017).

helicopters.⁵ The kangaroo populations within these blocks are estimated annually based on these aerial surveys. Harvest quotas are then based on a fixed proportion of the estimated population; known as constant proportional off take; this strategy has been used in Queensland since 1984.⁶ The approach is considered a low risk for species where the estimation of population size is regular and accurate (Pople 2004). In each of the harvest zones there are conditions on the harvest period. These conditions specify trigger points, which are used to adjust harvest quotas. For example, where a harvest zone shows a greater than 40 per cent female harvest, 'then appropriate management action would be taken' (Southern Region 2013: 6). In these circumstances the industry might receive a revised Harvest Period Notice.

Between species there are variations in the proportion of animals allocated to the quota. The maximum proportions used for each species are 15 per cent of populations for eastern grey kangaroos and common wallaroos, and 20 per cent of the population for red kangaroos. These maximum proportions are applied only to populations within the Central Harvest Zone where the survey effort is greatest. In both the eastern and western harvest zones more conservative harvest proportions of 10 per cent are used for species for which a quota is set. These sustainable-use harvest proportions are based on research and modelling undertaken (e.g. by Caughley et al. 1987; Hacker et al. 2004). The sustainability of a commercial harvest managed on the basis of this modelling has been confirmed in several reviews carried out by independent scientists (e.g. see Olsen and Braysher 2001; Olsen and Low 2006; and Lunnery 2010). Using the prior year's population estimates the Macropod Business Centre determines by individual species the percentage of the population they will allow to be harvested. These quotas are then submitted for approval, first to the State Minister and then the Commonwealth Minister for the same department. The purpose of the plan is conservation, but it is this document that allows trade in kangaroos from anywhere in Australia including Queensland to take place. An additional requirement in the legislation on harvesting is the minimum weight limit, which means that animals that weigh below 13 kilograms cannot be harvested.

The Macropod Business Centre monitors and manages the harvest of kangaroos through the allocation of tags. These tags are colour-coded for each species and year. Every kangaroo delivered for processing must have a self-locking numbered tag attached to the carcass. Harvesters apply to the Macropod Business Centre for the tags. Only the licensed harvester who purchases the tag can use that tag. The price of a tag was 75 cents in 2012; in this way the

⁵ Line or strip transect sampling from a fixed wing aircraft involves trained observers seated on either side of the plane. Observers count the kangaroos visible in 200 metre-wide strips on the ground that are delineated by streamers or rods attached to the wing struts on either side of the aircraft. Further details and references relating to this method can be found at Australian Government. Commercial harvesting of kangaroos in Australia. Online: <https://www.environment.gov.au/node/16675> (accessed 17 May 2017).

⁶ At the time of this fieldwork the Department was known as the Queensland Department of Environment and Resource Management.

administration of the harvest is self-funding. The harvesters are required to return records to the Macropod Business Centre to indicate their use. The Macropod Business Centre monitors the use of these tags to check on characteristics such as sex and species, and records this along with the number of kangaroos harvested.

The Queensland Department of Environment and Heritage Protection issues commercial Wildlife Harvesting licences. To operate in the kangaroo industry as either a harvester or a field depot operator requires a licence. The number of licenses that were current in the years between 2008 and 2015 are listed in Table 2. These figures, provided by the Department of Environment and Heritage, show that the number of both dealers and harvesters has declined during that period. In 2008 there were 2,101 harvester licences and in 2013 only 1,045; in 2008 there were 236 dealer licences and in 2013 there were only 93 licences.

A harvesting licence provides the holder with the authority to take a protected species. The licensees are supposed to ensure that harvesters are competent to take a live animal in an ethical way. The requirements for a licence include: a technical course with a component on animal welfare; a current firearms license; and a firearms competency test. Applicants must also state whether they have been convicted in the previous three years for any offences against the Nature Conservation Act or against animal welfare.

And we have had a few instances where people have shot kangaroos on the road, poaching, doing things like that, who have then applied to us for a licence, and we have refused a licence because we don't deem them as a suitable person to harvest in a competent and ethical way (Macropod Business Centre manager, Charleville, April 2012).

Harvest Period	2008	2009	2010	2011	2012	2013	2014	2015
Number of kangaroos commercially harvested	1,249,761	1,206,346	830,618	1,013,330	975,304	1,140,580	1,044,498	1,061,009
% of overall quota	64.10%	55%	36.24%	55.5%	31.4%	31.4%	20.8%	26%
Bias towards males	83%	86%	87.96%	86.8%	88.9%	93.2%	97%	96%
Harvester licenses	2101	1952	1641	1455	1314	1126	1064	1045
Dealer licenses	236	206	161	125	118	88	87	93
Infringement notices	24	22	28	21	31	24	7	5
Warning notices	37	87	21	46	19	??	79	63
Prosecutions		7	0	0	1	0	0	3

Table 2. Activities of the Commercial Macropod Management Program, Queensland 2008–2015

Source: Queensland Commercial Macropod Management Program, Annual Reports 2008- 2015. The Department of Environment and Heritage Protection, Queensland. These reports summarise the activities of the program for that year in accordance with the Wildlife Trade Management Plan for Export.

When a licence is issued it provides a list of all the requirements of the licence. In addition to the licence, before a person can begin harvesting it is a condition of their authority that they carry a signed landholder's consent form; this is the evidence that the landholder has given the harvester approval to harvest on their property.

The administration of the harvest also involves monitoring compliance and enforcing penalties for violations of the regulations. At the time of this research the Macropod Business Centre employed two compliance officers for these functions. The compliance officers also enlist the support of wildlife officers in local ranger centres to help them with surveillance activities. Surveillance primarily involves surveying the harvesters and field depots to ensure that the animals are the correct weight, that they have valid tags (i.e. they are the correct species for the tag and the tags are current) and there are no body shots. The agency also audits firearm licence registration throughout the year to ensure compliance of licensed harvesters and works 'quite closely with the Queensland Police doing audits and inspections as well' (Manager of the Macropod Business Centre, Charleville, April 2012). In most cases offenders are ticketed and fined, with records showing very few cases proceeding to the courts (Table 2).

Other key actors

Aside from the government and its representative agencies there are a number of other actors active in the institutional framework for the commercial harvest of kangaroos, these include:

The Kangaroo Industry Association of Australia (KIAA)

The Kangaroo Industry Association of Australia (KIAA) is the peak representative body for the kangaroo meat-processing sector and the peak industry group with whom governments consult in relation to management of the commercial harvest. For much of its history the KIAA operated with a voluntary president (one of the Directors of the meat processing companies), and then a part-time executive officer position was established. The KIAA supports the Australian Government in compiling relevant data and documentation required for negotiating market access. The main focus for the KIAA over the last decade has been enlisting the support of the Australian Government in negotiations to open the Chinese market to kangaroo products. The position also responds when required to reports about product quality, providing data and information to address allegations of problems with kangaroo meat hygiene. In the interviews conducted for this research several participants emphasised that whilst the government regards the KIAA as representative of the kangaroo industry, in fact it only represents the voice of the meat processors, with harvesters having extremely limited representation.

