

SUSTAINABLE USE OF WILDLIFE IN WESTERN NEW SOUTH WALES: POSSIBILITIES AND PROBLEMS

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Abstract

Sustainable use of wildlife has become equated with exploitation of animal products (meat, skin or feathers) and/or removal of wild progenitors into the pet trade. This consumption of the wildlife is therefore largely *ex situ* and so removes nutrients and energy from the rangelands. Demand for lethal or a removal action is often driven by the severity of the perceived conflict between the wildlife and other enterprises, especially agriculture, rather than for the resulting products. Such uses also raise community concerns about humane treatment of animals and a valuing of the natural heritage. Wildlife-based tourism, as part of the valuable and growing nature-based or ecotourism industry in Australia, is an *in situ* use that may be a more ecologically sustainable and economically viable option for use of rangeland wildlife. This paper examines these possibilities and their problems with a focus on the commercial kangaroo industry and the use of arid-zone mammals, birds and reptiles for pets. It provides new evidence that wildlife-tourism based on free-living kangaroos in the rangelands is both feasible and in demand. This industry should be given advocacy in the on-going debate on the management and future of the rangelands.

Key words: kangaroos, wildlife management, wildlife tourism, game harvesting

Introduction

Commercial exploitation of wildlife is usually equated with the use of the end products of some lethal action for profit. Such action may be justified as a natural continuation of a hunter-gatherer past where meat, hides and feathers were essential commodities gathered from free-living animals. The action is consistent with accepted systems of exploitation of domestic stock and fowl. The difference is that wildlife is free-living and so issues of ownership may need to be resolved with the state, community and/or landholder. The two systems converge in game 'ranching', whereby wildlife is brought under human spatial and demographic control (Bothma 1989). Caughley and Sinclair (1994) contrast this with game 'cropping' where the wildlife is free-ranging, and note that the benefit may be recreational or commercial. Cropping should follow the principle of sustainable use. Wildlife, as a biological resource, should be used within its capacity for renewal, and future use should not be thereby impaired (IUCN/UNEP/WWF 1980,1991). Any harvest should be within the maximum sustainable yield with a precautionary margin for error (Caughley and Sinclair 1994).

Regardless of whether wildlife is cropped or ranched, there will be strong concerns about inhumane practices causing pain and suffering. Such concerns are justifiably stronger if cropping is unregulated, especially if the species is considered 'worthless' or a pest (Taylor and Dunstone 1996). Thus some argue that the price of exploitation (pain and suffering) should be extracted from as few species as possible, and so wildlife should be left to a 'wild' existence free from unnecessary human predation. Others advocate a more utilitarian view that species must pay for their continued existence and so if they have products of use to humans then these should be exploited sustainably. However, economic value is no guarantee of ecological sustainability. Profitable species may be encouraged to the detriment of less valuable ones. Highly valued species may be over-exploited to economic extinction (eg. whaling), if not to biological extinction (Lander *et al.* 1994).

Sustainable use of wildlife

An alternative to a lethal harvest is to remove wild progenitors into the pet trade. If the species is easy to keep in captivity and cheap to breed then this process may be infrequent once the nucleus of a captive breeding population is established. If not, then wild individuals may be taken into captivity regularly, following the principle of sustainable use. Advocates of this strategy suggest that it conserves valuable genotypes that may be vulnerable in the wild, it educates urban populations about wildlife, and may reduce feral animal problems if the wildlife species is or was endemic to where it is held in captivity. Detractors suggest that the pet trade thrives on the exotic, the mutant and/or the rare and has little conservation value. Leiman and Ghaffar (1996) give an example of these issues for the orang utan (*Pongo pygmaeus*). About 600 individuals are kept as pets in Taiwan, captive individuals are used in the television and film industries, they are used as advertising gimmicks and to promote tourism, and are a valuable commodity attracting 200,000 tourists pa. Clint Eastwood, a popular Hollywood actor/director, made some movies featuring an orang utan named Clyde. These reached a mass audience and raised public awareness about the existence of orang utan but there is little evidence that this has assisted the species' conservation (Leiman and Ghaffar 1996).

Wildlife can also be made to pay in situ rather than removing products or pets from the wild. Nature-based tourism (or ecotourism) is an economic use that should be compatible with the protection of wildlife and its habitat. Even so the animals tourists seek can be impacted by such enterprises (Dunstone and O'Sullivan 1996). They may become a nuisance (eg. the result of artificial feeding) or secretive and avoid humans. Visitor pressure may imperil sensitive sites for breeding or feeding. Furthermore when visitors seek close interactions with wildlife (eg. whale watchers), it has proved necessary to implement codes of practice to accommodate the welfare of the wildlife attraction (Evans 1996). The economic benefits are not always realised for local communities; in some cases of 80-90% of gross tourism revenues go elsewhere (Goodwin 1995).

This paper examines three options - commercial harvest, pet trade, wildlife tourism - for the commercial use of wildlife in the arid rangelands of NSW with a focus on kangaroos (Macropodidae), but drawing in other mammals, birds and reptiles in the pet trade option. I question the economic and ecological sustainability of these consumptive and non-consumptive uses of wildlife. The case for a commercial kangaroo harvest as an ecologically sustainable exploitation of a resource has had strong advocacy (Grigg 1997). A less formal case has been put for the pet trade (Oakwood and Hopwood 1999) and so the objectives and benefits reside more in the popular press than scientific and economic analysis (Brook 1999). Nature-based tourism generates a large income stream from international tourists (Blamey and Hatch 1998) and the holiday/leisure activities of Australians (BTR 1999). Thus one of the main aims of this paper is to better define the wildlife tourism market and its current and potential role in sustainable use of wildlife in western NSW.

Commercial game harvesting of kangaroos

The Western Catchment Regional Strategy (WCMC 1997) identifies current administrative, legislative and physical impediments to controlling kangaroos as seriously jeopardising sustainable management of large parts of the Western catchment (ie. 170,000 km² of the Far West of NSW). This appears to question whether there is sufficient benefit from killing the 1,309,140 kangaroos in, for example, the 1998 quota for the Western Division. From the

WCMC's perspective kangaroo management should control at least this segment of non-domestic herbivores to facilitate management of total grazing pressure.

'Total grazing pressure', as typically applied in the arguments to cull kangaroo populations, is a curious accountant's view of ecology. It is as if one can add up all the metabolically active biomass of mammalian herbivores and apportion a blade of grass amongst them. It simply ignores the well-known scientific facts that all grazing systems are serviced by a guild of herbivores whose diets and foraging strategies are dissimilar (eg. Underwood 1982, Belovsky 1986), not identical, otherwise one or more amongst competing species would go extinct. More than a decade of research at Fowlers Gap has clearly shown this for sheep (*Ovis aries*), red (*Macropus rufus*) and grey kangaroos (*M. giganteus*, *M. fuliginosus*), common wallaroos (*M. robustus*), goats (*Capra hircus*) and rabbits (*Oryctolagus cuniculus*) (Dawson and Ellis, 1994, Edwards *et al.* 1995, McLeod 1996). If 'total grazing pressure' applies then it is an indication of an ecosystem under stress (eg. soil loss, invasion of unpalatable plants, suppression of natural predators) not in equilibrium. There is also a failure to consider any possible synergies between herbivores. Compare the perceived conflict between sheep and kangaroos, with Davies and Skinner (1986) advocating grazing springbok (*Antidorcas marsupialis*) and Merino sheep together for economic sustainability in South Africa.

The Western Catchment regional strategy (WCMC 1997) recommends a better kangaroo management program (more accurate counts, more realistic quotas, integrated data sets, transparent policies) and a change in its policy focus. Kangaroo management should address the control of these species in the maintenance of biodiversity, habitat protection and sustainable grazing pressure (stated as 'management of total grazing pressure') not 'damage control'. The current objectives of Commonwealth-approved kangaroo management programs are: (a) to mitigate damage to farming and grazing properties, (b) to maintain viable populations of harvested species throughout their natural range, and (c) to maintain a sustainable kangaroo products industry. Thus by implication under the Western Catchment regional strategy the focus of management should shift to (c) while upholding (b) given that kangaroos are a highly visible part of biodiversity. Kangaroos are a resource to use sustainably and no longer a pest to suppress mercilessly.

Is this good conservation and land management policy? Environment Australia's kangaroo management objectives do not explicitly address the aims of long-term wildlife conservation (eg. MacNab 1991) which are to:

- Conserve genetic diversity
- Sustain natural selective forces
- Maintain the whole range of species interactions.

