

Best Practice Camel Book

An illustrated guide to the 2012 Australian Standard, Model Code of Practice and Standard Operating Procedures relevant to the humane control of feral camels.

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Cover: Camels mustered on Urrumpinyi Aboriginal homelands, N.T., await transportation (Grenville Turner 2009).

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Warning:

This book contains images of deceased people that may cause sadness or distress to Aboriginal and Torres Strait Islander people.

Contents

| | |
|--|-----|
| Foreword | 6 |
| Preface | 6 |
| Acknowledgements | 7 |
| Introduction | 9 |
| - Laws and best practice when working with camels | 10 |
| - Occupational Health Safety and Welfare | 12 |
| - Camel Handling Hazards | 13 |
| - Body conditon, bulls in rut and cow camels in late pregnancy | 18 |
| Model code of practice for the humane control of feral camels | 23 |
| Standard operating procedure: ground shooting of feral camels | 55 |
| Standard operating procedure: aerial shooting of feral camels | 67 |
| Standard operating procedure: mustering of feral camels | 71 |
| Australian Standard for the land transport of livestock | 99 |
| - Part A: General Standards for the transport of livestock | 101 |
| - Part B: Specific requirements for the land transport of camels | 107 |



Foreword

This book is unique.

It brings together for the first time best practice national guidelines relevant to feral camel management into a well illustrated publication.

Trudy Sharp and I prepared the original text for the Model Code of Practice and accompanying Standard Operating Procedures to meet community expectations regarding animal welfare and pest animal control.

The preparation and compilation of drawings, diagrams and photographs is a useful addition to further convey and make readily accessible information in the text to people unfamiliar with technical jargon or for whom English may be a second language but for whom knowledge of the information in these important documents is essential.

As well as being an illustrated reference of the relevant Australian Standard, Model

Code of Practice and Standard Operating Procedures, the use of illustrations will enable this book to be an excellent resource for education, community engagement and skills development around best practice feral camel handling.

I commend Rural Solutions SA, in particular Mel Feldmuller for her vision and skills to bring this book together. George Aldridge, the artist, has brought life and humour (where appropriate) to the text thereby ensuring greater audience engagement with the book and its subject matter. I also commend the South Australian State Feral Camel Management Project and the Australian Feral Camel Management Project (supported under the Australian Government's Caring for our Country initiative) for supporting and funding the production of this work.



Glen Saunders
Research Leader
NSW DPI and Invasive Animals CRC

Preface

This publication was developed by Rural Solutions SA on behalf of South Australia's State Feral Camel Management Project to meet anticipated needs of key stakeholders in the rangelands of Australia where feral camels are found.

The intent of this publication is to ensure the technical information presented in the "Model code of practice for the humane control of feral camels" and the accompanying Standard Operating Procedures for ground shooting and mustering of feral camels, and, the "Australian standards and guidelines for the land transport of livestock" (specifically camels), are readily understood and acted

upon by the wide range of stakeholders dealing with the feral camel issue.

Photographs, illustrations, annotated diagrams and captions have been added to compliment the text and make the content more accessible to the target audience.

An introduction has been added which describes camel handling hazards, body condition scoring, and ways to identify body condition of camels, camel bulls in rut and camel cows in late pregnancy. This information is provided as body condition, rutting bulls and cows in late pregnancy are referred to in the sections that follow.



Acknowledgements

We are grateful for the feedback received during the preparation of this publication.

This publication would not have been possible without the support and funding from both the South Australian State Feral Camel Management Project and the Australian Feral Camel Management Project (supported under the Australian Government's Caring for our Country initiative).

Every effort has been made to obtain permission for use and to accurately reference all text and images.

Information in the Introduction is adapted from texts by Manefield and Tinson (2000), Dioli, M (1992), Grill, P.J. (1988) and from personal communication with Phil Gee of Rural Solutions SA, and Dr. O.J. (Taffy) Williams, veterinary surgeon with 20 years experience working with camels.

Text in other sections is taken verbatim from:

- Sharp, T. & Saunders, G. (2012). *Model code of practice for the humane control of feral camels*, April 2012. New South Wales Department of Primary Industries, Orange. <http://www.feral.org.au/animal-welfare/>
- Sharp, T. & Saunders, G. (2012). *Standard operating procedure for the ground shooting of feral camels* (CAM001), April 2012. New South Wales Department of Primary Industries, Orange. <http://www.feral.org.au/animal-welfare/>
- Sharp, T. & Saunders, G. (2012). *Standard operating procedure for the aerial shooting of feral camels* (CAM002), April 2012. New South Wales Department of Primary Industries, Orange. <http://www.feral.org.au/animal-welfare/>

- Sharp, T. & Saunders, G. (2012). *Standard operating procedure for the mustering of feral camels* (CAM003), April 2012. New South Wales Department of Primary Industries, Orange. <http://www.feral.org.au/animal-welfare/>
- Animal Health Australia (AHA) (2012). *Australian Standards and Guidelines for the Welfare of Animals — Land Transport of Livestock*. Version 1.1. AHA, Canberra. <http://www.animalwelfarestandards.net.au/land-transport/>

Illustrations are by George Aldridge, with technical direction and input by Rural Solutions SA camel project staff (Mel Feldmuller, John Pitt, Phil Gee, Leah Feuerherdt, Paul O'Leary and Annmarie Mabarrack).

Photographs are from:

- Grenville Turner;
- Kanyirninpa Jukurrpa;
- Broome Camel Safaris;
- Australian Desert Expeditions;
- Peter Watkins;
- SA Dept of Environment and Natural Resources;
- Central Australian Camel Industry Association Inc.;
- South Australian Museum.

The camel density map on page 28 is from:

- Edwards GP, Zeng B, Saalfeld WK, Vaarzon-Morel P, McGregor, MJ. (2008) *Managing the impacts of feral camels in Australia: a new way of doing business*. DKCRC Research Report. 47. <http://www.desertknowledecrc.com.au/publications>



We would like to thank the many people who have helped put this book together.





Introduction



Laws and best practice when working with camels

The Australian community has expectations and standards about what is acceptable behaviour and treatment of both workers and animals.

These community expectations are written into various Commonwealth, State and Territory Acts (such as: Animal Welfare Acts, Occupational Health, Safety and Welfare Acts, Firearms Acts etc., see p50 for more detail), as well as Australian Standards (AS), Codes of Practice (COP) and Standard Operating Procedures (SOP).

These documents describe current best practice and cover the health, safety and welfare of workers, and the welfare of all animals (including feral animals). There are heavy penalties, including imprisonment for not following best practice.

As well as it being the law, there are economic and moral reasons to follow best practice. Injury to workers results in downtime and costs to the worker and employer. Bruised or otherwise injured animals may be rejected or downgraded at sale or abattoir.

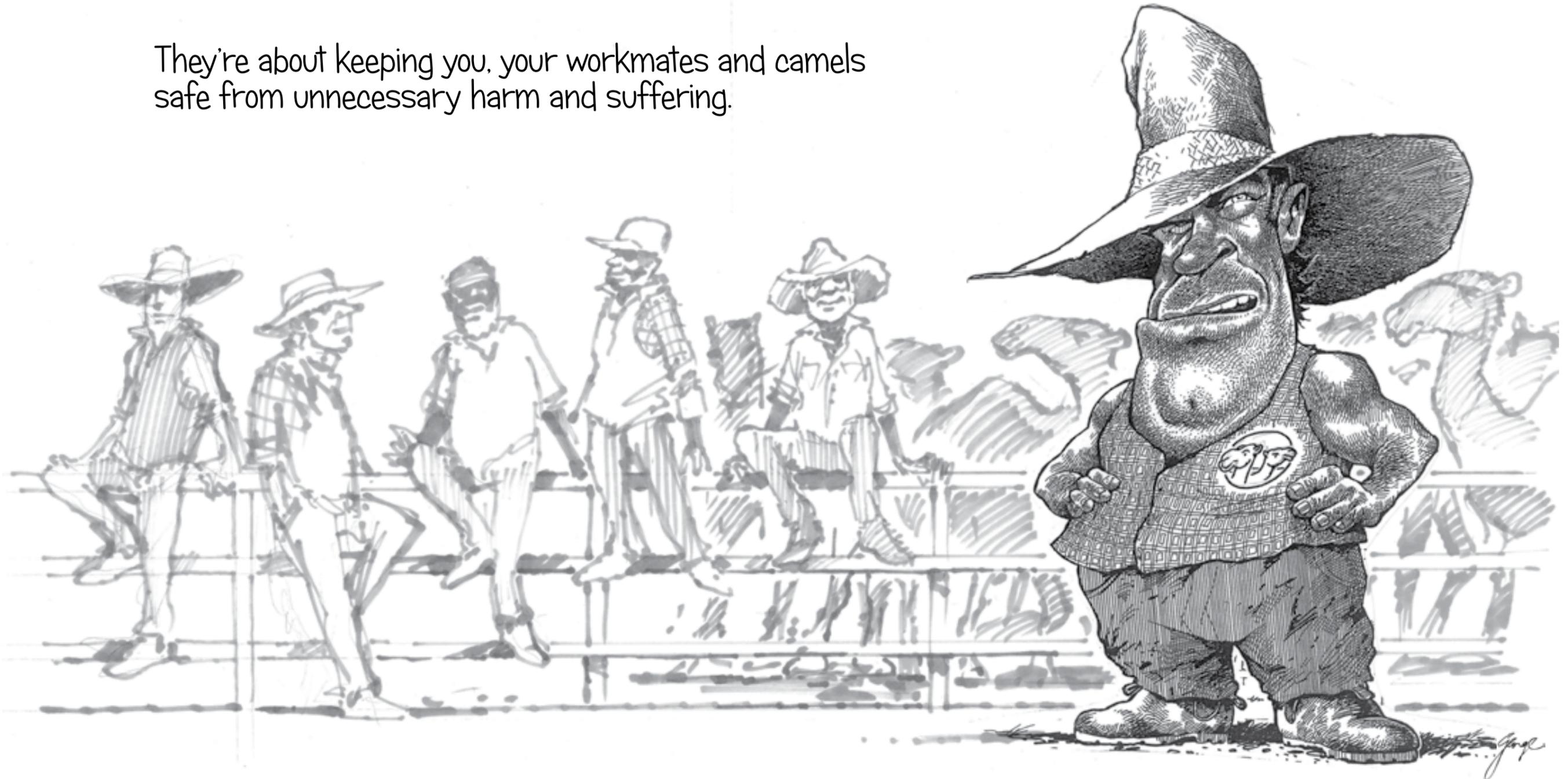


There are best practice laws to be followed when working with camels. Best practice is written into the Commonwealth, State and Territory Acts, Australian Standards, Codes of Practice and Standard Operating Procedures.



There are best practice ways to do this camel stuff.
You've got to know them and follow them.

They're about keeping you, your workmates and camels
safe from unnecessary harm and suffering.



There are heavy penalties, including imprisonment, for not following best practice.



Occupational Health Safety and Welfare

You cannot do your best work if you think your workplace is dangerous, or if you do not know safe ways of working.

Every employer has a moral and legal responsibility to make sure the workplace is safe, and every employee has a moral and legal responsibility to help employers achieve this.



Camel Handling Hazards

The one-humped (dromedary) camel is native to parts of Asia and Africa. In these countries they are preyed upon by predators such as wolves, Caspian tigers and lions. In Australia, the only natural predator of the camel is the dingo which can attack newly born camel calves or very young camels.

The instinct of camels to protect themselves from real or imagined predators is strong and innate.

Feral camels are not used to being confined or to close human contact. If they cannot escape or if they feel trapped, camels in fear, may try to protect themselves by biting, kicking, striking, crushing or charging the imagined or real threat. Throwing up their cud can also be a fear response.

The camel's large size, power, horny toes, large mouth and dental structure means being crushed, kicked or bitten by a camel can easily cause injury (and potentially death) to humans.

Bull camels in full rut and new mothers with newborn calves may behave more unpredictably than other camels.



Feral camels are not used to being confined or having close human contact. Captured feral camels may, out of fear, try to protect themselves from handlers and this can make them dangerous.

Be careful. Camels may kick, strike, lunge, bite, crush, charge, and spray cud when frightened.



Kicking and striking

Camels can kick forcefully with both their front and back legs. With their back legs they can kick in a wide swinging arc from the front shoulder to almost directly behind them (even when sitting). With their front legs they can also strike forwards, though not as forcefully as for kicks from their back legs. Front leg striking is usually as part of a rearing jumping action. This action is considered by many camel handlers to be more dangerous than rear leg kicking. Kicking and striking can be very swift and is all the more dangerous because of the 2 horny toes on the foot pad.

(Adapted from Manefield and Tinson 2000)



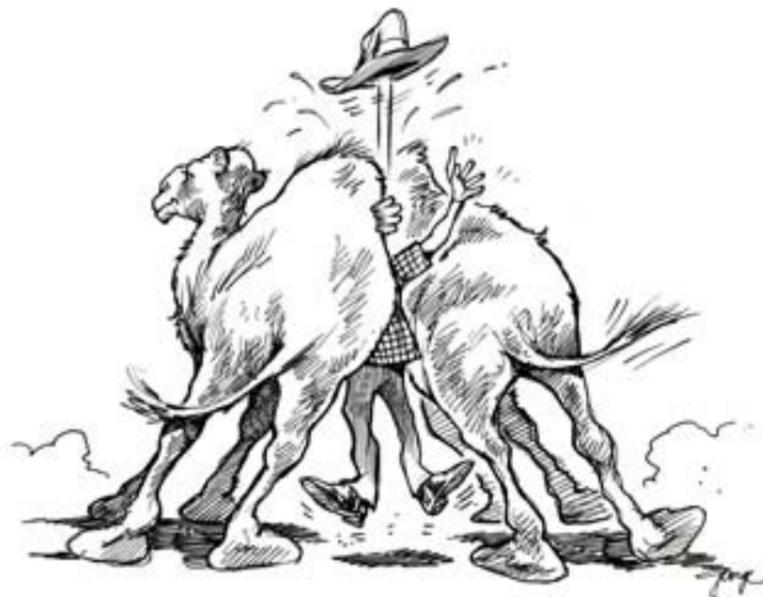
Crushing and charging

Camels are large animals. They can weigh up to 1000 kg. Despite their size they can move surprisingly quickly and unpredictably.