Agforce

Agforce is the peak organisation representing primary producers in Queensland. Within Agforce there is a Macropod Advisory Group that works on issues in relation to kangaroos affecting land management, this includes harvest management, damage mitigation permits, total grazing pressure and population estimates.

Science community

The science community includes primarily biologists, working on biodiversity and sustainability of farming systems in Australia's rangelands. This cohort includes a range of government scientists and academic researchers who have demonstrated the benefits of applying conservation through sustainable use approaches to the kangaroo harvesting (Grigg, Hale and Lunney 1995; Grigg 2002; Cooney 2008; Cooney et al. 2009). Some of this research was done under the Future of Australia's Threatened Ecosystem Program (University of NSW) and projects administered by the Rural Industries Development Corporations Animal Industries (New, Developing and Maturing Program), which is funded by levies from the kangaroo Industry.⁷

Animal rights lobby groups

There are a number of advocacy groups operating both in Australia and overseas who oppose both the commercial kangaroo harvest. This includes Voiceless, Australian Society for Kangaroos, Animals Australia, PETA and VIVA. The RSCPA is also actively engaged with matters relating to the welfare of kangaroos in relation to the commercial harvest, or through their individual efforts to lobby government or hold government agencies to account for the administration of the harvest.

These groups engage regularly with the agencies involved in the administration of the commercial harvest. This engagement occurs through a range of forums including formal committees (e.g. the Ministerial Macropod Advisory Committee); during the review or development of standards relating to the harvest; engagement with government on specific issues of concern, or through in-direct and direct lobbying of public opinion and officials. Whilst this list of actors may not be exhaustive I have included these actors because their interest and activities intersect in ways to drive outcomes that are not necessarily aligned with the stated objectives for managing kangaroo populations. These difficulties are evident in

⁷ The National Residue Survey excise levy on the processing of kangaroos is 3.0 cents per carcase and a further 4.0 cents per carcase is collected for R and D for kangaroos used in human consumption (*Primary Industries Levies and Charges Collection Act 1991*, the *National Residue Survey (Customs) Levy Act 1998* and the *National Residue Survey (Excise) Levy Act 1998* Statutory Rules No. 147, 1998.

relation to the contestation of land management and sustainable development and the problems being reported with meat hygiene.

Contestation: Land management, sustainable development

The material uncovered in this study, suggests that the current approach to kangaroo harvesting in Queensland falls short of the principles and values for managing rangelands that were agreed by Australian governments for the purposes of ecologically sustainable management (see Australian Government Document 1999: 875). Key shortcomings include:

- capacity for sustainable resource management by the land user is removed and delegated to government, and
- enforcement of the harvesting arrangement relies on sanctions rather than incentives, or coercion rather than encouragement, to deliver the desired outcomes.

At present the kangaroo harvest returns no income back to the rangeland graziers involved, and at the same time the kangaroo industry ‘relies on a product dependent on the resources of people who typically would like to eliminate it as far as possible’ (Cooney et al. 2009: 284).

At the time the fieldwork for this study was conducted kangaroo populations were growing rapidly following a period of high rainfall.⁸ The graziers I interviewed talked about the pressure exerted by increasing numbers and the strategies that some graziers would carry out to reduce the numbers of kangaroos grazing on their land. It was extremely alarming to hear stories being recounted, which involved kangaroos being poisoned, allegedly to manage grazing pressures, as this interviewee explained this practice involves the use of urea:

They can’t handle urea. So they just put urea into the water trough and close the gate. The cattle can’t get through it and the sheep can’t get it. Kangaroos can crawl through all day long so they just put it in the water and kangaroos come during a night or a day. They let the trough out and refill before they allow the cattle back in again. National Parks had a fellow down here at ... they counted something like 5000 dead kangaroos on his property. But they couldn’t prosecute him because they couldn’t prove that he did it. He did that because they were eating him out of house and home (Meat processor two, South Central Queensland, April 2012).

This cruelty is clearly unacceptable and raises concerns that the current system is failing kangaroos. The major issue here is that the kangaroo does not deliver benefits to graziers grazing cattle in the rangelands, only costs. Graziers interviewed in this study and the Agforce

⁸ There are no regulations governing stocking on pastoral land in Queensland. The variations in land type, condition and the changes in climate mean it would be difficult to create regulation in this area. Instead the Queensland government provides information to assist graziers with making decisions about stocking. See Queensland Government. 2017. ‘Grazing frequency and intensity.’ Online: <https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/grazing-pasture/sustainable-grazing/frequency> (accessed 7 June 2017).

representative claim that these costs can be in the order of hundreds of thousands of dollars to an individual grazier. Government has in turn questioned these costs, for example research conducted for the NSW government found that kangaroos did not have the impacts on production that graziers assert (Olsen and Low 2006). Nevertheless the current practice of putting up fencing to exclude kangaroos suggests that this issue is seriously affecting graziers. As the representative of the Agforce macropod advisory committee explains:

Going through all the previous branch meetings, it is one of the consistently main issues, yes. So wild dogs, dingoes would probably be more important. But kangaroos are definitely there. So people are spending half a million dollars on fencing their properties to exclude kangaroos.

Interviewee: Are they doing that because of dogs as well?

Agforce representative: In some instances they are, but in some instances it's only because of kangaroos. Its \$6000 a kilometre and its happening in quite a lot of places ... more around Charleville and Augathella. I was talking to one of those people about it and he said well, I can spend half \$1 million to fence off my property from kangaroos, or I can buy the next-door property. The biggest way to increasing production is controlling kangaroos but the negative of doing all that exclusion fencing for kangaroos, is that you actually exclude everything else. And if you talk to (name of conservationist), he is horrified at the thought. Because he is a strong believer in climate change and he thinks the animals will need to migrate from habitat to habitat to adjust to climate change and exclusion fencing will prevent that (South Central Queensland, April 2012).

The Agforce macropod advisory committee representative stressed that graziers do not want to do this but to maintain viability they are forced to put in the fencing to deal with the large aggregations of kangaroos on their land. In the interviews I conducted debates about the abundance of kangaroo populations and the efficacy of the commercial harvest for managing grazing pressure was raised repeatedly.

As outlined above, under the current regulatory framework monitoring activities of the state are all focused on documenting the abundance of the macropods under the commercial harvest. Every year the figures relating to the harvest are published on the website of the Department of Environment and Heritage Protection.⁹ While the population estimates show fluctuations in the number of kangaroos under harvest, over time numbers remain consistently high. In 2012, when this study was conducted, the population estimate of Macropods in the areas where commercial harvesting takes place in Queensland was 24,088,150. For the state as a whole the numbers of these macropods would be significantly higher (see Appendix 2). Yet despite the evidence that populations remain abundant there are a small number of people who prosecute the notion that kangaroo numbers in Australia are declining. In Chapter 3, I listed some examples of this line of advocacy, and there are many others available across the internet. There is also an ongoing of

⁹ For the current Quota Submission for Commercially Harvested Macropods in Queensland, see Queensland Government, Harvest quotas and zones.

enquiry from private citizens concerned about this issue to government ministers. The Macropod Business Centre Manager estimated that he spends up to two days each month addressing official correspondence. The representative of the Agforce macropod advisory committee seeking answers from the government, claims there are challenges in getting responses from policy makers because of the political sensitivities that surround the harvest. Whilst kangaroo meat has gained acceptance as meat for consumption, he claimed that politicians and policy makers are still very reluctant to become involved in the issues relating to the commercial harvest. The view that politicians were reluctant to act or become involved for fear of repercussions was repeatedly made in the interviews conducted in Australia. For example the representative of the Agforce Macropod Advisory Committee described making repeated representations to the government about the problems that rangeland graziers were having managing the grazing pressures from large populations of kangaroos (but without response).¹⁰ With respect to this issue Graziers were seeking responses from government in relation to the size limitation on current harvesting practices, the male-only cull strategy and the instability of kangaroo meat markets.