There are strong concerns that commercial use of valuable kangaroo products in its current and future form fails some of these objectives (Wilson 1999). For example, the commercial harvest is an unnatural selective force. Only those individuals above a certain size are killed and there is a clear bias in the offtake of age/sex classes (Kirkpatrick and Nance 1985, Pople 1996). As a consequence few individuals, especially males, older than 3 years survive in heavily harvested red kangaroo population relative to lightly or unharvested ones (Pople 1996). Perhaps adaptive genotypes are being lost as few large males and females survive to be tested by a range of environmental contingencies. Some species (red kangaroos) are tastier than others (western grey kangaroos) and thus species interactions are facing unnatural anthropogenic influences. So there is a challenge for the WCMC (1997) strategy to fulfil its biodiversity, habitat and grazing management objectives with a commercial harvest.

Management of conflicts between domestic and non-domestic mammalian herbivores has challenged stakeholders in the rangelands of all the continents. Typically this requires the resolution of ecological and economic problems of favouring one ungulate species, usually an exotic, over another which is endemic. Australia has the unique problem of attempting to manage the relationships between exotic placental ungulates and endemic marsupial macropods. Perhaps Australian plants and soils may fare better under macropod feet than ungulate hooves but in terms of commercial use of macropods, their mode of reproduction throws up a major animal welfare dilemma. All the females of the commercially harvested species have continuous or long breeding seasons. Two (no diapause in western greys) or three generations of offspring overlap in their dependence on the mother. Thus rarely is there an opportunity to kill a mature female without also killing one or more dependent offspring. An industry based on killing males and immature females would be unlikely to be economically and ecologically sustainable and so the ethics of this issue will have to be carefully negotiated.

There may be other impediments to a kangaroo products industry, especially if it were to partially or completely replace the wool industry in the sheep rangelands (see Grigg 1997). For example, we can look to Africa where game ranching originated (Dasmann 1964). Like Australia, cattle and sheep did not evolve in Africa and have caused major land degradation under human management (Skinner 1996). In the 1960's, attempts were made to replace at least cattle (*Bos taurus* and *B. indicus*) with native eland (*Tragelaphus oryx*) (Posselt 1963, Skinner 1967). Eland have many desirable characteristics. They are large (450-650 kg), docile, aseasonal breeders, non-territorial, can be herded (Skinner 1989) and have a reasonable quality meat (von La Chevallerie 1970). Yet enterprises in southern and east Africa failed. The Bantu and the Europeans alike had cultures of cattle, not eland, herding.

Amongst the Batswana the traditional bank is wealth held in cattle ownership, and important rights of passage such as marriage are negotiated by the payment of a bride price (Lobola or Bogadi in Setswana) in cattle. Eland and other native ungulates are not part of this commerce – they are for bush meat and tourism. They are perceived as an unwelcome reservoir of disease and exert uncontrolled grazing pressure to the detriment of stock and land management (Skinner 1996). Veterinary cordon fences traverse both Botswana and northern Namibia on a scale equivalent to Australia's dingo fence. The fence in Botswana was intended to limit the spread of foot and mouth disease from Cape buffalo (*Syncercus caffer*) to cattle. It had a devastating impact on wildlife migrations and probably wiped out 99% of Botswana's wildebeest (*Connochaetes taurinus*) (Owens and Owens 1984). It has provided some protection to wildlife in the Okavango Delta from the incursion of cattle ranching although the latter industry won 20% of the protected delta in recent times (Swaney 1999). Furthermore the major market for animal production in Botswana is for beef not eland (or any other native ungulate). The cattle herd has grown from 400,000 in the 1950's to three million. Herding on communal lands has been replaced by an industry dominated by 5000 large-scale ranchers, supported by World Bank loans, and selling US\$100 million worth of beef into the European Union at above-market rates.

For Botswana to move from a cattle industry to game-ranching, it would have to not only convince its own populace to eat game meat in preference to beef but also its export market where beef is a traditional food. Australia faces similar, if not greater, market problems with a populace with a predominantly European ancestry, and a meat export market where beef and, to a lesser extent, lamb rule. Indeed Bolton (1997) notes that the Australian beef

industry has given no succour to the 'Grigg proposal' (Grigg and Lunney 1988). Likewise the economics at the 'farm gate' of cropping wildlife in the Western Division of NSW do not look good to pastoralists (Table 1). Kangaroos are mobile and difficult to contain at the scale of a pastoral property (Croft 1991). Thus game ranching through extensive containment would require cooperative management across landholders and perhaps a return to the notion of the commons. Efficient cropping and marketing would need to be developed beyond the current commercial kangaroo industry, dominated by a low grade product.

Problems such as these impaired the development of game ranching in Africa. Eland are herd-forming but are the most mobile of antelope (Mills and Haagner 1989). Large herds in the Kalahari break up to forage and eland easily traverse and jump fences that contain domestic stock. Furthermore, an industry that specialised on one antelope species would do no better at sustaining savannas and veldts adapted to mixed grazing by a guild of antelope and other ungulates. Caughley and Sinclair (1994) and Bolton (1997) warn against the ecological consequences of wildlife utilisation directed at one or a few species. An industry that profits from the products of red kangaroos will likely retain all those causative factors that led to the anomalous (Newsome 1975) increase of this species in the sheep rangelands; namely, no natural predators, widespread artificial waters, and open habitat favouring annual grasses and forbs. We may see a return to widespread killing of wedge-tailed eagles (*Aquila audax*) because they prey on joeys.

Table 1. The income per sheep in 1993-6 compared to a theoretical harvest of red kangaroos at Fowlers Gap arid zone research station in far-western NSW. The kangaroo population is assumed to be equivalent to that of sheep (see Croft 1991) and harvested at 15%. Values for meat yield, meat and skin values are estimated from figures in Ramsay (1994). Net income from kangaroos would rarely exceed that from sheep.

Year	1993	1994	1995	1996
Sheep shorn	6934	8313	8107	7637
Wool/Sheep (kg)	5.47	4.21	5.22	6.13
Cents/kg	240	406	336	294
Cost/kg	15.6	13.1	14.01	9.64
Net wool in income	\$50,410.00	\$106,142.00	\$81,435.00	\$92,087.00
Net stock income	\$19,509.00	\$35,995.00	\$65,330.00	\$63,009.00
Net total	\$69,919.00	\$142,137.00	\$146,765.00	\$155,096.00
Income/sheep	\$10.08	\$17.10	\$18.10	\$20.31
Kangaroos culled	1040.1	1246.95	1216.05	1145.55
Meat yield (kg)	\$12,481.20	\$14,963.40	\$14,592.60	\$13,746.60
Meat value @ \$1.5/kg (\$)	\$18,721.80	\$22,445.10	\$21,888.90	\$20,619.90
Skin value @ \$5 (\$)	\$62,406.00	\$74,817.00	\$72,963.00	\$68,733.00
Total	\$81,127.80	\$97,262.10	\$94,851.90	\$89,352.90
Net at 10% costs	\$73,015.02	\$87,535.89	\$85,366.71	\$80,417.61
Income/kangaroo	\$10.53	\$10.53	\$10.53	\$10.53

In the development of pastoralism in South Africa, millions of springbok were killed as competitors and potential disease carriers to sheep in regions such as the Karoo. Yet now

Skinner (1996) argues that not only are these persistent accusations unfounded but ‘...a mix of domestic and wild ungulates, with appropriate and correct management, can maximise profits’ (p. 71). He advocates mixing sheep and springbok together! He also notes that the increasingly profitable wildlife industry is more than just the consumption of meat and hides. Other consumptive and non-consumptive uses of wildlife, such as safari foot trails, wildlife photography, amateur ornithology, and, in the African context, trophy hunting, add significantly to this profitability.

We should likewise look for synergies between current agricultural practices in the sheep rangelands and utilisation of wildlife, and modify and integrate them into a sustainable future. Kangaroos, for example, seem to always be a problem and never a blessing. Yet research at Fowlers Gap (summarised in Dawson 1995) shows that where chenopod shrubs (a valuable drought reserve in the pasture) have been maintained through conservative stocking of sheep, red kangaroos diverge in diet from sheep and the two can ecologically and economically live together. Kangaroos could thus add substantial value to an enterprise formerly based solely on sheep products. However, specialisation on the cropping of one or a few species of wildlife is naive if the aim is a sustainable future (Bolton 1997). Those entrepreneurs with the imagination to go beyond a 19th century view of wildlife exploitation (*viz* eat it or wear it – see Lavigne *et al.* 1996) are the most likely to profit.

