



# National Feral Camel Action Plan:

A national strategy for the management of feral camels in Australia

Natural Resource Management Ministerial Council  
Developed by the Vertebrate Pests Committee

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# National Feral Camel Action Plan

## ***Executive summary***

There are currently over one million feral camels in the rangeland ecosystems of Australia. Feral camels are causing significant damage to the natural environment as well as to social, cultural and economic values across their extensive range. If left unmanaged, the number of feral camels will double in the next 8–10 years and feral camels will expand into new areas. If this happens, the extent and magnitude of the damaging impacts of feral camels will increase.

Management of feral camels and their impacts across the rangelands (primarily consisting of Aboriginal, conservation, pastoral and crown lands) is a complex issue that has two significant challenges:

- the rapid reduction of the currently over-abundant feral camel population, and
- building a legacy that will sustain on-going protection of assets and values of the rangelands.

There is a substantial number of stakeholders in feral camel management, including governments, landowners and landholders, communities and individuals, and those with commercial interests in feral camels. In order to achieve a significant reduction of the negative impacts of the feral camel population, all these groups will have to work together. However, there are differing views on how feral camels should be managed to achieve this outcome.

The National Feral Camel Action Plan (the National Plan) has been developed to guide the management of feral camels now and into the future. It provides a strategic and risk-based approach upon which local, regional and state-based management of feral camels can be undertaken. The National Plan's vision is:

***Comprehensive, coordinated and humane management of feral camels and their impacts that maintains and promotes the biodiversity, agricultural assets and social values of our rangelands for all Australians.***

The four key outcomes identified for the National Plan are the:

- development of the Australian and international community's understanding of and support for the humane management of feral camels and their impacts
- amelioration of the negative impacts of feral camels by addressing the current over-abundance of feral camels through the immediate, substantial and sustained reduction in their numbers and impacts across the rangelands
- adoption of a platform for the on-going humane management of feral camels, and
- development of partnerships and social capacities for feral camel management into the future.

The National Plan has been developed as a management plan for an Existing Pest Animal of National Significance (EPANS) under the Australian Pest Animal Strategy (APAS). A Feral Camel Working Group of the Vertebrate Pests Committee will oversee the implementation of the National Plan.

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## **1. Vision**

Feral camels are wild camels that roam long distances across Australia's rangeland ecosystems. The National Feral Camel Action Plan (the National Plan) has been developed in response to the increasing number of feral camels, their increasing damage to the natural environment, community infrastructure, cultural sites and primary industries and the need for a nationally coordinated approach to dealing with these issues. The vision for the National Plan is:

*Comprehensive, coordinated and humane management of feral camels and their impacts that maintains and promotes the biodiversity, agricultural assets and social values of our rangelands for all Australians.*

Throughout this plan, the term "rangelands" refers to the arid ecosystems across central and western Australia. Such ecosystems are primarily a mix of Aboriginal, conservation, pastoral and crown lands.

The National Plan is not about farmed camels that are deliberately fenced in for productive or other purposes or that are under the control of a person or company.

## **2. Challenges**

Management of feral camels across the Australian rangelands is a complex issue. There are currently over one million feral camels and this population will double in the next 8-10 years and beyond. At this population level feral camels are having significant negative impacts across their extensive range and are expanding into new areas. These impacts are environmental, social, cultural and economic. The overarching challenges for the National Plan are to set a framework that will:

- enable rapid and humane reduction of the currently over-abundant feral camel population to a level where it does not threaten the integrity of assets and social values and where jurisdictions and landowners can readily undertake on-going management to protect these assets and values, and
- ensure there is a legacy or platform in place that will sustain on-going protection of these assets and values from feral camels.

These central challenges are complicated by the array of other challenges that the implementation of the National Plan faces.

The feral camel range extends across three states (Western Australia, South Australia, Queensland) and the Northern Territory. Each jurisdiction has legislative and regulatory frameworks for the management of all pest animals including feral camels, which landholders must abide by. However, the detailed requirements of these frameworks have not been harmonised across jurisdictional boundaries. To date there has been little cooperative, cross-jurisdictional feral camel management except on a small scale ad hoc basis. This limited cross-jurisdictional effort has had little impact on feral camel populations overall, and has been ineffective in mitigating their impacts across Australia's rangelands. The jurisdictions are facing a considerable challenge to:

- harmonise legislative and regulatory requirements for feral camel control, and/or
- develop appropriate protocols to both allow and encourage cross jurisdictional feral camel management, and

- implement mechanisms to deal with the management of feral camels across different land tenures (e.g. pastoral, government and Aboriginal) when the approach required needs to access all tenures.

The values that are held by individuals and stakeholder groups about feral camels vary considerably. For some groups the negative impacts that feral camels have on environmental, social and cultural values are highly significant. Similarly, the economic costs associated with damage to infrastructure (such as fences) caused by feral camels and expenditure required to manage feral camels is a significant impost to land managers. Alternatively some communities and individuals see that feral camels are a potential economic resource that could be harnessed providing local employment and income. Further, the value of feral camels as a protein resource that could contribute towards a need in the world context is also valued by some individuals and groups. The challenges faced by the jurisdictions given this broad array of values include the:

- engagement of the different interest groups/stakeholders in the need for, and to undertake, action to manage the negative impacts of feral camels
- development via partnerships of appropriate capacities amongst stakeholders to manage feral camels and their impacts in a variety of settings and through a variety of control mechanisms
- countering of inaccurate and misrepresentative domestic and international information which condemns or interferes with the implementation of the National Plan, and
- identification and implementation of processes to address regulatory barriers to the development of commercial camel use, enterprises and/or industries.

A great deal of research has been undertaken on the ecology of feral camels and this has been synthesised by the Desert Knowledge Cooperative Research Centre (DKCRC) in recent years. This has provided a significant base of knowledge upon which sound management decisions can be based. Nevertheless, there are gaps in this knowledge in respect of impacts, potential control methods and in capacities to predict changes in population distribution and densities. However, waiting for research to address these knowledge gaps is not a justifiable reason to stop immediate action towards the humane management of feral camels and their impacts.

The National Plan has been developed using the 12 principles of the Australian Pest Animal Strategy (see Appendix A1) in order to bring together an agenda of short, medium and long-term actions and those responsible for undertaking them. The goals, objectives and actions listed are of an aspirational nature and the National Plan is dependent upon the jurisdictions and other stakeholders that are involved adopting and pursuing the actions for which they are responsible. The National Plan does not have a statutory basis.

## **2.1 Why a national plan?**

The current management of feral camels is largely ad hoc and is fragmented by jurisdictional and tenure boundaries. Consequently, feral camel management to date has failed to provide a strategic and risk-based approach upon which local, regional and state-based management can be undertaken.

**In order to develop a strategic and risk-based approach to feral camel management, an overarching emphasis has to be placed on humane management techniques and the mitigation of the impacts of feral camels at appropriate scales, rather than simply reducing feral camel numbers.** However, as there is a

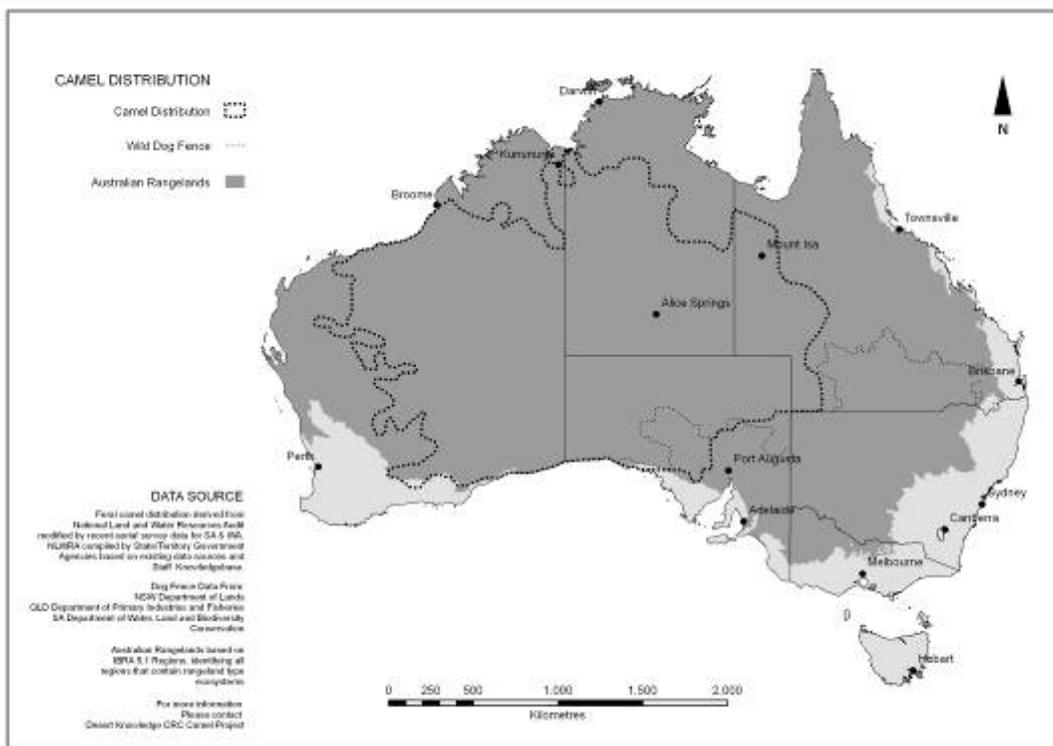
positive relationship between feral camel density and degree of damage, reducing feral camel numbers is an important strategy in achieving damage mitigation. Further, mitigation of the negative impacts of feral camels requires immediate effort by all - governments, industries, land managers and the various stakeholder communities.

This can only be achieved by providing a framework at a national level as:

- the current large population of feral camels occurs over a vast area
- feral camels are highly mobile and are able to move over large distances in relatively short time periods
- feral camels occur in very remote areas that are sparsely populated by humans and where ground access may be extremely limited or non-existent
- there are differing perceptions on feral camels and their impacts. Feral camels are considered to be both a pest and a resource and on occasion an ‘icon’.

The current distribution of the feral camel covers much of arid Australia – see **Figure 1**. Feral camels are present in up to 50 per cent of Australia’s rangelands ecosystems, which includes most of the arid regions of Western Australia, South Australia, the Northern Territory and parts of Queensland. Table 1 shows each of the jurisdictions where feral camels are present and the percentage of the total feral camel range that is in each jurisdiction.

**Figure 1.** Australian rangelands showing estimated distribution of feral camels in 2008 and the location of the dog fence (from Report 47 “*Managing the impacts of feral camels in Australia: a new way of doing business*”, Desert Knowledge CRC).



**Table 1.** The area occupied by feral camels in each jurisdictions across the feral camel range

<b>Jurisdiction</b>	<b>Area within feral camel distribution (km<sup>2</sup>)</b>	<b>Percentage feral camel range in jurisdiction</b>
Western Australia	1,534,000	46
Northern Territory	875,000	26.3
South Australia	589,000	17.7
Queensland	331,000	10
Total	3,329,000	100

## **2.2 What are the negative impacts of feral camels?**

Feral camels are found over a variety of land tenures. The key landholders/mangers across the feral camel range are conservation agencies (manage 10 per cent of land within the camel range), Aboriginal landholders (23.5 per cent) and pastoral landholders (24.5 per cent) (see Table 2). The remaining land on which camels occur is largely classed as unallocated crown land, much of which is subject to native land title claim. While the negative impacts of feral camels are generally the same across land tenures, perceptions vary about the loss of values of the rangelands, the importance of the different impacts and the subsequent costs to mitigate those impacts between tenures. However, across tenures, it is the increasing and unsustainable densities of feral camels that have created significant negative impacts, not the presence of feral camels per se.

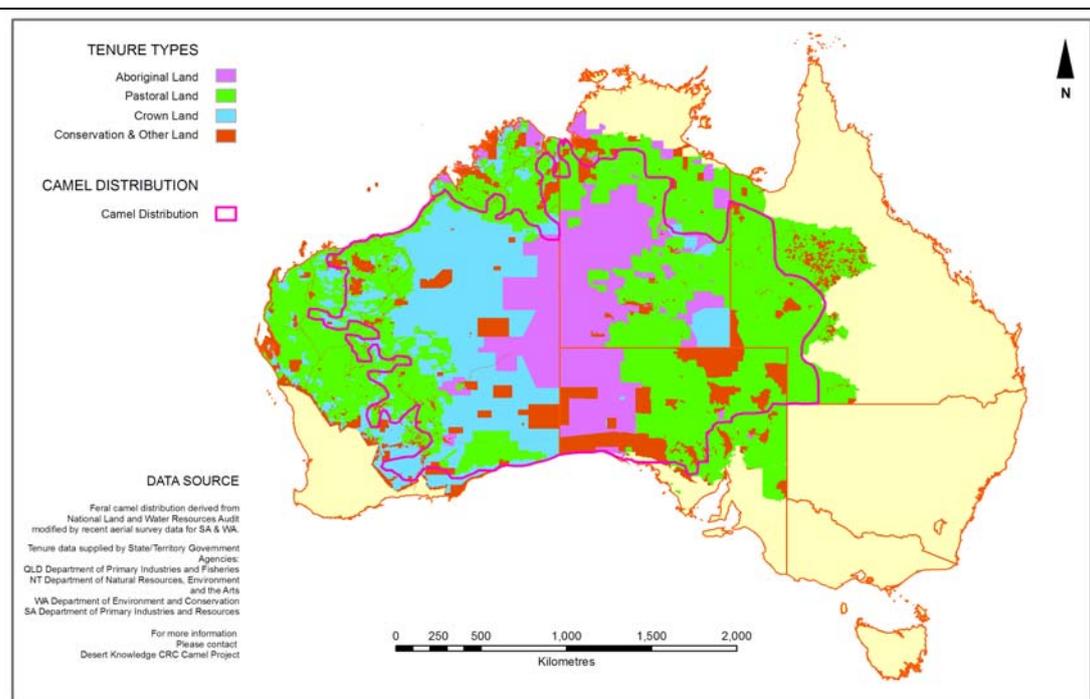
**Table 2. Major tenures across the feral camel range**

<b>Tenure classification</b>	<b>Area within feral camel distribution</b>	<b>Percentage tenure in feral camel range</b>
Aboriginal	783,000	23.5
Conservation/other	335,000	10
Pastoral	813,000	24.5
Vacant Crown Land *	1,399,000	42
Total	3,330,000	100

\* Such lands may be subject to native title claims.