The minimum weight requirement (13 kilograms) for the commercial harvest of kangaroos is one of the issues of concern to graziers. According to one of the Queensland government officials interviewed for this study that requirement was introduced at the request of the kangaroo processors back in the early 1980s, the reason being that the cost of processing is proportionately higher for smaller kangaroos. As the Department of Environment and Heritage Protection continues to enforce this weight limit, the selection of kangaroos for harvesting tends towards older, larger animals.

So the harvesters could target young males no worries at all but they are not allowed to [harvest smaller animals] and the processors don't want them to. So there are two silly scenarios. One is that 16 kg I think is the minimum weight that the manufacturing people will accept. And I think the State government wants around about 14 kg, but you'd need to check those. But because there is loss from blood and dripping and carcass shrinkage they call it, and there is this enormous fine if you go under that, even though there is no environmentally sensible reason for it. So no one wants to be caught with a kangaroo anywhere near that weight (Grazier three, South Central Queensland, April 2012).

This requirement is contentious because rangeland graziers would prefer harvesters to shoot the smaller roos, which are more plentiful, but the kangaroo industry can withstand pressure from rangeland graziers to shoot smaller animals because it is not permitted under the regulations. The Macropod Business Centre Manager in discussing the requests from Agforce to revise

¹⁰ This interview was conducted in April 2012, changes may have occurred since that time.

down the weight restrictions, pointed out that whilst the government could chose to reduce the weight limit, this would be largely irrelevant to the practices of the harvesters. He said,

Something Agforce came up with a little while ago, they mentioned maybe we should look at lowering the minimum weight and we pointed out well we could do anything with the minimum weight, processors dealers would not buy it (Manager of the Macropod Business Centre, Charleville, April 2012).

The other government representative I interviewed also shared this perspective:

So therefore the pressure is taken off that sector, the harvester through to the processor. They can legitimately say no, we can't shoot that size animal since it's underweight or undersize (Queensland Policy Officer, South Central Queensland, April 2012).

The critical issue from a land management perspective is how the weight requirement in the legislative framework affects the kangaroo populations under harvest and the grazing pressures they exert. This issue was raised several times by both graziers and harvesters in the interviews for this study, for example this harvester talks about the pressure he is under from graziers:

And it's like a lot of times lately, they will be whingeing at you, that you are not shooting enough roos. But there are just no big roos there, they have got any amount of little roos and you can drive around looking at them all night. But you can't shoot them and they are the ones that bother the farmers more than anything, because they have so many of them there and they are never getting shot (Field depot operator and harvester two, South Central Queensland, 2012).

The observations are supported by the modelling which shows that 'size-selective harvesting can result in significantly smaller kangaroos for a given age when the entire population is subject to harvesting' (Tenhumberg et al. 2004: 2003). However the same modelling also found that harvest refuges have the capacity 'to counteract potential effects of size-selective harvesting on the allele frequency of red kangaroo populations' (ibid.). These findings again underline the importance of integrating kangaroo harvesting and land management, in order to provide incentives for graziers to retain harvest refuges.' Another issue raised by some graziers interviewed in this study was the 'male-only harvesting policy'; some graziers believe that the male-only harvest is having a major impact on the dynamics of kangaroo populations. Under the present arrangements almost all of the animals being harvested are male and this represents a significant change in harvesting practices. These interviewees claimed that in addition to the work by Steven McLeod, Ron Hacker and John Druhan (2004: 20), further research is required to understand the recursive relationship between how harvesting practices such as the male bias and the 13 kilogram minimum weight impact on the population spikes and troughs related to cycles of rain and drought.

In this study there were several explanations given by government representatives for the absence of further research in this area: first the lack of funding—currently almost all the funding generated by the harvest itself is returned to population monitoring. The second reason

given was if anything the male-only cull is expected to ensure there are more animals rather than less, given that most females are likely to have young in pouch and at foot. Third it is not seen as being within their area of responsibility. The Manager of the Macropod Business Centre indicated that he was aware that rangeland graziers struggle to manage the impacts of fluctuations in the numbers of kangaroos on grazing areas when the populations increase following years of good rainfall. However he explained that the Government does not regard it as its role to manage kangaroo populations to more stable levels, because it regards this as a natural cycle regulated by the environment.

Manager of the Macropod Business Centre: We saw it back in the early 2000s, populations exploded ... and of course they dropped off after they went through their natural cycle and essentially ran out of food and came back to a more average population number.

Interviewer: So the environment regulated them?

Manager of the Macropod Business Centre: Absolutely and that's been happening ever since. And I think it is impractical to expect the government to intervene and keep a specific species at a constant level when there are natural population fluxes and trends that have happened for thousands and thousands of years. What we can do though is take advantage of those population spikes and booms and if we have an export market we have a program which allows the harvest to take place. Another thing to note too is that there are some people fencing their properties now from kangaroos.

The main message here is that from the Government's perspective the main priority in relation to sustainability is ensuring that a national native species is not going to be impacted on from the harvest. The difficulty with this perspective is that kangaroo population monitoring is essentially divorced from a broader understanding of the health and management of ecosystems. This is also reflected in the fact that macropod harvest zoning neither equates to bioregions nor does it match Australia's Natural Resource Management regions where resources and decision making flow for land and water management. Misalignment is maybe a barrier to more appropriate management of kangaroos, and aligning such boundaries would make more sense ecologically. In light of these issues it is debatable whether the plans can really demonstrate that harvesting does not have a negative impact on the ecology of the species, as they are required to do by the Commonwealth legislation.

From the graziers' perspective kangaroo population spikes severely impact on their ability to manage total grazing pressure, which in turn impacts on their profitability. Despite decades of research, scientists working to involve graziers in the commercial harvest to support biodiversity in the rangelands have failed. The current situation, where graziers incur only costs and no benefits, presents significant risks for conservation goals in the future. As the conservation scientists (Cooney et al. 2009) have argued, in these circumstances it is highly likely that 'magic bullet' solutions to cheaply reduce kangaroo numbers will be rapidly adopted

as they become available. Methods emerging to rapidly reduce kangaroo numbers include immuno-contraception (Cooper and Larsen 2006 in Cooney et al., 2009) and technologies to prevent kangaroos from drinking (Finch et al. 2006; Foresheew 2007 in Cooney et al. 2009: 284).

It is a serious concern that many rangeland graziers are now erecting macropod-proof fences around their properties (Cooney et al. 2009: 284).

This removes kangaroos completely from large areas and will inevitably disrupt foraging and dispersal patterns of other species, including small macropods of conservation concern (Cooney et al. 2009: 284).