Be careful when working with camels not to be caught between the camel and a hard place such as yard rails, other camels or the ground.

Generally camels won't hurt you intentionally, however, some camels have been known to charge across a yard at a particular person, avoiding others on the way. Charging may be a strategy of new mothers to protect their newborn calves, or of bulls in rut to chase away rival bulls.

(Adapted from Manefield and Tinson 2000)



Be careful when working with camels not to be caught between a camel and a hard place.



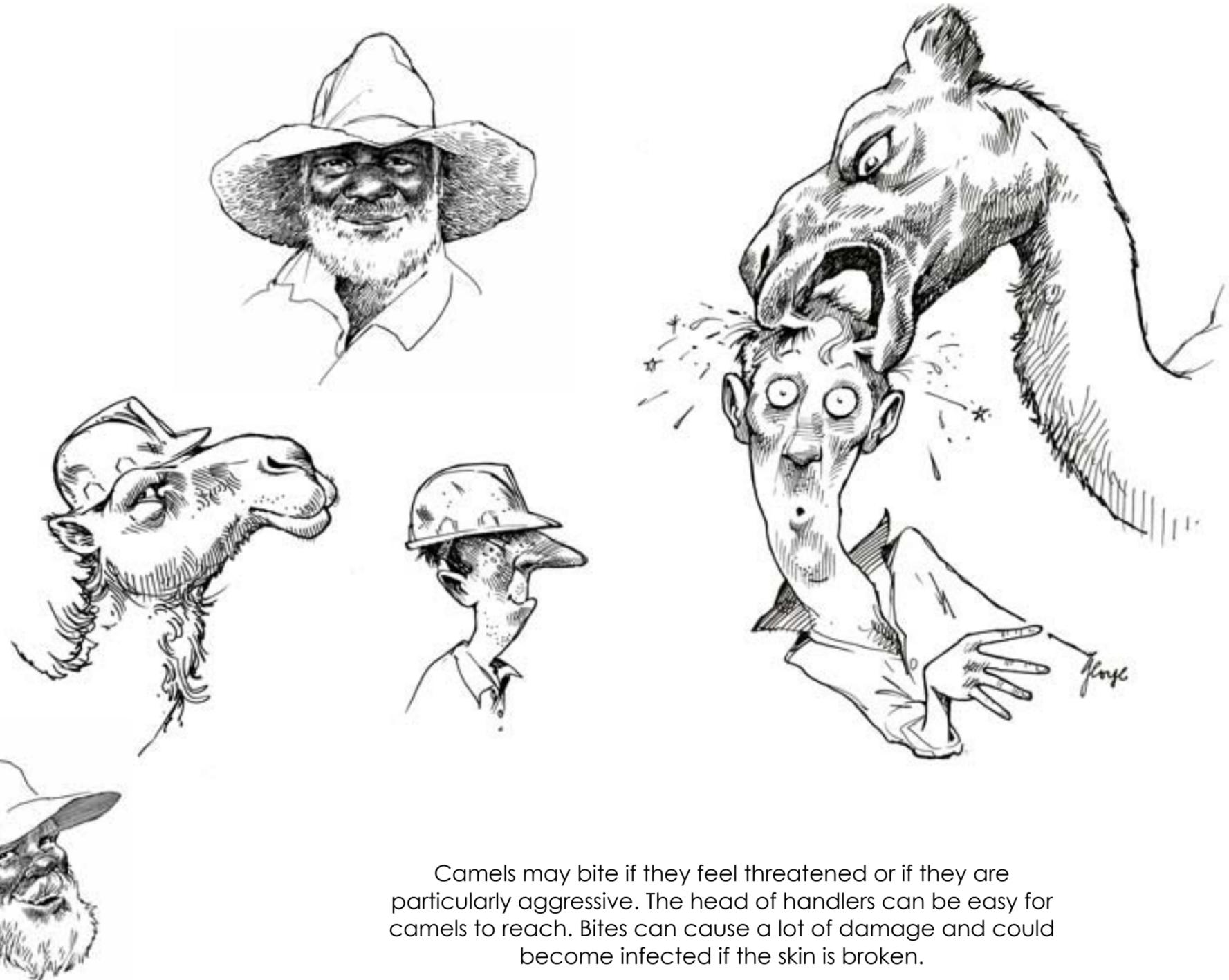
Lunging and biting

Camels often lunge without biting. They do this in an attempt to scare off potential threats. However, camels may actually bite if feeling pressured or if they are particularly aggressive.

Camel bites can cause a lot of damage due to the number and type of teeth. The camel has 22 milk teeth and 32 permanent teeth. It is different to ruminants in having two front teeth in the upper jaw. Camels also have a pair of canine (dog teeth) in both the upper and lower jaws which are used to crush woody plants for food.

There are documented reports of human skulls being crushed and arms being severed. Apart from physical damage, bites may lead to infection and should be regarded as potentially serious if the bite breaks the skin.

"Because yarded wild camels may attempt to bite any human part they can reach over the top rail, it should be the practice of personnel to always wear a hat when handling such animals. The hat will most usually slide free with the bite. If the hat is of the hard safety type then so much the better." (Manefield and Tinson 2000, p24)



Camels may bite if they feel threatened or if they are particularly aggressive. The head of handlers can be easy for camels to reach. Bites can cause a lot of damage and could become infected if the skin is broken.



Wearing a hat when handling feral camels can help protect the head from camel bites.

Spraying cud

Camels digest food similar to cattle, with some differences. Like cattle, they regurgitate and re-chew their food until it is ground to very small pieces. However, they have a different stomach structure to cattle which makes them better at getting protein and energy out of poor quality feed (Fowler 2010). The regurgitated food is known as “cud”. Camels spend many hours a day chewing their cud. Nervous or frightened camels may sometimes spray or expel this cud forcefully over a handler.

Being sprayed with cud is not dangerous but it is unpleasant. It is not performed in the sense of aiming spit. It occurs when a camel is indignant or upset about being physically handled and it quite purposefully expels a mouthful of cud to discourage the handler from continuing with the handling activity. It may help, before attempting any procedure that involves getting close to a camel, to allow the camel time to re-swallow any cud it has in its mouth then move in smartly to carry out the task. (Gee 2012; Manefield and Tinson 2000)



Nervous or upset camels might deliberately spray cud to try and stop a handler from getting really close. It might help to wait till the camel has swallowed any cud in its mouth before getting close.

A camel may spray cud to put off a handler. This is not dangerous, but it is unpleasant.



Body condition, bulls in rut and cow camels in late pregnancy

Assessing body condition using hump scores

The camel's hump can be used to estimate a camel's general body condition. "Hump scores" of 0-5 are used. Camels with hump scores of 0 or 1 are in poor condition. Camels with a hump score of 5 are excessively fat and they don't tolerate much physical activity and may find long distance transport stressful. Camels for the abattoir should have hump scores of 3 or 4 (Williams 2002).

Puberty and sexual maturity

Bull (male) camels reach puberty at ~3 years of age, but are not considered sexually mature until ~6-8 years of age. Cow (female) camels can reach puberty at ~1½-2 years of age, and are considered sexually mature at ~4-6 years of age. Their ability to get pregnant appears to be affected by seasonal conditions. After a run of very good seasons more than half of Australian feral camel cows tested were found to be pregnant at or before 2 years of age. In drought times pregnancy is generally not seen in feral camels until they are ~4 years of age.

Breeding behaviour

Camels are seasonal breeders showing greater sexual activity and an urge to mate generally between May and October, although some breeding does occur outside of this time.

During the breeding season both males and females become restless which can make them more difficult to handle.

Bull camels in rut

Bull camels are said to be in "rut" when they show particular physiological, physical and behavioural signs.

In a mixed herd of male and female camels, only one male will do the mating. If other males come into rut, the aggressiveness of this dominant bull will overpower the sexual desire of weaker males in the herd. In most cases younger bulls have little chance of mating.

Bulls in rut can often (but not always) be visually identified by: enlarged testicles; a swollen forehead (caused by the swelling of occipital glands in the forehead); and, from dark stains down the back of the neck caused by a dark oily secretion made by the occipital glands. This substance is secreted from gland openings on the back of the upper neck, behind the ears (i.e. at the "poll" position). This secretion contains hormones and pheromones which seem to trigger sexual interest in cows.

Sexually excited rutting bulls behave in very distinctive and visual ways: they make a deep gurgling sound; blow out a pink sac (called the "dulaa") from the roof of the mouth with

the head arched back; and, mark their scent by flicking urine off their urine soaked tail and rubbing their occipital gland secretions on themselves, cows, bushes, soil etc.

Bulls in full rut show no fear, and are more arrogant and aggressive, which can make them quite dangerous.

During rut, a bull is usually too agitated to feed. The length of an individual bull's rut varies from one to four months, depending on the bull's health, strength, hormonal condition and ability to dominate and fight off other bulls. Not all bulls rut at the same time. As one bull's rut ends, another bull may come into rut and take over any cows in the herd that are not yet pregnant.

Cow camels

Cows which are ready to mate will make a gurgling sound similar to that made by rutting bulls.

About half of sexually receptive cows will sit down ("couch" or "cush") automatically when approached by an interested bull. This is so the bull can mount her easily. Other cows may be forced by the bull to couch. Mating occurs with the bull kneeling over the couched cow and generally lasts for a few minutes, but can last for up to an hour.

Mating induces ovulation or heat (the release of a fertile egg). Heat lasts three to four days, and the average cycle lasts 27 days.

Pregnancy

When cows become pregnant, they no longer show interest in mating and will try to keep sexually interested bulls away by biting.

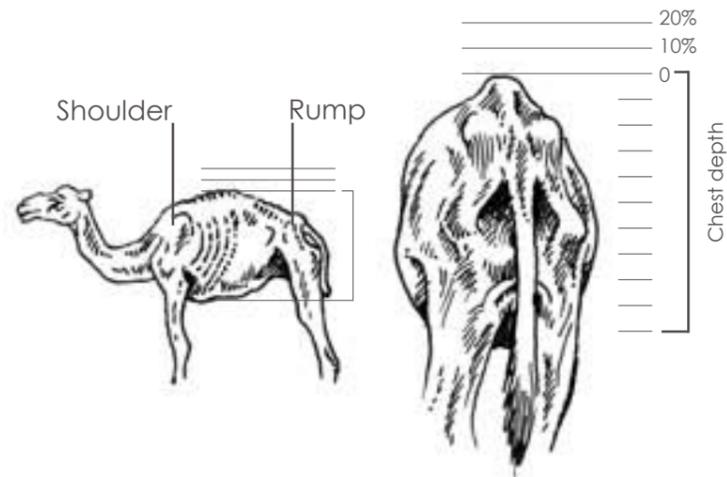
Pregnant females show a "tail up reflex" when approached by bulls. They do this within 2 weeks of getting pregnant. The tail up reflex can be a tail held just above horizontal to an almost vertical tail exhibiting tremor (shakes). The tail up reflex occurs throughout pregnancy and disappears within a few hours following birth or abortion. It should be noted however, that the tail up reflex can easily be confused with a tail up response to fear. The differences are subtle.

The length of pregnancy ranges between 364 days (12 months) and 419 days (14 months). A cow generally gives birth to a single young which is weaned at about 18 months. The last 4 weeks of pregnancy prior to calving is referred to as "late pregnancy".

Different cows will show signs of pregnancy to varying degrees. The more reliable sign of late pregnancy is a tight, swollen udder.

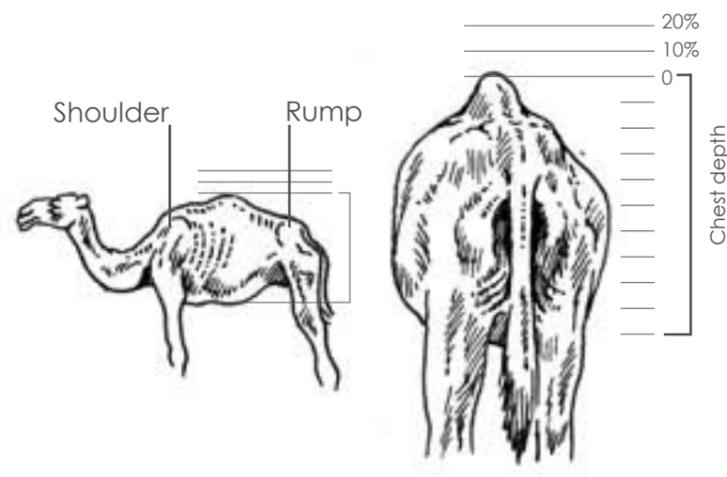


Body condition and camel hump scores



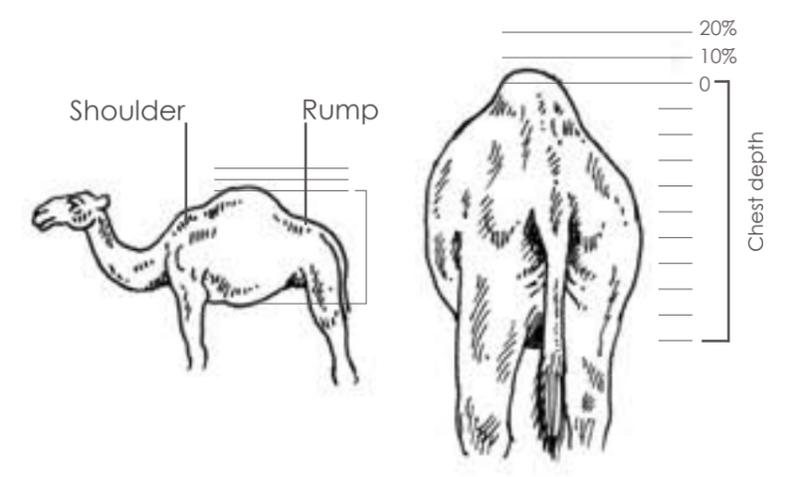
Score 0

Camel is in very poor condition. The camel looks like skin on bones. The camel has no hump, all ribs and back bones are visible, there is a very deep hollow at the base of the tail, and there are easily seen hollows in the camel's sides.



