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# The Australian Feral Camel Management Project – a model for managing the impacts of large feral herbivores at the landscape scale

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## Introduction

The feral camel is an established pest animal in Australia. The species occurs across an area of about 3.3 million km<sup>2</sup> encompassing parts of Queensland (Qld), South Australia (SA), the Northern Territory (NT) and Western Australia (WA) (Saalfeld and Edwards 2010). Across this area, the density of camels varies considerably with the highest densities being recorded in recent times in the vicinity of the SA/NT/WA tri-state border region and in the Simpson Desert (Saalfeld and Edwards 2010). In recent years there have been concerns about the impacts of camels on the environment, pastoral production and cultural values, particularly where camels occur at high densities (Edwards *et al.* 2010).

A research project undertaken by the Desert Knowledge Cooperative Research Centre in 2006-2008 recognised that previous attempts to manage the impacts of feral camels had been largely *ad hoc* and ineffective (Edwards *et al.* 2008). The research concluded that effective management of camels and their impacts would need to incorporate all available control methods, be underpinned by a strategic and integrated management framework that worked across jurisdictions, tenures, boundaries and industry sectors, and include clearly prescribed management targets (Edwards *et al.* 2008). The Australian Feral Camel Management Project (AFCMP) was established in 2009 to do just this.

The main goal of the AFCMP was to mitigate the impacts of feral camels at 18 sites (with 17 buffer zones around these sites as per Figure 1) classified as 'biodiversity refuges' selected because of their high environmental value (Ninti One Ltd 2013). Impact mitigation was achieved by reducing the density of camels at and around these sites. Camels have a large body size and a relatively slow rate of population increase, and so the best strategy for reducing population density is to target adult survival (Pople and MacLeod 2010). The density targets selected in the vicinity of the refugia ranged from <0.1 to 1.0 camels per km<sup>2</sup>, depending on the asset and the distance from the asset. Edwards *et al.* (2008) suggested a long-term goal of <0.1 camels per km<sup>2</sup> should be aimed for in order to reduce feral camel impacts to more acceptable levels.

Density reduction was effected by removing camels from the landscape using a combination of aerial culling, ground-based culling (for pet meat only) and mustering for commercial utilisation. Of the three management approaches, aerial culling is the only method that can effect large-scale population reduction over extensive areas in short time frames (Saalfeld and Zeng 2008) and it was the principal method applied under the AFCMP (Ninti One Ltd 2013).

At the project's end in December 2013, it had reduced feral camel populations to target densities at buffers around 14 of the 18 assets and largely achieved the targets at the remaining sites. The project's success at the national level was underpinned by six key factors. These are described below.

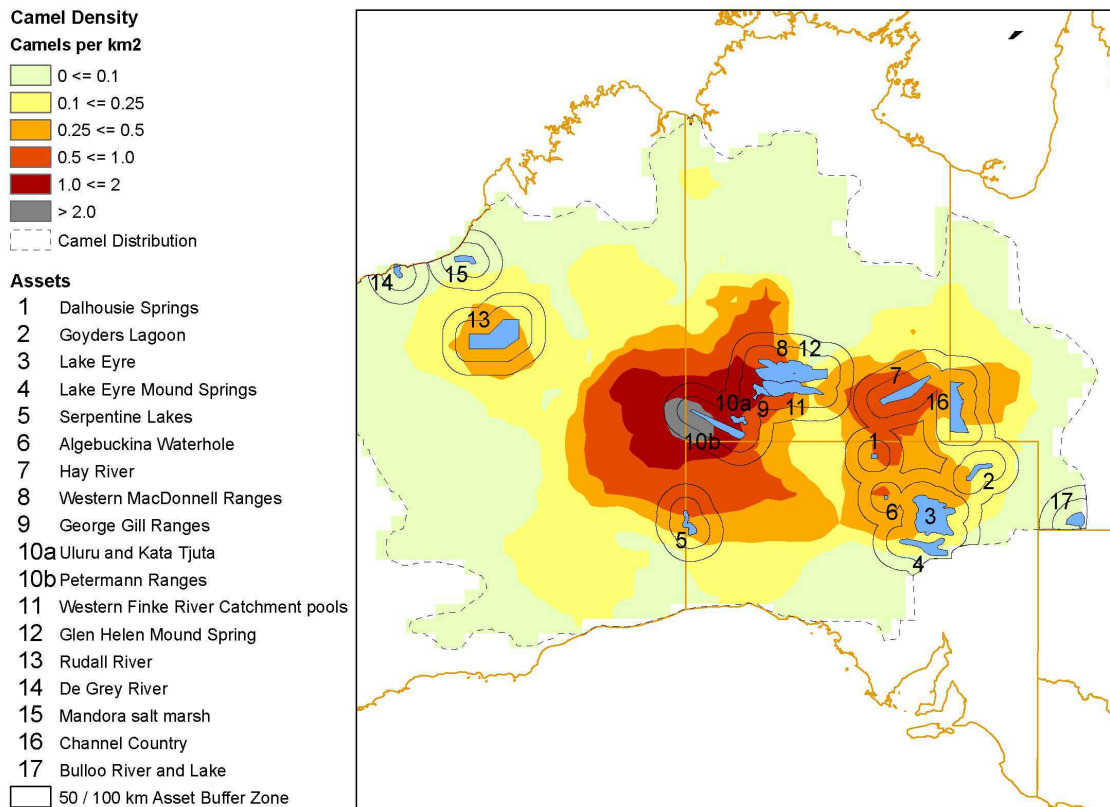


Figure 1. Map showing the buffered assets for the project and the camel density of feral camels as it was understood in 2010.