Some commentators have argued that these scenarios—where kangaroo populations are reduced and harvesters are excluded from fenced areas—highlight the vulnerability of the meat processors who have limited control over primary production (Cooney 2009). Rosie Cooney (2009) also writes that at the same time there is also nothing in the current regulation governing the commercial industry which prevents graziers from participating more directly in harvesting kangaroos. Within the rules established by the state, graziers could regulate patterns of resource use within their quota, if they gained the rights to withdraw and they could also receive benefits.

There have been a number of initiatives where graziers have come together to develop collaborative models: The Maranoa Kangaroo Harvesters and Growers Cooperative in Central South Queensland was underway during the time of this research, and there was a previous attempt made in NSW with through the Barrier Ranges Sustainable Wildlife Enterprise Trial, funded by the Rural Industries Research and Development Corporation (Ampt and Baumber 2010). One of the major obstacles to the development of these types of ventures has been difficulty in gaining licences to open a processing facility. It is notable that at the time of this research despite reports of several applications for this kind of operation in New South Wales and Queensland no licences for processing operations had been provided to this type of landholder initiative. Interviewees in this study reported that in the past when applications have been made for licensing or funding, public officials seek advice from the KIAA as the peak industry group and they have opposed these types of initiatives, on the basis that the industry can not sustain additional processors. The issue here is whose interests are being served. Escalating rates of land clearing in the areas under the commercial harvest underscore the urgency for this type of incentive. In Queensland clearing of woody vegetation, primarily for pasture, increased by 73 per cent in 2012–13 from 2011–12 and by a further 11 per cent from 2012 to 2014 (Queensland Department of Science, Information Technology and Innovation: 2015). These increases followed announcements by the State government early in 2012 that prosecutions of illegal clearing would be halted. In the absence of an effective regulatory framework to protect biodiversity from land clearing, incentives for ecological restoration are urgently required. Involvement of graziers more directly in the harvest offers opportunities: for

income diversification, to more effectively manage total grazing pressure, and most importantly to provide incentives for leaving patches of remnant vegetation.

Product quality: Disagreements about kangaroo meat hygiene

Like any other meat product, issues relating to meat safety can arise in relation to the treatment that carcasses receive during harvesting, transportation and processing. Kangaroos suffer from few of the diseases associated with domestic animals such as sheep and cattle, (Cooney et al. 2012). However animal rights groups continue to claim that they find problems with the hygiene of kangaroo meat and have reportedly produced evidence of carcasses contaminated with *E. coli* (Ben-Ami 2009), and supermarket meat contaminated with *E.coli* and *Salmonella* (Dingle, 2011). A study comparing the hygiene and disease status of kangaroo meat in processing plants with beef reported either similar or better microbiological qualities (Eglezos, Huang and Stuttard 2007). On average only 0.7 per cent of all kangaroo carcasses inspected show signs of any sort of pathological condition, which is the same figure from abattoirs that process domestic stock (Hopwood and Martin. 1991). Despite this finding, the industry has had ongoing problems with product quality going back to the mid-sixties, when regulations were first introduced to improve standards and upgrade the product (Kirkpatrick and Amos 1985; Lunney 2010). The most significant example of this was the closure of Russian markets. In 2008 Russia imposed a ban on imports of kangaroo meat on the basis of food-safety concerns. This was announced following the detection of coliform and salmonella bacteria in containers of frozen kangaroo meat inspected by Russian Veterinary and Phytosanitary Surveillance officials. Participants in the supply chain interviewed for this study did not believe that problems with meat hygiene were the reason for the suspension and they questioned whether the testing procedures and results were legitimate. Interviewees reported that port-of-entry testing departed from the established protocols that were in place at the time. As one interviewee explained,

And normally you don't do port of entry testing and we have data accredited labs – we test the meat and if it doesn't pass the test it's not allowed to be exported so no one really does port of entry testing. They decided to do that and change the regulation without notifying anyone, I might add. The first thing we know, AQIS knew, and we get a phone call: 'excuse me establishment, XX license suspended' (Meat processor two, South Central Queensland, April 2012).

In recounting the events around the suspension of kangaroo meat to Russia, several interviewees were emphatic in their opinion that there had never been an issue with the hygiene of kangaroo meat entering that market. They pointed to the anomaly of port-of-entry testing, of the benchmarks used in the testing and some interviewees also raised questions about political interference in the suspension of imports by the Russian Government. One of the interviewees explained the later suggestion as follows:

There was thinking that it was a political issue to do with Australia supporting Georgia and sending troops to Georgia to help train their people. Or it's something to do with uranium and the Australian government saying Russia could not have our uranium. So the Russian government decided to give Australia a lesson in politics ... The word that I get from Russia is that kangaroo is particularly Australian. Whereas they can get beef from anywhere else, they know that Australia needs Russia for the kangaroo meat (Meat trader one, phone interview, July 2012).

According to one of the processors at the time of the ban, the benchmark for acceptable levels of *E. coli* was about 10,000 parts per million, while the swabs taken by Russian officials found 3,200 parts per million. He stated that the Russian authorities then revised this down to zero, which in his words: 'is impossible – even the beef industry says they can't get below 1–2,000 parts per million, and we were 3,200 when the acceptable benchmark is 10,000 per million' (Meat processor three (b), outer Adelaide, June 2012).

In addition one of the meat processors pointed out that while his licence was suspended he had a month to continue to ship their product to their Russian buyers to satisfy their clients' pre-purchases. The interviewee claimed that this arrangement suggested that they did not have any real concerns about the quality of the meat.

They allowed us to continue shipping for another month and we cleared our stock. So how can there be a genuine food safety issue? If there was you would cancel it, wouldn't you? You would say, 'That's it, it's not safe to eat.' But they let us continue (Meat processor two, South Central Queensland, April 2012).

After suspension of the trade to Russia in 2008–09, the Queensland Government's meat hygiene authority SAFE Food Production Queensland (Safe Food QLD) and the Australian Quarantine Inspection Service (AQIS) implemented a range of changes to improve the food safety standards and hygiene procedures in the kangaroo meat industry.¹¹ These changes were designed to lift the standards to levels that will be more broadly accepted overseas and included: more intensive training requirements for harvesters' deadlines for delivery of the carcass to the field depot and the removal of the dual standard for processing. Previously there were dual standards for meat processing: one for pet food and the other for human consumption. Meat that was processed for pet food could be identified by blue ink. This was part of the regulations designed to avoid crossover from knackereries into human consumption supply chains (which involved spraying all surfaces of a carcass or part thereof with a solution of methyl violet). After the Russian market was suspended, Food Queensland changed the regulations to set one

¹¹ Russian delegations to Australia indicated interest in farmed kangaroo meat. The difficulty is that kangaroos must maintain their mobility in order to stay healthy. The feasibility of farming kangaroo was carefully explored by N.C. Shepherd (1983), who concluded that the viability of this option was 'limited by a low reproduction rate and a slow growth rate.' It is now generally agreed that farming kangaroo is not viable because kangaroos can jump stock fences and their behaviour patterns prevent mustering or herding (Shepherd 1983). With the market adequately supplied through wildlife cropping, a farmed kangaroo product cannot compete because of the costs involved with fencing and animal husbandry.

standard, which requires all meat to be processed for human consumption. So even meat that is destined for pet food, must now be produced to human consumption standards.