Commercial exploitation of wildlife in the rangelands, through consumption of body parts or sequestering of individuals into the live pet trade, mines resources. For example, the energy and nutrients gathered by a kangaroo in western NSW and sequestered in its tissues depart in a refrigerated truck (or tanned skin) to provide a few meals to restaurant diners in Sydney (or provide a leather item). Waste ends up in an ocean outfall or landfill east of the Great Divide. The inputs into the kangaroo are lost to the Western Division unless a few diners from Sydney die and are buried in the outback. Can we afford to mine outback resources not only from stock, agricultural products but also wildlife or should we look for in situ uses? The loss of rangeland resources through land degradation is bad enough as it is.

Capturing and breeding wildlife for the pet trade

The avifauna and herpetofauna of the Australian arid zone have made a substantial contribution to the world trade in pets in spite of local protection and export bans. Budgerigars (*Melopsittacus undulatus*), cockatiels (*Nymphicus hollandicus*) and zebra finches (*Poephila guttata*) inhabit birdcages and aviaries throughout the world. Likewise Australian geckos, pythons and, common lizards, such as bearded dragons (*Amphibolurus barbatus*) are traded throughout Europe and North America. Place the common or species name of your favourite arid zone reptile in a web-based search engine and you will undoubtedly come up with many traders in the US. In Texas, there are ranches breeding bearded dragons in their thousands (eg. El Dorado Dragon Ranch, **URL:** <http://www.calweb.com/~pweber96/dragonranch/>) and several web sites devoted to adulation of the ‘beardie’ as an ideal pet (**URL:** <http://www.3rdimension.com/Dragon/>). The breadth of this commercial activity with Australian wildlife pets may indicate that there is a valuable market not being accessed by landholders in the rangelands. However, this market does not seem to be a model for sustainable use.

The global trade in wildlife (alive and dead) is indeed huge, anywhere between US\$8 billion (Geist 1994) and US\$20 billion (Swanson and Barbier 1992), and probably third to the trade in arms and illegal drugs. Many of the 500 or so mammal species on the CITES (Convention on the International Trade in Endangered Species of Wild Fauna and Flora) list

(WCMC 1998), are there because of historic overexploitation in the wildlife trade (Bowles 1996). Hunting (for food, skin, sport, live trade, pest destruction) has led to 49% of mammal extinctions (Groombridge 1992) about equal to the introduction of predators and competitors. Thus we should be cautious as to whether trade in wildlife, including pets, encourages conservation of free-living species or exploits them to their detriment.

Schedule 7 of the Commonwealth Wildlife Protection (Regulation of Exports & Imports) Act 1982 includes only sulphur-crested cockatoos (*Cacutua galerita*), galahs (*C. roseicapilla*), corellas (*C. sanguinea* and *C. tenuirostris*), cockatiels and budgerigars as eligible for export as household pets. Thus many Australian species in the international pet trade are largely there because regulatory processes have been circumvented.. Barbier *et al.* (1990) found that this is typical of the wildlife trade as a whole. Profits are maximised by evasion of controls as this is the cheapest way to reduce costs. Furthermore, local people are rarely paid the real value of the product. Likewise, the range state loses much of the potential licensing and taxation revenue through evasion by illegal traders. Traders tend more towards short-term profit than a long-term sustainable outlook. Perhaps we could exploit a market matured by (illegal) traders to North America, Europe and Asia by introducing regulated trade in our wildlife, or perhaps we are too late and the 'horse has bolted'. Although the pet trade has educated others about our wildlife (or at least the existence of species), this has not always been appropriate. I have found that even zoology students, familiar with the typical solitary or pair of pet budgerigars, fail to recognise the species in a large flock of the green wild-type. They expect to see one or two blue (or other coloured) birds in the wild.

The pet trade tends to be about the exotic, the mutant and the 'genetically' enhanced. In the example above, there are no blue budgies in the wild. Similarly, galahs now come in cinnamon and lutino forms, bearded dragons in a variety of colour morphs (golden is extremely popular!) and the most valuable Children's python (*Liasis childreni*) is some rare colour variation. The pet trade also raises another set of welfare issues from humane methods of capture and management of stress of wild progenitors to the appropriate training in the keeping of what are likely to be unfamiliar and exotic species. For example, I have seen well-meaning wildlife carers frustrated and angry when a joey fails to respond to petting and obedience training like a dog. When pets becomes problems due to their behaviour (eg. a male kangaroo 'boxing' people) or the owner's changed circumstances then many are killed to effect their disposal. The RSPCA in NSW is already challenged by the euthanasia of more than half of the dogs and cats it receives (24,395 out of 43,695 animals in 1998-9 - RSPCA NSW 1999).

A trade in pets based on wildlife from the rangelands is unlikely to generate substantial profits at the farm gate. It may have a small benefit in educating people about species and thereby encouraging wildlife tourism. However, the nexus between pet owning and discrete unobtrusive observation of wild conspecifics is unclear. While the tropical forests of Malaysia and Indonesia attract 200,000 visitors to see orang utan (mostly in the rehabilitation centres of Sabah, Sarawak, Sumatra and Kalimantan) (Leiman and Ghaffa 1996), few, if any, of these visitors are likely to own a pet orang utan at a cost of US\$30,000 (Bowles 1996).

Tourism based on wildlife

In situ commercial use of wildlife offers us the best opportunity to make wildlife pay while cycling energy and nutrients within the ecosystem. Beeton (1998) already provides a

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comprehensive guide for the rural entrepreneur who wishes to diversify into ecotourism, where clients engage in 'farm stays', bush tucker and exploration of natural and cultural history. Wildlife tourism, as part of the ecotourism segment, is the best example of in situ use as it is tourism based on interactions with wild (non-domesticated) animals in the natural environment (or captivity) (Higginbottom and Hardy 1999). Large mobs of kangaroos as one of the great wildlife experiences that the Australian outback has to offer both domestic and international tourists. The focus on lethal control of kangaroos has turned us away from realising their tourist potential because it undervalues the intrinsic qualities of the kangaroo as a living, behaving, biological entity.

In southern Africa game-viewing is much more valuable than game-farming or cattle/sheep farming (eg. Muir 1987). For example, the multi-species production project in Zimbabwe showed that, where wildlife remained abundant, returns on investment were 2.5% for cattle and 8.6% for wildlife (Kock 1996). The wildlife tourism provided by national parks such as Kruger, Kalahari Gemsbok, Etosha, Chobe, the Okavango Delta, and Hwange has proved to be the major asset, along with mining, for southern Africa. Likewise Stafford Smith (1994) has shown that the value of mining and tourism in the Australian rangelands far outstrips traditional enterprises in pastoralism and the relatively paltry income from the current 'kangaroo industry' (Fig. 1).

The total expenditure of inbound nature-based tourists in Australia was \$6.6 billion in 1995, with \$3.7 billion spent in visits to National Parks and \$0.3 billion on outback safaris (Blamey & Hatch 1998) (Fig. 2). Inbound tourists express a clear interest in the natural history of Australia as 50% of the 3.5 million visitors in 1995 visited a national/state park, reserve or cave. Outback safaris represented 3% of inbound tourist activity but such tourists spent twice the average and considerably more than in other high-profile outdoor activities such as scuba. All segments of the inbound tourism market expressed some desire to engage in an outdoor activity or visit a rural/outback location but northern Europeans and Scandinavians expressed significant interest (Fig. 3). Outback and rural areas, unique wildlife, and national parks and wilderness were important factors influencing decisions to visit Australia (Fig. 4). The economic value of inbound tourism was \$16.1 billion in 1996 (14.5% of export earnings). Of these tourists, 22% were attracted because of Australia's unique wildlife and 11% stated they would not visit this country without it. Thus wildlife contributes between \$1.8 and \$3.5 billion of inbound tourist expenditure which equates to employment for between 14,700 and 29,500 people (Hundloe and Hamilton 1997).

This economic activity by international tourists is currently small in the Orana and Far Western region of NSW, which receives only 0.4% of the \$2,761 million spent by international visitors to NSW in 1997 (Tupel  1999). Even so, the larger tourism market is the domestic one as overnight travellers from Australia spent \$16,726 million in NSW in 1998 for holiday/leisure (BTR 1999). Of the activities pursued, the category 'national parks, bushwalking and rainforest walks' was third ranked accounting for 13% of NSW visitors. Visiting the outback accounted for 1% of overnight travel by Australian holiday/leisure travellers but NSW was not a recognised outback destination compared to NT and to a lesser extent QLD and WA (BTR 1999). Thus the Western Division of NSW, relative to its area, seems to be missing the economic activity being generated by tourism in the rest of the state.