Figure 2 provides an indication of the variety of land tenures within the feral camel range. The number of different tenures and the mosaic spread of tenures makes the success of any significant feral camel control dependant on cross tenure and cross jurisdictional cooperation.

**Figure 2** Indicative tenure in the feral camel range (from Report 47 “*Managing the impacts of feral camels in Australia: a new way of doing business*”, Desert Knowledge CRC).



The overarching negative impacts of feral camels as vertebrate pests are:

- **Environmental** – broad landscape damage including damage to vegetation through foraging behaviour and trampling, suppression of recruitment of some plant species, selective browsing on rare and threatened flora, damage to wetlands through fouling trampling and sedimentation, competition with native animals for food and shelter and loss of sequestered carbon in vegetation
- **Economic** – direct control and management costs, damage to infrastructure (fences, yards, grazing lands, water sources), competition with cattle for food and water, cattle escapes due to fencing damage, destruction of bush tucker resources
- **Social** – damage to culturally significant sites including religious sites, burial sites, ceremonial grounds, water places (e.g. water holes, rockholes, soaks, springs), places of birth, places (including trees) where spirits of dead people are said to dwell and resource points (food, ochre, flints), destruction of bush tucker resources, changes in patterns of exploitation and customary use of country and loss of opportunities to teach younger generations, reduction of people’s enjoyment of natural areas, interference with native animals or hunting of native animals, creation of dangerous driving conditions, cause of general nuisance in residential areas, cause of safety concerns to do with feral camels on airstrips, damage to outstations, damage to community infrastructure, community costs associated with traffic accidents.

Further detail on the assessed negative impacts can be found in Report 47 “*Managing the impacts of feral camels in Australia: a new way of doing business*”, Desert Knowledge CRC.

In addition to the general impacts listed above, drought, which occurs regularly across much of the current feral camel range, forces feral camels on to a reducing number of

water (drought) refuges. This accelerates the loss of these refuges with many feral camels often bogging and dying in these waters. There are consequent serious implications both for the welfare of the feral camels and the other species which depend on the same scarce water resources as drought refuge.

### 2.3 Primary stakeholders

There are a wide variety of individuals, groups and institutions that would consider themselves to be stakeholders in the implementation of the National Plan. An initial listing, not necessarily exhaustive, of stakeholders is at **Appendix A2**. Those who have regulatory responsibility for pest animals or land management are primary stakeholders in the implementation of the National Plan. So too are those who own or occupy land where feral camels occur as they are responsible for its stewardship and have statutory responsibility for humanely managing feral animals.

#### 2.3.1 State and territory governments

State and territory governments are primary stakeholders in the humane management of feral camels as responsibility for the regulation of feral animals lies with them. They are responsible for the management of feral animals on lands under their direct management, and have a further responsibility to lead humane management of feral animal impacts for the benefit of the whole community. In many cases state and territory governments take on a role of facilitating the humane control of feral animals by private landholders (e.g. through education programs, extension services, by undertaking research and development).

#### 2.3.2 Natural resource management regions

Most of the jurisdictions have formally declared natural resource management regions that have to varying degrees responsibilities for facilitating and undertaking natural resource management (primary industry and conservation management) across significant areas of the feral camel range. The key natural resource management regions are:

**Table 3. Natural resource management regions across the feral camel range**

State	Natural resource management board	Area within camel range (per cent)
Western Australia	Avon	3.4
	Rangelands	70.1
	South Coast	7.2
Northern Territory	Natural Resource Management Board NT Inc	66
South Australia	Alinytjara Wilurara Natural Resource Management Board	100
	Southern Australian Arid Lands Natural Resource Management Board	40
Queensland	Desert Channels Natural Resource Management Group	30

While the natural resource management boards have not been directly surveyed about their views on feral camels and their impacts, by virtue of their investments in the issue over the past four years, it is expected that their concerns would be similar to those of conservation managers and pastoralists (see below).

The Alinytjara Wilurara and Southern Australian Arid Lands Natural Resource Management Boards have conducted risk assessments that are incorporated into regional pest management strategies that highlight the threat from feral camels.

Desert Wildlife Services, for the Natural Resources Management Board (NT) Inc., Regional Investment Strategy have produced a guide for investment in camel management in the Northern Territory for the five year period 2009-2013.

### **2.3.3 Conservation managers**

Conservation managers report that the majority of impacts of feral camels are on environmental and cultural values, the very values that reserves are endeavouring to protect. Negative impacts associated with feral camels include problems in the broad landscape context such as:

- damage to vegetation
- damage to water sources
- increased risks to biodiversity
- competition with native animals
- damage to cultural sites
- damage to infrastructure, and
- traffic hazards.

The annual monetary value of the negative impacts of feral camels on conservation lands within the feral camel range was recently estimated to be \$0.18 million for damage to infrastructure damage and management actions. However, these costs are believed to be minor in comparison to those associated with damage to environmental assets which are difficult to evaluate in monetary terms.

### **2.3.4 Aboriginal landholders and land managers**

Aboriginal people's concerns about feral camel impacts are multi-faceted and encompass aesthetic, practical and physical dimensions, as well as religious issues. In areas of high feral camel density many Aboriginal people have indicated that feral camels negatively impact the broader landscape environment. However, feral camel impacts on natural and cultural resources are of greatest concern. Major concerns include the following:

- high feral camel densities near water sources making camping difficult and using and contaminating drinking water supplies
- feral camels trampling, eating and/or otherwise destroying types of bush tucker forcing changes to the patterns of customary use of country
- feral camels disturbing game species or getting in the way of hunters
- destruction and other impacts (e.g. loss of opportunity to teach younger generations) on cultural and sacred sites including rockholes
- the risk feral camels pose to people's safety including road safety and safety at airstrips
- loss of amenity/enjoyment of the country
- competition with native animals for food and water, and
- feral camel damage to community and township infrastructure, including fences and water supply.

Aboriginal attitudes to feral camels and their impacts are not homogenous. Many Aboriginal people value the opportunity they believe feral camels may provide for meaningful and productive economic activity. Potentially they could provide jobs in mustering and pet meat operations, along with income from the sale of camels, tourism enterprises such as camel farms and safaris, production of meat for human consumption and products such as camel wool. However, to date, few Aboriginal communities have developed enterprises using feral camels.

There are some ongoing, if small-scale, local suppliers of camel meat. Although the number of Aboriginal people eating camel meat is increasing, this is not consistent across communities.

### **2.3.5 Pastoralists**

Pastoralists are responsible for managing the total grazing pressures on the lands they own or are managing. Pastoralists in the rangelands have indicated the following negative impacts associated with feral camels:

- problems in the broader landscape context including environmental impacts, such as damage to vegetation, damage to water sources, soil trampling, biodiversity loss and environmental degradation, and
- negative impacts on pastoral properties such as damage to fences, damage to water sources, damage to grazing lands, competition with cattle for food and water, disturbance or injury of livestock and cattle escaping.

The monetary value of this damage and management to mitigate it has recently been estimated to be \$7.15 million annually across all pastoral properties within the margins of the feral camel range.

However, some pastoralists report that they benefit from feral camels including:

- deriving income from selling camels
- consumption of feral camel meat, and
- other economic benefits (e.g. some pastoralists in Queensland are using feral camels for woody weed control).

The monetary value of the benefit that pastoralists realised from feral camels has been recently estimated to be about \$0.58 million annually across all pastoral properties within or on the margins of the feral camel range.

It should be noted that the monetary values shown in the previous sections have been developed by the DKCRC. While there may be areas of contention in regard to the specific figures, the ratios of cost to benefit are appropriate to justify investment in control and the net benefit of undertaking humane feral camel management over 20 years would be extremely high. The 'do nothing' option is likely to increase the costs of impacts across all tenures exponentially.

### **2.3.6 Other rangelands communities**

Other outback townships, such as those servicing transport, mining and tourism industries, and road and rail infrastructure are also affected by feral camels. In particular they suffer from impacts that affect public safety and infrastructure. These impacts have been substantially described in the Desert Knowledge CRC's Report 47.

## **2.4 Secondary stakeholders**

Secondary stakeholders are those who, while not having an ongoing role in the direct management of feral camel impacts, have an overarching interest in feral camel management actions, or associated procedures and processes.

### **2.4.1 Australian Government**

The Australian Government, while not responsible for feral camel management other than on lands under its direct control, has a secondary stakeholder role as it has an overarching concern to maintain or improve biodiversity outcomes across Australia. The current degradation that is occurring as a consequence of feral camel impacts is of concern and the Australian Government has announced that it will provide \$19 million over four years commencing in 2009-2010 towards a major feral camel management project under its Caring for our Country initiative. The project is to be delivered by Ninti One Ltd (the commercial enterprise established by the DKCRC) and its partners. The purpose of the project is to bring about a significant reduction in the number of feral camels in the Australian rangelands so as to protect key biodiversity and other values. This funding and the outcomes that it is to provide are the subject of negotiations between the Australian Government and Ninti One, and are not discussed in detail in this National Plan.

### **2.4.2 Ninti One**

Ninti One is the proponent for a major project to be funded under the Caring for our Country initiative. Ninti One represents 19 partners in the proposal, including the Western Australian, Northern Territory, South Australian and Queensland governments. Contributing funding and in-kind support to the Caring for our Country initiative are being developed as the project is implemented.

The goals and the actions delineated in Section 6 of the National Plan will help to set the implementation of the Caring for our Country project and the on-going management of feral camels after the project has been completed.

### **2.4.3 Animal welfare groups**

Animal welfare is central to the implementation of feral camel management and the management of the impacts of feral camels on wildlife species. Standard Operating Procedures (SOPs) and Codes of Practice (COPs) are either in place or being developed across the range of issues (e.g. transport, humane culling) relevant to the management of feral camels. It will be critical to maintain a high level of interaction with animal welfare groups over the life of the National Plan.

### **2.4.4 Research institutes**

The DKCRC, amongst others, has been involved in undertaking a variety of research around feral camel biology, economics, social and cultural values and management approaches over recent years. The National Plan is based on the research that has been undertaken by the DKCRC, the Invasive Animals CRC, and other research organisations and jurisdictions. There is an ongoing need for research associated with camels and the National Plan will help to prioritise research that is critical to feral camel management.

### **3. Key outcomes**

Four key outcomes have been identified for the National Plan.

1. Development of the Australian and international community's understanding of and support for the humane management of feral camels and their impacts
2. Amelioration of the negative impacts of feral camels by addressing the current over-abundance of feral camels through the immediate, substantial and sustained reduction in their numbers across the rangelands
3. Adoption of a platform for the on-going humane management of feral camels, and
4. The development of partnerships and social capacities for humane feral camel management into the future.

These are articulated as the overarching goals of the National Plan in Section 6.

### **4. Process to be followed**

#### **4.1 Development of the draft National Plan**

This National Feral Camel Action Plan was requested by the National Resource Management Ministerial Council (NRMMC), a body comprised of all the Ministers for natural resources issues at the Australian Government and state and territory levels. It was developed by a working group of the Vertebrate Pests Committee (VPC).

The National Feral Camel Action Plan is the first to be developed as a plan for an Established Pest Animal of National Significance (EPANS) under the Australian Pest Animal Strategy (APAS). The National Plan has been based on the APAS principles (see **Appendix A1**) and may serve as a model for other EPANS.

#### **4.2 Public comment and endorsement**

The draft National Feral Camel Action Plan was agreed to by the NRMMC and approved for release for public comment late in 2009.

NRMMC mandated a two month consultation period which commenced on 1 December 2009 and concluded on 31 January 2010. The period of public comment was notified in both the Australian and in state and territory newspapers in the relevant jurisdictions. During the consultation period 32 public submissions were received and were subsequently appraised by the Feral Camel Working Group. Recommendations for changes to the draft National Feral Camel Action Plan were provided to the Natural Resources Management Ministerial Council. The NRMMC has endorsed this National Plan.

#### **4.3 Implementation**

The implementation of the National Plan will be overseen by the VPC with the responsibility for undertaking the actions under each goal being the responsibility of the parties identified in the plan. The Vertebrate Pests Committee's Feral Camel Working Group will be the major mechanism used for ensuring coordinated and collaborative implementation of the National Plan's actions. The VPC will provide annual updates of the progress against the National Plan to the NRMMC.

A significant number of the actions under the National Plan will involve the Caring for our Country feral camel Project partners. In order to ensure that the implementation of the National Plan and the project work in tandem, the Chair of the VPC's Feral Camel Working Group will represent the VPC and the National Plan on the Caring for our Country feral camel project steering committee.

## **5. Background**

### **5.1 Camel ecology and biology**

#### **5.1.1 Biology**

Although some preferences in habitat selection have been observed, camels are capable of using almost all available habitat types within the arid and semi-arid areas of Australia. Usage is seasonally variable with the exception of open bushland which is the preferred habitat all year round due to the rich and varied food sources it supplies regardless of season, the open vegetation which provides good observational awareness and the presence of shade trees. Dense bushland is not a preferred habitat except to mothers with new calves who use it to provide cover.