Yes, you used to be able to shoot for pet food and it had a different dressing standard, a different cut. But our food authority, Safe Food Queensland and AQIS determined that it would be much simpler and it would stop the progression of pet food into the human consumption supply chain if everything was dressed for human consumption standards and shot as human consumption standard (Queensland policy officer, Charleville, April 2012).

Both the executive officer of the Kangaroo Industry Association of Australia and a meat processor interviewed for this research reported that as a result of these changes problems with standards in the past are now resolved. They acknowledged that there might have been issues with product quality in the past. 'It might have been the case five years ago but since we have got these systems there is nowhere to hide and we have what we call the pre-dressing inspector and it's part of the requirements for export' (Meat processor three (a), outer Adelaide, June 2012). These interviewees pointed to the range of measures that had been put in place as evidence that there is a high level of attention to standards.

However other industry players along the supply chain dispute these measures are sufficient to ensure the standards are consistently maintained. Some of these interviewees discussed the continuing issues they observe with product quality and harvesting standards. The following excerpt illustrates the experiences of one meat trader in relation to contaminated meat after the introduction of the new regulations:

Interviewer: I have been told the meat processors have made huge improvements to quality and food safety all the way along the chain.

European wholesaler and processor (a): It's not true; words are one thing reality is another thing. We bring [one of the suppliers'] products over here and bacteriologically wise, we have serious problems with it ... on every 500 kilo we take one bacterial test and we get it to the lab and we have the results. If we are working with certain suppliers that always have good records, then we will do it on one tonne and then we will do it on two tonne. We are spending like 5000 euros a month on bacterial tests. Then you know what you are selling ... we have big problems with [one supplier], with E. coli to an extent which is not acceptable anymore; so that meat will never come into our production. We have stopped buying from them (Belgium, August 2012).

Several interviewees were also highly critical about the efficacy of the current regulatory processes for ensuring standards are enforced during harvesting. In particular they raised a number of concerns about harvesting practices that they asserted still take place, these include:

- i. a lack of compliance by some licensed harvesters to follow hand washing requirements in the middle of winter when temperatures drop below zero,

- ii. cold gutting—a practice where licensed harvesters drive around and shoot a number of ‘roos’ before stopping to eviscerate them; the result is that the smell of the intestines goes through into the meat,
- iii. dogs seen on the rigs of harvesters delivering into field depots (refrigerated storage units): ‘The dogs are there on the back having a bit of a lick of the roo’ (Meat processor two, South Central Queensland, April 2012), and
- iv. carcasses are delivered to field depots after the sun has risen and temperatures are rising.

None of these practices are permitted under the regulations, and there are many harvesters who would not participate in any of these activities. However there are a number of reasons why these practices may still be continuing. Firstly licensed harvesters are for the most part self-regulated; they work at night primarily on their own. Safe Food Production Queensland does annual audits on the operation of harvesters, field depot sites and processing facilities. However this process was regarded by some of the interviewees as ineffective because it provided the harvesters up to two-months notice before their audit date, which allows them to clean up their rigs in preparation.

But then for the next 12 months it just slowly goes downhill again. Secondly the industry does not pay a premium for premium products. Kangaroo harvesters receive a straight return for weight regardless of quality, whereas suppliers in other meat industries are paid on the condition of the animal that is sent to the market, and this provides an incentive to deliver a better quality product (Field depot operator and harvester, South Central Queensland, April 2012).

Second the current regulations for the fit up of vehicles used by harvesters do not provide for the conditions in which kangaroos are being harvested:

Kangaroos are about 32 degrees when they are alive in the middle of the summer; the nights are 36 degrees, so the carcass is actually hotter when we receive it than when it was killed because it is no longer cooling itself. So why don’t we legislate? The butcher doesn’t drive around town with a dead cow on the back. But here we have got kangaroo-licensed harvesters driving up and down with insects and dust, bugs and grasshoppers flapping into them as they are driving down the road (Meat processor two, South Central Queensland, April 2012).

Third it was reported that the poor treatment given to the carcasses is reflected in the attitudes and values that some licensed harvesters attach to the product, which reflect the low status that kangaroo meat has had in the rural areas of Australia. The general attitude is reported to be, ‘It’s only roo,’ not something they would be prepared to eat themselves so they lack any sense of the importance of keeping it in good quality for the consumer.

And I say, ‘but you expect everybody else to eat your roos, you want Russia to eat your roos, you want China to eat your roos and here you are...’ They just won’t clean their act up (Meat processor two, South Central Queensland, April 2012).

Finally some interviewees argue that despite regulatory changes, the pet food industry continues to create a downward pressure on standards. In their view there continues to be a layered production standard between the meat processed for human consumption and processing for pet food. One interviewee described why he believes the dual standard is still operating,

If I say, 'Hey Joe that is too bloody dirty we can't do it.' He says, 'Stuff you' and goes straight down the road and sells to the next bloody bloke who does the pet food factory. Yet the pet food factory is supposed to have the same standard as for human consumption (Meat processor two, South Central Queensland, April 2012).

It is evident from the material presented above and in Chapter 4 that the kangaroo meat industry has had a history of problems with hygiene, which they have not always been willing to acknowledge. The material uncovered in this research suggests that problems with quality control are continuing for a range of reasons including: practices of harvesters, who are largely self-regulating; cultural attitudes to kangaroo meat in the bush; and downward pressure on standards from the pet food industry. International markets have historically provided the demand to support the commercial harvesting industry. When access to these markets is removed the impacts are felt not just by the kangaroo sector but also by land managers across the rangelands. This was evident during the field work for this study. In 2012 kangaroo populations were increasing rapidly but at the same time the demand for kangaroos had fallen off as a result of the suspension of trade to Russia. As Table 2 illustrates the percentage of the harvest quota utilised dropped from 64 per cent in 2008 to 31 per cent in 2012. In this respect the capacity of graziers for managing total grazing pressure was directly affected by food safety issues because there was no demand from export markets.

Summary

In this chapter I have argued that the current institutional frameworks for managing the commercial harvest are not returning the optimal results for either kangaroo populations, biodiversity outcomes or grazing enterprises in the rangelands. In the application of the current legislative frameworks, important ecological considerations are externalised by the focus on macropod numbers. While population monitoring provides Australian Governments with a defence against allegations raised by animal rights advocates that the harvest is unsustainable it does not address the population dynamics of large kangaroos. This is evident in the extreme methods that graziers are adopting to manage kangaroo populations, which include fencing, poisoning and the use of damage mitigation permits. At the same time questions remain about whether current organisation of the supply chain can consistently deliver a 'safe' product for human consumption.

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In bringing the different elements together, I conclude that a major difficulty with the legislation and institutional frameworks is the lack of integration between environmental and agricultural (including trade) policies.