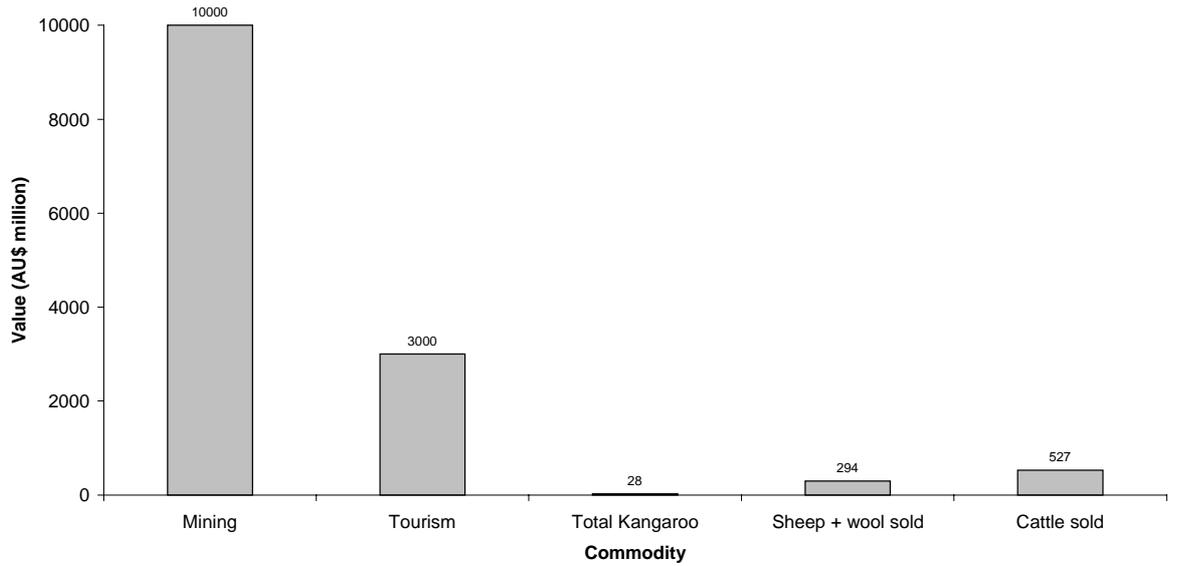


Fig. 1. The value of Australian rangeland commodities (1991-2). (Adapted from Stafford Smith 1994, with value of kangaroo products from Ramsay 1994).

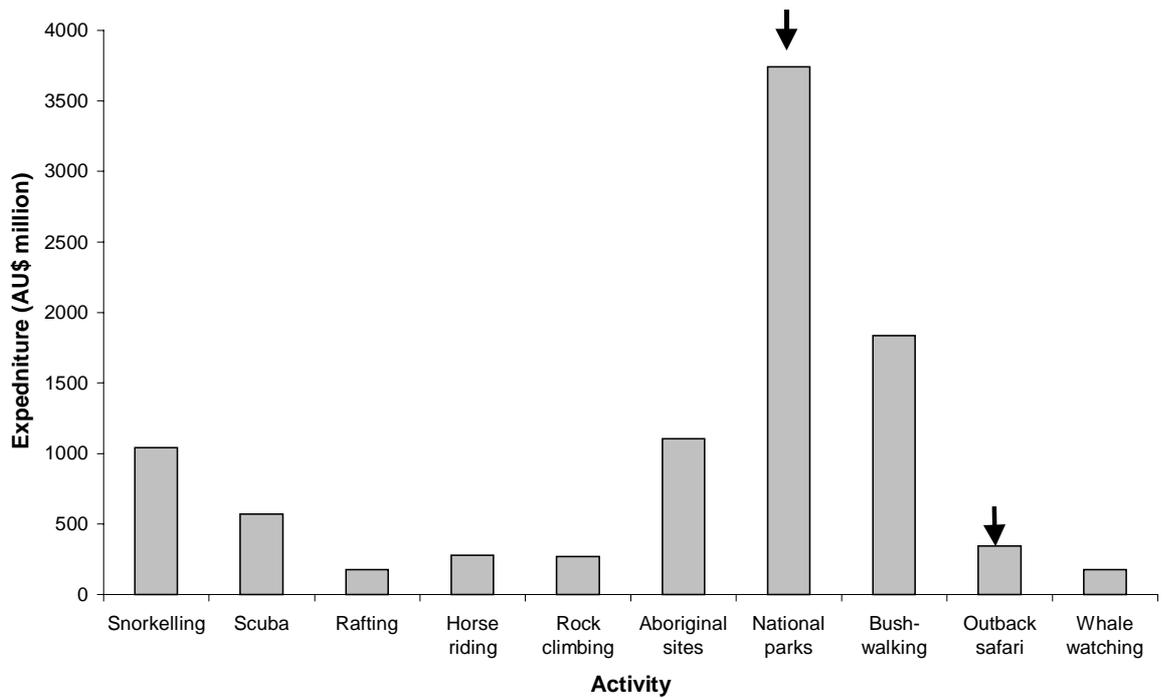


Fig 2. International nature-based tourism expenditure on various activities in Australia for 1995 (adapted from Blamey and Hatch 1998). indicates most relevant categories.

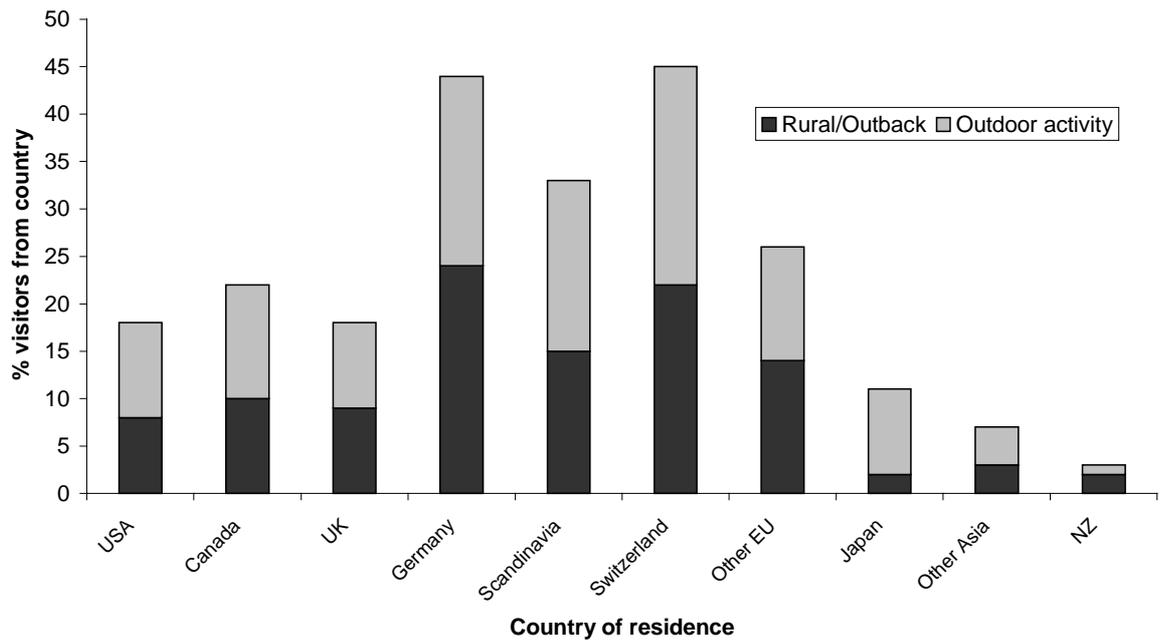


Fig. 3. Percentage of tourists from major countries providing inbound tourists to Australia who seek outdoor activity and a rural/outback experience (adapted from Blamey and Hatch 1998).

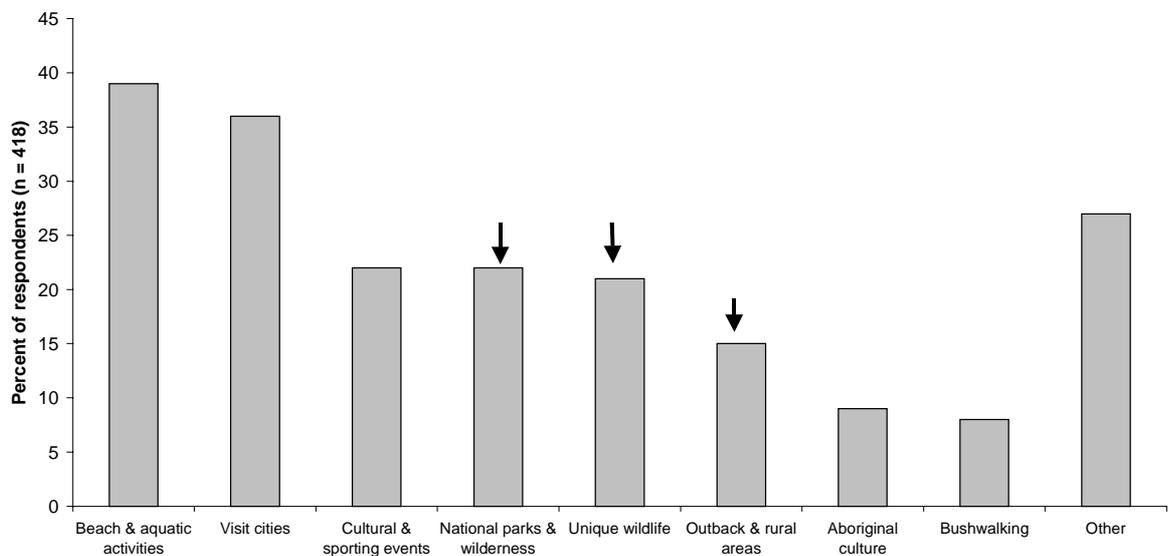


Fig. 4. Factors influencing the decision of international tourists to visit Australia (adapted from Hundloe and Hamilton 1997). ↓ indicates most relevant categories.