#### **5.1.2 Food requirements**

Over 80 per cent of plant species available to feral camels in central Australia are used by them as food sources. However, nearly 70 per cent of the actual food intake consists of only seven per cent of the species available. Forbs and small lignified plants comprise 63 per cent of the species eaten, with 19 per cent being shrubs and trees and 18 per cent grasses and ferns. While trees and shrubs comprise only 19 per cent of the range of food species consumed they make up almost 53 per cent of the volume, with forbs comprising 42.5 per cent of the remaining volume and grasses less than five per cent. Many of the plants eaten by feral camels are important bushtucker species.

#### **5.1.3 Water requirements**

Camels can survive for considerable periods without access to free/surface water. This is the result of morphological and physiological adaptations that maximise water conservation and facilitate them in obtaining sufficient water from ingested food at those times of the year when food is plentiful and/or high in moisture content. Camels are observed to drink at intervals of two to eight days in summer if water is available, but may go up to several months without drinking in winter in central Australia.

#### **5.1.4 Movement**

Camels, when not constrained, have the ability to move over areas of thousands to tens of thousands of square kilometres. There is a strong correlation between long-term annual rainfall and the size of areas used by feral female camels related to habitat productivity, with feral camels choosing to move over greater areas to obtain preferred or sufficient forage as aridity increases. It is unclear whether patterns of movement are nomadic, migratory, or movement within a home range. Feral camels need access to sources of water, which are more likely to be widely dispersed in arid areas. Overall the areas used are large and management to mitigate negative impacts will need to address the capacity of feral camel populations to use extensive areas of habitat covering many thousands of square kilometres.

### **5.1.5 Social organisation and behaviour**

Social organisation of feral camels in central Australia is characterised by non-territoriality and group formation, with formation of cow groups that are temporarily herded by a bull during rut and bachelor groups comprised of younger bulls. Older bulls tend to live solitarily. Cow groups are the basis of 'core groups' that are formed by the joining together of cows with same aged calves. The core group is stable for one and a half to two years, corresponding to the nursing phase of the calves, and stability is dependent on the presence of a herding bull.

Adult bulls compete for access to the cows when in rut. In central Australia, rut is highly seasonal with nearly all adult bulls capable of coming into rut at the start of winter. Bulls in rut compete to take over a core group and will attempt to herd it for three to five months.

### **5.1.6 Reproduction**

Female cows reach sexual maturity at three to four years of age. Gestation is variable but within the range of 336-405 days. The reproductive lifespan for female camels is around twenty five years. The calving interval is slightly less than two years. While births take place throughout the year there is a distinct increase in the six month period from June to November and particularly during late August to early September.

### **5.1.7 Diseases and parasites**

Diseases and parasites do not have a major impact on feral camels in Australia. Diseases that can affect camels such as Brucellosis and Tuberculosis, camel pox or camel Trypanosomiasis are not present in Australian camel populations. It is possible that some camels could carry some diseases that don't affect them. However, there is no evidence that this is the case in Australia. Similarly, parasitic impacts on Australian feral camels appear to be minimal. Scabies (sarcoptic mange) is reported as having a major impact on camel health in their natural range and reportedly affects large numbers of animals in central Australia, particularly during wet periods. The near disease-free status greatly enhances the suitability of Australian feral camel populations for commercial use, particularly domestic but also live export.

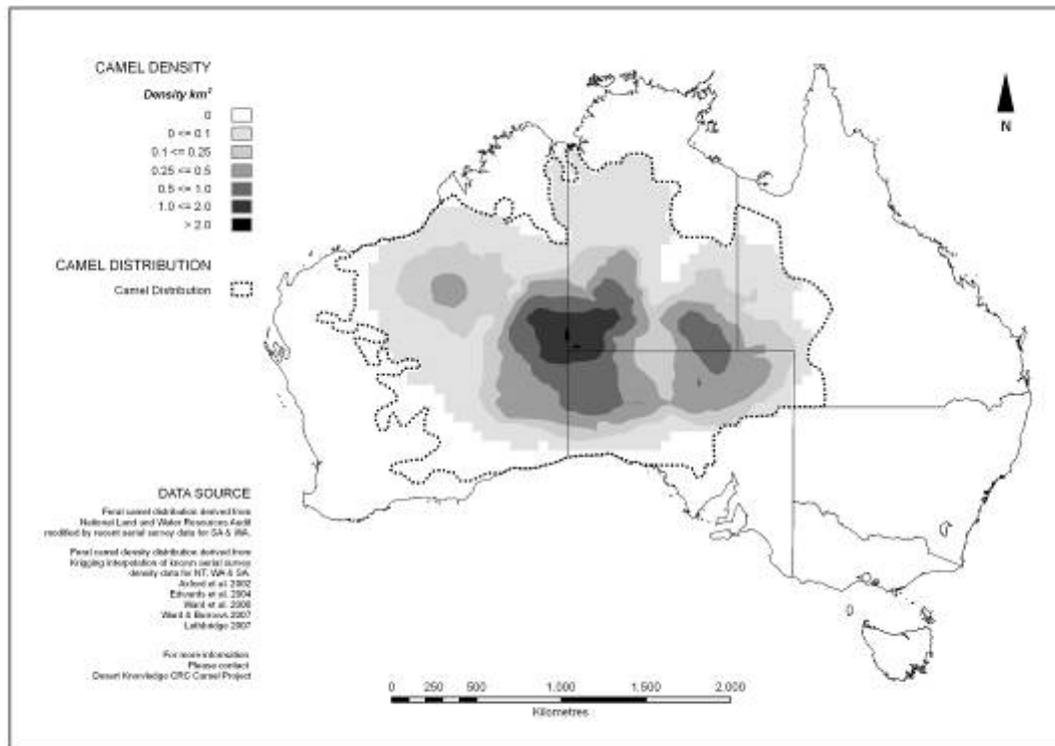
### **5.1.8 Predators**

Feral camels in Australia may not have any predators other than humans. The dingo is the only potential predator, though only on newborns and calves.

### **5.1.9 Population parameters**

The average lifespan within free camel populations is between 25 and 40 years. Mortality rates have been calculated to be 6 – 9 per cent per year. Current feral camel distribution is shown on **Figure 1**. Feral camels are distributed broadly across the Australian rangelands, occupying almost 50 per cent of their expanse and covering a minimum area of 3.3 million square kilometres. It is currently estimated that there are over 1 million feral camels in the rangelands. The population is doubling every 8-10 years. **Figure 3** shows the density of feral camels across their range. It should be noted that the densities have been calculated on best available but patchy information and may be inaccurate for some areas, particularly on the margins of the range.

**Figure 3.** Density distribution of feral camels across the estimated 2008 range of the feral camel in Australia derived from Kriging interpolation of known aerial survey densities extrapolated forward to 2008 (from Report 47 “*Managing the impacts of feral camels in Australia: a new way of doing business*”, Desert Knowledge CRC).



## 5.2 History of spread

The one-humped dromedary (*Camelus dromedarius*) was first introduced into Australia in 1840. Between 1866 and 1907 up to 20,000 camels were imported into Australia. Camels were well suited to working in remote dry areas and were used for riding, carting goods and as draught animals in the early development of the arid interior of the continent. From 1920 onwards the numbers of domestic camels declined as the use of motor vehicles for freight haulage increased. The widespread establishment of feral camel populations can be attributed to the wholesale abandonment of domestic camels during the 1920s and 1930s.

In 1969 the first systematic attempt was made to assess the number of feral camels across outback Australia. It provided an estimate of 15,000-20,000 feral camels. By 1988 it was estimated that the minimum Australian feral camel population was 43,000 camels in a broad belt-like distribution through central Australia from Broome in Western Australia to western Queensland. Feral camels are now broadly distributed across about half of the Australia rangelands with the population being estimated at 1 million in 2008. The wild dog fence currently provides an effective barrier limiting the further spread of feral camels into suitable areas of New South Wales and Queensland (Figure 1).

### **5.3 Annotated bibliography of camel-related research in Australia**

McKnight (1969) provided a comprehensive review of the history of the camel in Australia. The first broad-scale quantitative assessment of the number and distribution of feral camels in Australia was undertaken by Short *et al.* (1988). Since then, a series of independent aerial surveys has been conducted at various locations to determine feral camel population size and distribution at sub-regional to regional scales. On the basis of existing surveys, Saalfeld and Edwards (2008) generated a density distribution for feral camels in Australia with a population estimate of approximately one million animals.

Studies into the movement patterns of feral camels have been conducted by Dörger and Heucke (1995), Grigg *et al.* (1995), Edwards *et al.* (2001) and Lethbridge (2007).

Food selection by feral camels in Australia has been described by Barker (1964), McKnight (1967, 1976), Newman (1975), Dörger and Heucke (1995, 2003) and Peeters *et al.* (2005).

Social organisation of the feral camel in central Australia was studied extensively by Dörger and Heucke (1995).

Zeng and McGregor (2008) and Saalfeld and Zeng (2008) respectively reviewed commercial and non-commercial approaches to management. Lapidge *et al.* (2008) reviewed potential chemical, biological and fertility control options for the feral camel in Australia.

### **5.4 Control methods**

Current management of feral camels falls short of an integrated management approach, with only limited integration of different control methods or of programs across jurisdictional boundaries. To date management initiatives have failed to arrest population growth and also to mitigate feral camel impacts, except perhaps in the southern Simpson Desert area where both commercial and non-commercial control methods have been used. Non-commercial feral camel control methods currently used are aerial culling, ground culling and exclusion fencing (See Table A3.1 in Appendix A3). Commercial control methods have mainly focussed on harvesting feral camels for meat (pet meat and meat for human consumption) or for live export. Feral camels could potentially be used to produce a range of products apart from meat including dairy products and oil (see Table A3.2 in Appendix A3). Both commercial and non-commercial control management actions are subject to Codes of Practice (COPs) and Standard Operating Procedures (SOPs).

Effective management of feral camels and their impacts will involve the harmonisation of processes and systems to facilitate the integration of programs across jurisdictional boundaries, the identification of priority target areas and the development of scale-dependent, multiple-outcome local management plans integrated under this National Plan.

The implementation of the National Plan will be undertaken in accordance with the Australian Animal Welfare Strategy and the animal welfare regulatory requirements of all jurisdictions, including COPs and SOPs. This includes those minimum standards that have been determined amongst other things for the mustering, transport, and slaughter of feral animals, camels in particular, and the Australian Standards for the Export of Livestock.

There is some potential to develop new and innovative control methods including chemical and biological culling and fertility control, although the feasibility for these methods is currently considered to be low. These will require medium to long-term development periods.

One of the twelve key principles of the Australian Pest Animal Strategy (see Appendix A1) is “As part of an integrated pest animal management program, commercial harvesting may offset management costs.” There are commercial options for feral camel management which include harvesting for meat, medicine and other products. A camel industry has been emerging in Australia but it remains very small and has struggled to gain momentum because it has few export accredited processing facilities, it has been based on ad hoc harvest of a feral herd that is located in very remote areas (leading to supply issues), and has targeted price sensitive international markets. It is currently estimated that the camel industry removes around 5,000 to 6,000 feral camels each year: 3600-4,000 for pet meat, fewer than 400 for live export and 1,000 annually for human consumption (see DKCRC report 47). It is recognised that take-off of feral camels will slowly increase due to pet meat demand but would likely increase substantially with an expanded abattoir capacity in the longer-term.

Although the current number of feral camels removed is small, commercial capture and sale could potentially remove enough animals to have a significant localised impact on the levels of damage currently being caused and may form part of an integrated management approach. However, commercial feral camel harvesting must be developed within the overall context of reducing feral camel impacts. Ultimately, establishment of a long-term sustainable camel industry will need to be based on farmed camels, not the opportunistic harvest of a free-ranging feral herd to enable a reliable supply of suitable animals for markets whilst minimising the environmental impacts of feral camels.

The South Australian Arid Lands Natural Resource Management and Alinytjara Wilurara Natural Resource Management Boards evaluated market-based methods to allow efficient allocation of incentives for feral camel management to encourage competing interests (including landholders, mustering contractors, shooters, pet-meaters etc.) to submit proposals. Where a market exists for feral camels, financial returns can offset control costs providing incentive for consumptive use rather than culling. Competing interests for feral camels include abattoirs, pet meat and contract harvest, however, their role is limited by financial and logistical constraints. The costs to access, transport and process feral camels can exceed their value and create a financial loss of approximately \$20-\$60 per head depending on location. Any market based approach for management will have to address this gap.

While this National Plan is focussed on reducing the impacts of feral camels in rangelands ecosystems, it is also acknowledged that the reduction of feral camel numbers may have implications for population levels of other pest species such as feral donkeys, horses or foxes. The integrated management of pest animal species will remain the responsibility of all landowners/managers and be overseen by the state and territory governments.

### **5.5 Socio-economic factors affecting management decisions**

Because they occur in sparsely populated areas, feral camels are only noticed when their activities intersect with remote Aboriginal people, pastoralists and the tourism and mining industries. The significant damage that feral camels have done, and are currently doing, to the natural ecosystems, cultural sites, isolated communities and

pastoral enterprises of desert Australia has gone largely unnoticed by the bulk of Australia's population. The development of solutions to the current feral camel crisis in the Australian rangelands and the ongoing management of feral camels will require an understanding of the complex nature of social and economic factors in this area.

Feral camel management will be coordinated under the framework provided by this National Plan. Management actions will need to be developed at appropriate scales among all levels of government in partnership with communities, land managers and industry.

The potential for feral camel management activities to provide significant economic and social outcomes to Aboriginal communities will vary. The ability to gain economic outcomes will be a matter of the suitability of the area for commercial enterprises in the short and long-term. This will be affected by access and remoteness, the willingness of communities to participate in feral camel enterprises and market conditions for camel products.