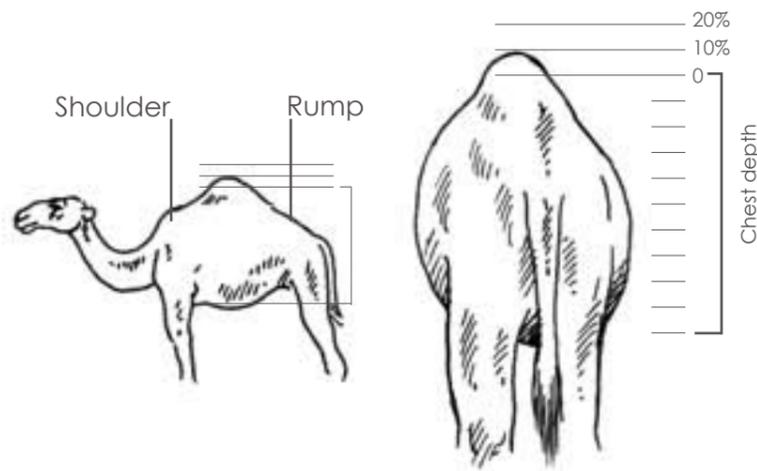
Score 1

Camel is in poor condition. There is little or no fat in the hump and the hump may be leaning to one side.



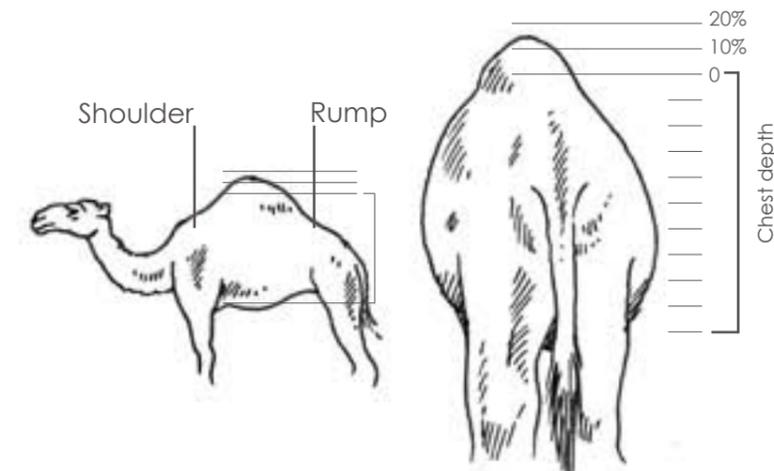
Score 2

Hump with some development. Hump rising ~5% higher than chest depth. Hump may be leaning to one side.



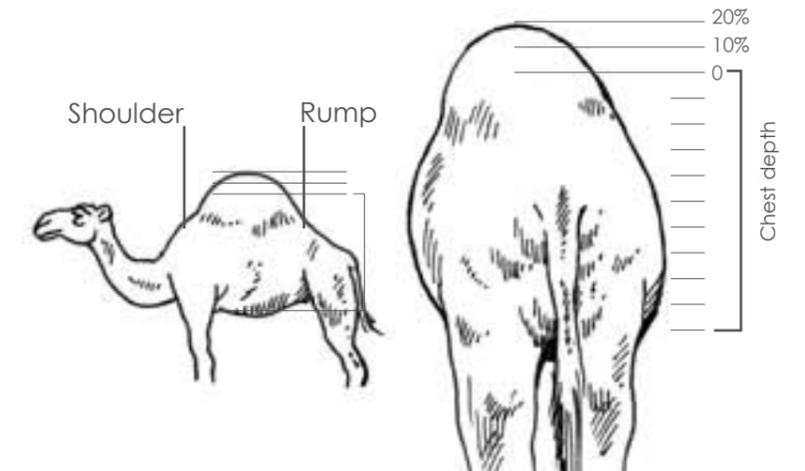
Score 3

Camel is generally considered suitable for abattoir. Hump with good development. Hump rises to 10% higher than chest depth. Hump is still sculptured inwards on both sides and still fits over the chest and abdominal area.



Score 4

Camel is generally considered suitable for abattoir. Hump fully developed. Hump rises to 15% higher than chest depth. Hump rounded outwards on both sides and runs from the shoulder to the rump.



Score 5

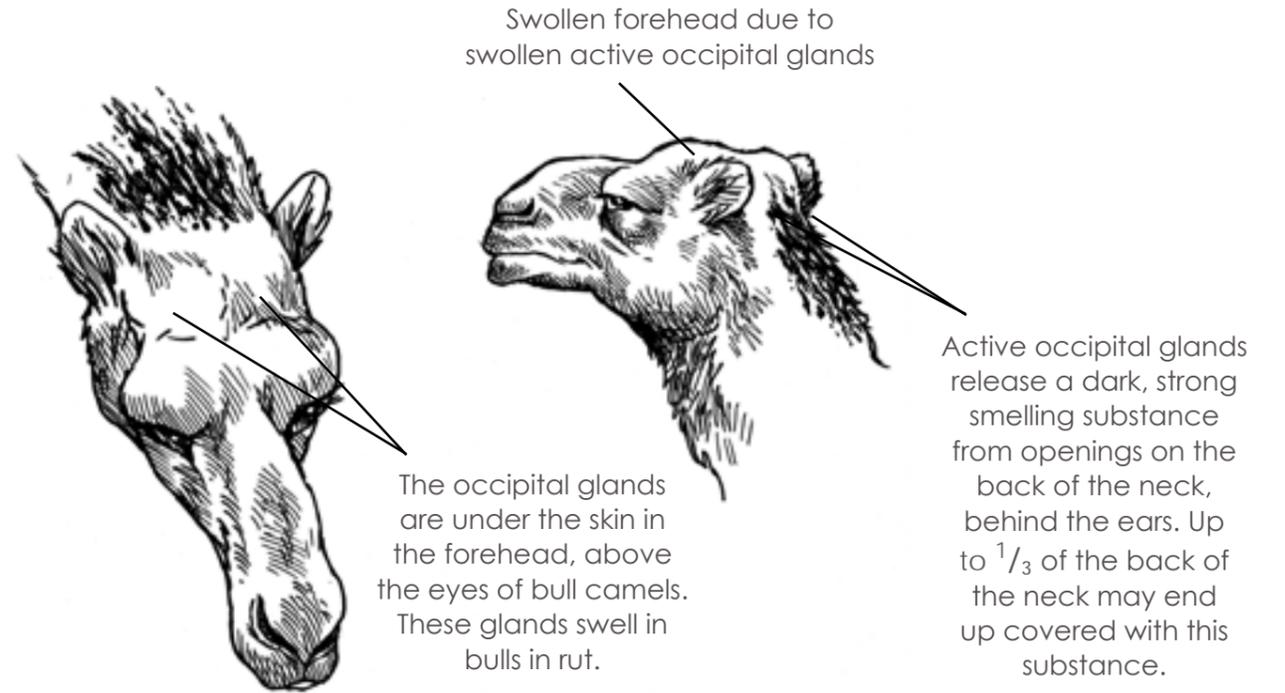
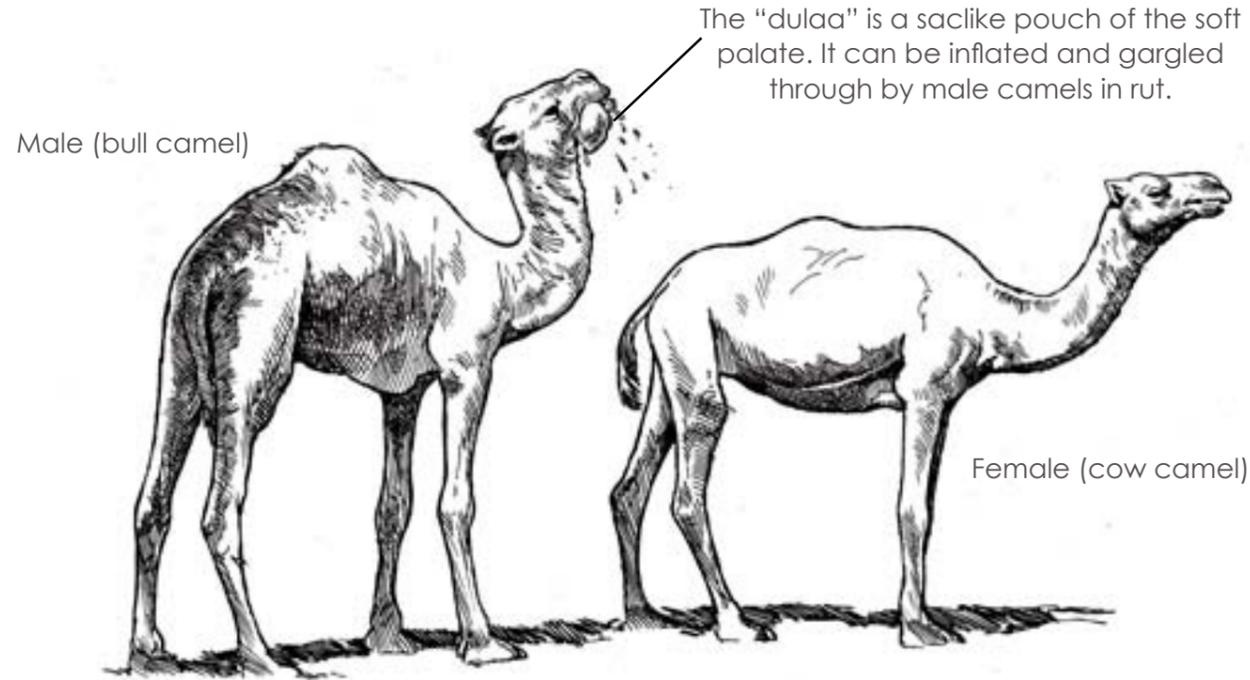
Camel is considered to be excessively fat. Hump over-extended and rises more than 15% higher than chest or the hump is so full that it is rounded on the sides like a semi circle.

Camels in poor condition have a hump score of 0 or 1.

(Text taken from PISC 2006. Images adapted from Faye et al. 2001)

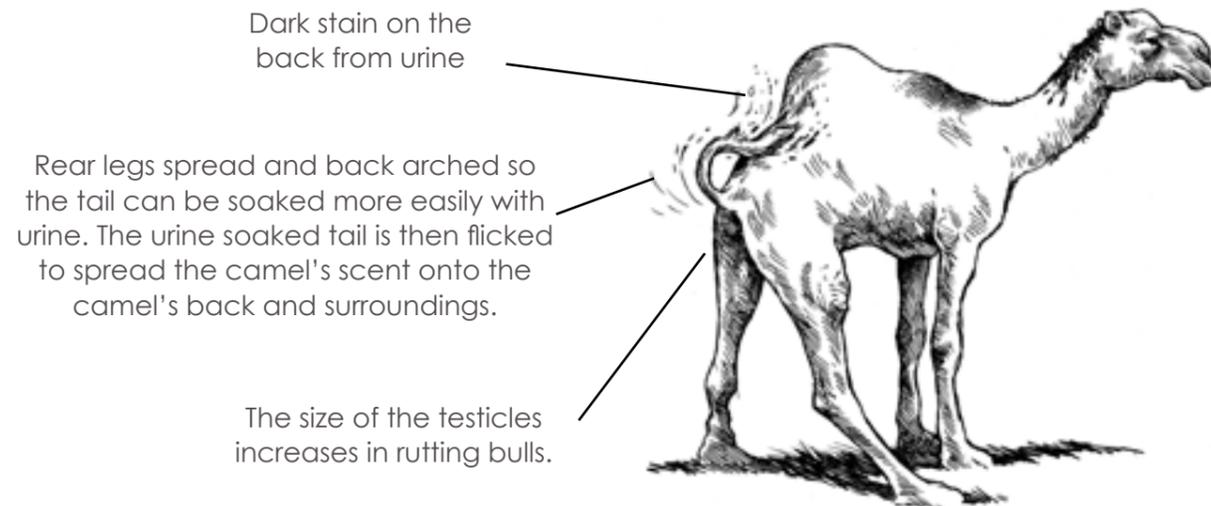


Identifying rutting bulls



Bulls in rut froth at the mouth, make gurgling noises, and blow out a large pink sac ("dulaa") from the mouth. The dulaa is a pouch of skin of the soft palate on the roof of the mouth. It is inflated by closing the nostrils, stretching the neck back and blowing lung air forcibly through it.

There are 2 occipital glands in the forehead of bull camels. They become active and swell in rutting bulls. The glands secrete a dark, acrid smelling secretion from openings on the back of the neck behind the ears. This secretion contains pheromones and hormones (e.g. androgen) and appears to attract cow camels.



Rutting bulls spread their scent by flicking urine onto their back and surroundings with their tail. The tail is more easily soaked with urine when the rear legs are spread wide and the back is arched. This brings the tail as far forward as possible. The urine of the rutting bull has high testosterone levels and contains some pheromones.

