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The Desert Knowledge Cooperative Research Centre is an unincorporated joint venture with 28 partners whose mission is to develop and disseminate an understanding of sustainable living in remote desert environments, deliver enduring regional economies and livelihoods based on Desert Knowledge, and create the networks to market this knowledge in other desert lands.

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ERRATA: July 2010. Note that changes have been made to figures on pages 340 and 341 in this pdf.

- p.340: Contribution to greenhouse gas emissions and hence impact on global climate change: assessed in this report as ~~\$3.73 million~~ \$13.87 million per year, assuming each camel emits 0.97 t of CO₂ per year (see Drucker 2008a), a value of \$15 per ton of CO₂ emitted (see Drucker 2008a) and a total population of 953 000 camels (Saalfeld & Edwards 2008).
- p. 341: The negative economic impacts of feral camels (excluding carbon emissions) outweigh the positive economic impacts by a factor of about 18 (Table 12.1). The net economic impact is ~~-\$14.39~~ -\$24.53 million annually (assessed over the period July 2005 – June 2007 for the most part) taking greenhouse emissions into account and -\$10.67 million annually without accounting for greenhouse emissions.
- In Table 12.1: -\$3.73 million becomes -\$13.87 million and -\$14.39 becomes -\$24.53 million.

- Suppression of recruitment in some plant species. It is considered that camels have the ability to cause the local extinction of highly preferred species like the quandong (*Santalum acuminatum*), curly pod wattle (*Acacia sessiliceps*), and bean tree (*Erythrina vespertilio*) (Dörge & Heucke 2003): no quantifiable dollar value has been determined in this report but the impacts are thought to be significant.
- Damage to wetlands through fouling, trampling, and sedimentation. The ability of wetlands to act as refugia for many types of aquatic and terrestrial wildlife, particularly during droughts, is being undermined by the impacts of feral camels: no quantifiable dollar value has been determined in this report, but the impacts are thought to be significant.
- Competition with native animals for food and shelter: no quantifiable dollar value has been determined in this report, but the impacts are thought to be significant.
- Contribution to greenhouse gas emissions and hence impact on global climate change: assessed in this report as \$13.87 million per year, assuming each camel emits 0.97 t of CO₂ per year (see Drucker 2008a), a value of \$15 per ton of CO₂ emitted (see Drucker 2008a) and a total population of 953 000 camels (Saalfeld & Edwards 2008).

Negative social/cultural impacts of feral camels include:

- Damage to sites that have cultural significance to Aboriginal people. Water places in particular (water holes, rock holes, soaks, springs, etc.) are special places for desert Aboriginal people and many, but not all, are sacred sites (Yu 2002). Thus, the negative impacts of camels on wetland areas also have a very important social/cultural dimension: no quantifiable dollar value has been determined in this report, but the impacts are thought to be significant.
- Destruction of bush tucker resources: no quantifiable dollar value has been determined in this report, but the impacts are thought to be moderate.
- Reduction of people’s enjoyment of natural areas: no quantifiable dollar value has been determined in this report, but the impacts are thought to be significant.
- Causing a general nuisance and creating dangerous driving conditions in residential areas of remote settlements: no quantifiable dollar value has been determined in this report, but the impacts are thought to be significant.

Camels could potentially be epidemiologically involved in the spread of diseases such as bluetongue, Rinderpest, Rift valley fever, surra (trypanosomosis), and bovine tuberculosis if outbreaks of these diseases occurred in Australia (Brown 2004; Robert Henzell 2008, SA Animal and Plant Control Group, pers. comm.).

The climate change forecast for arid Australia to 2030 is for a temperature increase of 1–1.2°C, higher frequency of hot days, a decline in rainfall of between 2–5%, higher evaporation rates, and higher frequency of droughts (CSIRO 2007). Under this scenario, even if camel populations remain static, the negative impacts of camels are likely to be exacerbated. Water will be a scarcer resource and camels will put more pressure on water resources on pastoral leases, in remote settlements, and in wetlands. As droughts increase in frequency, so too will the frequency of camels moving en masse onto pastoral leases and into remote settlements in search of water. Wetlands will become increasingly important as refugia in arid Australia as the frequency of droughts increases and this will magnify the effects of feral camels on environmental values. The exotic disease risk associated with feral camels is also likely to increase if camels are brought into closer contact with stock as they seek out scarcer water resources.

2.5 Positive impacts of feral camels

Feral camels can have both positive economic and environmental impacts. Landholders can derive economic benefit from feral camels by using them for meat or by selling them for uses which include pet meat and meat for human consumption. The economic benefit from the sale of camels by landholders accrues along the supply chain as transporters, wholesalers, agents, meat processors, and meat marketers handle the product. Small numbers of feral camels are also used in the tourism industry. Many Aboriginal people believe that feral camels should be used to provide benefits to local people, including income and jobs (Vaarzon-Morel 2008a, 2008b). Camels have also been used for woody weed control in Qld.

2.6 Density/damage relationship

There is a positive density/damage relationship for camels and infrastructure on pastoral properties, which is likely to hold true for environmental variables and cultural/social variables as well (Edwards et al. 2008). There are real gains to be made in maintaining camel densities on pastoral leases at <0.3 camels/km². The amount of damage tends to flatten out at densities between 0.1–0.2 camels/km², at levels of about \$5000–6000 over two years. For most pastoralists, this may be a tolerable level of damage. Camel densities also need to be kept at or below 0.3 camels/km² in order to safeguard the survival of tree species that are extremely susceptible to high levels of camel browsing.

Therefore, irrespective of climate change, the magnitude of the negative impacts of feral camels will increase if the population is allowed to continue to increase. Furthermore, the likelihood that camels would be epidemiologically involved in the spread of exotic diseases (if outbreaks of these diseases occurred in Australia) is also very likely to increase with population density.

2.7 Net economic cost of the impacts of feral camels

The negative economic impacts of feral camels (excluding carbon emissions) outweigh the positive economic impacts by a factor of about 18 (Table 12.1). The net economic impact is -\$24.53 million annually (assessed over the period July 2005 – June 2007 for the most part) taking greenhouse emissions into account and -\$10.67 million annually without accounting for greenhouse emissions.

Table 12.1: The annualised monetary value of the economic impacts of feral camels

Impact	Value
POSITIVE	
Selling and eating camels	\$0.62 million
Control of woody weeds	Not quantified
NEGATIVE	
Direct control and management costs	-\$2.35 million
Impacts on livestock production	-\$3.42 million
Damage to infrastructure, property, and people	-\$5.51 million
Damage to vegetation through feeding behaviour and trampling and subsequent erosion	Not quantified
Suppression of recruitment in some plant species	Not quantified
Damage to wetlands through fouling, trampling, and sedimentation	Not quantified
Competition with native animals for food and shelter	Not quantified
Contribution to greenhouse gas emissions	-\$13.87 million
Damage to sites that have cultural significance to Aboriginal people	Not quantified
Destruction of bush tucker resources	Not quantified
Reduction of people's enjoyment of natural areas	Not quantified
Causing a general nuisance and dangerous driving conditions in residential areas of remote settlements	Not quantified
Net quantifiable cost/benefit	-\$24.53 million

Note: The positive economic impacts are those for landholders, not those that accrue along the commercial supply chain.