It is not the place of this National Plan to analyse or develop commercial enterprises or the factors that could potentially contribute to their success.

## **6. *National Action Plan***

The National Feral Camel Action Plan has been developed to address the current crisis in feral camel numbers in the Australian rangelands and the impacts that this is having on the biodiversity and other assets of this area. It is predicated on scientific assessments that show:

- the numbers of feral camels have reached a crisis point in regard to their impacts on the Australian rangelands
- the number of camels will double in the next 8 to 10 years and beyond
- while there are gaps in our knowledge, these are insufficient to justify slowing or halting the active humane management of feral camel numbers in the landscape, and
- that solutions to the humane management of feral camels will need to be approached on a national level, though many solutions will be implemented at landscape and local levels.

### **The National Plan acknowledges that animal welfare is paramount to the success of feral camel impact management.**

The current over-abundance of feral camels can only be addressed by acknowledging that this is a shared responsibility. While management of pest animals is a landholder responsibility under state/territory legislation, the crisis brought about by current feral camel numbers requires government intervention to help support the landholders. However, the long-term goal is for landholders to have the capacity to deal with feral camel impacts, with the ongoing role for governments being to manage feral camels on their own lands and to look after the public good (e.g. by providing appropriate legislative and regulatory support to landowners, by setting standards for humane management of feral camels).

The management of feral camels and their impacts is a complex issue with many stakeholders. This National Plan recognises actions taken to mitigate the damage caused by feral camels, especially the removal of feral camels from the landscape via culling, may be confronting to some stakeholders and communities and that there is a

need to engage with these groups directly. In particular the National Plan recognises that appropriate strategies and resources need to be developed in order to help Aboriginal communities protect their sacred and cultural sites and bush food resources and their infrastructure.

Further, the actions set out in the National Plan (see Table 4 for summary and Table 5 for detail) address both the current crisis and the need for development of a platform for ongoing humane management of the negative impacts of feral camels. The National Plan sets the priorities for on-going humane management and takes a holistic approach to managing the impacts of feral camels across the entire area of the Australian rangelands.

The National Plan acknowledges that the humane management of feral camels will only be successful if capacities and partnerships are developed within and between stakeholders. In effect, the management of the current feral camel crisis will require a cross-tenure (nil-tenure) approach at a landscape scale, even while acknowledging that there are different capacities to undertake the management actions on different tenures. The National Plan also acknowledges that animal welfare is a fundamental consideration in all management actions no matter the tenure over which management actions are being taken.

The National Plan does not deal explicitly with the development of a camel industry. The exploration and development of markets for camel products and by-products is a matter for the camel industry and individual entrepreneurs. It is not the role of government to develop the underlying infrastructure that would be required to support a camel-based industry. Government responsibilities lie in ensuring that there are no unnecessary regulatory impediments to the development of such an industry. Risks associated with the commercial use of camels are a matter for those that wish to enter into or develop a camel industry.

The National Plan is a general accord between the states and territories and the Australian Government to manage the impacts of feral camels. In that the plan is agreed at this level, it is supported at state, not agency levels. The National Plan acknowledges that some actions may be undertaken within existing budgets and that some will require additional funding. It also acknowledges that there are a variety of avenues for the funding of further research and hence does not directly address research funding issues.

The four goals that have been delineated for the National Feral Camel Action Plan on the basis of the stated objectives are:

**Goal 1**

The Australian public and international community understand the need for and support the humane management of feral camels and their impacts.

**Goal 2**

Mitigation of the negative impacts being caused by the current overabundance of feral camels.

**Goal 3**

Adoption of a platform for on-going humane management of feral camels.

**Goal 4**

Partnerships and social capacity for humane feral camel management are in place.

The objectives and actions that need to be met in order to fulfil these goals are detailed in the following tables.

It should be noted that the life of the National Feral Camel Action Plan is envisaged as being considerably longer than the time allocated for the Caring for our Country project. While the two are intrinsically linked, the varying time lines and the need for states and territories to continue to oversee humane feral camel management beyond the life of the Caring for our Country project means that the parties responsible for actions under the National Plan will vary over time. The success of both the National Plan and the Caring for our Country project is dependant upon the willingness of all stakeholders to work together to achieve the on-going humane management of feral camels to ensure that their impacts on the Australian rangelands and the people who inhabit them are within tolerable limits.

<b>GOALS</b>	<b>The Australian public and international community understand the need for and support the humane management of feral camels and their impacts.</b>	<b>Partnerships and social capacity for humane feral camel management are in place.</b>
<b>Mitigation of the negative impacts being caused by the current overabundance of feral camels.</b>	<p>Engagement and communication strategy in place.</p> <p>Priority target areas for control are identified and agreed between jurisdictions,</p> <p>Feral camel management is undertaken in these areas.</p> <p>Crisis management is reviewed to help delineate long-term management platform.</p>	<p>Stakeholders well defined and engaged.</p> <p>A consistent understanding has been established with partners and stakeholders on the need for and methods to humanely manage feral camels and their impacts.</p> <p>Practitioners are appropriately trained.</p> <p>Stakeholders are managing feral camels and their impacts in a variety of settings and using a variety of humane control mechanisms.</p>
<b>Adoption of a platform for on-going humane management of feral camels.</b>	<p>Processes of feral camel management are humane, transparent and meet appropriate standards of accountability (safe, and efficient).</p> <p>Cross jurisdictional feral camel management processes, regulation and practices are in place.</p> <p>Priorities for long-term asset protection have been determined along with monitoring and evaluation methods.</p> <p>Feral camel population changes and impacts are monitored and resources applied strategically to humane feral camel management.</p> <p>Key knowledge gaps are identified and addressed via scientific research.</p>	<p>Information about humane feral camel management outcomes is available to all stakeholders.</p> <p>Risks associated with social and cultural assets are identified and appropriate response and mitigation methods are in place.</p> <p>Commercial feral camel harvesting is developed within the overall context of reducing feral camel impacts.</p> <p>Barriers to the development of commercial feral camel use enterprises and/or industries are identified and where appropriate revised.</p> <p>New and complementary management techniques are investigated.</p>

**Table 4. Goals and objectives - This matrix summarises the National Plan. Greater detail on objectives, actions and implementation are given below.**

**The National Feral Camel Action Plan: goals, objectives/actions and implementation strategy**

**Goal 1: The Australian public and international community understand the need for and support the humane management of feral camels and their impacts**

Objective/Actions	Outcome	Responsible party	Resources	Priority/Timeframe	Performance Measure
<p><b>1. Maximise public and community support for humane feral camel management within Australia</b></p>					
<p>1.1 Develop an engagement and communication strategy (a two way process)<sup>a</sup>.</p>	<p>1) Widespread understanding of the impacts of feral camels in the rangelands.                  2) Widespread understanding of the need for humane feral camel management, in particular the need for significant reduction of the feral camel population at this time.                  3) Community ownership of the issue</p>	<p>Ninti One and partners.</p>	<p>Funding provided under the Caring for our Country Project</p>	<p>High priority.                   As per head contract between Ninti and Australian Government.</p>	<p>1) Written communication strategy in place.                  2) One point for communications on the National Plan and the Caring for our Country Project in place and being used.</p>

<b>Objective/Actions</b>	<b>Outcome</b>	<b>Responsible party</b>	<b>Resources</b>	<b>Priority/Timeframe</b>	<b>Performance Measure</b>
1.2 Delineate stakeholder groups.	Detailed understanding of stakeholders and their needs, responsibilities and perceptions in regard to humane feral camel management.	Ninti One and partners.	Funding provided under the Caring for our Country Project.	High priority. By March 2010.	Stakeholder groups delineated.
1.3 Develop communications tools and material for pro active and reactive situations.	Targeted material available to address issues either before or as raised by stakeholders over the life of the action plan.	Lead: Ninti One and partners.  Other: VPC's Feral Camel Working Group and affected jurisdictions.	Ninti: Funding under the Caring for our Country Project.  Other: Within existing resources.	High priority. Commence March 2010.  Central website and hot links in place by end April 2010.  On-going posting of materials on website.	1) Central website and stakeholder email list established. 2) Proactive material available on central website with hot links to jurisdictional websites. 3) Media releases provided for the release of the National Plan. 4) FAQ sheets prepared and available on central website with appropriate hot links. 5) FAQ sheets provided in appropriate Indigenous languages to Indigenous stakeholders.

Objective/Actions	Outcome	Responsible party	Resources	Priority/Timeframe	Performance Measure
1.4 Maintain communication with all stakeholders on feral camel management activities.	No surprises amongst stakeholders about the goals, management methods and outcomes of the National Feral Camel Action Plan.	Lead: Ninti One and partners.  Other: VPC's Feral Camel Working Group and affected jurisdictions	Ninti: Funding under the Caring for our Country Project.  Other: Within existing resources.	High priority.  Commencing in March 2010 and ongoing.  National Plan provided to stakeholders electronically within 1 month of Ministerial approval and announcement.	1) Regular provision of information to stakeholders via email network. 2) National and local media satisfied with availability and quality of information. 3) Stakeholders provided with copies of the National Plan.
<b>2. Anticipate and address international concerns with implementation of the National Plan and the feral camel management project</b>					
2.1 Develop an engagement and communications strategy to address potential international issues <sup>a</sup>	1) Increased understanding of the impacts of feral camels on the Australian rangelands. 2) International understanding of the need for humane feral camel management, in particular the need	Lead: Ninti One and partners.  Other: VPC's Feral Camel Working Group and affected jurisdictions	Ninti: Funding under the Caring for our Country Project.  Other: Within existing resources.	High priority.  As per head contract between Ninti and Australian Government.	Written communication strategy in place (see Goal 1, Action 2.1).

Objective/Actions	Outcome	Responsible party	Resources	Priority/Timeframe	Performance Measure
	for significant reduction in the feral camel population at this time.				
2.2 Identify major international stakeholders <sup>b</sup>	Detailed understanding of stakeholders and their needs, responsibilities and perceptions about feral camel impacts and management in the Australian rangelands.	Lead: Ninti One and partners.  Other: Australian Government.	Lead: Funding provided under the Caring for our Country Project.  Other: Within existing resources.	High priority.  By March 2010.	Stakeholder groups delineated.
2.3 Develop communications tools and material for pro active and reactive situations	Targeted material available to all to address issues either before or as raised by stakeholders over the life of the National Plan	Lead: Ninti One and partners and Australian Government.	Ninti: Funding under the Caring for our Country Project.  Australian Government: Within existing resources.	As in Goal 1, Action 1.3.	As in Goal 1, Action 1.3.
2.4 Develop key media releases on feral camel management with (where possible) endorsement from international conservation groups and industry groups <sup>c</sup> .	On-going support for the National Plan and implementation by international groups.	Lead: Ninti One and partners and Australian Government.  Other: VPC's Feral Camel Working Group.	Ninti: Funding under the Caring for our Country Project.  Australian Government and other: Within existing resources.	High priority.  Commence March 2010 and ongoing.  Key international media release to coincide with the Ministers release of the National Plan.	Media releases provided for the launch of the National Plan and as required.

<b>Objective/Actions</b>	<b>Outcome</b>	<b>Responsible party</b>	<b>Resources</b>	<b>Priority/Timeframe</b>	<b>Performance Measure</b>
2.5 Engage with international media.	Processes seen as open, based on scientific assessment, an urgent environmental imperative and in response to loss of environmental, pastoral and Indigenous values and utilising appropriate humane control methods.	Lead: Australian Government and affected state and territory governments, Ninti One.	Ninti: Funding under the Caring for our Country Project.  Australian Government and other: Within existing resources.	High priority.  As required commencing March 2010.	1) Media releases provided for the launch of the National Plan and as required. 2) Regular communication through stakeholder e-mail network on issues relating to feral camel management in Australia.
2.6 Maintain communications with targeted international stakeholders, in particular those who are supportive of the National Plan.	On-going support for the National Plan and implementation by international groups.	Lead: Ninti One and partners.  Other: VPC's Feral Camel Working Group.	Ninti: Funding under the Caring for our Country Project.  Other: Within existing resources.	High priority.  Commencing March 2010.	Regular communication through stakeholder e-mail network on issues relating to feral camel management in Australia.
2.7 Develop and maintain communication between national governments on the impact of feral camels, the need for feral camel management including extensive removal of feral camels from the	Acceptance by foreign governments of the need for and the professional and humane management of the feral camel issue in the Australian rangelands.	Australian Government.	Within existing resources.	High priority.  Ongoing but determined via consultation between Department of Sustainability , Environment, Water, Population and	1) National government to national government briefings provided as required to back media releases etc. 2) Appropriate representations made to national

Objective/Actions	Outcome	Responsible party	Resources	Priority/Timeframe	Performance Measure
landscape and the National Plan.				Communities and the Department of Foreign Affairs and Trade.	governments where Australian feral camel management issues are likely to be or are raised.
<b>3. Ensure practitioners of camel management meet appropriate standards</b>					
3.1 Operators are trained and competent to an exacting standard outlined by COPs and SOPs and other pre-determined standards.	Widespread Australian and international community acceptance that the National Plan is being implemented humanely and appropriately.	Affected state and territory governments and Ninti One and partners.	State and territory governments: Within existing resources.  Ninti: Funding under Caring for our Country Project.	High priority.  Commencing in March 2010 and ongoing.	1) Requirement that under state and territory contracts and the Caring for our Country Project that all feral camel management operators are trained and competent and are meeting the COPs and SOPs as adopted nationally and in each jurisdiction. 2) Regular review by state/territory authorities of compliance of non-government funded feral camel management undertaken within affected jurisdictions.