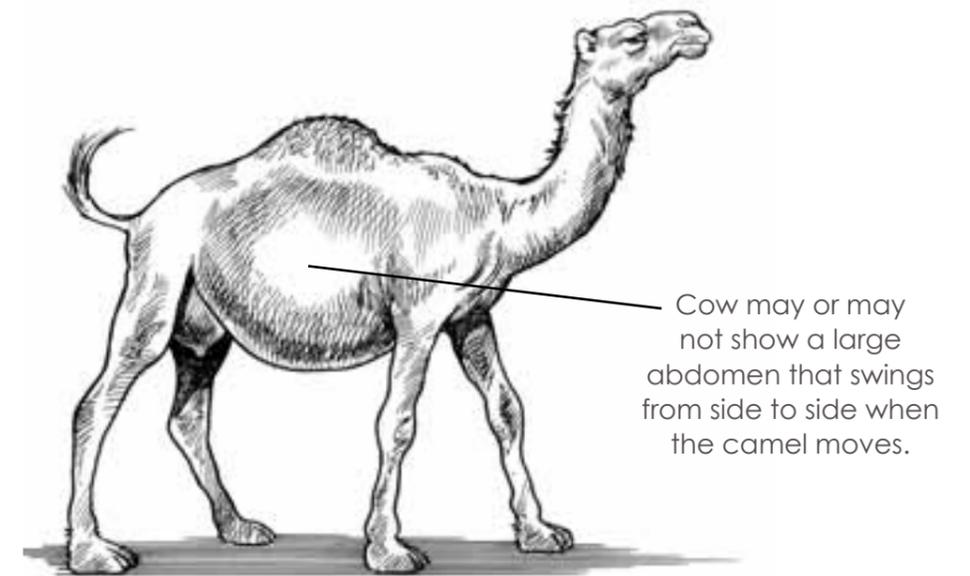
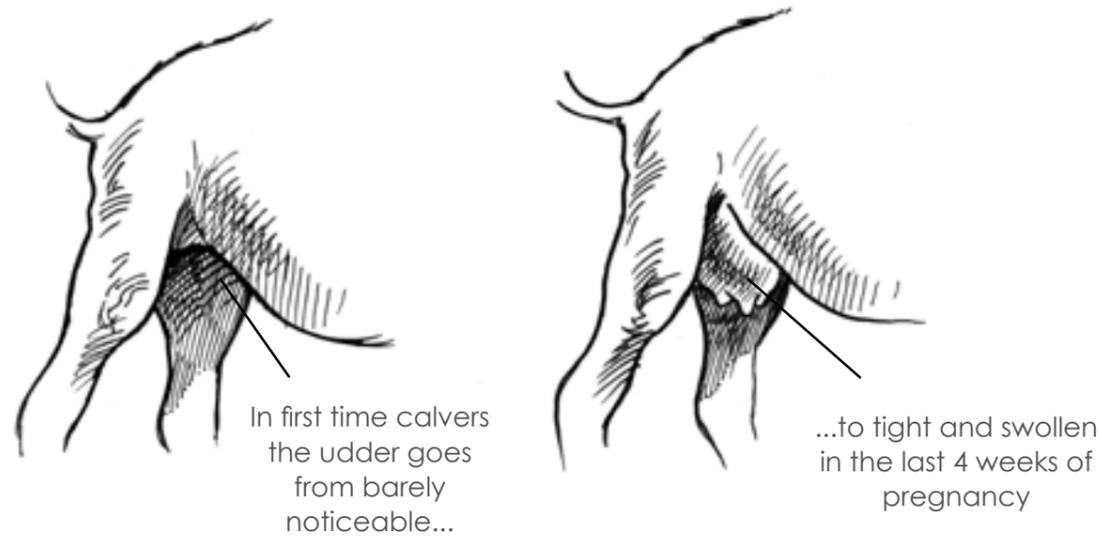
Rutting bulls also spread their scent by rubbing the secretion from the occipital glands on to themselves (e.g. on to the front of their withers, leaving a dark stain), as well as onto cows, bushes and soil.



Be able to identify bulls in rut and what brings on rut. Rutting bulls need to be handled differently to other camels.

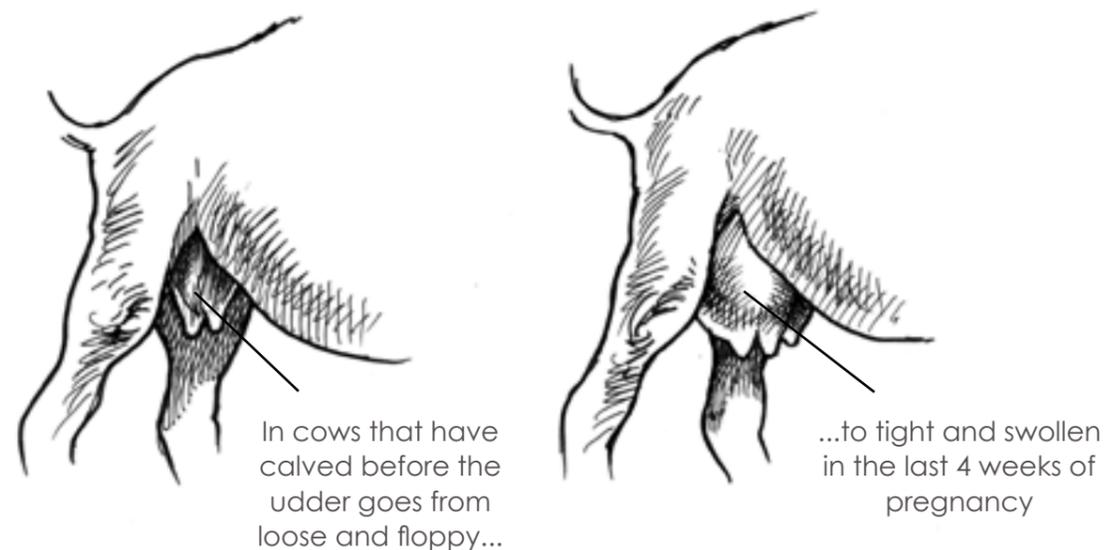
(Text adapted from Manefield and Tinson 2000. Images adapted from Dioli (2007) and Williams (2002))

Identifying cow camels in late pregnancy

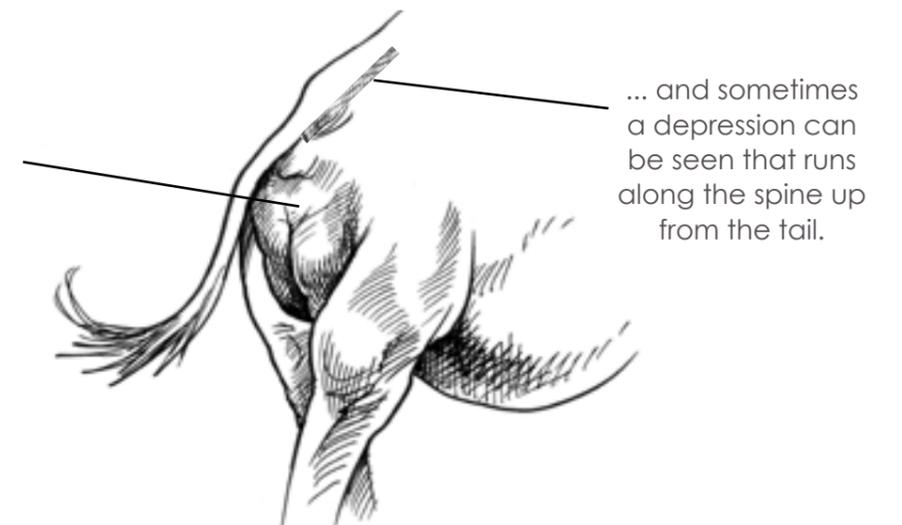


The easiest and most reliable way to identify a cow camel in the last month of pregnancy is by their large, full and tight udder. In **first time calvers** the udder swells in the last month of pregnancy from being almost unnoticeable to about the size of half an AFL football cut lengthwise.

Late pregnancy cows often have a very large abdomen which swings from side to side when the cow camel moves, but some do not.



The vulva becomes loose and swollen in the last 1-2 weeks before giving birth...



In cows that have **calved before**, the udder swells in the last month from being loose and floppy and about $\frac{1}{4}$ the size of an AFL football, to being tight, and swollen and between $\frac{2}{3}$ and $1\frac{1}{2}$ times the size of an AFL football.

In the **last 1-2 weeks** of pregnancy, the vulva becomes very obviously swollen and loose in preparation for giving birth. The sacrosciatic ligament also becomes very relaxed and a depression may be seen that runs along the spine leading up from the tail. When calving is very close, the pregnant cow becomes restless, the tail is held horizontally almost continuously, and if possible the cow will leave the group to be alone.

The most reliable way to identify cow camels in late pregnancy is from their tight, swollen udder.

(Text adapted from personal communications with Dr. O.J. Williams)



References

- Dioli, M. (2007) Pictorial Guide to Traditional Management, Husbandry and Diseases of the One-Humped Camel. Photographic CD-ROM with 1000 captioned pictures. www.lulu.com/content/759963. ISBN 978-82-303-0840-0
- Faye, B., Bengoumi, M., Cleradin, A., Tabarani, A., Chillard, Y. (2001) Body condition score in dromedary camel: A tool for management of reproduction. *Emirates Journal of Food and Agriculture*, Vol 13 (1) 01-06. <http://ejfa.info/article/viewFile/5193/2660>
- Fowler, M.E. (2010) *Medicine and Surgery of Camelids*, 3rd Edition. Wiley-Blackwell Publishing, ISBN: 081380616X
- Gee, P. (2012) Personal Communications
- Grill, P.J. (1988) *Introducing the Camel. Basic Camel Keeping for the Beginner*. UN Environment Program.
- Manefield, G.W. and Tinson, A.H. (2000). *Camels - A Compendium*. The T.G. Hungerford Vade Mecum Series for Domestic Animals. Series C, No 22. University of Sydney Postgraduate Foundation in Veterinary Science, Sydney.
- Williams, O.J. (2002). *Capture and handling of camels destined for the abattoir*. 2nd Edition. Central Australian Camels Industry Association Inc. Alice Springs, NT.
- Williams, O.J. (2012) Personal Communications



Model code of practice
for the humane control of
feral camels



Introduction

The aim of this code of practice is to provide information and guidance to vertebrate pest managers responsible for the control of feral camels. It includes advice on how to choose the most humane, target specific, cost effective and efficacious technique for reducing the negative impact of feral camels.

This code of practice (COP) is adopted nationally. Jurisdictions can apply more stringent requirements as long as they retain the principles set out in these codes. The COP should only be used subject to the applicable legal requirements (including OH&S) operating in the relevant jurisdiction.





This model code of practice gives advice on choosing the most humane and appropriate control method(s).



Background

There is an expectation that animal suffering associated with pest management be minimised. The most humane methods that will achieve the control programs' aims must be used. Consideration of animal suffering should occur regardless of the status given to a particular pest species or the extent of the damage or impact created by that pest. While the ecological and economic rationales for the control of pests such as the feral camel are frequently documented, little attention has been paid to the development of an ethical justification as to how these pests are controlled. An ethical approach to pest control requires recognition of and attention to the welfare of all animals affected directly or indirectly by control programs. Ensuring such approaches are uniformly applied as management practices requires the development of agreed Standard Operating Procedures (SOPs) for pest animal control. These SOPs are written

in a way which describes the procedures involved for each control technique as applied to each of the major pest animal species. While SOPs address animal welfare issues applicable to each technique, a Code of Practice (COP) is also required which brings together these procedures into a document which also specifies humane control strategies and their implementation. COPs encompass all aspects of controlling a pest animal species. This includes aspects of best practice principles, relevant biological information, guidance on choosing the most humane and appropriate control technique and how to most effectively implement management programs.

This code is based on current knowledge and experience in the area of feral camel control and will be revised as required to take into account advances in knowledge and development of new control techniques and strategies.



Definitions and Terms

Pest animal – native or introduced, wild or feral, non-human species of animal that is currently troublesome locally, or over a wide area, to one or more persons, either by being a health hazard, a general nuisance, or by destroying food, fibre, or natural resources (Koehler, 1964).

Welfare – an animals' state as regards its attempts to cope with its environment (Broom, 1999). Welfare includes the extent of any difficulty in coping or any failure to cope; it is a characteristic of an individual at a particular time and can range from very good to very poor. Pain and suffering are important aspects of poor welfare, whereas good welfare is present when the nutritional, environmental, health, behavioural and mental needs of animals are met. When welfare is good suffering is absent (Littin et al., 2004).

Humane Vertebrate Pest Animal Control – the development and selection of feasible control programs and techniques that avoid or minimise pain, suffering and distress to target and non-target animals (RSPCA, 2004).

Best Practice Management – a structured and consistent approach to the management of vertebrate pests in an attempt to achieve enduring and cost-effective outcomes. 'Best practice' is defined as the best practice agreed at a particular time following consideration of scientific information and accumulated experience (Braysher, 1993).



Best Practice Pest Management

From an animal welfare perspective, it is highly desirable that pest control programs affect a minimum number of individuals and that effort is sustained so that pest densities always remain at a low level. Over the last decade, the approach to managing pest animals has changed. Rather than focussing on killing as many pests as possible, it is now realised that like most other aspects of agriculture or nature conservation, pest management needs to be carefully planned and coordinated. Pest animal control is just one aspect of an integrated approach to the management of production and natural resource systems. Most pests are highly mobile and can readily replace those that are killed in control programs. Unless actions are well planned and coordinated across an area, individual control programs are unlikely to have a lasting effect. When planning pest management, there are some important steps that should be considered (after Braysher & Saunders, 2002).

1. What is the trigger to undertake pest animal management? Is there a community or political pressure for action on pests and an expectation that pest animals should be controlled? Pest control is unlikely to be effective unless there is strong local or political will to take action and commit the necessary resources.
2. Who is the key group to take responsibility for bringing together those individuals and groups that have a key interest in dealing with the pest issue?
3. What is the problem? In the past the pest was usually seen as the problem. Hence the solution was to kill as many pests as possible. We now know that the situation is more complex. First, determine what the problem is. For example, it may be damage to native trees, or damage to stock fences or watering points, particularly during drought. Several factors impact on each of these problems

and control of pests are often only part of the solution. The following questions then help define the problem:

- Who has the problem?
 - Where is the problem?
 - How severe is the problem?
 - Will the problem change with time?
4. Identify and describe the area of concern. Sometimes it helps to remove agency and property boundaries so that the problem can be viewed without the tendency to point blame at individuals; groups or agencies. Property and agency boundaries can be added later once agreement is reached on the best approach.

