

CAMEL FACT SHEET

Camels were imported to provide transport through inland Australia and they have since made it their domain. They are well adapted to the conditions found in arid and semi-arid parts of Australia. Feral camels (*Camelus dromedarius*) are capable of inflicting enormous damage to desert eco-systems, Indigenous cultural sites, remote communities and pastoral properties, particularly in times of drought. Much of this damage may go unnoticed because of its remoteness.

History

Thousands of camels were imported into Australia between 1840 and 1907 to open up the arid areas of central and western Australia. They were used for riding, and as draught and pack animals for exploration and construction of rail and telegraph lines. They were also used to supply goods to remote mines and settlements.

Many different types and breeds of camels were brought into Australia, but most were from India. They included the large, fleece-bearing, two-humped Bactrian camel of China and Mongolia, the elite Bishari and Bikaneri riding camels of Arabia, and the powerful, freight-carrying lowland Indian camels, capable of moving huge loads of up to 800 kilograms. The feral camels found in Australia are a meld of these breeds.

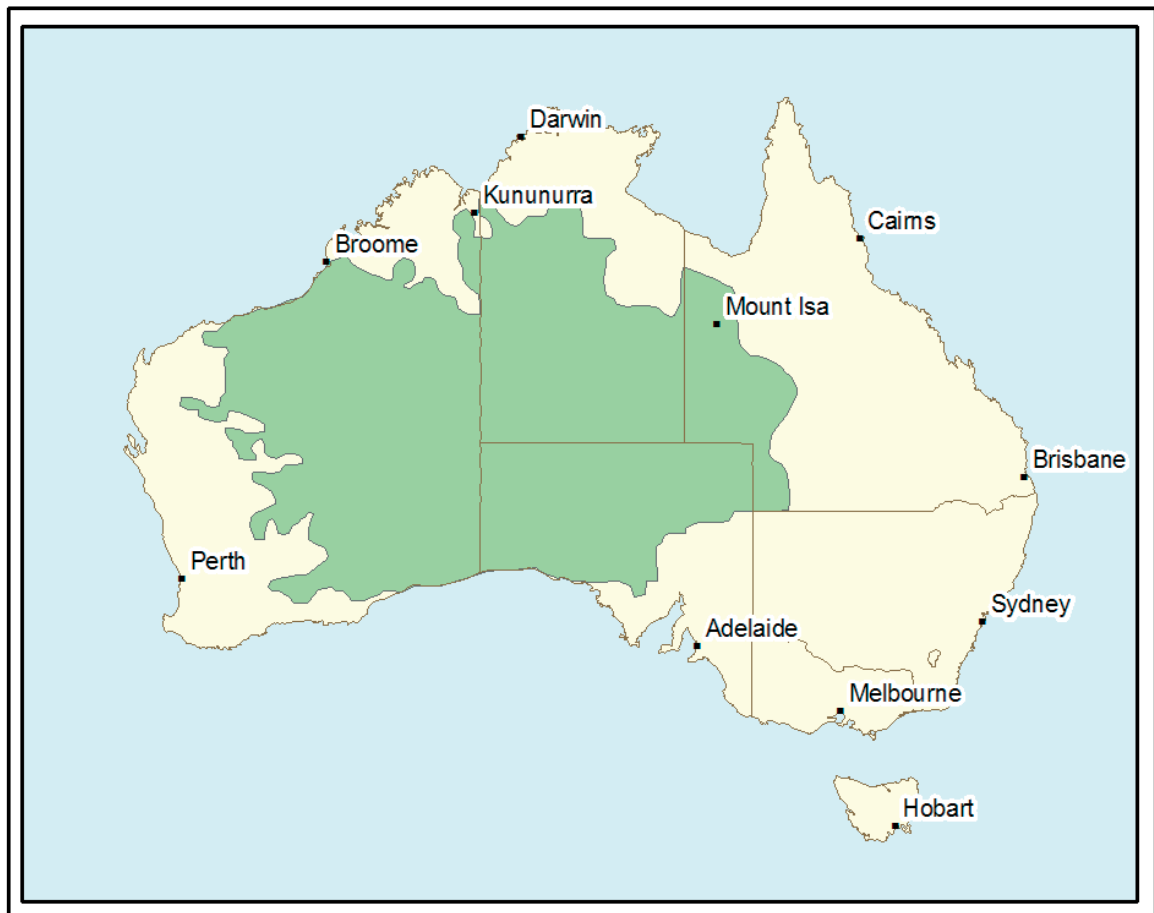
In the 1920s, there were an estimated 20 000 domesticated camels, but by 1930, with the advent of rail and motor transport, they were no longer needed and many were released into the bush. Well suited to the Australian deserts, these feral camels bred prolifically, spreading across arid and semi-arid areas of the Northern Territory, Western Australia and South Australia, and into parts of Queensland.