Objective/Actions	Outcome	Responsible party	Resources	Priority/Timeframe	Performance Measure
<b>4. The processes of feral camel management are transparent</b>					
4.1 Transparent process for investigating complaints and reporting of results are determined and operating across the life of the National Plan.	Widespread Australian and international community acceptance that the National Plan is being implemented appropriately.	Lead: VPC's Feral Camel Working Group, State and Territory governments.  Other: Ninti One and partners.	State and territory governments, VPC: Within existing resources.  Ninti: Funding under Caring for our Country Project.	High priority.  Commencing in March 2010.	1) Single point of contact established for complaints established in each jurisdiction. 2) Principles established for investigating and reporting complaints. 3) Appropriate process/linkages established for Ninti One to investigate and report on any complaints. 4) All complaints investigated and appropriate actions taken within 3 months of a complaint. 5) Annual report of complaints and actions taken provided to VPC at end of each financial year.

Objective/Actions	Outcome	Responsible party	Resources	Priority/Timeframe	Performance Measure
<p><b>5. Appropriate open governance structures are in place including processes and responsibilities for managing any repercussions of the National Plan and to spread the knowledge gained prior to and through the life of the National Plan</b></p>					
<p>5.1 Roles and responsibilities of all involved in the implementation of the National Plan are defined and agreed, including primary response roles for different stakeholders.</p>	<p>1) Transparent accountability for implementation of the National Plan. 2) Coordinated action when needed.</p>	<p>Lead: Affected state and territory governments, VPC's Feral Camel Working Group, Ninti One and partners.  Other: Where third parties are involved in the delivery of outcomes it will be the responsibility of the contracting authority to ensure appropriate delivery.</p>	<p>State and territory governments, VPC: Within existing resources.  Ninti: Funding under Caring for our Country Project.  Other: Within existing resources.</p>	<p>High priority.  By time National Plan is endorsed.</p>	<p>1) Roles and responsibilities clearly delineated and agreed at Ministerial level. 2) Stakeholders aware of the different roles of those involved in the implementation of the National Plan.</p>

Objective/Actions	Outcome	Responsible party	Resources	Priority/Timeframe	Performance Measure
<p>5.2 Governance of and access to any intellectual property, (including data bases, mapping) to be negotiated and agreed to by relevant parties.</p>	<p>1) Transparent accountability for implementation of the National Plan. 2) A central source of information that can be used within the Australian Government's MERI framework of adaptive management.</p>	<p>Lead: Ninti One and partners.  Other: VPC's Feral Camel Working Group.</p>	<p>Ninti: Funding under Caring for our Country Project.  Other: Within existing resources.</p>	<p>High priority.  Governance arrangements: As per head contract between Ninti and Australian Government.  Reporting to VPC: annually.</p>	<p>1) Agreed governance of and access to intellectual property developed and in place and access to information governed in accordance with established protocols. 2) Seamless sharing of information on camel management between the affected jurisdictions, the Australian government and Ninti One and partners. 3) Annual reporting on implementation of the National Plan to VPC with 'learnings' as well as outputs and outcomes over the life of the Plan.</p>

<sup>a</sup>Critical messages should include:

- feral camel numbers have built over time to an unsustainable level
- the negative impacts of feral camels are affecting the environment, pastoral capacities, and Indigenous communities and cultural values
- the need to achieve a significant reduction in feral camel numbers (i.e. beyond recruitment numbers) before the problem becomes insurmountable
- the need to reduce feral camel numbers so that a lower level of on-going humane management can maintain control of impacts
- the processes are in place to ensure feral camels are managed in a safe, humane and efficient manner
- the processes are in place to investigate any complaints and the reporting of subsequent investigations.

<sup>b</sup>List should include:

- national governments
- conservation NGOs
- animal welfare NGOs
- Indigenous forums
- Scientific camelid community
- Countries where the camel is considered a valuable resource

<sup>c</sup>To include:

- announcement of the problem and action plan
- definition of loss of environmental and cultural values
- the actions to be taken.

**Goal 2: Mitigation of the negative impacts being caused by the current overabundance of feral camels**

Objective/Actions	Outcome	Responsible Parties	Resources	Priority/Timeframe	Performance Indicator
<b>1. National adoption of COPs and SOPs</b>					
1.1 Review relevant existing COPs and SOPs (transport, humane management, capture and handling) and develop new ones as required.	Consistent and humane feral camel management	Affected state and territory governments via the Vertebrate Pest Committee and the Animal Welfare Committee.	Within existing resources.	High priority.  Review to have been completed and gaps identified within one month of the National Plan being endorsed.  Any gaps and to be addressed by the affected jurisdictions, VPC and AWC within six months of being identified.	Consistent and humane framework for feral camel management in place and regulated by affected jurisdictions.
1.2 Determine and implement appropriate mechanisms to ensure harmonisation of COPs and SOPs as appropriate.	Consistent and humane feral camel management. Removal of regulatory impediments to cross-jurisdictional management through agreements or other processes.	Lead: Affected state and territory governments, VPC's Feral Camel Working Group.  Other: Ninti One and partners.	Lead: Within existing resources.  Other: Funding under the Caring for our Country Project.	High priority.  Harmonisation issues identified and addressed within six months of the review of the COPs and SOPs (see Goal 2, Action 1.1).	1) Mechanisms in place to overcome regulatory impediments to cross-jurisdictional management. 2) Adoption of harmonised COPs and SOPs as deemed appropriate by the affected jurisdictions. 3) Changes to regulatory requirements, COPs

Objective/Actions	Outcome	Responsible Parties	Resources	Priority/Timeframe	Performance Indicator
					and SOPs communicated to stakeholders via the stakeholders email and the central website within one month of changes being instigated.
<b>2. Harmonisation of processes/regulations to allow efficient work across jurisdictions</b>					
2.1 Ministerial endorsement of the National Feral Camel Action Plan.	Inter-jurisdiction endorsement of and cooperation to achieve the vision, goals and objectives of the National Plan.	Australian Government and affected state and territory governments via the National Resource Management Ministerial Council.	Within existing resources and committee processes.	High priority.  Public submissions appraised, National Feral Camel Action Plan revised and Implementation Strategy developed and submitted to the VPC in May 2010.  Submission of papers to subsequent committees OOS ASAP post VPC comments. Submission to NRMCC at first possible meeting in	1) Ministerial (Australian Government and state and territory) endorsement of the national Feral Camel Action Plan including the implementation strategy early in the second half of 2010. 2) Official announcement of the endorsement of the National Plan and Implementation Strategy in accordance with requirements of the Communications Plan (see Goal 1).

<b>Objective/Actions</b>	<b>Outcome</b>	<b>Responsible Parties</b>	<b>Resources</b>	<b>Priority/Timeframe</b>	<b>Performance Indicator</b>
				second half of 2010.	
2.2 Targeted review of actions and mechanisms needed to allow consistent management approaches across jurisdictional boundaries for work undertaken under the National Plan.	Delineation of cross-jurisdictional feral camel management issues (e.g. harmonisation of firearm requirements) and possible ways to address them.	Affected state and territory governments and VPC's Feral Camel Working Group.	Within existing resources.	High priority.  Commence April 2010, complete April 2011.	1) Review completed. 2) Implementation of appropriate mechanisms within 6 months of review being completed for areas of highest priority.
2.3 Develop MOUs or other appropriate mechanisms and processes that help to provide for efficient effective and humane feral camel management across jurisdictional boundaries.	Feral camel governance arrangements (including processes/mechanisms) in place that allow cross jurisdictional work to be undertaken (including by contractors) with the greatest efficiency.	Lead: Affected state and territory governments, VPC's Feral Camel Working Group.  Other: Ninti One and partners.	Lead: Within existing resources.  Other: Funding under the Caring for our Country Project.	High priority.  Within six months of Ministerial endorsement of the National Plan.  Landscape level planning for efficient effective and humane camel management to be undertaken on an annual basis as per the head contract between Ninti and the Australian Government over the life of the Caring for our Country Project.	1) MOUs and other mechanisms are in place (including processes/mechanisms and safeguards for humane management) in place. 2) Annual planning undertaken under the Caring for our Country Project.

Objective/Actions	Outcome	Responsible Parties	Resources	Priority/Timeframe	Performance Indicator
2.4 Establish and maintain strong linkages between VPC's Feral Camel Working Group and the steering group for the Caring for our Country Project over the life of the Project.	1) Overarching and active coordination of the National Plan and the Caring for our Country Feral Camel Management Project. 2) A "one-stop-shop" for information about policy issues and participant responsibilities under the National Plan and the Caring for our Country feral camel management project.	VPC's Feral Camel Feral Camel Working Group and Ninti One.	VPC: Within existing resources.  Ninti: Funding under the Caring for our Country Project.	High priority.  By the time of the first steering group meeting for the Caring for our Country Project.	Overarching and active coordination of the National Plan and the Caring for our Country Project.
<b>3. Identify priority target areas for control and develop local management plans</b>					
3.1 Using existing information (scientific and landholder/expert knowledge), review and reconcile stakeholder perceptions of priority target areas at landscape scale <sup>a</sup> .	1) Priority areas for locational culling/ feral camel removal determined. 2) Stakeholder acceptance and support for the priority target areas.	Ninti One and partners, affected state and territory governments.	Ninti: Funding under the Caring for our Country Project.  Other: Within existing resources.	High priority.  Priority areas for feral camel removal determined on an annual basis in accordance with the Caring for our Country Project requirements during the life of the project and then State and	1) Annual assessment of priority target areas. 2) Stakeholder acceptance and support for the priority target areas.

<b>Objective/Actions</b>	<b>Outcome</b>	<b>Responsible Parties</b>	<b>Resources</b>	<b>Priority/Timeframe</b>	<b>Performance Indicator</b>
				Territory priorities over the life of the National Plan.	
3.2 Interjurisdictional agreement on the priority areas.	Intergovernmental agreement and support for the priority target areas.	Ninti One and partners, affected state and territory governments, Australian Government.	Funded under the Caring for our Country project over the life of the project and then within existing resources across the remaining life of the National Plan.	High priority.  Annually.	Intergovernmental agreement to and support for the priority target areas.
3.3 Designation of acceptable feral camel densities (either landscape or spot densities) in priority areas.	Target feral camel densities and reduction requirements at target localities.	Ninti One and partners, affected state and territory governments, Australian Government.	Funded under the Caring for our Country project over the life of the project and then within existing resources across the remaining life of the National Plan.	High priority.  Designation of acceptable densities to be determined as part of annual designation of priority areas (see Goal2, Action 3.1).	Designation of feral camel densities and reduction requirements for priority areas annually.
3.4 Within priority areas, identify and define management units and develop local management plans	1) Development of scale-dependent local management plans.	Ninti One and partners, affected state and territory governments.	Ninti: Funding under the Caring for our Country project.	High priority.  Priority areas for feral camel removal determined on an	1) Development of local management plans each year.

Objective/Actions	Outcome	Responsible Parties	Resources	Priority/Timeframe	Performance Indicator
which may have multiple outcomes.			Other: Within existing resources.	annual basis in accordance with the Caring for our Country project requirements during the life of the project and then state and territory priorities over the life of the National Plan.	
<b>4. Identify methods of removal to be used in priority target areas including monitoring requirements</b>					
4.1 Identify all existing feral camel management methods (direct and indirect, commercial and non-commercial) and define parameters (biological, ecological, welfare, efficacy issues and social acceptability) for appropriate use.	A menu of agreed feral camel management methods along with defined parameters for their appropriate use is available for any landholder, community group or government agency to use,	Australian Government, affected state and territory governments, via the VPC's Feral Camel Working Group.	Within existing resources.	High priority.  Commence March 2010.  Published on the central website within one month of the Ministerial endorsement of the National Plan.  Revisions made as required in light of adoption of new COPs and SOPs, new	1) A menu of agreed feral camel management methods along with defined parameters for their appropriate use is available for any landholder, community group or government agency to use. 2) Stakeholders aware of their management responsibilities especially in regard to the humaneness requirements for

<b>Objective/Actions</b>	<b>Outcome</b>	<b>Responsible Parties</b>	<b>Resources</b>	<b>Priority/Timeframe</b>	<b>Performance Indicator</b>
				research etc.  Stakeholders advised of revisions via the stakeholder email network within two weeks of being posted on the central website.	different camel management methods.
4.2 Assess the humaneness of existing camel control methods using the model developed by Sharp and Saunders.	Methods for control of feral camels assessed for humaneness	Australian Government and state and territory governments via the VPC.	Within existing resources.	High priority.  Within six months of Ministerial endorsement of the National Plan.	1) Humaneness assessment completed and information published. 2) Stakeholders aware of humaneness assessment. 3) Jurisdictional regulations amended where required.
4.3 Using parameters defined above identify appropriate humane methods, including a mix of methods, to be applied in each priority target area.	Methods for control identified for each priority target area.	Ninti One and partners.	Funded under the Caring for our Country project over the life of the project and then within existing resources across the remaining life of the National Plan.	High priority.  To be included in the annual plans (see Goal 2, Action 3.1).	Methods for control identified for each priority target area as part of annual planning.