5. Trying to deal with the complexity of a very large area can be daunting so it often helps to break the area into smaller management units for planning. These smaller units may be determined by water bodies, mountain ranges, fences, vegetation that is unsuitable for a particular pest or other suitable boundaries that managers can work to. While it is best to work to boundaries that restrict the movement of pests, this may not be practicable and jurisdictional boundaries, for example, the border of a Landcare group, may have to be used in combination with physical boundaries. Once the management units are identified:

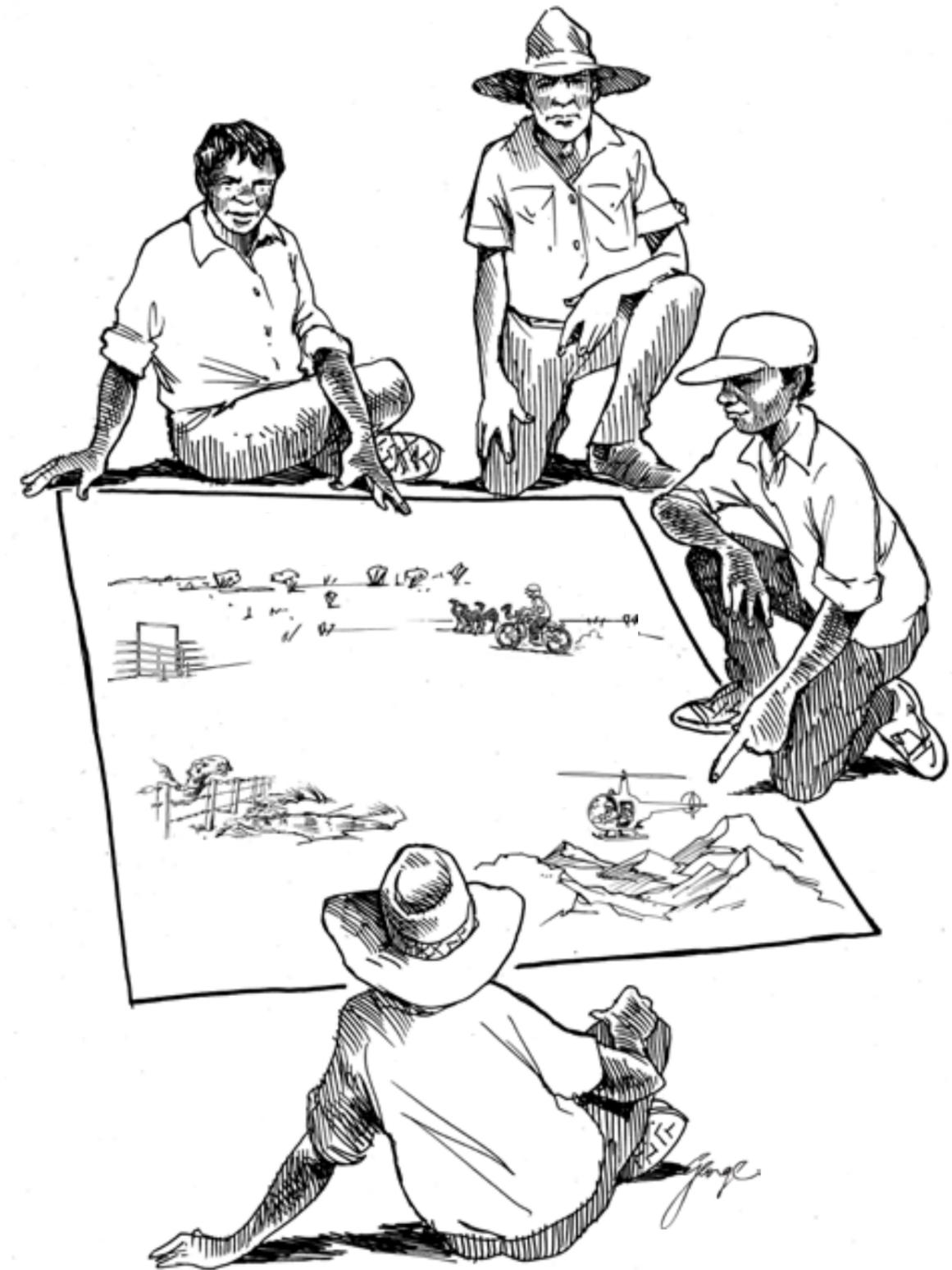


- Identify as best you can, the pest animal distribution and abundance in each management unit.
- Estimate as far as is practicable, the damage caused by the pest or pests to production and to conservation.

6. Gather and assess other relevant planning documents such as Catchment Management Plans, Recovery Plans for threatened species and Property Management Plans. Identify any key constraints that may prevent the plan being put into operation and identify all the key stakeholders.

7. Develop the most appropriate pest management plans for each of the management units.

Implementing effective and humane pest control programs requires a basic understanding of the ecology and biology of the targeted pest species and in some cases those species affected directly (non-targets) or indirectly (prey species) by a control program. It is also essential to understand the impact created by the pest i.e. what is the problem? Managers should take the time to make themselves aware of such information by reading the recommended texts at the end of this code of practice. A brief summary of the biology, ecology and impacts of feral camels follows. This information is extracted from the report 'Overview of the project - Cross-jurisdictional management of feral camels to protect NRM and cultural values' by Edwards et al. (2008) and also from a fact sheet titled 'The feral camel (*Camelus dromedarius*)' by the Natural Heritage Trust, Department of Environment and Heritage (2004).



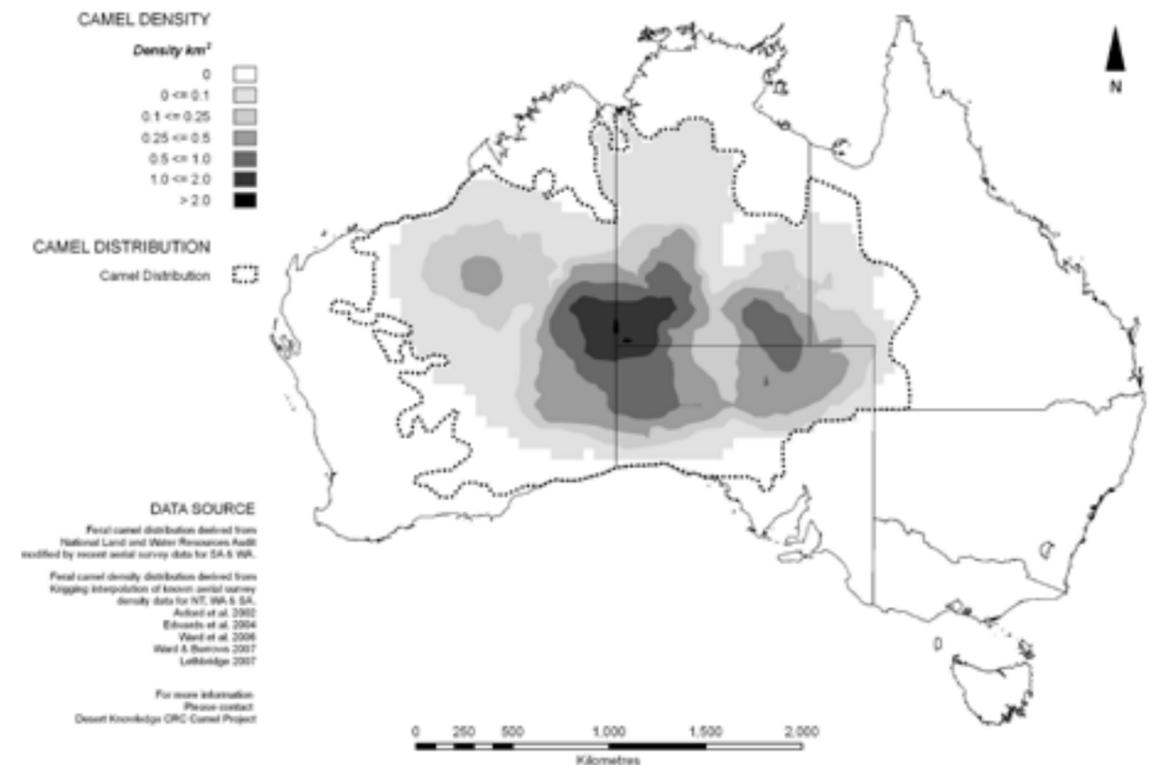
Feral Camel Facts

The camel played an important role in the development of central Australia in both the nineteenth and early twentieth centuries. The replacement of the camel by the motor vehicle in the early twentieth century resulted in large numbers of animals being released into the wild and the subsequent establishment of a feral population in arid Australia. Monitoring of Australia's camel population was haphazard at best until the 1980s. Since that time, a number of systematic aerial surveys of camel

distribution and abundance have been carried out across substantial areas of the camel's distribution. The current distribution of the camel covers much of arid Australia. Up to 50% of Australia's rangelands are reported as having camels present, with the arid regions of WA, SA, the NT, and parts of Qld being affected. The feral camel population in Australia today is estimated to be approximately one million with numbers increasing at a rate of around 8% per year.



Camels carrying wool bales, Strzelecki Track, 1928. (Photo AA357, South Australian Museum Archives)



Desert Knowledge CRC Report 47 (2008), p27.



There are about one million feral camels in Australia and numbers are increasing.

Feral camels wander widely according to conditions, sometimes covering 70 kilometres in a day. In summer, they are usually found in bushland and sandplain country that offers food and shelter from the sun, but in winter they move to salt lakes and salt marshes.



Camels in East Simpson Desert (Department of Environment and Natural Resources 2010)



Camels in East Simpson Desert (Department of Environment and Natural Resources 2010)



Camels can travel up to 70km a day. They can live in different types of desert country such as bushland, sand dune country, salt lakes and salt marshes.

Camels can walk long distances and can be found in different desert landscapes depending on conditions.

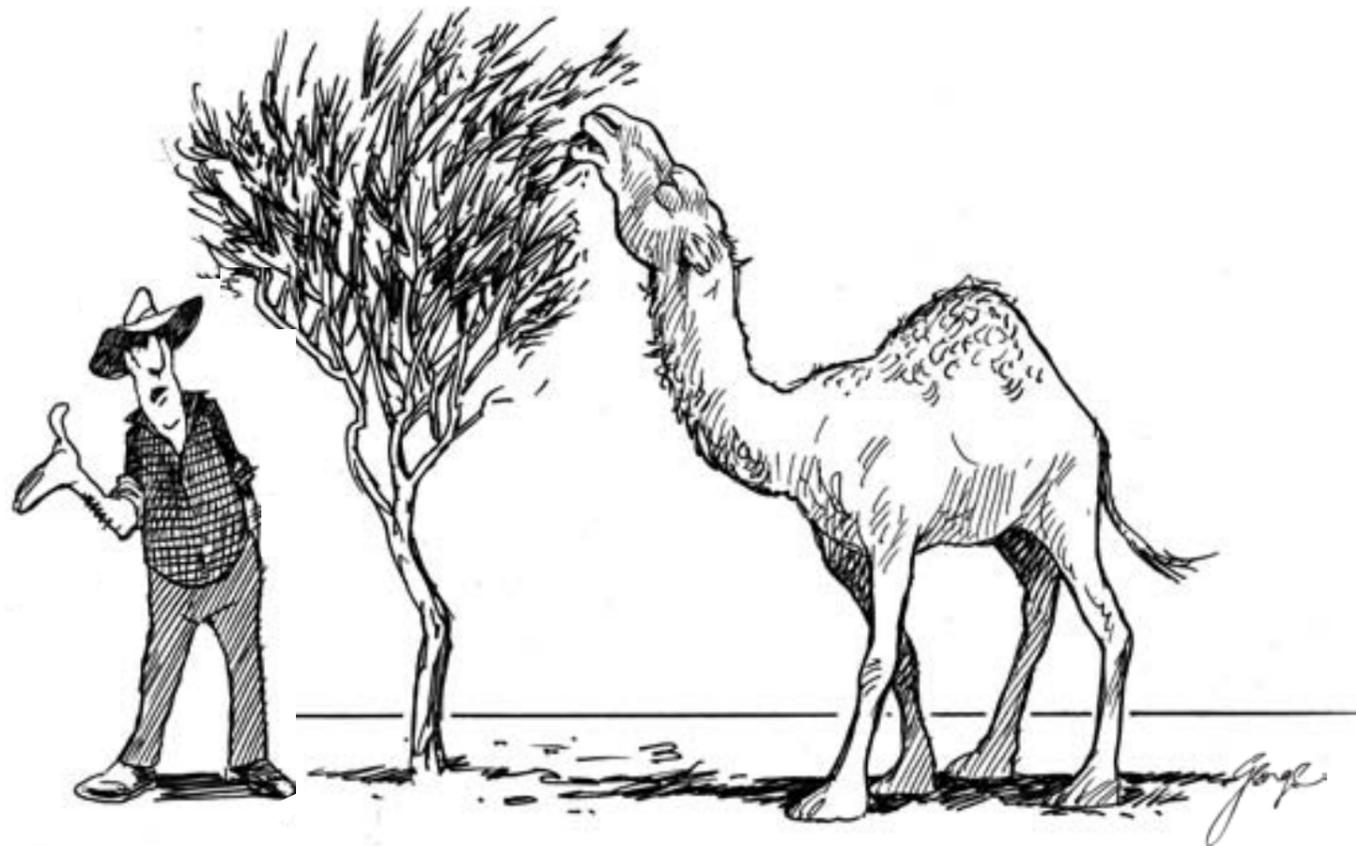


As well as grazing on grass, feral camels browse on vegetation as high as 3.5 metres above the ground. They eat most plant material, including fresh grasses and shrubs, preferring roughage to pasture that has introduced grasses or has been fertilised. Camels appear to eat half to $\frac{3}{4}$ that of cattle in terms of dry matter as a percentage of body weight. The expected dry matter intake for a 450kg camel is ~7.5kg of dry matter per day (Manefield and Tinson 2000). It is difficult to estimate a camel's daily intake of fresh vegetation in kg as this depends on the moisture and nutrient content of the feed.

Camels have a high need for salt and they eat salty plants, even thorny, bitter or toxic species that are avoided by other herbivores.



Camels eat most plant material, and they need a lot of salt in their diet.



Camels eat from plants up to 3.5 metres above the ground.



Camels eat salty, thorny, bitter and poisonous plants that other animals avoid.



At times when forage is green and moist, feral camels gain all the water they need from their food and do not require drinking water. If water is available in summer, camels will drink regularly, usually at dawn. In extreme drought they need access to waterholes.

Contrary to legend, the hump is mostly fat, a store of energy rather than water.