Conclusion

The contribution of this thesis

Contemporary studies of the kangaroo have been remarkably few as well as singular in focus. Studies of the kangaroo have focused on either harvesting or consumption. Rangeland scientists over a number of decades have built a body of evidence that supports the sustainable well-managed use of kangaroos (Grigg 1987; Grigg, Hale and Lunney 1995; Cooney et al. 2009). These scientists have also made strong arguments for the importance of providing returns from the commercial harvest to rangeland graziers in order to conserve remnant bush land which would support the maintenance and recovery of other wildlife (for an overview of these arguments see (Cooney et al. 2012). In relation to consumption several studies have examined the cultural construction of kangaroo meat as a food taboo in the making (Lien 2004), and its modest, indeed minor, presence on the Australian culinary landscape (Peace 2011). Other research has explored the disconnections between the utility of the kangaroo as a resource for delivering environmental benefits and its role as a centrepiece for animal rights campaigners (Probyn 2000).

Yet little attention has been given to what Gerardo Torres Salcido and José Muchnik (2012: 103) have described as the conjunction of ‘food culture-human action-institutions.’ In this thesis the primary focus has been on the evolution of a commodity industry and associated regulations that are riddled with contradictions and contestations from social movements, plus the highly malleable nature of culinary cultures in a context of consumer and industry ignorance of agro biodiversity. The empirical material describes practices and knowledge related to kangaroo production and distribution, the institutional frameworks that regulate the production and consumption of kangaroo; as well as the ways in which knowledge and capital circulates between key stakeholder groups across the industry and in institutional and community settings. The thesis has explored how these different forms of knowledge including rangeland management and science, civil society beliefs about what is good eat, and animal rights advocacy, have shaped demand for kangaroo meat.

The research sheds new light on the capacity of the current institutional arrangements for kangaroo management to sustain agricultural livelihoods and environmental outcomes including biodiversity in the Australian rangelands. In this way it should prove useful to policy makers and an ecologically concerned public.

The problem

At the heart of this thesis lies the issue that even today the kangaroo enters the supply chain as a pest. The commercial kangaroo harvest is an industry-funded pest control mechanism that continues on the basis of the problems caused by high populations of kangaroos for rangeland

livestock production and their impact on grazing resources (Pople and Grigg 1999, cited in Thomsen and Davies 2005: 1239). Because of their abundant numbers, kangaroos—which are under the protection of the Crown—can be harvested. The commercial harvest takes advantage of the spikes and peaks in the populations of large macropods to produce meat and leather products. Ironically, previous research has suggested that the ‘pest status’ of kangaroos is a key reason that kangaroo meat has failed to gain more widespread consumer acceptance (Ampt 2008). As one of the participants in this study explained, if market forces tend to put a premium on products on the basis of exclusivity and restricted supply, the perception of abundance devalues the product (Smallgoods processor, outer Adelaide, June 2012). So the claim that these animals need to be harvested because of their numbers does nothing to increase the value of the meat.

For several decades now there has been a substantial body of evidence that demonstrates the nutritional value of kangaroo meat relative to other protein sources, and the comparatively low resource requirements for producing a low carbon meat product. Involving kangaroos more directly into pastoral production systems is seen as a critical step for delivering conservation outcomes. Rangeland scientists advocating for conservation for sustainable use have proposed methods by which rangeland graziers could have greater involvement and then receive a financial return from the commercial harvest. These models offer the opportunity to create a premium product through more selective harvesting methods and better attention to quality control and food standards. To date these models have largely been untried. They have never received any support from government, either in terms of investment or through policy or regulatory frameworks. The problem as it is currently framed is that there is not enough value for the product to provide a return to rangeland graziers, but this argument can be questioned against the evidence major profits being returned to companies like VIP petfoods.

The key issue is that it is not possible to describe the current arrangements for harvesting kangaroos as improving the sustainability of agriculture in the rangelands for a number of reasons:

- Little value is returned to the regions where kangaroos are harvested; although harvesters are paid for the work they do, the majority of the profit from the animal is collected at a later point in the supply chain.
- Because rangeland graziers have no effective way of managing the kangaroos on their properties they undertake activities that have negative impacts on biodiversity like removing remnant bushland to reduce populations of kangaroos, and/or fencing kangaroos out of their properties, thereby also reducing the accessibility of many other animals to green corridors across the landscape.
- The current system of harvesting is not effective in managing kangaroo populations to reduce grazing pressure, and this has impacted not only on the capacity of pastoral land

to carry domestic stock but also on the ability of other animals to find food and shelter in the affected areas.

There are, however, no perceived incentives for the meat-processing sector to change the current settings. On the contrary, the evidence presented here has illustrated that the existing industry dynamics are currently constraining innovation. Business as usual will not deliver the changes required to increase the value of the product, deliver a return to graziers and improve the integrity of land-management practices in the rangelands. Kangaroo meat reached its peak value when the Russian market was at its peak. There was never any move to provide rangeland graziers with a return during that time, when the returns were evidently substantial. The current strategy that processors are pursuing to increase the price of kangaroo meat is to secure new markets overseas that have a high demand for animal protein. For several years China has been regarded as providing the best chance of success for achieving this. The Chinese are expected to offer higher prices for kangaroo because of the size of the market, the opportunities to substitute kangaroo in popular meals, for example oxtail soup, and an emerging trend that is associating virility with kangaroos.

The industry-led survival strategy raises a key question. Is it just about creating a return per kilo, or is it also important that we are celebrating kangaroo for its unique culinary and nutritional qualities and connection to the environment? The culinary nexus that Chinese dishes like oxtail soup offer for the kangaroo tail represent another form of substitution, in which kangaroo will deliver excellent eating. This step, though, is not about creating value for kangaroo meat in a way that celebrates other key qualities of the meat—such as the advantages for the environment and human health.

Value and quality are obviously closely linked. A range of sources consulted for this study suggest that, in the current situation, the meat is often not valued financially to mitigate against poor practices post mortem in harvesting. The experience of the Belgium company reported here, highlights that it is possible to create greater demand for high-value kangaroo products; but these markets will require more attention to quality at all levels of the supply chain. This example also illustrates the tension that exists between meat processors who depend on throughput of volume and any wholesalers or retailers who wish to create products of higher value and quality.

Reflection

This thesis has drawn together information from a diverse range of sources to introduce and illustrate the need for a new approach to the production of kangaroo meat. Central to the story I have presented are the relationships between rangeland grazing systems and non-rangeland consumers. In presenting the perspectives of the people in the networks that connect these places, I have provided consideration of multiple aspects of the story. This approach represents

a new and important representation of the problem. Previous academic enquiry has typically been limited by the discipline of the researcher: rangeland scientists have assessed and modelled different land management scenarios, while social scientists have surveyed consumer attitudes or delivered a cultural analysis of kangaroo consumption. The tendency to singularise the discussion around these different aspects has missed opportunities to explore how these different aspects are interrelated. The evidence presented here suggests that there are several dichotomies entrenched in the discourse and debate around the management of kangaroos and their productive use. Here I refer in particular to the way the discourse around kangaroo is framed in terms of novelty as opposed to heritage, animals rather than ecology, and protectionism versus integrated land management.