<b>Objective/Actions</b>	<b>Outcome</b>	<b>Responsible Parties</b>	<b>Resources</b>	<b>Priority/Timeframe</b>	<b>Performance Indicator</b>
4.4 Identify monitoring and evaluation approaches at appropriate scales (national, regional and local).	Monitoring and evaluation methods agreed and procedures and processes in place before active feral camel population reduction commences. (See VPC guidelines on monitoring and evaluation).	Ninti One and partners.	Funding under the Caring for our Country project.	High priority.  As per head contract between Ninti and Australian Government.	Monitoring and evaluation methods identified and procedures and processes in place before large scale active feral camel population reduction commences.
4.5 Identify possible risks associated with non-target organisms/cultural assets in each priority target area and consider appropriate responses/mitigation processes e.g. increased numbers of predators associated with carcass scavenging potential new disease risks, animal health and welfare.	Risk assessment completed and mitigation actions incorporated into the methods for each priority target area.	Ninti One and partners, affected state and territory governments, landholders/managers.	Funded under the Caring for our Country Project.	High priority.  As per head contract between Ninti and Australian Government  To be considered in development of the annual plans (see Goal 2, Action 3.1).	1) Generic risk assessment completed and available to all stakeholders. 2) Mitigation actions incorporated into the annual plans for each priority target area. 3) Mitigation actions incorporated into landholder and other stakeholder actions as required.
<b>5. Strategic allocation of resources to manage camels</b>					
5.1 Identify a process and develop a capacity to undertake rapid targeting and removal	1) National monitoring in place. 2) Capacity for rapid opportunistic removal	Ninti One and partners, affected state and territory governments,	Funded under the Caring for our Country Project.	High priority.  By 2011.	1) National monitoring and field reporting framework in place. 2) Capacity for rapid

<b>Objective/Actions</b>	<b>Outcome</b>	<b>Responsible Parties</b>	<b>Resources</b>	<b>Priority/Timeframe</b>	<b>Performance Indicator</b>
of feral camel aggregations on an opportunistic basis determined by national monitoring and/or field reports.	of feral camels in place.	landholders/managers.			opportunistic removal of feral camels in place.
5.2 Develop policies on a variety of market approaches that could be used to aid in the management of feral camels.	Market based approaches available and used where appropriate to the goal of reducing the impacts of the overabundance of feral camels.	Lead: Affected state and territory governments.  Other: Ninti One and partners.	Lead: Within existing resources.  Other: Funded under the Caring for our Country project.	Medium priority.  Within twelve months of Ministerial endorsement of the National Plan and as appropriate during the life of the project.	State based policies on market based approaches adopted and conveyed to stakeholders.
5.3 Investigate alternative funding resources to supplement the NRM investment in feral camel management (e.g. Aboriginal employment programs, infrastructure protection, carbon economy)	Additional resources to enable greater investment in feral camel removal, impact reduction and protection of key site assets	Australian Government and state and territory governments via the VPC.	Within existing resources.	High priority.  Within six months of Ministerial endorsement of the National Plan.	1) Engagement with organisations that may provide alternative funding resources. 2) Agreements in place to secure additional resources.

Objective/Actions	Outcome	Responsible Parties	Resources	Priority/Timeframe	Performance Indicator
<b>6. Non-commercial management (aerial culling, ground culling and fencing)</b>					
6.1 Identify parameters for and designate assets requiring direct protection (e.g. fencing) from feral camels.	Priority assets requiring direct protection identified.	Ninti One and partners, affected state and territory governments, Aboriginal groups, other stakeholders.	Funded under the Caring for our Country project.	High priority.  Initial assessment within twelve months of Ministerial endorsement of the National Plan  To be considered in development of the annual plans (see Goal 2, Action 3.1).	1) Priority assets requiring direct protection identified. 2) Relevant information on central website and conveyed to stakeholders.
6.2 Conduct aerial and ground culling activities in accordance with COPs and SOPs modelled on those endorsed by VPC and other Standing Committees.	1) Safe, efficient and humane control of feral camels in line with community expectations. 2) Operators are trained and competent to an exacting standard outlined by COPs and SOPs.	Ninti One and partners, affected state and territory governments, Aboriginal groups, other stakeholders.	Within existing resources.	High priority.  Interim use of existing state-based COPs and SOPs for the Caring for our Country project commencing March 2010 until national COPs and SOPs adopted.  National COPs and SOPs endorsed by VPC and other appropriate inter-	1) All feral camel managers aware of and operating within existing COPs and SOPs across the life of the National Plan. 2) State based regulatory systems for monitoring feral camel management in place and proactive. Report on regulatory actions provided to the VPC through the Feral Camel Working Group at end of each financial

Objective/Actions	Outcome	Responsible Parties	Resources	Priority/Timeframe	Performance Indicator
				<p>jurisdictional committees by end first quarter 2011.</p> <p>National COPs and SOPs through regulatory processes by end 2011.</p> <p>Alignment of existing state-based COPs and SOPs with national documents by June 2012.</p>	<p>year (see Goal 1, Action 4.1).</p> <p>3) Feral camel managers operating outside the existing regulatory system dealt with appropriately under state and territory regulations.</p>
6.3 Allocate resources to the direct protection of priority assets.	Funding provided from a variety of sources for protection of priority assets	<p>Lead: Ninti One and partners.</p> <p>Other: Australian Government (through Heritage and Indigenous Programs).</p>	<p>Lead: Funded under the Caring for our Country project.</p> <p>Other: Within existing resources.</p>	<p>High priority.</p> <p>To be considered in development of the annual plans (see Goal 2, Action 3.1).</p>	Level of resource allocation to direct protection of priority assets.
6.4 Identify at the landscape scale areas that are deemed a high priority for the removal of feral camels	A set of priority areas for action and associated methods for removal designated.	Ninti One and partners.	Funded under the Caring for our Country project.	<p>High priority.</p> <p>Commencing March 2010, with seasonal and annual reviews as appropriate.</p>	National priorities identified.

<b>Objective/Actions</b>	<b>Outcome</b>	<b>Responsible Parties</b>	<b>Resources</b>	<b>Priority/Timeframe</b>	<b>Performance Indicator</b>
				To be considered in development of the annual plans (see Goal 2, Action 3.1).	
<b>7. Feral camel removal through commercial camel harvesting for sale and slaughter to be developed within overall context of reducing impacts</b>					
7.1 Develop and publicise a statement on the roles and responsibilities of governments and (potential) commercial enterprises in the development of managed camel-based industries or opportunistic feral camel harvest activities.	Clear acknowledgement of the potential role of commercial enterprises in the management of feral camels without a concomitant expectation of ongoing government subsidies/support.	Australian Government, affected state and territory governments.	Within existing resources.	High priority.  To be released via the central web site.	1) Statement developed and placed on the central website soon after the endorse National Plan is released. 2) Stakeholders informed about the statement.
7.2 All entities seeking to remove feral camels from the landscape for commercial purposes (supported in principle by the National Feral Camel Action Plan)	1) Commercial enterprises are assisting the feral camel management effort with no expectations that Government will	Lead: Commercial entities.  Other: Affected state and territory governments (through approval processes).	Lead and other: Within existing resources.	Medium priority.  As required.	1) Landowners and managers aware of and working within the goals and objectives of the National Plan as is appropriate to their land management

<b>Objective/Actions</b>	<b>Outcome</b>	<b>Responsible Parties</b>	<b>Resources</b>	<b>Priority/Timeframe</b>	<b>Performance Indicator</b>
acknowledge their responsibilities to ensure that their activities do not contravene the goals and objectives of the National Feral Camel Action Plan. Further such entities acknowledge their responsibilities for their own financial and economic viability.	support and/or subsidise the development of commercial camel industry enterprises.				responsibilities. 2) Entities involved in commercially using feral camels do not contravene the goals and objectives of the National Plan and are responsible for their own financial viability.
7.3 Investigate parameters for use of commercial harvesting to offset management costs on government controlled lands.	Commercial harvesting is considered amongst the methods that could be used for selected priority target areas and asset protection.	Affected state and territory governments, Ninti One and partners.	State and territory governments: Within existing resources.  Ninti: Funded under the Caring for our Country project.	Medium priority.  On-going across the life of the National Plan.	1) Parameters defined. 2) Commercial harvesting is considered in the mix of management methods for government controlled lands.
<b>8. Review success of crisis management and delineate transition to long-term platform</b>					
8.1 Evaluate progress on implementation of National Plan and associated activities on	Development of an adaptive management approach (i.e. change the plans according to	Lead: VPC's Feral Camel Working Group.	Lead: Within existing resources.	High priority.  Annually across the life of the National	1) Annual reports presented to VPC within three months of receipt of the Ninti

<b>Objective/Actions</b>	<b>Outcome</b>	<b>Responsible Parties</b>	<b>Resources</b>	<b>Priority/Timeframe</b>	<b>Performance Indicator</b>
an annual basis.	changes in circumstances) to the implementation of the National Plan and the Caring for our Country project.	Other: Ninti One and partners. Note that Ninti One is obliged to report on the Caring for our Country project only under the head contract with the Australian Government.	Ninti: Funded under the Caring for our Country project.	Plan.  Annual reports to be provided to the VPC within three months of the Ninti One annual reports being received each year.	One annual report. 2) Annual reports agreed as appropriate by VPC progressed to the NRMSC within three months of endorsement.

<sup>a</sup>Note: as feral camels are highly mobile, a process to quickly re-evaluate areas to be targeted may be required.

**Goal 3: Adoption of a platform for on-going humane management of feral camels**

<b>Objective/Actions</b>	<b>Outcome</b>	<b>Responsible Parties</b>	<b>Resources</b>	<b>Priority/Timeframe</b>	<b>Performance Indicator</b>
<b>1. Investigate potential new and complementary management techniques.</b>					
1.1 Further investigate fertility control, use of toxins and other new and complementary broad scale methods including delivery mechanisms that could be used to manage feral camel population size as appropriate.	New and complementary methods for broad scale control of feral camels either established or dismissed.	Lead: Affected state and territory governments, research organisations.  Other: While not responsible for undertaking this action, animal welfare organisations are supportive of investigating potential new and complementary management techniques and will be consulted on this action.	Lead: Within existing resources and/or with new resources.	Low priority.  Medium and long-term research beyond the life of the National Plan.	Not appropriate.
1.2 Investigate new physical management techniques that could be used to protect	New and complementary physical management techniques to reduce	Affected state and territory governments, research	Within existing resources and/or with new resources.	Medium priority.  On-going across the life of the National	1) Where new possibilities arise, assessment undertaken as appropriate. 2) Assessments to be placed on

Objective/Actions	Outcome	Responsible Parties	Resources	Priority/Timeframe	Performance Indicator
assets and reduce or mitigate the impacts of feral camels on priority assets and the landscape generally.	or mitigate the impacts of feral camels either established or dismissed.	organisations.		Plan.	the central website within three months of appropriate endorsement.
<b>2. Develop priorities for government action/intervention based on protection of priority assets.</b>					
2.1 Develop an inventory of significant assets of all varieties potentially and actually affected by feral camels and their condition across the feral camel range.	Base line measure of assets and their condition against which early detection of changes brought about by feral camels and feral camel management can be assessed.	Ninti One and partners.	Funded under the Caring for our Country project.	<p>High priority.</p> <p>Commencing March 2010, ongoing across life of the Caring for our Country project.</p> <p>Development of state based assets register and monitoring data bases within 12 months of Ministers endorsing the National Plan.</p> <p>Advice provided to stakeholders re assets mapping and monitoring within 3 months of register</p>	<p>1) Inventory developed.</p> <p>2) On-going stakeholder participation in mapping/describing/monitoring assets and their condition.</p>

Objective/Actions	Outcome	Responsible Parties	Resources	Priority/Timeframe	Performance Indicator
				database development.	
2.2 Undertake periodic auditing of asset condition and feedback into management decision making.	Capacity to reprioritise feral camel management resources on the basis of changes in priority asset condition.	Lead: Ninti One and partners.  Other: Affected state and territory governments, landholders and Aboriginal groups beyond the Caring for our Country Project.	Lead: Funded under the Caring for our Country project over the life of the project and then within existing resources across the remaining life of the National Plan.  Other: Within existing or new resources.	High priority.  Initially in accordance with arrangements agreed to between Ninti and the Australian Government under the head contract in respect of the Monitoring, Evaluation, Reporting and Improvement (MERI) framework of adaptive management (i.e. using current information to guide future management).  Capacity for stakeholder input including about management actions in place within 6 months of register/database being developed.	Asset condition and management action information available to stakeholders with appropriate protections for information on Aboriginal sacred sites.  Stakeholders using register/database to record management actions and changes in asset condition.  Register/database being used to provide information for annual reporting (see Goal 2, Action 8.1).