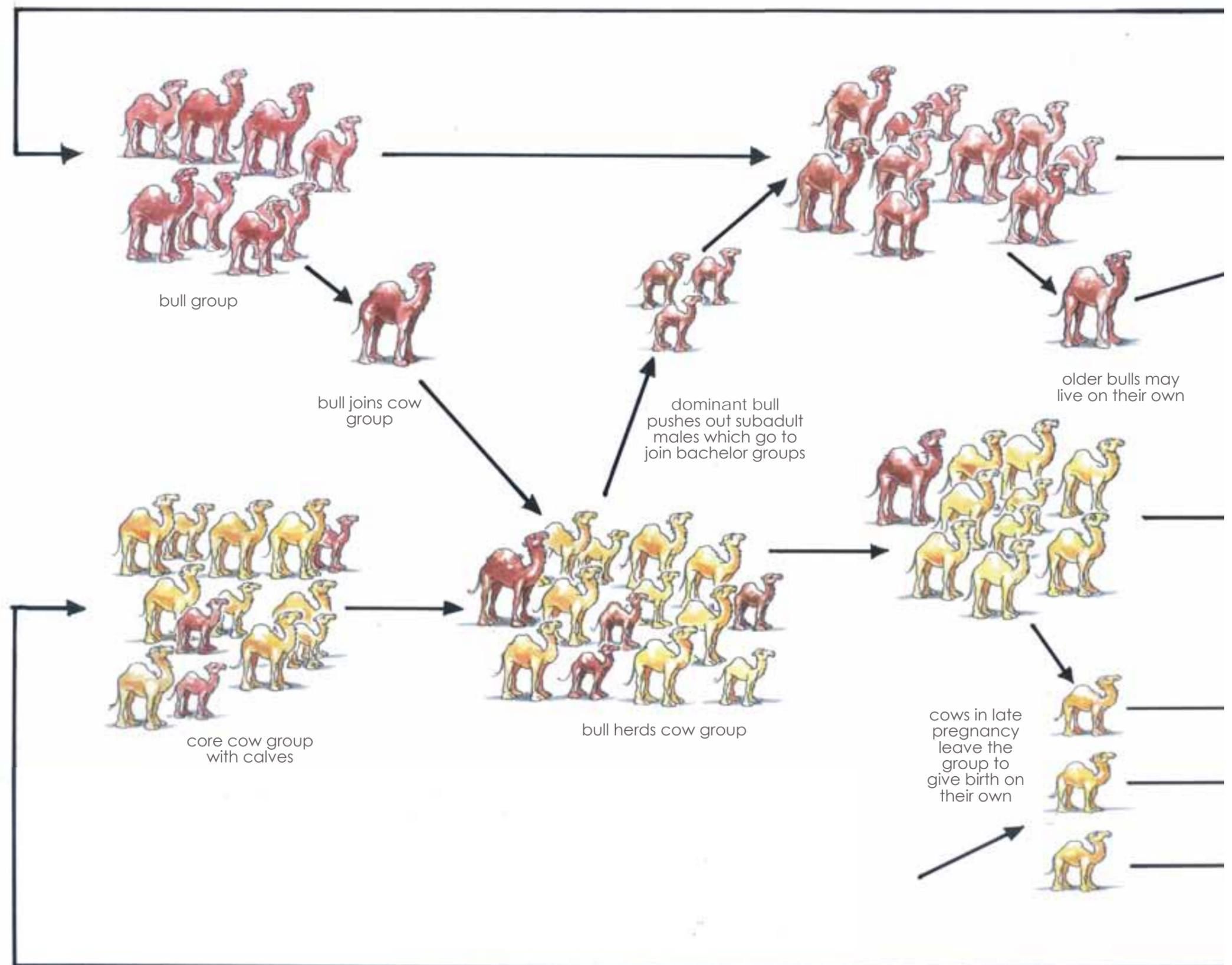
Camels don't need to drink water if they can eat enough plant material that is green and has lots of water in it, such as parakeelya.

Feral camels can survive without drinking water if they can eat enough green, succulent feed.



Summer

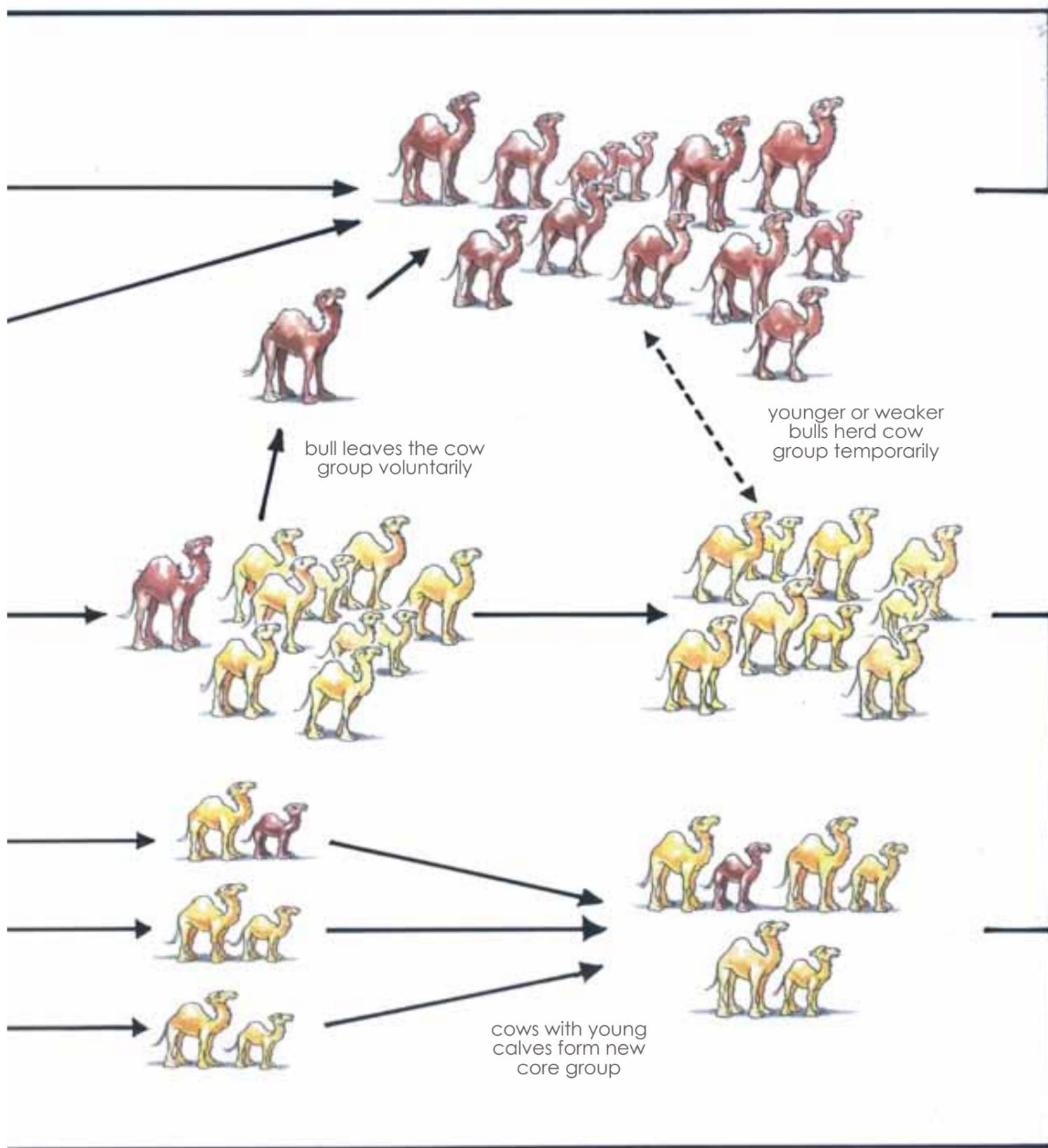
Winter



The feral camel lives in non-territorial groups of three main kinds: year-round groups of bulls (males); summer groups of cows (females) and calves; and winter breeding groups that include a mature bull and several cows and their calves. Only old bulls tend to be solitary. Larger herds may form in summer when groups congregate. During the breeding season, from May to October, rutting males have a herd of many cows, which they defend against advances from other bulls. Pregnancy lasts about 13 months and a cow gives birth to a single young, which is weaned at about 18 months. Captive camels can live for as long as 50 years and breed for at least 30 years.

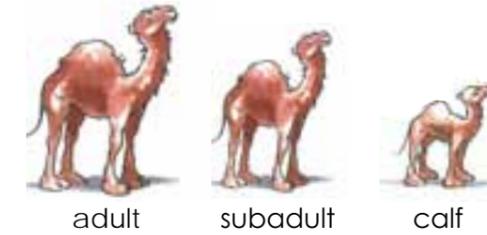


Summer

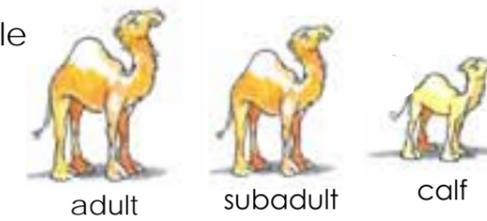


Legend

Male



Female



Size of symbol corresponds to respective age class

Figure adapted from figure by Dorges and Heucke in Williams, O.J. (2002). Capture and handling of camels destined for the abattoir. 2nd Edition. Central Australian Camels Industry Association Inc. Alice Springs, NT.

The social structure of wild camel herds changes with the seasons.



Feral Camel Impact

The harmful impacts of feral camels fall into three main categories: economic, environmental, and social/cultural. Negative economic impacts of feral camels mainly include direct control and management costs, impacts on livestock production through camels competing with stock for food and other resources, damage of infrastructure, and damage to people and vehicles due to collisions.



Camels can compete with stock for food, water and shelter.

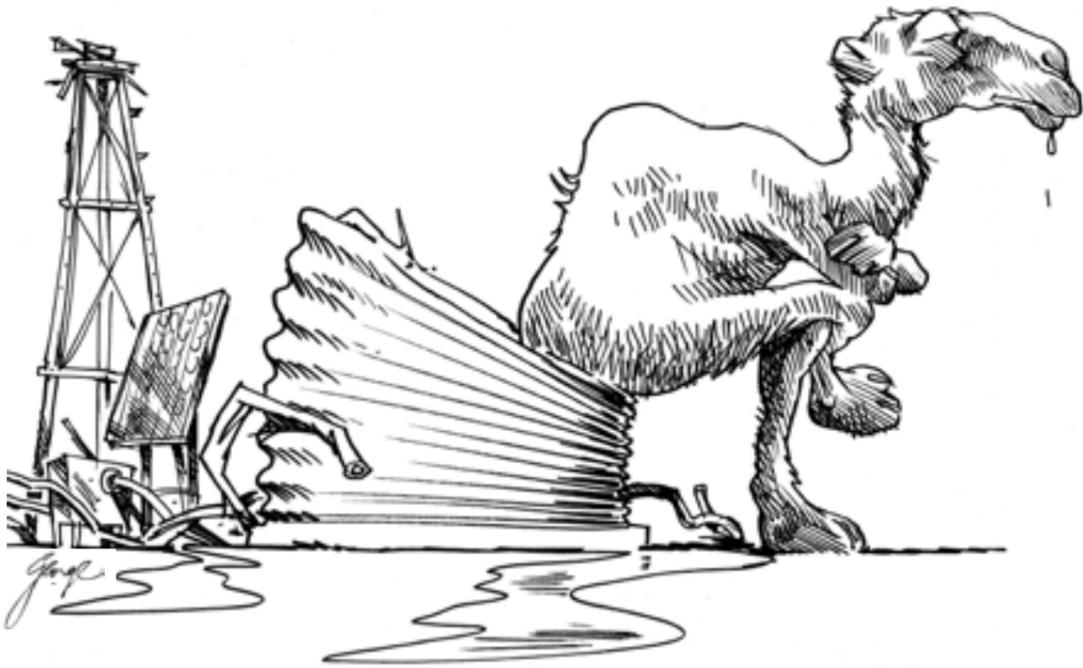


People can be injured and vehicles damaged in accidents with camels.



Managing and controlling feral camels can cost money.





Camels can damage water tanks and water pumps.



Camels looking for water can damage air conditioners.



Camels can damage fences and water troughs.



Negative environmental impacts of feral camels include damage to vegetation through feeding behaviour and some trampling; suppression of recruitment in some plant species; damage to wetlands through fouling, trampling, and sedimentation; and competition with native animals for food and shelter.



Camels can compete with native animals for food, water and shelter.



Camels can damage plants.

There are some plants camels really like to eat such as quandong, bush plum, curly pod wattle. They can eat these until they are all gone and make some local plants extinct. Camels also trample plants and seedlings by walking or lying down on them, and break branches to reach feed higher up.





Camels can damage water places.



Camels can damage the homes of other animals.

Camels can drink all the water at waterholes leaving none for other animals or humans (a dehydrated camel can drink 200L in 3 minutes). Dead camels and camel droppings make the water unhealthy. Camels can make waterholes boggy, make the water muddy and change where the water would have normally gone.



Feral camels have significant negative impacts on the social/cultural values of Aboriginal people. Camels damage sites, such as waterholes, that have cultural significance to Aboriginal people; they destroy bush tucker resources, reduce people's enjoyment of natural areas, create dangerous driving conditions, and cause a general nuisance in residential areas.



Camels can be scary and stop people having fun in the bush.



Camels can damage places of cultural significance.



Camels can destroy bush tucker plants.