Perhaps wildlife tourism could become a major attraction to the region amongst the large number of domestic and international visitors interested in Australia's natural heritage. Locals may not actually perceive the wildlife as being as interesting as interstate or international visitors. For example, international visitors to Kangaroo Island in SA rank 'see/interact with wildlife' fifth behind 'see natural wonders' as their motivation to visit (Beeton 1998). Interstate visitors rank 'experience wildlife in its natural state' as second to 'know and experience own country' whereas intrastate visitors rate 'improve knowledge of

state' first and make no mention of wildlife in their top seven motivations. We need to find out about the motivations of visitors in order to build appropriate products for wildlife and other ecotourism.

Therefore, tourists at the Broken Hill, Kinchega National Park and Sturt National Park visitors centres were surveyed about their attitudes to and engagement in wildlife tourism in outback NSW in 1998-9 (Croft, in press). More than 90% of these visitors were Australian residents (domestic tourists) (Fig. 5). They tended to be couples or families travelling independently in their own or a hired vehicle. They mostly used a tent/swag or campervan/caravan for accommodation. All generally spent some proportion of their holiday in engaged wildlife viewing, more so if they visited a national park (Fig. 6). Regardless of whether they visited only Broken Hill and nearby attractions or Kinchega or Sturt they rated 'wild mobs of kangaroos' as a major wildlife attraction (Fig. 7). Tourism operators taking clients to Sturt National Park rated the attraction even more highly (Fig. 7). Many visitors to Sturt (22.6%) nominated kangaroos as their favourite Australian animal and they were reasonably satisfied with their experience (saw large mobs – 20.3%, saw them close at hand – 36.2%, saw interesting behaviour – 20.3%). International visitors likewise have nominated kangaroos as wildlife they wanted to see, slightly fewer than those wanting to see koalas (*Phascolarctus cinereus*) (Fig. 8).

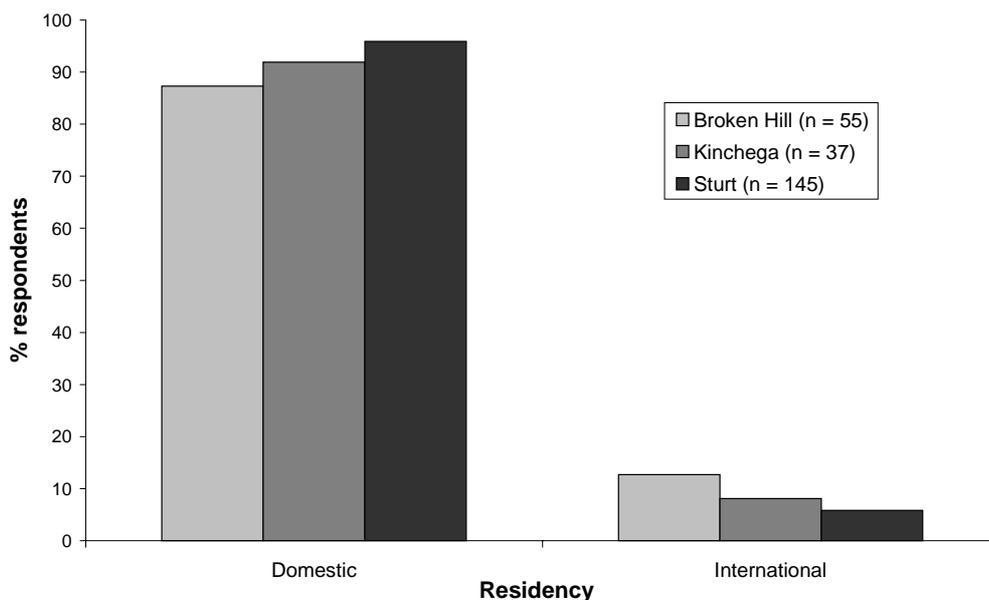


Fig. 5. Percentage of respondents to a survey on outback tourism in western NSW with domestic or international residency (adapted from Croft 2000).

Thus we can demonstrate a strong interest and attraction of kangaroos in the wildlife experience of current visitors to the Far West of NSW. However, these visitors are relatively few individuals in the total tourism clientele and so perhaps we are poorly marketing this experience. The red and grey kangaroos and the common wallaroo combined number over 20 million and thus are one of the world's largest remaining communities of large wild terrestrial mammals. Yet many an outback tourist will lament that of the few kangaroos he/she saw, the majority were road kills. Even when they visit a park like Sturt, which some say is overrun with kangaroos, they see many but not hundreds (Fig. 9). When these tourists seek a wild experience with kangaroos they often find members of rural

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communities discouraging, as the latter view kangaroos as little more than an unwelcome road hazard. We have certainly effectively marketed kangaroos as a faunal symbol. It prominently continues to grace the tail of Qantas planes. In any large coastal and inland city you can meet 'Skippy' and pet and feed a kangaroo in one of the many fauna parks. Thus we can assure any tourist an opportunity to see a kangaroo. But where is the promotion of a great wildlife experience in the vast wilderness of the Australian outback?

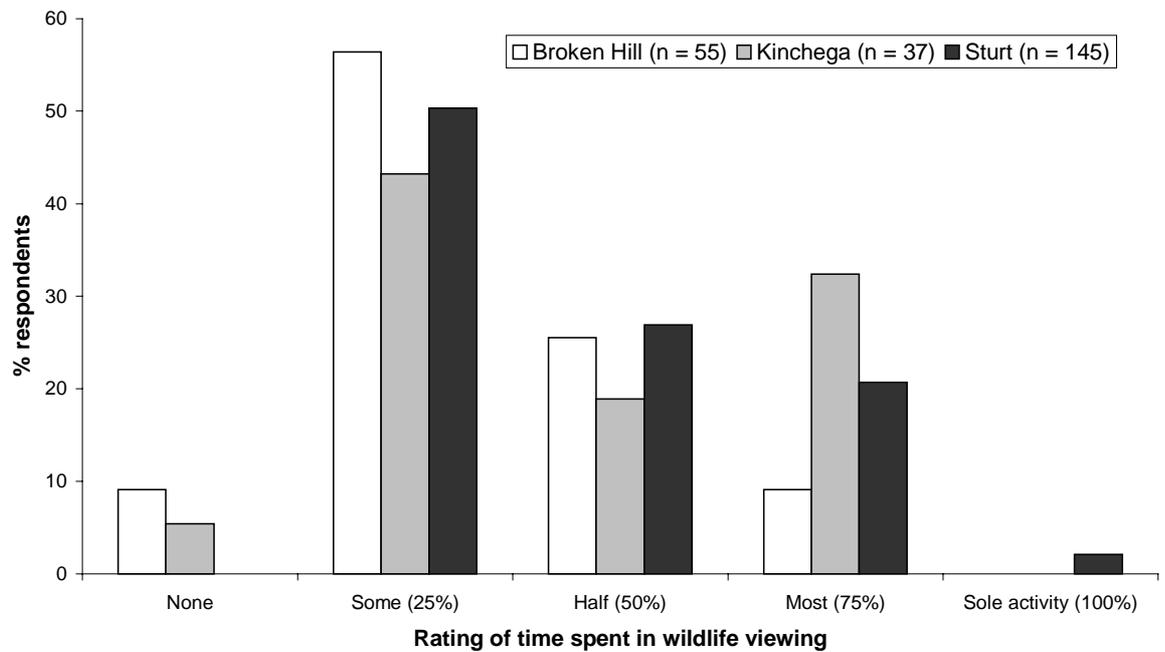


Fig. 6. Proportion of visit to outback NSW spent wildlife viewing for respondents to a survey at three visitors centres (adapted from Croft 2000).