<b>Objective/Actions</b>	<b>Outcome</b>	<b>Responsible Parties</b>	<b>Resources</b>	<b>Priority/Timeframe</b>	<b>Performance Indicator</b>
<b>3. Monitor feral camel population changes and impacts to target local and regional effort</b>					
3.1 Continue to improve the coverage and accuracy of feral camel population monitoring across the rangelands.	Improved targeting of feral camel management resources over time.	Ninti One and partners.	Funded under the Caring for our Country project over the life of the project and then within existing resources across the remaining life of the National Plan.	High priority.  On-going across the life of the National Plan.	Improved targeting of feral camel management resources over time reflected in annual reviews.  Increasing stakeholder input into and use of assets register/ database.
3.2 Develop feral camel population models that help to delineate appropriate sub-groups (e.g. by age, size, sex) for management control.	Targeting of feral camel population reduction that provides the most efficient return periods against asset protection needs.	Ninti One and partners.	Funded under the Caring for our Country project over the life of the project and then within existing resources across the remaining life of the National Plan.	Medium priority.  Commencing in March 2010 and on-going.	Targeted feral camel population reduction that provides the most efficient return periods against asset protection needs.
3.3 Develop a process by which landholders and land managers can record their feral camel management	An on-going record of feral camel management actions, including the protection of assets.	Ninti One and partners.	Funded under the Caring for our Country project over the life of the	Medium priority.  Commencing March 2010, ongoing across life of the	Stakeholder use of the assets register/ database providing an on-going record of privately funded and publicly funded feral camel management

Objective/Actions	Outcome	Responsible Parties	Resources	Priority/Timeframe	Performance Indicator
actions for incorporation into broader scale management assessment and targeting framework.			project and then within existing resources across the remaining life of the National Plan.	National Plan.  Advice provided to stakeholders on assets mapping and monitoring within 3 months of asset register database development (see Goal 3, Action 2.1).	actions.  Incorporation of information provided on the assets register/ database into the annual reviews and development of priorities and targets each year (see Goal 2, Action 8.1).
<b>4. Identify barriers to the development of commercial camel use enterprises and/or industries.</b>					
4.1 Identify legislative and regulatory processes and procedures and impediments associated with commercial use of feral camels <sup>a</sup> .	1) Readily accessible information on regulation and processes to be met by commercial enterprises/individuals interested in development of camel enterprises. 2) This information to be made available with the cross-government statement on roles and responsibilities for commercial development of camel	Lead: Affected state and territory governments  Other: The camel industry.	Lead: Within existing resources.  Other: Within existing resources.	Medium priority.  Commencing in 2011 with initial reports on impediments in each jurisdiction made available on jurisdictional websites and the central website by end 2011.	1) Processes, procedures and impediments identified. 2) Readily accessible information on regulation and processes to be met by commercial enterprises/individuals interested in development of camel enterprises. 3) This information to be made available with the cross-government statement on roles and responsibilities for commercial development of camel enterprises on the central website within three months of being available on the

<b>Objective/Actions</b>	<b>Outcome</b>	<b>Responsible Parties</b>	<b>Resources</b>	<b>Priority/Timeframe</b>	<b>Performance Indicator</b>
	enterprises.				jurisdictional websites (see Goal 2, Action 7.1).
4.2 Identified legislative and regulatory processes and procedures to be streamlined where possible and amended where they create an unacceptable impost on the development of commercial enterprises associated with the use of domesticated camels and the capture and removal of feral camels.	Government is seen to have taken action within its roles and responsibilities to help commercial development of camel use enterprises.	Lead: Affected state and territory governments  Other: The camel industry.	Lead: Within existing resources.  Other: Within existing resources.	Medium priority.  Initial reports on impediments available on jurisdictional websites by end 2011.  Proposed changes to legislative and regulatory processes and appropriate time tabling to be determined by jurisdictions as required.	Unacceptable imposts on the development of commercial enterprises using camels within the goals and objectives of the National Plan amended as required.
4.3 Commercial ventures to seek relevant approvals as appropriate within jurisdictions	Development of commercial camel enterprises/industry is managed by governments within the appropriate regulatory frameworks.	The camel industry.	Within existing resources.	Medium priority.  On-going across the life of the National Plan.	Management of any developing commercial camel enterprises/industry managed by governments within the appropriate regulatory frameworks.

<sup>a</sup>Including

- feral camel harvesting
- use of camel meat
- use of camel hides
- use of other camel body parts (e.g. bones, wool, oil)
- camel farming

**Goal 4: Partnerships and social capacity for humane feral camel management are in place**

<b>Objective/ Actions</b>	<b>Outcome</b>	<b>Responsible Parties</b>	<b>Resources</b>	<b>Priority/Timeframe</b>	<b>Performance Indicator</b>
<b>1. To develop, via partnerships, appropriate capacities amongst stakeholders to humanely manage feral camels and their impacts in a variety of setting and through a variety of control mechanisms.</b>					
1.1 Identify existing feral camel management opportunities, capacities and gaps across the different land tenures and within the variety of stakeholder groups (including lack of appropriate infrastructure).	Identification of gaps and support required to develop appropriate capacities.	Ninti One and partners.	Funded under the Caring for our Country project over the life of the project and then within existing resources across the remaining life of the National Plan.	High priority.  Commenced in 2011 and completed by end second quarter 2012.  Assessment placed on central and jurisdictional websites within three months of completion.	1) Management opportunities, capacities and gaps identified. 2) Identification of support required to develop appropriate capacities.
1.2 Develop and resource a plan to overcome deficiencies in local capacities to manage	1) Development of appropriate capacities over time to meet the ongoing challenge of feral	Ninti One and partners and Australian Government (in particular in regard	Ninti: Funded under the Caring for our Country project  Australian	High priority.  Plan for capacity enhancement developed within	1) Development of appropriate capacities over time to meet the ongoing challenge of feral camel management.

Objective/ Actions	Outcome	Responsible Parties	Resources	Priority/Timeframe	Performance Indicator
the impacts of feral camels <sup>a</sup> .	camel management 2) Development of partnership approaches under the Caring for our Country project.	to Indigenous Ranger development).	Government: Within existing resources.	<p>each jurisdiction or across jurisdictions by end 2012.</p> <p>Funding sought for capacity enhancement projects/programs in 2013/2014 budgets.</p> <p>Review paper of Indigenous ranger capacities, gaps and training needs commenced in second half of 2010 and completed by first quarter 2011.</p> <p>Review of Indigenous ranger capacities and needs provided to and discussed with states and territories in second quarter 2011 with view to developing cross jurisdictional approaches/programs.</p>	<p>2) Programs supporting capacity development in place in 2013/2014 financial year.</p> <p>3) Early development of training portfolio to meet Aboriginal ranger needs in all jurisdictions.</p> <p>4) Early capacity and partnership development under the Caring for our Country project.</p>

<b>Objective/ Actions</b>	<b>Outcome</b>	<b>Responsible Parties</b>	<b>Resources</b>	<b>Priority/Timeframe</b>	<b>Performance Indicator</b>
<b>2. To encourage the development of appropriate feral camel management capacities amongst Aboriginal people on Aboriginal controlled lands.</b>					
2.1 Provide Aboriginal communities with information about feral camel impacts and management techniques in appropriate languages.	Informed communities empowered to prioritise and undertake management of feral camels.	Ninti One and partners.	Funded under the Caring for our Country Project over the life of the project and then within existing resources across the remaining life of the National Plan.	High priority.  Key language issues and mechanisms to overcome language obstacles identified in first half of 2010.  As materials on feral camel management become available, identified mechanisms used to make them available to Aboriginal communities, including translations into key languages where appropriate.	All key information about feral camel impacts and management provided to Aboriginal communities in an appropriate and timely manner.
2.2 Develop monitoring and evaluation processes that can be used by land managers to document feral camel	Aboriginal communities and other landholders have relevant evaluation processes and use them to	Ninti One and partners.	Funded under the Caring for our Country project over the life of the project and then within existing	High priority.  Initially in accordance with MERI arrangements agreed to between	Aboriginal communities and other stakeholders have relevant evaluation processes and use them to inform and prioritise feral camel management and

<b>Objective/ Actions</b>	<b>Outcome</b>	<b>Responsible Parties</b>	<b>Resources</b>	<b>Priority/Timeframe</b>	<b>Performance Indicator</b>
impacts and the recovery of key assets as the result of feral camel management.	inform and prioritise feral camel management and promote the success of management between communities.		resources across the remaining life of the National Plan.	Ninti and Australian Government under head contract (see Goal 3, Action 3.2).	promote the success of management between communities.
2.3 Empower Aboriginal communities to manage feral camels impacts via negotiated action <sup>b</sup> .	Informed landholders negotiating within and between communities and external stakeholders on feral camel management issues.	Lead: Affected state and territory governments, Aboriginal communities and leaders, peak Aboriginal organisations.  Other: Other stakeholders.	Lead: Within existing resources.  Other: Within existing resources.	High priority.  Commence in 2011 and ongoing.	Informed landholders negotiating within and between communities and external stakeholders on feral camel management issues, including commercial harvesting of feral camels.
2.4 Investigate the degree to which feral camel management can be incorporated into Indigenous rangers- work programs and agreements.	Local groups empowered to undertake management of feral camel impacts via a variety of methods.	Australian Government and Aboriginal groups.	Within existing resources.	High priority.  Commencing as soon as the National Plan is endorsed by Ministers and on-going across the life of the National Plan.	Local groups empowered to undertake management of feral camel impacts using a variety of methods.
2.5 Develop appropriate courses for training Indigenous rangers in the management of feral camels.	Local groups able to respond appropriately to changes in feral camel impacts and population dynamics.	Australian Government, affected state and territory governments, Aboriginal groups.	Within existing resources.	High priority.  On-going across the life of the National Plan.	Local groups able to respond appropriately to changes in feral camel impacts and population dynamics.

<b>Objective/ Actions</b>	<b>Outcome</b>	<b>Responsible Parties</b>	<b>Resources</b>	<b>Priority/Timeframe</b>	<b>Performance Indicator</b>
2.6 Where priority target areas coincide with Aboriginal controlled lands, early and extensive consultation on control methods, timing of control events, disposal of carcasses are to be undertaken to the satisfaction of the Aboriginal community.	1) A partnership approach to the management of feral camels on Aboriginal controlled lands is developed and implemented. 2) There is widespread agreement between the Ninti One partners and the Aboriginal communities about the implementation of the National Feral Camel Action Plan and the Caring for our Country project.	Ninti One and partners.	Funded under the Caring for our Country project over the life of the project and then within existing resources across the remaining life of the National Plan. Within existing resources.	High priority.  Commencing in March 2010 and ongoing across the life of the National Plan.	1) Appropriate consultations completed. 2) A partnership approach to the management of feral camels on Aboriginal controlled lands is developed and implemented. 3) There is widespread agreement between the Ninti One partners and the Aboriginal communities about the implementation of the National Feral Camel Action Plan and the Caring for our Country project.
2.7 Develop and implement local access agreements for the management of feral camels (e.g. removal from the landscape, protective infrastructure).	Access for management of feral camels is undertaken within a collaborative partnership for the mutual benefit of Aboriginal communities and the wider Australian community.	Ninti One and partners.	Funded under the Caring for our Country project over the life of the project and then within existing resources across the remaining life of the National Plan. Within existing resources.	High priority.  Ongoing across the life of the National Plan.	Local access agreements developed and in place.

<b>Objective/ Actions</b>	<b>Outcome</b>	<b>Responsible Parties</b>	<b>Resources</b>	<b>Priority/Timeframe</b>	<b>Performance Indicator</b>
<b>3. Address knowledge gaps using good science</b>					
3.1 Prioritise gaps in knowledge and seek research funding opportunities to address these.	Continual improvement in capacities to undertake successful feral camel management.	Australian Government, affected state and territory governments, research institutions.	Within existing resources.	Low priority.  On-going across the life of the National Plan.	1) Prioritisation undertaken. 2) New research funded.
<b>4. Establish a consistent understanding within landholding communities on need for and methods to manage feral camels</b>					
4.1 Development of an engagement and communication strategy for landholders within the feral camel range.	Landholders informed and empowered to meet their on-going responsibilities to manage feral camels.	Ninti One and partners.	Funding provided under the Caring for our Country Project	High priority.  As per Goal 1, Action 1.1.	As per Goal 1, Action 1.1.

<sup>a</sup>That addresses:

- training needs for a variety of purposes
- delineates the areas in which national or cross jurisdictional agreements are needed (e.g. for aerial shooting) cultural sensitivities
- infrastructure needs, including web-based access to information and for reporting of feral camel management actions animal welfare NGOs

<sup>b</sup>Could include workshops held with Aboriginal communities and other stakeholders regarding the roles and responsibilities for the protection of sacred sites and water holes, development of partnership arrangements, and commercial enterprise negotiations as appropriate.

## ***Australian Pest Animal Strategy – Key principles***

The Australian Pest Animal Strategy is based on the following 12 key principles:

1. Pest animal management is an integral part of the sustainable management of natural resources for the benefit of the economy, the environment, human health and amenity.
2. Combating pest animal problems is a shared responsibility that requires all parties to have a clear understanding of their roles and responsibilities.
3. The development, monitoring and review of integrated pest animal management strategies need to be underpinned by good science.
4. Setting priorities for, and investment in, pest animal management must be informed by a risk management approach.
5. Prevention and early intervention are the most cost-effective techniques for managing pest animals.
6. Pest animal management requires coordination among all levels of government in partnership with industry, land and water managers and the community, regardless of land tenure.
7. Effective pest animal management requires capacity-building across government, industry, land and water managers and the community.
8. Management of established pests should aim to address actual rather than perceived problems, and to reduce impacts rather than simply pest animal numbers.
9. Management should be strategic in terms of determining where management should occur, timing of management, being proactive and using appropriate techniques.
10. Where there is a choice of methods, there needs to be a balance between efficacy, humaneness, community perception, feasibility and emergency needs.
11. The benefits of management should exceed the costs of implementing control.
12. As part of an integrated pest animal management program, commercial harvesting may offset management costs.

## **Camel management stakeholders**

This list is indicative and may not provide an exhaustive list of all groups and individuals who believe they are stakeholders in the management of feral camels in Australia.

### **1. Primary**

This group has direct responsibility for managing land impacted by feral camels and includes landowners and land managers. It includes:

- State and territory governments and their agencies
- Natural resource management boards
- Conservation managers (government and non-government)
- Aboriginal communities and associated land management units
- Pastoralists
- Mining lessees
- Managers of Defence lands

### **2. Secondary**

This group does not have an on-going role in the direct management of feral camels, but do have an overarching interest in feral camel management actions, or procedures and processes. It includes:

- Australian Government (as a funder of the Caring for our Country project)
- Vertebrate Pests Committee and the Feral Camel Working Group
- Ninti One and partners (as the proponent for the Caring for our Country project)
- Camel industry interests including peak industry bodies (e.g. ACIA), helicopter pilots, commercial shooters, pet and human meat enterprises and enterprises that domesticate/farm camels
- Animal welfare groups e.g. RSPCA Australia
- Conservation groups e.g. WWF
- Research institutions
- Other agencies (e.g. those responsible for infrastructure development and maintenance, social and cultural development and conservation), local government and remote communities and townships

### **3. Tertiary**

This group is substantially removed from the direct management of feral camels, but is either:

- undertaking business that could be affected by either feral camels and their impacts or by a major feral camel management action, or
- concerned with the humanness of feral camel management methods and/or wildlife conservation

This group includes:

- Tourism associations and operators
- Camel owners
- Australian public

- Non-government community based organisations
- Hunters, where their actions are part of an integrated feral animal management plan
- National freight/transport industries
- International groups such as the World Wildlife Fund
- International communities
- International camelid scientific community

**Feral camel control methods**

There are a range of control methods, both commercial and non-commercial that can be used to manage feral camels and mitigate their impacts.