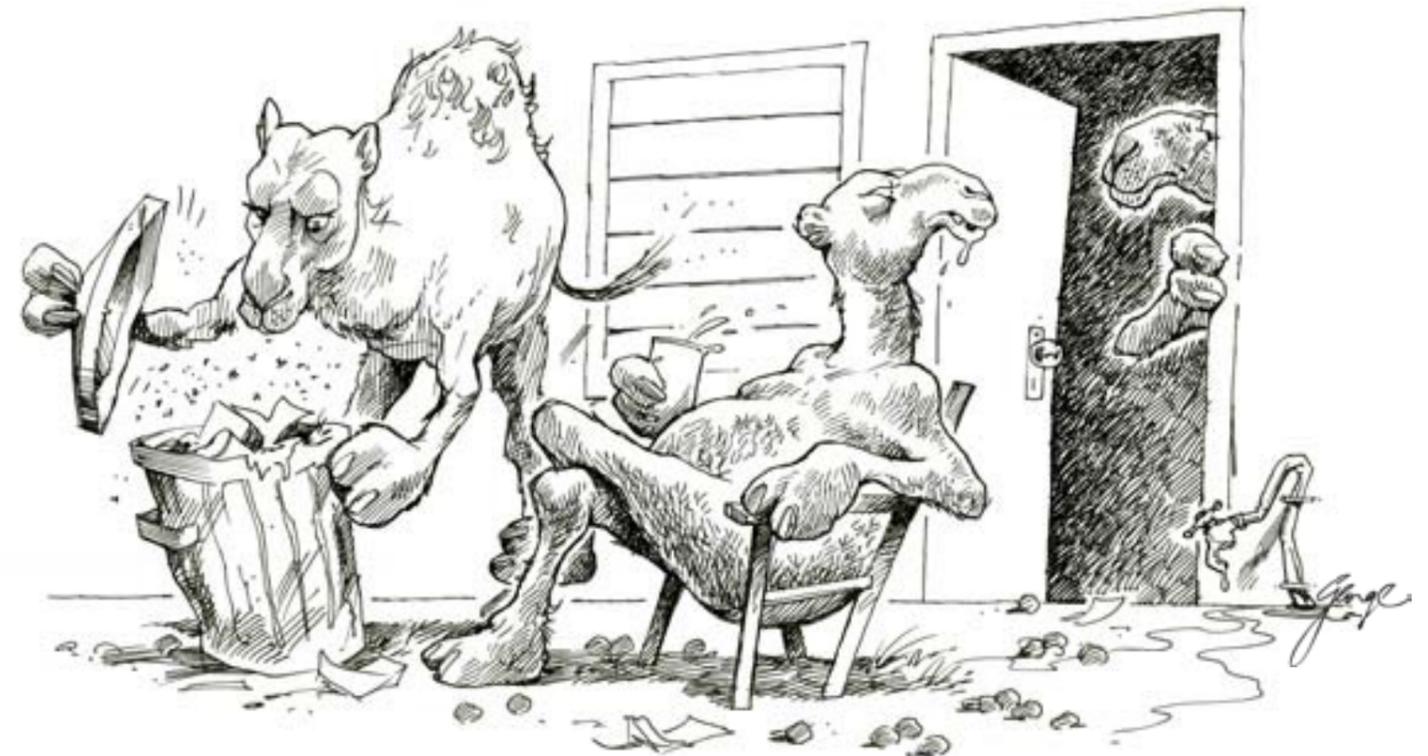


Camels can make driving more dangerous.



Camel droppings and dead camels in water holes can make people sick if they drink, or swim in, the polluted water.

In addition, camels could also potentially be involved in the spread of exotic diseases such as bluetongue, Rinderpest, Rift valley fever, surra (trypanosomiasis), and bovine tuberculosis if outbreaks of these diseases occurred in Australia.



Camels can be a general nuisance where people live. They go through bins, hang around houses and scare people.

Feral camels can be a nuisance to humans.



Feral camels can also have both positive economic and environmental impacts. Landholders can derive economic benefit from feral camels by using their meat for domestic consumption or by selling them for other uses that includes pet meat, leather and export meat products.

Small numbers of feral camels are also used in the tourism industry.



Tourist camel rides, Cable Beach, WA (Broome Camel Safaris 2010)

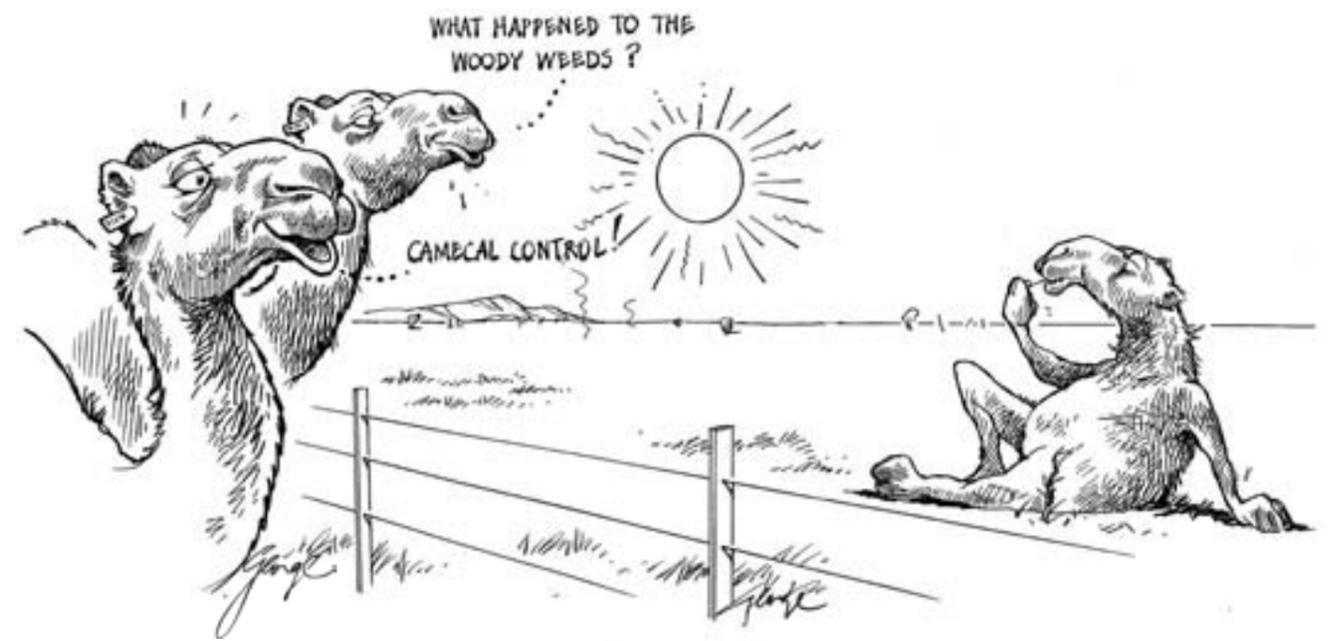


Scientific and ecological surveys using camels as transport (Australian Desert Expeditions 2007)

Camel meat and products made from camel leather and wool (Central Australian Camel Industry Association Inc. 2006)



Feral camels can be used for meat, leather, wool, milk, and tourism, and are used in some places to control woody weeds.



Many Aboriginal people believe that feral camels should be used to provide benefits to local people, including income and jobs. Camels have also been used for woody weed control in Queensland.



Aboriginal stockmen, Urrumpinyi Aboriginal homelands, N.T. (Grenville Turner 2009)



Setting up portable yards, Urrumpinyi Aboriginal homelands, N.T. (Grenville Turner 2010)



Erecting Hessian wing fence. Urrumpinyi Aboriginal homelands, N.T. (Grenville Turner 2010)



Martu rangers with DAFWA staff attaching a satellite tracking collar, near Parnngurr, W.A. (Kanyiminpa Jukurpa 2011)



Martu rangers at firearm training, Newman Rifle Range, W.A. (Kanyiminpa Jukurpa 2011)

Many Aboriginal people believe feral camels should be used to provide jobs and income.



Feral Camel Control Strategies

The control of feral camels is challenging because of their wide-spread distribution, high mobility, low density and low requirement for water. At present, management mostly involves periodic aerial culling and live capture by mustering or trapping at water. Ground-based shooting and exclusion fencing are also used. However, none of these methods have had a significant impact on the overall population of camels. Reducing the density of camels, particularly at key assets, is an important strategy to achieve damage mitigation. Since camels have a relatively slow rate of population increase the best approach for reducing population density is to target adult survival not reproductive output.

Exclusion fencing is useful for protecting key risk areas but does not reduce populations. It is expensive and limited in its application. Aerial shooting and trapping at water points is effective during drought when camels are congregating near water points but is less effective at other times. The capture and removal of feral camels can provide an income for land managers, particularly Aboriginal people living in isolated communities. However it is generally only economical to harvest feral camels when they have congregated in accessible areas or where they are at relatively high densities. Various stakeholders can have divergent and sometimes conflicting views regarding pest management. For example, some stakeholders see feral camels as a

resource while others see them as a pest. Consequently, landscape scale control strategies may need to address a range of views and be flexible in achieving the desired outcomes. In the case of feral camel control, all removal activities that are legal, humane and cost effective are considered as valid options and the final selection of removal activity remains the responsibility of the various landholders.

By necessity, any control effort should be sustained. The best strategy is to develop a plan which maximizes the effect of control operations and reduces the need to cull large numbers of animals on a regular basis. There are three essential requirements for a pest control plan – necessity, effectiveness and humaneness.



Developing a management plan

This involves:

- *Defining management objectives.* Objectives are a statement of what is to be achieved, defined in terms of desired outcomes, usually conservation or economic benefits. Objectives should state what will be achieved (reduced impact) where, by when and by whom.
- *Selecting management options.* The management option is selected that will most effectively and efficiently meet the management objectives. The options include: eradication, containment, sustained management, targeted management, one-off action and taking no action.
- *Set the management strategy.* This defines the actions that will be undertaken: who will do what, when, how and where. It describes how the selected pest management options and techniques will be integrated and implemented to achieve the management objectives.
- *Monitoring the success of the program against the stated objectives.* Monitoring has two components, operational monitoring – what was done when and at what cost:- this determines the efficiency of the program, and performance monitoring:- were the objectives of the plan achieved and if not why not, that is the effectiveness of the program.



Choosing control techniques

Feral camel control techniques have the potential to cause animals to suffer. To minimise this risk the most humane technique that will achieve the control program's aims should be used. This will be the technique that causes the least amount of pain and suffering to the target animal with the least harm or risk to non-target animals, people and the environment. The technique must also be effective in the situation where it will be used (e.g. trapping will have little effect when there is plenty of surface water and/or succulent feed available). It is also important to remember that the humaneness of a technique is highly dependant on whether or not it is correctly employed. In selecting techniques it is therefore important to consider whether sufficient resources are available to implement that technique properly.



Cooperative control

Effective management of feral camels and their impact will not only require the application of a range of control methods but also a strategic approach that involves collaboration across jurisdictions. Feral camels are very mobile and move over very large areas. Consequently, extensive buffer zones will be needed in arid regions to protect environmentally sensitive areas from camel impacts if these threaten biodiversity values in those areas. Also, because feral camels are wide ranging, it is imperative that the relevant State and Territory Governments act together to manage the species across its entire range.



Camel 'steak' holders working together.



Feral Camel Control Techniques

Control techniques with the widest practical application across Australia and greatest potential for effective control of feral camels are aerial shooting and ground shooting, mustering and trapping at water. Fencing that excludes camels but allows free access by wildlife has also been used to reduce damage to key waterholes. Fertility control is not likely to be an efficient form of population control since most camels live in the vast rangelands of central Australia making delivery of any fertility control agent problematic.

Different techniques are best suited to particular situations depending on issues such as camel density, accessibility, geography and season. Aerial culling by properly trained and accredited shooters using approved procedures is considered to be a humane way to reduce feral camel numbers over large areas. The process is quick and, depending on circumstances, may be more humane than mustering, yarding and transportation for slaughter.

Cost-effectiveness, humaneness and efficacy for each control technique are useful in deciding the most appropriate strategy. A brief evaluation of the humaneness of control techniques follows:

Humaneness of control techniques

Fertility control

Fertility control is seen by some as a preferred method of broad-scale feral camel control as it offers a potential humane and target specific alternative to lethal methods. However, delivery of hormones or vaccines that have a transient contraceptive effect are difficult to administer to large numbers of free-roaming camels and there is no long-acting or permanent method of fertility control presently available; therefore repeated administration would be required. Consequently, its application is not currently feasible for most Australian conditions where feral camel numbers are high and their domain extensive.

Feral camel control methods must be humane and effective where they are used.



Exclusion fencing

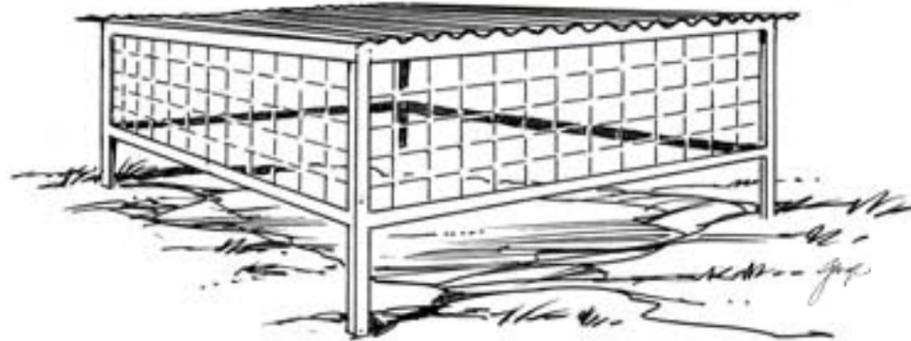
Exclusion fencing is generally regarded as a humane, non-lethal alternative to lethal control methods. However, fencing of large areas is expensive to construct and maintain and is difficult in rugged and/or extensive terrain. Therefore it is only feasible and economical for protecting smaller areas of high conservation or cultural value. Exclusion fencing is mostly used to prevent access of camels to important cultural sites on Aboriginal land, primarily waterholes.

Camel-proof fences around waterholes deny access to drinking water. There are significant animal welfare considerations with this form of management, if there are no other waterholes nearby. If the objective is to prevent camels from going into a waterhole and fouling it or becoming trapped, rather than stopping them from drinking, a more humane approach is to use a 'spider' structure. This is placed over the waterhole to prevent camels from entering the water but still allows them access to the water to drink.

Although exclusion fencing acts as a barrier to feral camels it can have negative effects on non-target species by altering dispersion and foraging patterns, and causing entanglement. It can also create a significant hazard to wildlife in the event of a bushfire. Fences constructed to exclude feral camels from a water source should not preclude wildlife such as kangaroos and dingoes.



Fences need to be strong and visible to keep camels out.



A 'spider' design that also shades the water.



'Spiders' can stop camels falling into the water.



Mustering

Mustering will expose feral camels to extended periods of stress and anxiety compared to aerial culling. To minimise this impact, it is preferable to use coacher camels which calm the mob and minimise potential for injury, exhaustion or separation of dependent calves from cows. Camels will be less stressed if they are mustered using horses or 4WD vehicles rather than motorbikes.