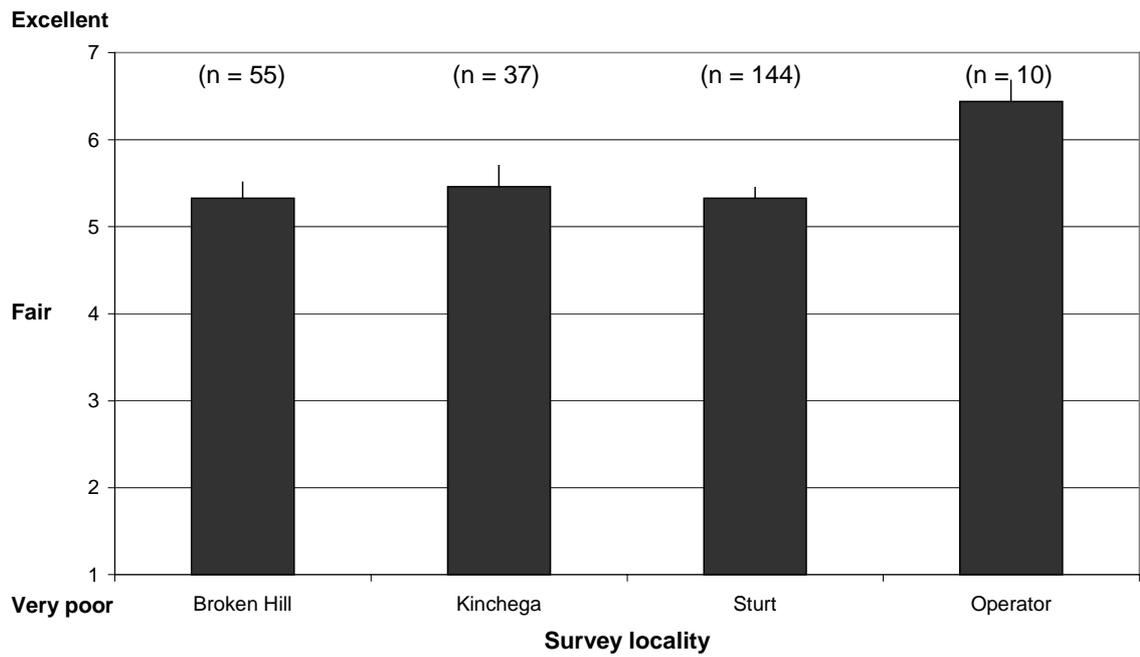


Fig. 7. Mean (± 1 SE) rating of wild mobs of kangaroos as a wildlife attraction for respondents to a survey at three visitors centres in outback NSW (adapted from Croft 2000).

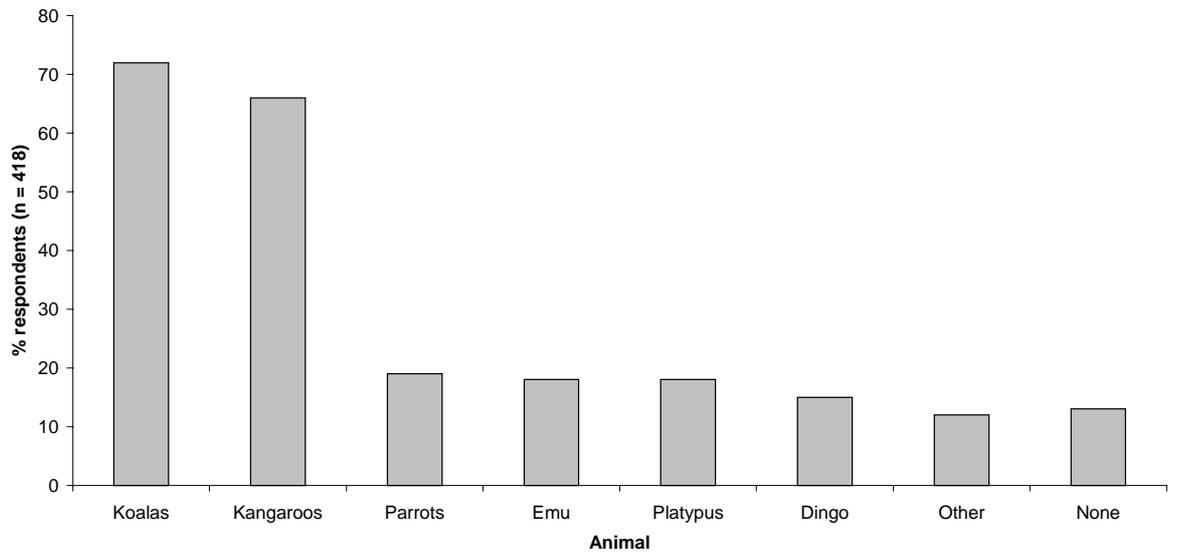


Fig. 8. Percentage of international tourists choosing various categories of Australian wildlife as those they wished to see during their visit to Australia (adapted from Hundloe and Hamilton 1997).

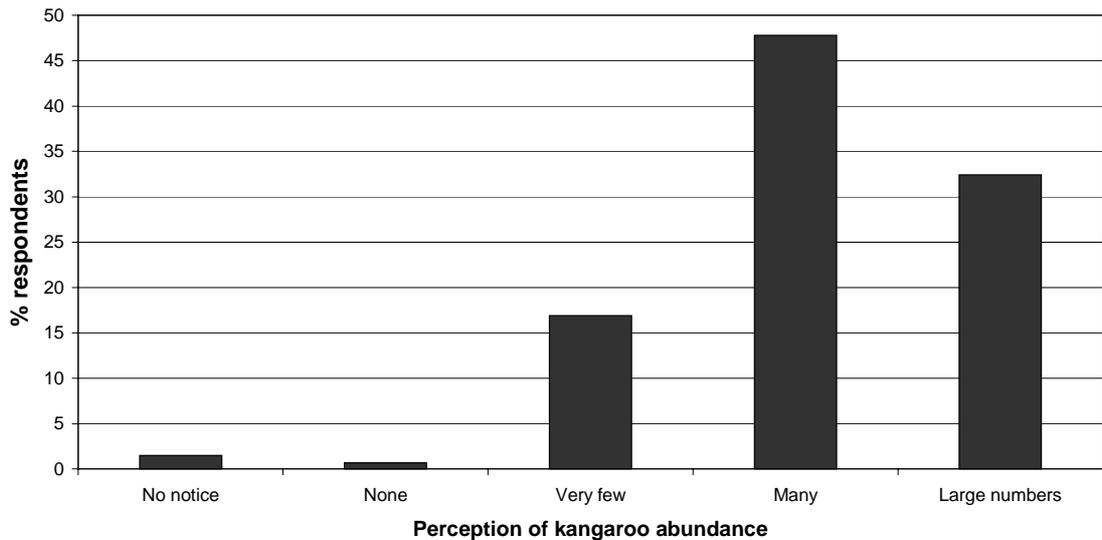


Fig. 9. The perception of the abundance of kangaroos by visitors to Sturt National Park (adapted from Croft 2000).

I have an alternative vision for the commercial exploitation of rangeland kangaroos. We should apply our well researched and scientifically based kangaroo management strategies with the same vigour to wildlife-based tourism enterprises as we do to a trade in meat and skins. Thereby we can unequivocally demonstrate that we have secure populations in large conservation areas and that we value these amongst the country's greatest assets. We can promote these to the domestic and international tourist as the very best of wildlife experiences. If we achieve this through high-value tourism, then in contrast to current consumptive use of kangaroos:

- we recognise the intrinsic qualities of kangaroos and Australia's wildlife heritage
- large populations of kangaroos are both desirable and valuable
- the economic value of tourism encourages and finances maintenance and restoration of biodiversity
- the economic activity creates more jobs for both sexes in rural communities.

We can look to countries such as South Africa, Namibia or Botswana to find the best practices in the development of wildlife-based tourism modelled on safari-style game viewing. I focus on these countries since they have similar arid landscapes in the Kalahari, Etosha and Makgadikgadi Pan national parks, respectively; they are in the same latitudes with similar climates to much of Australia, and they are likely our most significant competitors in this segment of the tourist market. We should develop our own safari-like experience amidst mobs of roos rather than springbok, gemsbok or wildebeest and thus also add substantial value to our wildlife.