Ecology

Feral camels wander widely according to conditions, sometimes covering 70 kilometers in a day. They can utilise most habitats in the arid and semi-arid areas, depending on availability of food and summer shade.

As well as grazing on grass, feral camels browse on vegetation as high as 3.5 metres above the ground. They eat most plant material, including grasses and shrubs.





At times when forage is green and moist, feral camels gain all the water they need from their food and do not require drinking water. If water is available in summer, camels will drink regularly and at dawn. In extreme drought, they need access to waterholes—a dehydrated camel can drink 200 litres in three minutes. Contrary to legend, the hump is mostly fat, a store of energy rather than water.

Feral camels live in nonterritorial groups of three main kinds: year-round groups of bulls (males), summer groups of cows (females) and calves, and winter breeding groups that include a mature bull and several cows and their calves. Only old bulls tend to be solitary. Herds are generally around ten individuals but larger herds may form in summer when groups congregate around limited water resources.

During the breeding season, from May to October, males have a herd of 20 or more cows, which they defend against advances from other bulls. Pregnancy lasts about 13 months and a cow gives birth to a single young, which is weaned at about 18 months.

Feral camels have no natural predators in Australia, and tend to die from old age or from the effects of prolonged drought. Hence, camels can live in the wild for as long as 40–50 years and breed actively from 3–4 years old. There are some reports of infanticide, with rutting bulls showing aggression toward newborn calves and driving the cow from the calf after birth leading to the death of the calf. One record suggested an infant mortality rate of 29 per cent, of which over half was due to infanticide.



Impact

The increasing numbers of feral camels are a cause for concern as they are the only large browser in Australia.

Although camels are considered to be browsers, they have been observed to feed on most of the available plant species in areas where the diet has been examined, including pasture species. Camels damage trees and shrubs when browsing and can severely defoliate preferred trees, shrubs, and vines. They also inhibit recruitment of their preferred food species by suppressing flowering and fruit production and by browsing and killing juvenile plants.

Camels have the ability to cause the local extinction of highly preferred species like the quandong (*Santalum acuminatum*), plumbush (*S. lanceolatum*), curly pod wattle (*Acacia sessiliceps*), native apricot (*Pittosporum augustifolium*), bean tree (*Erythrina vespertilio*), and Lawrencia species. In 2008, both the quandong and native apricot were observed to have declined dramatically in the Petermann Ranges south-west of Alice Springs relative to the 1970s, attributed to a combination of inappropriate fire regime and camel browsing. Severe damage to desert poplar (*Codonocarpus cotinifolius*) was also noted.

In central Australia, serious and widespread negative impacts on vegetation have been recorded where camels occur at densities of more than two animals/km², though damage to highly palatable species occurs at much lower densities. In more arid country near Lake Eyre, significant negative impacts on vegetation have been recorded where camels occur at densities of more than one animals/km². Camels already occur at localised densities more than two animals/km² over much of their current range.

The impact of feral camels on native plants and drinkable water is most pronounced during drought, when areas close to remote waterholes become refuges that are critical to the survival of a range of native animals and plants. Feral camels can quickly degrade these areas during a drought to the point where they may no longer provide any refuge for native plants and animals, perhaps leading to the local extinction of these species. *The Action Plan for Australian Marsupials and Monotremes* recommends that feral camel numbers be reduced at specific areas to help protect the habitat of threatened animals such as the ampurta (*Dasyercus hillieri*).

Many water places are sacred sites to Aboriginal people, so the negative impacts of camels on waterholes, rockholes, soaks and springs can be culturally significant. Recent periods of drought have resulted in feral camels entering remote communities in search of water, and extensively damaging water infrastructure such as laundries, bathrooms, bores, taps and tanks.

Feral camels may damage pastoral enterprises through competition with stock for limited forage, and by damage to the property infrastructure — fences, windmills, water troughs, etc. Camels are susceptible to tuberculosis and brucellosis, which are serious diseases of livestock, as well as some other serious stock and human diseases that do not yet occur in Australia. Feral camels may act as a reservoir of infection for any of these diseases.

Feral camels have also become a public safety issue — with road, rail and even some air traffic at risk from collisions with wandering camels.