Novelty versus heritage

Is kangaroo meat really a new experience? Much discourse relating to the consumption of meat in the domestic market suggests that this is a ‘new’ and ‘unfamiliar’ meat, and it will take some time for people to become acculturated to it. There is evidently an idea that we do not have a cuisine that integrates indigenous meats and plants because the indigenous foods are ‘new’ to us. Here the narrative is about the journey we are on to discover kangaroo meat (and other indigenous products) and how to cook them. The difficulty with this argument is that it fails to recognise that we have rapidly changed what, how and where we eat in multiple ways since European settlement. We have also very rapidly forgotten that kangaroo in the steamer or in kangaroo tail soups was part of colonial culinary culture. I agree with Michael Symons (2007) that the critical feature of Australia’s contemporary culinary culture is not the newness but the fact that we are largely disconnected to the places in Australia where our food is produced. Contemporary Australians live a high consumption lifestyle in an industrial society. While the kangaroo meat debate still sits at the level of ‘eating Skippy’—focused on whether the meat tastes good, whether it is healthy and how it is cooked—the discourse remains separate from the issues relating to the landscapes in which Skippy is actually embedded as both a sentient living animal and an agent of change in the agro-ecological systems from which Skippy is harvested. We need to build a picture of both what makes food from these places good to eat, and to make visible the different ways in which kangaroo has been eaten both here and overseas.

Animal versus ecology

The concerns about the animal welfare implications of culling kangaroos have in part been addressed by the requirements for the animal to be headshot; blunt trauma is also regarded as an acceptable method of euthanasia for pouch young (there are however concerns remaining about joeys at foot) (McLeod 2010). The difficulty with the framework employed by animal rights groups is that their emphasis on saving kangaroos ignores pressure that kangaroos place on the grasslands in the rangelands and the implications this has for the survival of other species

(Foster, Barton and Lindenmayer 2014). It also overlooks the suffering that large kangaroos experience when dry periods occur and starvation reduces kangaroo populations through slow, painful death. The notion that these episodes are ‘natural’ is highly contentious. The narrow focus on whether one animal lives or dies precludes a more thoughtful discussion on the lives of these animals and those around them, such as how we might involve farmers more effectively in managing the fluctuations in kangaroo populations to reduce the impact of grazing pressure on both the biomass and other native animals. What is apparent is that the power of advocacy groups such as PETA, Viva or Animals Australia rests in their ability to ignore evidence that does not support their arguments. As Deborah Rose has observed, ‘Power lies in the ability to not hear what is being said. Not to experience the consequences of one’s own actions, but rather to go one’s own self-centric and insulated way’ (2004: 20).

In this case, despite the considerable body of evidence to the contrary, advocacy groups continue to assert that the kangaroos under harvest are threatened. Importantly, the critics of the industry are not the ones who are actually confronted with animals dying in their hundreds and thousands. During drought conditions in South West and Central Queensland, thousands of kangaroos die slow and painful deaths from starvation. However this reality is only experienced by those living in the rangeland areas with these animals, not the activists sitting in the cities.

Protectionism versus integrated land management

Regulatory institutions currently provide no support towards the integration of kangaroo into the sustainable management of rangeland productions systems. The central objective for the research and information collection undertaken relating to the management of macropod populations is to provide an accurate population census. This furnishes the government with the basis to claim that it has effectively performed its role as protector of the large macropods under harvest. When the commercial harvest is challenged or questioned, the Australian government’s response is to base their defence on the science that has been undertaken to demonstrate that the harvest is sustainable.¹ The issue at contention is that the current approach provides only a very narrow understanding of kangaroo population dynamics, how these dynamics are affected by both pastoralism and the commercial harvest, and how to achieve the best management outcomes. Some participants in this study have observed the impracticality of the government becoming more closely involved in the management of kangaroos or even the need for it to do so. From this perspective there are natural population fluxes and trends that have happened for thousands of years. The problem with the natural population argument is that it overlooks the

¹ This census has been subject to agitation for a number of years and there is a large body of evidence to support its validity and accuracy. For a recent example—in response to the US animal lobby, who were challenging import of kangaroo products into America—Australia’s ambassador to the US made the standard government statement that the kangaroo trade ‘is conducted according to science-based wildlife management practices designed to ensure sustainability of kangaroo populations’ (O’Malley 2015).

dynamic effects that kangaroo populations have in rangeland ecosystems that have themselves become stressed from a combination of climate pressures and human pastoral activities.

The current policy adopted by State governments is to separate the management of kangaroos from broader landscape management strategies in order to protect these species. There are no policies that provide incentives for the landholder to manage kangaroos in order to achieve sustainable outcomes. This narrow focus on protectionism does not provide politicians, policy makers or rangeland graziers with the information they need to establish whether the agro-ecology of the rangelands will meet community values and remain productive for the future.

Implications

Chapter Six opened up questions about the roles of government and representatives of organisations concerned with shifting our food-production system to a more ecologically sustainable process. The evidence suggests that the current institutional and supply chain arrangements for harvesting kangaroos are not delivering the types of outcomes that support sustainable agricultural landscapes and communities in the rangelands. Nor are they encouraging a growth in domestic consumption that would benefit human health. The outcome areas I refer to are the management of kangaroo populations and dynamics to manage the grazing pressure across the rangelands. In relation to macropod management, there are no incentives for farmers to manage the land under their care to improve biodiversity. The assumption that the state must retain centralised ownership and control of kangaroos remains a barrier to integrating wildlife into both farm businesses and natural resource management to achieve better ecological, social and economic outcomes in the rangelands.

Rangeland grazing enterprises are situated in already damaged landscapes. There was a rich biodiversity in the rangelands 200 years ago, which the violence of colonialism and pastoralism largely obliterated. For thousands of years kangaroos were well managed by Aborigines whose knowledge and practices ‘imposed a strict ecological discipline on every person’ (Gamage 2012: 4). It is undisputed that the subsumption of Aboriginal heritage in these landscapes resulted in serious declines in both the biomass and the number of plant and animal species. However, those dynamics have continued to shift over time and have evolved as rangeland graziers and other key stakeholder groups have developed knowledge and practices that support ecological processes in the rangelands. The questions raised by this research pivot on whether the tools and regulatory frameworks graziers have to support them in this enterprise are adequate for ensuring that plant and animal life flourishes on their farms or across the rangeland areas.

From the perspective of the Kangaroo Industry Association of Australia (KIAA) current business model works on the basis of harvesters being paid on a piecemeal basis to deliver kangaroos to processors, without any consideration of the factors of production. Processors

Conclusion

produce meat in large volumes with little in the way of value adding, into commodity markets where the product substitutes for other meats. Consumers of kangaroo currently eat older male animals, which are not the best quality for eating, but provide the easiest product for the industry to extract. To invest in harvesting models that would deliver a high quality meat product would involve more work in the management of kangaroo populations and would be more costly (and possibly more contentious if it involved taking younger animals). This is something that the kangaroo-processing sector has not been inclined to support signalling that this is an option for the future contingent on achieving higher returns for the product. In evaluating their position, one has to consider that the development of alternative business models might challenge the current arrangements under which the two meat processors are the primary recipients of economic returns.