A common argument is that a location like Sturt National Park could never compete with the Kalahari Gemsbok Park because it has no charismatic cats (lions, cheetah), lacks obvious biodiversity (such as large antelope) and provides none of the drama of large predators and their prey. The reality is that Sturt can produce a comparable experience with appropriate management. The park supports a large population of wedge-tailed eagles and a few dingoes (*Canis familiaris*) (mangaged to protect pastoralism as in the Kalahari) that prey on mainly juvenile kangaroos and thus provide the drama of predation. Visitors can be educated about the diversity of mammals (especially kangaroos), birds (150 spp.), reptiles

(46 spp.) and other fauna and how best to find and view them. For example, many visitors to the Kalahari seek out rare Raptors which are prominent in the avifauna, a characteristic that Sturt also provides (eg. grey falcon *Falco hypoleucos*). Furthermore, Australian mammals are typically nocturnal and so many visitors are unaware of the real diversity. To compensate their experience can be enhanced by night-time spotlighting or sitting at an illuminated water hole as already occur in Kruger and Etosha National Parks in Africa, and night-time wildlife tours in Australian coastal forests and reserves.

We should emphasise our assets. Kangaroos for their size have a body form unlike any other mammal. A European or North American visiting Africa sees antelope which share the same form and behaviour of familiar deer, sheep and goats. In contrast, the hopping locomotion, the bipedal stance that endows the kangaroo with human-like behaviour and the joey in the pouch will leave international visitors entranced. The absence of dangerous predators means that visitors can walk in the wilderness and examine the flora and fauna more closely rather than be confined to a vehicle or behind a protective fence. The disease risk is minimal compared to the malaria that haunts Southern African parks. Likewise the minimal risk of violent crime and political upheaval in Australia are outstanding assets relative to our African counterparts.

If we are to take the large populations of kangaroos in the boundless expanses of the outback, and build a unique and valuable tourist experience then we need appropriate products and marketing. Current visitors to Sturt National Park rate the quality of their wildlife experience as falling short of their expectations (Fig. 10). The top four motivations for nature-based tourism (ie. % rating is 'very important') are: (1) seeing the natural beauty of sites visited (79.0%), (2) a chance to see or experience something new (70.3%), (3) seeing wildlife in detail (66.5%), (4) being close to nature (64.9%) (Blamey and Hatch 1998). Thus wildlife, landscape and wilderness qualities need to be conserved together and not overwhelmed by any inappropriate development. Visitors to Sturt National Park reinforced this view. Furthermore, nature-based tourists rate simply 'seeing and observing' well above the provision of information (Blamey and Hatch 1998); ie. they want to do their own thing, self-guided by accurate and good quality interpretive materials.

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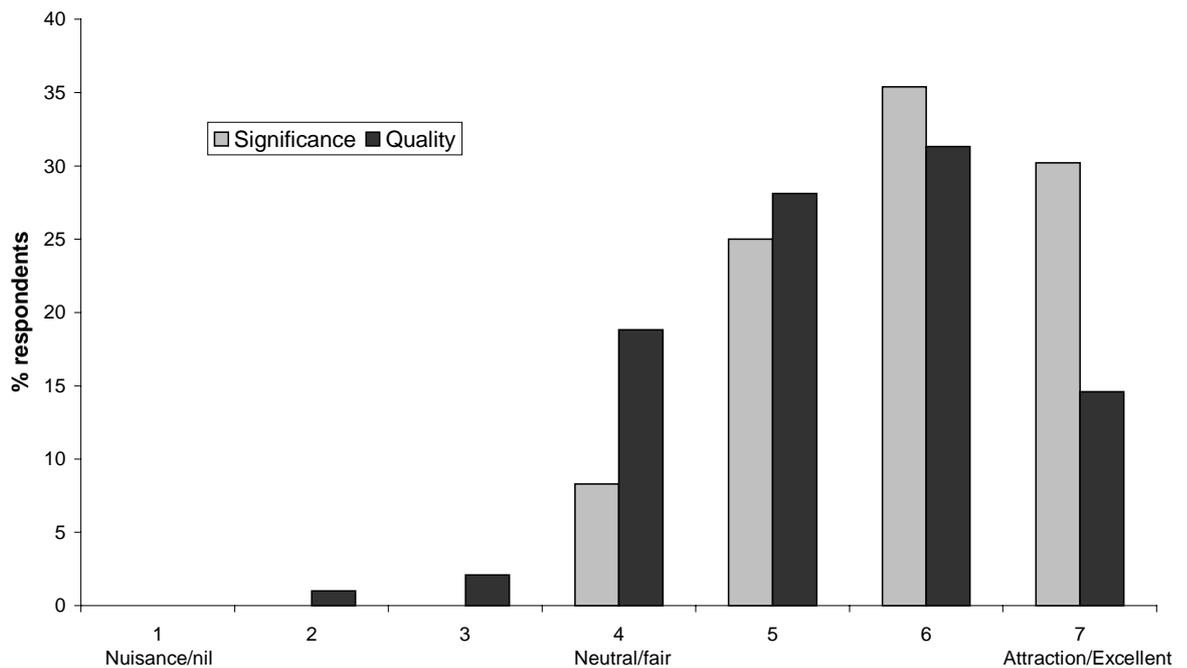


Fig. 10. Comparison of the rating of wildlife as an attraction to visiting Sturt National Park and the quality of the experience with wildlife (adapted from Croft in press).

We will develop and research a model facility at Fowlers Gap from 2000 to create appropriate products to underpin wildlife tourism in the region. We will promote these to potential tourist industry clients such as: pastoral enterprises wishing to diversify income sources through tourism, agencies such as the National Parks and Wildlife Service, developers who may create private game lodges and resorts, and tourist operators and tourism authorities looking to use and market products.

There is a potential for a new gold rush in the rangelands. However, at the vanguard will be tourists seeking an outback experience amidst dramatic and varied landscapes, where centre stage sits the very icon of its resilience – Big Red in big mobs. Not every property or location is favoured by landscape and wildlife to earn large amounts of tourist dollars, and so other land uses, traditional or otherwise, will continue. However, tourists want good financial services (an ATM), quality telecommunications (to phone or e-mail home), secure and high standard medical services, and highways and arterial roads that remain open in all but exceptional weather (holiday time is short). They provide and sustain a diversity of employment in service industries. The Outback needs a critical mass of visitors and it will not get them through a harvest of kangaroos or a trade in pets.

Managing tourist activity has its own challenges. For example, an artificial watering point such as an earthen tank in Sturt National Park may be many things: an unnatural point source of land degradation, a harbourage for introduced water-dependent pests, a causative factor for ‘overabundant’ kangaroos, an impediment to the natural flow of ephemeral creeks, or a centre for biodiversity and wildlife viewing. Water management across such a landscape needs to be strategic and well-researched so that natural heritage and tourism values are in synergy, not in conflict.

Conclusion

If wildlife tourism is to play a significant role in the use of wildlife in Western NSW then is this sustainable? I have demonstrated that we have an attractive product in our kangaroos (and other wildlife), and there is a good market for wildlife and nature-based tourism in general. Beeton (1998) provides a practical guide as to how an ecotourism business (of which wildlife tourism is a part) can be built in rural communities as a companion industry to other enterprises. Economic sustainability with careful but creative development and marketing of tourism products is thus reasonably assured. The key to ecological sustainability is that tourism operators should be accredited to provide a true ecotourism experience (Honey 1999). Such an experience should have the following characteristics: (1) travel to natural destinations, (2) minimal impact, (3) the building of environmental awareness, (4) the provision of direct financial benefits for conservation, (5) the provision of financial benefits and empowerment for local people, (6) a respect for local culture, and (7) support for human rights and democratic movements (Honey 1999). We should discourage the 'green' operator who leaves the farm gate open.

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References

- Barbier, E.B., Burgess, J.C., Swanson, T.M. and Pearce, D.W. (1990). *Elephants, Economics and Ivory*. (Earthscan Publications, London).
- Beeton, S. (1998). *Ecotourism: A practical guide for rural communities*. (Landlinks Press, Collingwood).
- Belovsky, G.E. (1986). Optimal foraging and community structure. Implications for a guild of generalist herbivores. *Oecologia* **70**, 35-52.
- Blamey, R. and Hatch, D. (1998). *BTR Occasional Paper Number 25, Profiles and Motivations of Nature-based Tourists visiting Australia*. Bureau of Tourism Research, Canberra.
- Bolton, M. (1997). *Conservation and the Use of Wildlife Resources*. (Chapman & Hall, London).
- Bothma, J. du P. (1989). *Game Ranch Management*. J.L. van Schaik, Pretoria.
- Bowles, D. (1996). Wildlife trade – a conserver or exploiter? In *The Exploitation of Mammal Populations*, V.J. Taylor and N. Dunstone (eds.), pp. 266-291. (Chapman & Hall, London).
- Brook, S. (1999). Gentle way to get back to native. *The Weekend Australian*, July 10-11, p. 5.
- Bureau of Tourism Research (1999). *Travel by Australians 1998. Annual Results of the National Visitors Survey*. (Bureau of Tourism Research, Canberra).
- Caughley, G. and Sinclair, A.R.E. (1994). *Wildlife Ecology and Management*. Blackwell Scientific, Oxford.
- Croft, D.B. (1991). Home range of the red kangaroo, *Macropus rufus*. *Journal of Arid Environments* **20**, 93-98.