**Table A3.1 Feral camel control methods**

Method	Advantages	Disadvantages	Development required	Community perceptions
<p><b>Aerial Culling</b></p>	<p>Effective control action to achieve large population density reductions over broad-scale areas, particularly in short time frames and in very remote or inaccessible areas. A humane and quick technique that results in instant death. Clearly defined COPs and SOPs.</p>	<p>There is substantial opposition to shooting ‘to waste’ within many Aboriginal communities with the emphasis of the opposition on the ‘waste’. Outcomes are highly dependent on the density of camels and the requirement for seasonally influenced aggregation to occur for cost efficiency but Judas techniques can overcome cost inefficiencies to some degree. Will be expensive in remote areas, particularly if aggregations have not occurred. Potential issues if carcasses are left on ground. RSPCA Australia believes that when culling for population management feral camels should be humanely killed in situ to avoid unnecessary transport. Short of complete eradication, culling may have to be undertaken regularly.</p>	<p>Judas technique. Acceptance by the community of standards of reporting on aerial shooting.</p>	<p>Significant opposition to aerial culling amongst some international animal welfare organisations on the perception that it is cruel and inhumane.</p>

<b>Ground culling</b>	Primarily used for long-term maintenance of low density populations through opportunistic shooting integrated with other activities. Optimal and only possible when there is easy road access.	Has limited applicability for broad-scale population-based reduction. Generally undertaken on an uncoordinated and opportunistic basis. Can be time consuming and labour intensive. Is impractical in rugged or inaccessible terrain. Short of complete eradication, culling may have to be undertaken regularly.		Carcasses are usually near access points and consequently they are visible. This can create issues, particularly for Aboriginal communities if carcasses are near sites of cultural value.
<b>Exclusion Fencing</b>	Most effective when applied at the local scale to protect high value assets. Costs depend on specific designs but are very dependent on terrain and remoteness.	Not a broad-scale level management tool. No impact on feral camel population size and population pressures on fencing can result in unacceptable levels of damage and maintenance costs. Requires on-going maintenance. Can have off target impacts. Potential welfare issues when excluding animal access to water sources.	A number of designs for exclusion fencing exist but have not all been field tested.	Exclusion fencing can detract from the natural aesthetic appeal of an asset. Fencing may give some people a sense that the problem is solved and that removal of camels from the landscape is unnecessary.
<b>Commercial harvest</b>	Potential to offset removal costs and utilise camel products	Currently limited industry capacity to process large numbers of feral camels for various products. Logistical and animal welfare constraints of mustering and holding animals that are long distances from transport corridors.	Limited national abattoir capacity for camels at present.	General support for utilisation. Concerns over animal welfare in moving feral camels long distances. Concerns over possible incentives to maintain feral herds.

<b>Chemical control</b>	Has the potential for broad-scale control of camel numbers.	No chemicals currently registered for use. The humane action of any chemical would need to be considered. Delivery mechanism may be difficult to design, distribute and manage.	Requires further investigation including into potential poisons and poison combinations, means of making the delivery camel specific and enhancing attractiveness to camels.	Like all chemical means of controlling pest animals, welfare issues will need to be considered.
<b>Biological control</b>	Has the potential for broad-scale control of camels.	No biological agents currently exist in a modified form that does not represent a biohazard to Australia. The humane action of the biological agents would need to be considered.	Requires further investigation. Camel pox has been noted as a disease that may merit further investigation.	Concerns about humanness, the potential for camel pox to spread and public perceptions about biological control of wild animals make it unlikely that such a technique would be available even in the medium to long term.
<b>Fertility control</b>	Has only limited potential for broad-scale control of camels in the short to medium term.	No chemicals currently exist that can be applied at a landscape scale in remote areas. Delivery mechanism issues are significant. Estimated that over 70% of the female camels would need to be made infertile for such an approach to be effective. Some concerns about humaneness.	Requires further investigation. An immunocontraceptive vaccine technology that is orally active and has a species-specific immunogen is favoured for fertility control. Could have long term potential.	Damage to the rangelands would continue until the animals die of old age. Community perception is that it is considered humane.

Of the above methods, only the first three are in current use. The determination of which methods or combination of methods of control are to be used are best addressed at the level of specific management programs or management of specific areas. They depend on a range of factors including feral camel density, the level and speed of reduction required, land tenure and perceptions/requirements of the landholder or manager, access to the camels, access to infrastructure to support the control methods and the conservation/natural resource/cultural values impacted by the feral camels.

Detailed assessments of the relative humanness of those methods described that currently have SOPs will be available in coming months from the Humaneness Assessment Panel convened by NSW Vertebrate Pest Research Unit. This information will be taken into account throughout the implementation of the plan.

## **Commercial control of feral camels**

The commercial use of feral camels can help to remove feral camels from the landscape, and consequently help to lessen the impact they have on the environmental and social values of the rangelands. To date commercial use has only been profitable for small scale enterprises operating during periods when there a high camel numbers. It should be noted that camel industry development has been spasmodic, small and not of high value to date.

It is not the intention of the National Feral Camel Action Plan to provide a pathway for the development of commercial enterprises. That is the responsibility of those individuals or companies that believe they can undertake a profitable enterprise based on feral camels. Governments are responsible for removing unnecessary or unjustifiable regulations that could impede the development of a camel industry but the delineation of these is not a matter for this plan.

Commercial uses of camels include are shown in the table below.

**Table A3.2 Potential commercial uses of camels**

<b>Commercial Use</b>	<b>Constraints</b>	<b>Potential to contribute to feral camel control</b>
Human meat consumption including live export	<p>Under developed domestic market. Hal Al butchering required for export market is difficult to undertake with harvesting of wild camels.</p> <p>Would require significant investment in an export level abattoir.</p> <p>Significant costs for transport of live animals to processing facility. Logistic difficulties in guaranteeing a supply line for an export market (this could improve if some camels were farmed).</p> <p>Distances, hence costs, of remoteness from domestic and expert markets.</p> <p>RSPCA Australia is opposed to the live export of camels for slaughter.</p> <p>RSPCA Australia believes that slaughter for consumption should take place in an abattoir as close as possible to the point of production.</p> <p>Use of camel meat for human consumption may be constrained by perceptions around the presence of parasites (e.g. ringworm) and general hygiene problems of slaughtering animals in the wild.</p>	<p>Low in the short to medium term.</p> <p>There are currently few commercial enterprises. Such enterprises rely on there being relatively high camel numbers for ready location and removal of animals.</p> <p>The number of animals that could be used by commercial enterprises in the short to medium term would be low and insufficient on their own to effect the changes required to protect the environment and social and cultural values.</p> <p>Seed stock for farmed camels would be sources from the feral herd, with approximately 40 per cent of the females being considered suitable. Some Queensland pastoralists have indicated a relatively strong interest in the transfer of feral cows into a managed domestic pastoral environment.</p>

Pet meat	The market is relatively small. Pet meat shooters move through areas collecting those animals that are most readily available and there may be a temptation to target the largest animals only.. Toxins in meat due to consumption of <i>Indigofera</i> sp. may cause poisoning in dogs.	Localised impacts only. Highly dependant on their being high numbers of camels available unless they are droved or transported from distant locations.
Milk and dairy products	Cannot milk feral herds. No supply mechanism. Currently international markets only.	Some interest in camel milk products as these are low in lactose and high in vitamin C. Camel milk contains insulin like proteins which could potentially be useful in helping to control diabetes within isolated Aboriginal communities. Would require placement of selected feral cow camels into managed herds for production.
Blood products	Blood cannot be taken from feral camels, There is no supply mechanism for the use of blood. Meat and bone meal could be used as blood and bone as fertiliser.	Negligible, Would not drive feral camel control..
Leather	Industry not geared to handle the number of feral camels that need to be removed.	Potential for some off take of camel skins for leather, potentially to increase commercial returns for commercial mustering and removal activities. The leather is versatile, has exceptional tensile strength and attractive grain. Potential for Aboriginal communities to develop local agreements for use of camel by-products.
Camel oil	Industry not geared to handle the number of feral camels that need to be removed. Low commercial use to date.	Lower in cholesterol than other animal cooking fats, also suitable for the manufacture of soap and cosmetics. Potential for Aboriginal communities to convert hump fat into alternative fuel for power supply systems.
Wool	Low level commercial production only to date. Primarily a resource value attributed to Bactrian (two humped) camels only.	Technology for improving the fibre is being researched. The wool has unique characteristics of conductivity, softness and strength.
Weed control	Minor use in western Queensland only.	Not considered a useful adjunct to removing camels from the landscape unless the numbers and their

		movements are managed.
Improved cattle productivity	Level of use is unknown. Some pastoralists have reported improved productivity in cattle herds from co-grazing, assumed to be from changes made to cattle microbial activity as a consequence of camel grazing.	Negligible impact on control of feral camels.
Tourism industry	Very small proportion of tourism activity.	Nil to negligible.

## **Consulted References**

- Barker, H. M. (1964). 'Camels and the Outback'. (Pitman, Melbourne.)
- Döriges, B., and Heucke, J. (1995). Ecology, social organisation and behaviour of the feral dromedary *Camelus dromedaries* (L. 1758) in central Australia. Unpublished Report (translated from two PhD theses, submitted 1995), University of Braunschweig, Braunschweig, Germany.
- Döriges, B., and Heucke, J. (2003). Demonstration of ecologically sustainable management of camels on Aboriginal and pastoral land, Final report on project number 200046, Natural Heritage Trust (Online). Available from <http://www.camelsaust.com.au/NHTreport2003.doc> . Accessed September 2008.
- Edwards, G. P., Eldridge, S. R., Wurst, D., Berman, D. M., and Garbin, V. (2001). Movement patterns of female feral camels in central and northern Australia. *Wildlife Research* **28**, 283–289.
- Edwards, G. P., Zeng, B., Saalfeld, W. K., Vaarzon-Morel, P., and McGregor, M. (Eds) (2008). 'Managing the impacts of feral camels in Australia: a new way of doing business'. DKCRC Report 47. (Desert Knowledge Cooperative Research Centre, Alice Springs.) Available at <http://www.desertknowledgecrc.com.au/publications/>
- Grigg, G. C., Pople, A. R., and Beard, L. A. (1995). Movements of feral camels in central Australia determined by satellite telemetry. *Journal of Arid Environments* **31**, 459–469.
- Lapidge, S. J., Eason, C. T., and Humphreys, S. T. (2008). *A review of chemical, biological and fertility control options for the camel in Australia*, DKCRC Research Report 51. (Desert Knowledge Cooperative Research Centre, Alice Springs.) Available at: <http://www.desertknowledgecrc.com.au/publications/>
- Lethbridge, M. (2007). 2007 camel survey of South Australia and Western Australia. Draft Final Report. (Flinders University, Adelaide.)
- McKnight, T. L. (1969). 'The camel in Australia.' (Melbourne University Press, Melbourne.)
- McKnight, T. L. (1976). Friendly Vermin. A survey of feral livestock in Australia. University of California Publications in Geographie, vol. 21. (University of California Press, California.)
- Newman, D. R. M. (1975). The Camel – its potential as provider of protein in arid Australia, pp. 95–101, in Proceedings III World Conference on Animal Production, Melbourne, Australia, ed. Reid RL. (Sydney University Press, Sydney.)

Paltridge, R., and Eldridge, S. (2009). 'Northern Territory Camel Management Plan 2009-2013'. Draft Report for Natural Resource Management Board (NT) Inc.

Peeters, P. J., Jennings, S., Carpenter, R. J., and Axford, G. (2005). Assessing the abundance and impacts of feral camels in the Great Victoria Desert, A report to the Aboriginal Lands Integrated Natural Resource Management Group. Department for Environment and Heritage, South Australia.

Saalfeld, W. K., and Edwards, G. P. (2008). Ecology of feral camels in Australia. In: 'Managing the impacts of feral camels in Australia: a new way of doing business'. (Eds G. P. Edwards, B. Zeng, W. K. Saalfeld, P. Vaarzon-Morel and M. McGregor.) Pp. 9-34. DKCRC Report 47. (Desert Knowledge Cooperative Research Centre, Alice Springs.) Available at: <http://www.desertknowledgecrc.com.au/publications/>

Saalfeld, W. K. and Zeng, B. (2008). Review of non-commercial control methods for feral camels in Australia. In 'Managing the impacts of feral camels in Australia: a new way of doing business'. (Eds G. P. Edwards, B. Zeng, W. K. Saalfeld, P. Vaarzon-Morel and M. McGregor.) Pp 185–220. DKCRC Report 47. (Desert Knowledge Cooperative Research Centre, Alice Springs.) Available at: <http://www.desertknowledgecrc.com.au/publications/>

Short, J., Caughley, G., Grice, D., and Brown, B. (1988). The distribution and relative abundance of camels in Australia. *Journal of Arid Environments* **15**, 91–97.

Zeng, B., and McGregor, M. (2008). Review of commercial options for management of feral camels. In 'Managing the impacts of feral camels in Australia: a new way of doing business'. (Eds G. P. Edwards, B. Zeng, W. K. Saalfeld, P. Vaarzon-Morel and M. McGregor.) Pp. 221-282. DKCRC Report 47. (Desert Knowledge Cooperative Research Centre, Alice Springs.) Available at: <http://www.desertknowledgecrc.com.au/publications/>