The economic costs of feral camels has been estimated at over \$10 million per year, comprising:

- \$5.51 million per year in damage to infrastructure, property, and people
 - damage to pastoral lands (fences, yards, and water troughs)
 - damage to government agencies and remote settlements (buildings, fixtures, fences and bores), and
 - damage to individuals mainly from vehicular collisions.
- \$2.35 million per year in direct control and management costs, and
- \$3.42 million per year in impacts on livestock production through competition with stock for food and other resources.

In addition, camels are ruminants and emit methane - a greenhouse gas - as a result of fermentation in the rumen (the large first chamber of a ruminant animal's stomach) at a rate of around 0.97 tonnes CO₂ equivalents per annum* (*International Panel on Climate Change).

Control

Between 1940 and 1966 the Australian feral camel population was neither officially monitored nor managed. Feral camel numbers in Australia were estimated in 2004 at more than 500 000 with approximately half of them in Western Australia. Current estimates place the population at closer to one million, and a doubling time of about nine years is likely.

Without management, camel populations have the potential to persist in large and growing numbers in already occupied sites and to expand into presently unoccupied areas.

Feral camels may be controlled by harvesting and/or culling, and damage may be mitigated by exclusion with heavy-duty fencing from critical areas.

Feral camels have some value as a resource. There is a pet-meat trade and a smaller trade — largely export driven — in camel meat for human consumption. Captured wild camels are easily domesticated for production purposes or for tourist ventures.

However utilisation of feral camels may not be sufficient to effectively control feral camel numbers within tolerable limits, and will not always be cost-effective. Aerial or ground culling without utilisation of the carcass may be required, particularly in the more inaccessible or remote areas, if numbers of feral camels are to be reduced to manageable levels.

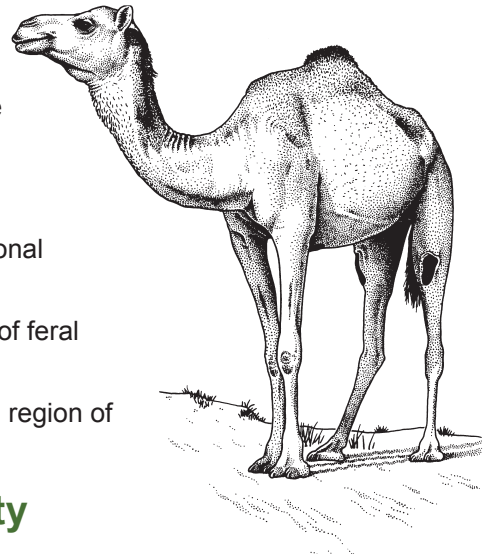
The Desert Knowledge Cooperative Research Centre in Alice Springs was funded by the Australian Government to develop a national management framework that would lead to a reduction in camel numbers to a level that reverses their current population growth trajectory and reduces their impacts on natural resource management, economic, and social-cultural values.

The project had five core sub-projects:

- evaluation of key stakeholder perceptions, focussing on Aboriginal, conservation, and pastoral land owners and managers within the camel's range,
- evaluation of the impacts of feral camels, based on consideration of economic, environmental, and social/cultural criteria,



- evaluation of commercial approaches, such as the live export of camels and the use of camels for pet meat and for human consumption, that could assist in the management of feral camels,
- evaluation of the non-commercial approaches, such as aerial culling, ground culling, and fencing, that are or could be used to manage feral camels: a review of possible chemical, biological, and fertility control options was also undertaken, and
- development of a spatially-explicit framework for the cross-jurisdictional management of feral camels.



The project also included:

- a review of legislative barriers to the cross-jurisdictional management of feral camels,
- modelling of management options for management of feral camels in central Australia, and
- an economic analysis of camel control in the central region of the Northern Territory.

Current national management activity

The Australian Government's Caring for our Country Business Plan 2009-10 identified feral camel management as one of the priority areas for investment.

The investigations by the Desert Knowledge Cooperative Research Centre to develop a national management framework became the basis for a proposal by Ninti One Ltd (as the commercial arm of the Desert Knowledge CRC) to remove 670 000 camels over four years and another 500 000 camels in the following four years, to reduce the density of feral camels to less than 0.1 animals per km² over their range. This proposal brought together for the first time all the relevant state and territory governments (South Australia, Western Australia, Queensland, and the Northern Territory), Aboriginal organisations across the four jurisdictions (land trusts, corporations and land councils), Natural Resource Management boards, conservation groups, the pastoral industry, commercial interests and research organisations to protect identified refuges for biodiversity in northern and remote Australia that are under threat from feral camels.

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