- Croft, D.B. (in press). 'Rangeland kangaroos - a world class wildlife experience'. CRC Tourism report series, CRC for Sustainable Tourism, Gold Coast.
- Dasmann, R.F. (1964). *African Game Ranching*. (Pergamon Press, Oxford).
- Davies, R.A.G. and Skinner, J.D. (1986). Spatial utilisation of an enclosed area of the Karoo by springbok, *Antidorcas marsupialis* and Merino sheep *Ovis aries* during drought. *Transactions of the Royal Society of South Africa* **46**, 115-132.
- Dawson, T.J. (1995). 'Kangaroos: Biology of the largest marsupials'. UNSW Press, Sydney.
- Dawson, T.J. and Ellis, B.A. (1994). Diets of mammalian herbivores in Australian arid shrublands: seasonal effects on overlap between red kangaroos, sheep and rabbits on dietary niche breadths and electivities. *Journal of Arid Environments* **26**, 257-271.
- Dunstone, N. and O'Sullivan, J.N. (1996). The impact of ecotourism development on rainforest mammals. In *The Exploitation of Mammal Populations*, V.J. Taylor and N. Dunstone (eds.), pp. 313-344. (Chapman & Hall, London).
- Edwards, G.P., Dawson, T.J. and Croft, D.B. (1995). The dietary interaction between red kangaroos (*Macropus rufus*) and sheep (*Ovis aries*) in the arid rangelands of Australia. *Australian Journal of Ecology* **20**, 324-34.
- Evans, P.G.H. (1996). Human disturbance of cetaceans. In *The Exploitation of Mammal Populations*, V.J. Taylor and N. Dunstone (eds.), pp. 376-394. (Chapman & Hall, London).
- Geist, V. (1994). Wildlife conservation as wealth. *Nature* **368**, 490-491.
- Grigg, G.C. (1997). A crossroads in kangaroo politics. *Australian Biologist* **10**, 12-22.
- Grigg, G.C. and Lunney, D. (1988). *Kangaroo harvesting and the conservation of arid lands: a symposium*. (Surrey Beatty & Sons, Chipping Norton).
- Goodwin, H. (1995). Tourism and the environment. *Biologist* **42**, 129-133.
- Groombridge, B. (1992). *Global Biodiversity. Status of the Earth's Living Resources*. (Chapman & Hall, London).
- Higginbottom, K. and Hardy, M. (1999). *Wildlife Tourism: Discussion Document*. (CRC for Sustainable Tourism, Gold Coast).
- Honey, M. (1999). *Ecotourism and Sustainable Development: Who Owns Paradise?* (Island Press, Washington DC).
- Hundloe, T. and Hamilton, C. (1997). *Koalas and Tourism: An Economic Evaluation*. Discussion Paper Number 13, The Australia Institute, Canberra.
- IUCN/UNEP/WWF (1980). *World Conservation Strategy. Living resource conservation for sustainable development*. IUCN, Gland, Switzerland.
- IUCN/UNEP/WWF (1991). *Caring for the Earth: a strategy for sustainable living*. IUCN, Gland, Switzerland
- Kirkpatrick, T.H. & Nance, C.A. (1985). Conservation. In *The Kangaroo Keepers*, J.J. Lavery (ed.), pp. 161-187. (University of Queensland Press, St Lucia).
- Kock, M.D. (1996). Zimbabwe: a model for the sustainable use of wildlife and the development of innovative wildlife management practices. In *The Exploitation of Mammal Populations*, V.J. Taylor and N. Dunstone (eds.), pp. 229-249. (Chapman & Hall, London).
- Lander, R., Engen, S. and Snether, B.-E. (1994). Optimal harvesting, economic discounting and extinction risk in fluctuating populations. *Nature* **373**, 88-89.
- Lavigne, D.M., Callaghan, C.J. and Smith, R.J. (1996). Sustainable utilisation: the lessons of history. In *The Exploitation of Mammal Populations*, V.J. Taylor and N. Dunstone (eds.), pp. 250-265. (Chapman & Hall, London).
- Leiman, A. and Ghaffar, N. (1996). Use, misuse and abuse of the orang utan – exploitation as a threat or the only real salvation? In *The Exploitation of Mammal Populations*, V.J. Taylor and N. Dunstone (eds.), pp. 345-357. (Chapman & Hall, London).

- MacNab, J. (1991). Does game cropping serve conservation? A re-examination of the African data. *Canadian Journal of Zoology* **69**, 2283-2290.
- McLeod, S. (1996). *The foraging behaviour of the arid zone herbivores, the red kangaroo (Macropus rufus) and the sheep (Ovis aries), and its role in their competitive interaction, population dynamics and life-history strategies*. PhD thesis, University of NSW, Sydney.
- Mills, G. and Haagner, C. (1989). *Guide to the Kalahari Gemsbok National Park*. Southern Book Publishers, Cape Town.
- Muir, K. (1987). Marketing African wildlife products and services/ In: *Proceedings of Conference on Wildlife Management in Sub-saharan Africa: Sustainable Economic Benefits and Contribution to Rural Development, 6-13 October, Harare, Zimbabwe*, pp. 189-202. New York: UNESCO and Gland, Switzerland: IUCN.
- Newsome, A.E. (1975). An ecological comparison of the two arid-zone kangaroos of Australia and their anomalous prosperity since the introduction of ruminant stock to their environment. *Quarterly Review of Biology* **50**, 389-424.
- Oakwood, M. and Hopwood, P. (1999). A survey of the attributes and requirements of quolls that may affect their suitability as household pets. *Australian Zoologist* **31**, 365-375.
- Owens, M. and Owens, D. (1984). *Cry of the Kalahari*. Houghton Mifflin, Boston.
- Pople, A.R. (1996). *Effects of harvesting upon the demography of red kangaroos in Queensland*. PhD thesis, University of Queensland, Brisbane.
- Posselt, J. (1963). The domestication of the eland. *Rhodesian Journal of Agricultural Research* **1**, 81-87.
- Ramsay, B.J. (1994). *Commercial Use of Wild Animals*. Australian Government Publishing Service, Canberra.
- RSPCA NSW (1999). RSPCA Shelter statistics. *Animals Magazine* **40**, 13.
- Skinner, J.D. (1967). An appraisal of the eland as a farm animal in Africa. *Animal Breeding Abstracts* **35**, 177-185.
- Skinner, J.D. (1989) Game ranching in Southern Africa. In 'Wildlife Production Systems, R.J. Hudson, K.R. Drew and L.M. Baskin (eds.), pp. . Cambridge University Press, Cambridge.
- Skinner, J.D. (1996). Game ranching. In *The Exploitation of Mammal Populations*, V.J. Taylor and N. Dunstone (eds.), pp. 65-74. (Chapman & Hall, London).
- Stafford Smith, M. (1994). Sustainable production systems and natural resource management in the rangelands. *Outlook 94, Vol 2, Natural Resources*. Pp. 148-159.
- Swaney, D. (1999). *Zimbabwe, Botswana & Namibia*. 2nd Edition. (Lonely Planet Publications, Hawthorn).
- Swanson, T.M. and Barbier, E.B. (1992). *Economics for the Wilds: Wildlife, Wildlands, Diversity and Development*. (Earthscan Publications, London).
- Taylor, V.J. and Dunstone, N. (1996). The exploitation, sustainable use and welfare of wild mammals. In *The Exploitation of Mammal Populations*, V.J. Taylor and N. Dunstone (eds.), pp. 3-15. (Chapman & Hall, London).
- Tupulé, A. (1999). *BTR Occasional Paper Number 29. Tourism Expenditure by International Visitors in Regional Australia*. (Bureau of Tourism Research, Canberra).
- Underwood, R. (1982). The feeding behaviour of grazing African ungulates. *Behaviour* **84**, 195-243.
- Von La Chevallerie, M. (1970). Meat production from wild ungulates. *Proceedings of the South African Society for Animal Production* **9**, 73-87.

Sustainable use of wildlife

- WCMC (1997). *Western Catchment Regional Strategy*. Western Catchment Management Committee, Cobar.
- Wilson, M. (1999). *The kangaroo BETRAYED*. (Hill of Content Publishing, Melbourne).
- World Conservation Monitoring Centre (1998). *Checklist of CITES species*. (IUCN Publications Services Unit, Cambridge).