Governments have failed to respond to the science that demonstrates ways in which the utilisation of kangaroos could enhance the productive functions of the landscape while decreasing the impacts of rangeland agriculture. In recent years research funding in this area has been negligible and policy initiatives completely lacking, despite strong evidence pointing to the opportunities for gains that could be achieved from reducing carbon emissions, improving biodiversity and enhancing the sustainability of rangeland enterprises. The need for more active and responsible leadership on this issue from both industry and government is evident. Both state and federal governments continue to take advice from the KIAA as the key industry body, so there is little sign that anything will change while this remains the case. The need for reference groups with regional links that can provide a more comprehensive and informed approach to the harvesting and marketing of kangaroos as part of integrated land management is critical for creating this change.

Recognising and supporting the nascent knowledge of design and management of agro-ecosystems is critical for supporting human health on a population level and rangeland communities—both human and non-human. While knowledge and understanding of how to create the most sustainable farming enterprises in rangeland areas is shifting, the harvest of kangaroos highlights how much further we have to go to deliver production systems that are fully integrated with local ecology.

Previous applications of the commodity chain approaches including Commodity Systems Analysis (CSA), Global Value Chains (GVC) and Global Production Network (GPN) have not really grappled with the human-environment relationship. This study reveals the importance of a commodity analysis looking at natural resource valuation. For this purpose, GPN emphasis on how governance is shaped by the wider social and institutional context was particularly valuable for highlighting the inadequacy of the current regulatory frameworks for responding to the complexity of the policy issues connected to the commercial harvest.

I believe there is a need for the creation of public policy that is different from existing categories which would specifically focus on a regulatory framework for looking at nature-society relationships in regional food systems. In this regard I have suggested the use of geographical indications to support the management of natural resources in connection with food production and consumption.

If we return to the question that is so central to public health ecology—how diets can be modified to support ecological sustainability—how, then, should we assess what we eat? Is it to eat what keeps a body optimally healthy, what we like? Or do we stay within environmental limits?

The key finding of this research is that our culinary engagement with kangaroo is still fragmented by both misunderstandings and confusion. I believe that a major shortcoming of the current institutional arrangements and regulatory frameworks is that they are failing to make the connections between food and the land—connections that could be transformative in creating value for kangaroo meat and delivering benefits for land management.

To do this we need to look beyond the metrics that can be provided by nutrient guidelines or numbers relating to Greenhouse Gas emissions. We need stories that are built around concepts of human identity that symbolise ecological respect and relationships.

Appendix 1

Consent form for kangaroo and Australian food systems interview participation

I understand that this study is being conducted by Michelle Young, a research student at the National Centre for Epidemiology and Population Health in the College of Medicine, Biology and Environment at the Australian National University

Purpose and Method: I understand that the purpose of this study is to increase knowledge about how to create more sustainable food systems within Australia, with specific reference to harvesting and consumption of kangaroo. I understand that as part of this study, the researcher will be conducting recorded interviews with individuals who are either directly connected to the kangaroo industry or who are involved in providing advice or creating change in relation to food production and consumption. I understand that this interview will be audio recorded, although I can request that the interviewer use note-taking as the only formal record. I have been informed that I can switch the recorder off at anytime or can ask for any part of the tape to be erased.

Time, Risks and Inconvenience: I understand that I will be participating in an interview approximately 45-minutes long, where I will be asked questions relating to my knowledge and involvement of the kangaroo industry and food production and consumption. I understand that it is not anticipated that this research will involve any risks or inconveniences to me beyond my giving of my time.

Voluntary Participation: I understand that, should I agree to participate, I will be required to sign this consent form. I understand that participation is completely voluntary; and that I can withdraw from the study at any point without providing an explanation. I know that I can ask questions of the interviewer at any time and that as long as these questions do not involve a breach of another's confidentiality, they will be answered. I also understand that I have the right to decline any question asked of me in this interview.

Impact and Outcomes of Research: I understand that it is not anticipated that involvement in this research will have any adverse impacts on participants. I am also aware that the results of the research will be made available in public documents including academic publications and the researcher's dissertation. I know that while my personal details will not be used to identify me in the findings, given the small size of this industry it is possible that someone might be able to attribute comments reported in this research to me. I understand that I will be given the opportunity to consider my comments in the light of this possibility and to request that they are not reported.

Michelle Young

I understand that the supervisors of this research will act as advisors or consultants on the research process and findings and they have the expertise to oversee this project: The supervisors include: Assoc Professor Jane Dixon and Dr Anthony Hogan.

Should I have any problems or queries about the way in which the study is being conducted and I do not feel comfortable contacting the researcher or the aforementioned supervisors, I can contact the Office of Research Integrity, by post at the Research Office at the ANU Chancellery Building Ground Floor Building 10B, ANU, ACT 0200; by email human.ethics.officer@anu.edu.au or T: 6125-3427.

.....(signed by interview participant)

.....(date)

Appendix 2

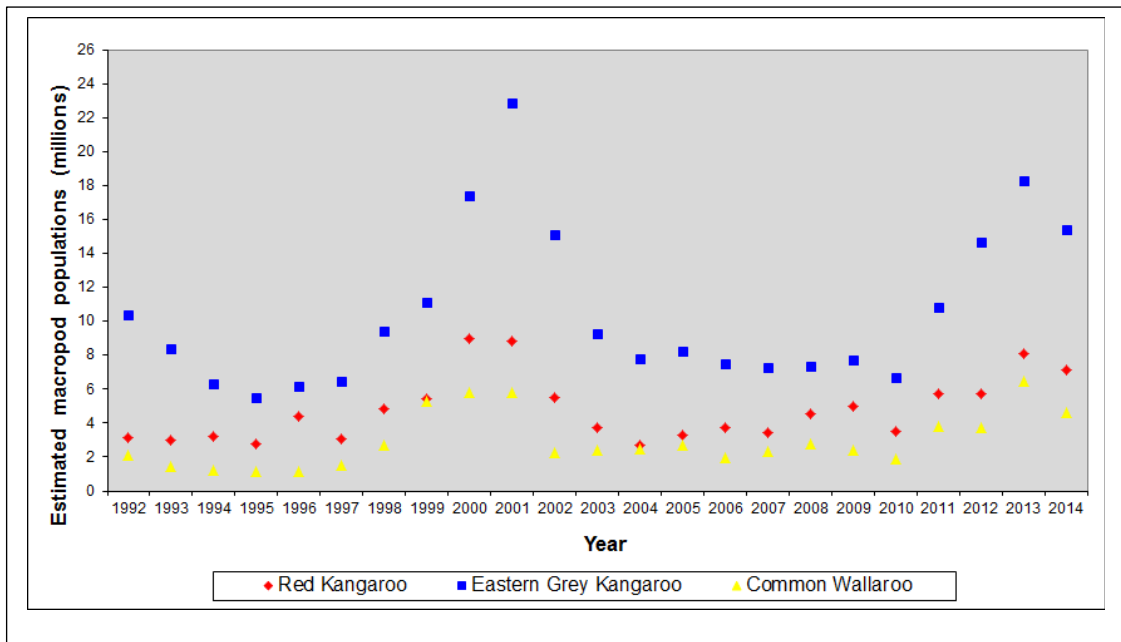


Figure 3. Estimated population size of three commercially harvested kangaroo species in Queensland 1992 to 2014

Source. Queensland Department of Environment and Heritage Protection.

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