### Six key factors that underpinned the success of the AFCMP

1. Extensive consultation prior to any management being undertaken. The engagement of landowners and managers was fundamental to undertaking any form of camel management under the AFCMP. Considerable effort was made in consulting with Aboriginal stakeholders as more than 40% of feral camels (Saalfeld 2008) and the majority of the environmental assets for the AFCMP occurred on Aboriginal land.
2. Respect for stakeholder values. Whether or not camels were managed on a particular parcel of land and the method of management used was ultimately a landholder decision.
3. Robust governance. The AFCMP established a comprehensive governance structure (Ninti One Ltd 2013) which allowed all stakeholders to be involved in the planning, implementation and evaluation of management and monitoring activities. This helped to ensure that a uniform methodology was applied, promoted the sharing of ideas and helped to foster cross-border collaboration.
4. Rigorous monitoring and review procedures. The AFCMP adopted a monitoring program based on the Monitoring, Evaluation, Reporting and Improvement (MERI) model (Ninti One Ltd 2013). The project developed appropriate metrics and monitored both environmental (e.g. Camel impacts on vegetation and wetlands) and operational parameters (e.g. Number and location of camels culled, camel movements, animal welfare outcomes). This allowed the AFCMP to measure its success in meeting its stated objectives, provided robust accountability to justify investment and management decisions, allowed an assessment of compliance with Standard Operating Procedures (SOPs), and provided a feedback loop which allowed a flexible approach to be taken to management.
5. Animal welfare and operator safety were paramount. All management activities complied with relevant Workplace Health and Safety policies in Qld, SA, NT and WA and all management approaches were applied in accordance with endorsed SOPs. These SOPs

complied with the draft "Model code of practice for the humane control of feral camels" (Sharp and Saunders 2012) and "CAM002: Aerial shooting of camels" (Sharp 2012).

6. A flexible approach to management. A flexible management approach was used to take advantage of conditions which were advantageous for the removal of feral camels and to accommodate changing landholder requirements. This included building capacity for rapid response and a contingency fund to support such initiatives.

### **Enabling factors that increased efficiency of aerial culling operations in the Northern Territory**

In the NT, a number of arrangements that were put in place during the project were identified as critical turning points in respect of the efficient and safe application of camel management in that jurisdiction. These are discussed below.

#### *Standing consent for aerial culling to occur*

As a result of a comprehensive initial consultation process, a number of key landowners and managers across the NT provided consent for aerial culling to occur on their land. Of particular importance, many Aboriginal landowners agreed for the first time to camels being aurally culled over vast expanses of Aboriginal land, provided that culling was not undertaken near culturally sensitive sites or close to roads, communities or outstations.

#### *Contracting of services to support culling operations*

It was obvious from the outset that the aerial culling programme under the AFCMP would involve the extensive use of helicopters, and consume large quantities of aviation fuel and ammunition. The NT government set up contracts for the supply of ammunition and aircraft over the life of the AFCMP and used existing contracts for the supply of aviation fuel. This circumvented the need to conduct high level procurement for each individual management operation, saving time and facilitating development of a rapid response capability.

#### *Appointment of operations manager*

Aerial culling operations under the AFCMP were conducted by government agencies in each of the jurisdictions involved in the project. To facilitate the effective delivery of aerial culling, the NT appointed a dedicated operations manager to oversee culling operations.

#### *Use of multiple helicopters*

Initial culling operations in the NT involved only one Robinson 44 helicopter as a shooting platform. By the end of the project, up to three shooting platforms were being used in individual operations. Also, during the mid to latter stages of the AFCMP, the NT began using smaller Robinson 22 helicopters in conjunction with the shooting platforms. The smaller helicopters were used to push camels out of areas where culling was not permitted into areas where culling was permitted and where the shooting platforms were waiting.

The largest individual aerial cull operation under the AFCMP was conducted in the NT in mid-2012. It employed three Robinson 44 cull platforms in combination with two Robinson 22 spotting/mustering platforms. It removed 11,560 feral camels in 280 operational hours over 12 days. The area covered was 45,000 km<sup>2</sup> and the average removal cost was around \$30 per camel. Smaller operations conducted earlier in the project often incurred a cost of \$75-120 per camel.

Using two or more helicopters not only increased operational efficiency but also provided the greatest level of safety to operational teams in the event of an aircraft crash or malfunction. The remote nature of most operations would make it difficult to get to a grounded helicopter by vehicle if it ran into trouble.

## Conclusions

The AFCMP was the first landscape-scale project undertaken in Australia to manage the impacts of a pest animal without the solid legislative support that underpinned a program such as the Brucellosis and Tuberculosis Eradication Campaign. Given the project's success in meeting its management objective, the AFCMP should serve as a useful model for the implementation of any future projects of a similar nature.

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