Feral camels should be handled quietly without force to avoid panic and trampling. The tail end of the mob must be allowed to set the pace rather than being forced to keep up with the leaders. Camels must not be driven to the point of collapse. Distances that the camels have to be mustered should be kept to a minimum e.g. by using portable yards.

It is preferable not to muster together separate feral camel social groups when bulls are in rut (April-September). However if this cannot be avoided, all mature bulls must be drafted off from mixed social groups of cows / calves / young bulls as soon as possible after capture. Notwithstanding the above, some rutting bulls may have to be humanely culled to avoid injury to young calves and fighting between competing males.



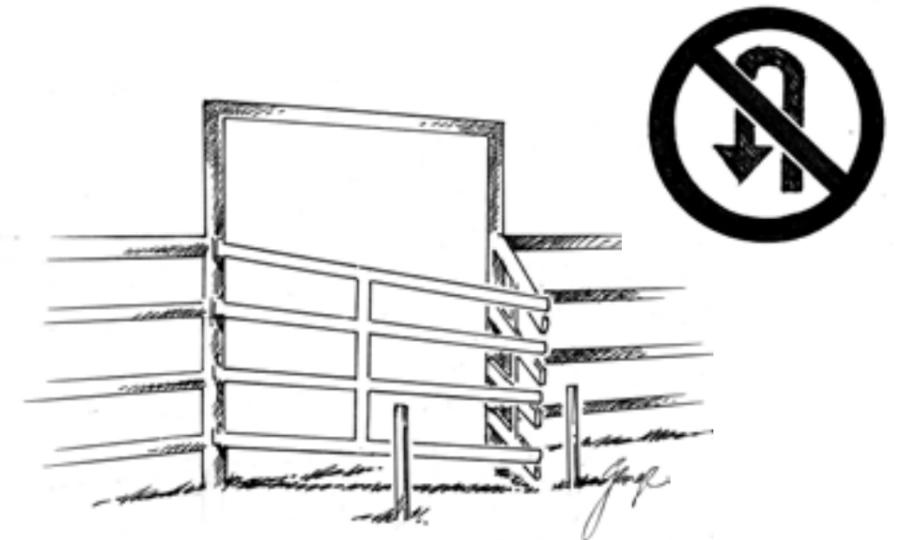
Trapping

Trapping presents different risks than mustering, given that the camels are not driven into the trap but go in quietly of their own accord. However herds of mixed ages and sexes are held together until separated so there is still the potential for welfare problems during the process of holding, handling and transferring the camels from the trap to a vehicle for transport.

To minimise the possibility of stress and injury, all traps must be inspected at least once daily. Bayonet gates must be removed from trap yards when yards cannot be inspected with appropriate frequency. Camels must have access to water and feed if they are to be held for more than 24 hours. Traps should be constructed to provide camels with shade and shelter and should be large enough to avoid overcrowding. In addition yards should be well drained to allow camels to sit down in areas free of surface water after rainfall.

Capture and handling should be avoided when females are calving or have dependent young at foot. Dependent calves that do not accompany their mother into the trap may be separated and die of starvation or if trapped can get trampled underfoot.

Camel traps can have a negative impact on native non-target species (especially macropods) by inadvertently trapping them and also by excluding them from water sources. This impact can be minimised by using a suitable yard design that incorporates fencing material and gates that allow wildlife to escape if trapped. Also, the fencing used to protect alternative water sources from camels when trapping should allow access to wildlife species.



Camels can be caught by mustering and by using trap yards.





Management of captured or mustered camels

Mustering, capture and handling increase stress in feral camels as they are not used to confinement or close contact with humans. Consequently, these procedures have the potential to cause mismothering, feeding disruption, social disruption, and also abortion in heavily pregnant females. Metabolic, nutritional and parasitic diseases and also changes in environmental conditions may cause mortality and morbidity in confined feral camels, especially when confined for long periods.

The removal of trapped feral camels off-property for either sale to abattoirs, live export, or for domestication, involves additional stress to animals.



Shooting

Shooting is considered more humane than capture and removal as the animals are not subject to the stresses of mustering, yarding, and long-distance transportation.

Ground shooting

Shooting can be a humane method of destroying free-roaming feral camels when it is carried out by experienced, skilled and responsible shooters; the animal can be clearly seen and is within range; the correct firearm, ammunition and shot placement is used; and any wounded animals are promptly located and killed as quickly and humanely as possible. If lactating females are shot, dependent calves should also be shot quickly and humanely. Ground shooting is not suited to rough country as wounded animals cannot be effectively pursued and would suffer unnecessarily.

Shooting is also used to euthanase camels that have been captured by mustering or trapping when they are injured or diseased, there is no market for them or for other reasons as described in the relevant SOP.

Aerial shooting

Aerial shooting of feral camels from a helicopter can be a humane control method when it is carried out by highly skilled and experienced shooters and pilots; the correct firearm, ammunition and shot placement is used; and any wounded animals are promptly located and killed. Shooting from a moving platform can significantly detract from the shooter's accuracy therefore helicopter shooting operations may not always result in a clean kill for all animals. Follow-up procedures are essential to ensure that any wounded animals are killed.

With aerial shooting of camels, initial head shots are most frequently made to achieve instantaneous loss of consciousness and loss of brain function. After the initial head shot, further shot/s must be fired into the cranium or chest to ensure death.



Table 1: Humaneness, Efficacy, Cost-effectiveness and Target Specificity of Feral Camel Control Methods

| Control Technique | Acceptability of technique with regard to humaneness* | Efficacy | Cost-effectiveness | Target Specificity | Comments |
|-------------------|---|--|---|--|--|
| Exclusion fencing | Acceptable | Limited | Expensive | Can be in certain situations | Expensive, therefore impractical for large scale application. Fencing can be effective for small, critical (economic or environmental) areas, though the maintenance costs are still high. Will have significant animal welfare impacts if camels are denied access to drinking water and there are no other sources of water nearby. |
| Fertility control | Conditionally Acceptable | Not currently effective | Expensive | Target-specific | Not currently available. Not currently possible for large scale control. Not suitable for population control in long-lived animals with a slow rate of increase when impact mitigation is a primary objective. |
| Mustering | Conditionally acceptable | Effective | Cost-effective. Requires sufficient returns to musters to offset costs. | Target-specific | Efficient and cost-effective where camels are present in high densities, terrain is relatively flat and camel prices are sufficient. Increased welfare concerns associated with capture and transport of camels, particularly if over large distances. May be more costly than trapping depending on trap location and accessibility. |
| Trapping | Conditionally acceptable | Effective | Cost-effective | Can have an impact on non-target species. Trapped non-target species must be removed as quickly as possible to avoid undue stress or death. Traps at natural water holes may restrict access by native species. Traps should be designed so that most wildlife can go through fences or under gates. | Can be used to trap animals to facilitate ground culling operations. Most effective when conditions are dry and there are few waterholes around where camels can drink. Cost-efficient method of capture, particularly when camels are trapped for sale and the trap facility is built in conjunction with trucking facility. If best practice is not adhered to there are significant animal welfare considerations with the implementation of this method. |
| Ground shooting | Acceptable if undertaken by approved and accredited operators | Not effective at reducing high density populations but can manage low densities and/or provide a solution to congregations during dry times. | Not cost – effective for large scale removal operations. | Target-specific | Labour intensive, only suitable for smaller scale, opportunistic operations. Most useful during drought and where camels cannot be captured by trapping or mustering. Limited application in good seasons when there is lots of water around and camels are widely dispersed. |
| Aerial Shooting | Acceptable if undertaken by approved and accredited operators | Effective | Relatively expensive. Can be cost-effective when camel density is high but cost prohibitive when camel densities are low. | Target-specific | Suitable for extensive areas and inaccessible country where landholder consent is attained. In these circumstances it is a most effective way of achieving quick, large scale culling during congregation events or in high density areas. |

* Acceptable methods are those that are humane when used correctly.

* Conditionally acceptable methods are those that, by the nature of the technique, may not be consistently humane. There may be a period of poor welfare before death.

* Methods that are not acceptable are considered to be inhumane. The welfare of the animal is very poor before death, often for a prolonged period.



Legislation

All those involved in pest animal control should familiarise themselves with relevant aspects of the appropriate Commonwealth and State or Territory legislation. The table below gives some of the relevant legislation. This list is not exhaustive and the legislation is constantly being reviewed.

| | |
|---------------------------|--|
| Commonwealth | <i>Agricultural and Veterinary Chemicals Code Act 1994</i> <i>Environment Protection and Biodiversity Conservation Act 1999</i> |
| ACT | <i>Animal Welfare Act 1992</i> <i>Nature Conservation Act 1980</i> <i>Poisons Act 1933</i> <i>Pesticides Act 1989</i> <i>Animal Diseases Act 1993</i> <i>Prohibited Weapons Act 1996</i> <i>Firearms Act 1996</i> <i>Environment Protection Act 1997</i> <i>Rabbit Destruction Act 1919</i> |
| New South Wales | <i>Prevention of Cruelty to Animals Act 1979</i> <i>Pesticides Act 1999</i> <i>Rural Lands Protection Act 1998</i> <i>National Parks and Wildlife Act 1974</i> <i>Game and Feral Animal Control Bill 2002</i> <i>Threatened Species Conservation Act 1995</i> <i>Wild Dog Destruction Act 1923</i> |
| Northern Territory | <i>Animal Welfare Act</i> <i>Territory Parks and Wildlife Conservation Act</i> <i>Poisons and Dangerous Drugs Act</i> |
| Queensland | <i>Animal Care and Protection Act 2001</i> <i>Health (Drugs and Poisons) Regulation 1996</i> <i>Land Protection (Pest and Stock Route Management) Act 2002</i> <i>Nature Conservation Act 1992</i> |

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| South Australia | <i>Animal Welfare Act 1985</i> <i>Natural Resources Management Act 2004</i> <i>Controlled Substances Act 1984</i> <i>National Parks and Wildlife Act 1972</i> <i>Dog Fence Act 1946</i> |
| Tasmania | <i>Animal Welfare Act 1993</i> <i>Vermin Control Act 2000</i> <i>Poisons Act 1971</i> <i>Agricultural And Veterinary Chemical (Control of Use) Act 1995</i> <i>National Parks and Wildlife Act 1970</i> <i>Police Offences Act 1935</i> |
| Victoria | <i>Prevention of Cruelty to Animals Act 1986</i> <i>Catchment and Land Protection Act 1994</i> <i>Agriculture and Veterinary Chemicals (Control of Use) Act 1992</i> <i>Drugs, Poisons and Controlled Substances Act 1981</i> <i>Wildlife Act 1975</i> <i>Flora and Fauna Guarantee Act 1988</i> <i>National Parks Act 1975</i> |
| Western Australia | <i>Animal Welfare Act 2002</i> <i>Agriculture Protection Board Act 1950</i> <i>Agriculture and Related Resources Protection Act 1976</i> <i>Poisons Act 1964</i> <i>Wildlife Conservation Act 1950</i> <i>Biological Control Act 1986</i> <i>Biosecurity and Agriculture Management Act 2007</i> |
| Other relevant legislation | <i>Firearms Acts</i> <i>Occupational Health and Safety Acts</i> <i>Dangerous Goods or Substances Acts</i> <i>Dog Acts</i> <i>Civil Aviation Acts</i> |

Note: copies of the above legislation and relevant regulations may be obtained from Federal, State and Territory publishing services.



Standard Operating Procedures

For regional variations on control techniques refer to local legislation and regulations. For additional examples refer to the NSW DPI Standard Operating Procedures (SOPs).

SOPs are currently available for the following feral camel control methods:

- Ground shooting of feral camels (CAM001)
- Aerial shooting of feral camels (CAM002)
- Mustering of feral camels (CAM003)

Further Information

Contact the relevant Commonwealth, State or Territory government agency from the following websites:

Commonwealth

Department of Sustainability, Environment, Water, Population and Communities

<http://www.environment.gov.au/>

Department of Agriculture, Fisheries and Forestry

<http://www.daff.gov.au/>

NSW Department of Primary Industries

<http://www.dpi.nsw.gov.au/biosecurity>

NT Department of Natural Resources, Environment, The Arts and Sport

<http://www.nretas.nt.gov.au/plants-and-animals>

QLD Department of Agriculture, Fisheries and Forestry

<http://www.dpi.qld.gov.au>

SA Department of Primary Industries and Regions

<http://www.pir.sa.gov.au/biosecuritysa>

WA Department of Agriculture and Food

www.agric.wa.gov.au/

Also refer to:

<http://www.feral.org.au/>

Disclaimer

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References

- Anon. (2004). The feral camel (*Camelus dromedarius*). Natural Heritage Trust, Department of the Environment and Heritage.
- Anon. (2000). Farmnote no. 122/2000 (Reviewed 2008). Feral Camel. Department of Agriculture and Food. Vertebrate Pest Research Services, Forrestfield, Western Australia.
- Anon. (2007). Arabian camel. Northern Territory Department of Natural Resources, Environment and the Arts. Available from: <http://www.nt.gov.au/nreta/wildlife/animals/exotic/camel.html>
- Braysher, M. (1993). Managing Vertebrate Pests: Principals and Strategies. Bureau of Resource Sciences, Canberra.
- Braysher, M. and Saunders, G. (2002). Best practice pest animal management. NSW Department of Agriculture Advisory Note DAI 279
- Broom, D.M. (1999). The welfare of vertebrate pests in relation to their management. In: Coward DP & Feare CJ (eds.). Advances in vertebrate pest management. Filander Verlag, Fürth. pp 309–329.
- Edwards G.P., McGregor M., Zeng B., Saalfeld W.K., Vaarzon-Morel P. and Duffy M. (2008). Overview of the project- Cross jurisdictional management of feral camels to protect NRM and cultural values, DKCRC Report 54. Desert Knowledge Cooperative Research Centre, Alice Springs.
- Koehler, J. W. (1964). Opening remarks. Proceedings of the 2nd Vertebrate Pest Control Conference. March 4 and 5, 1964, Anaheim, California.
- Lapidge S.J, Eason C.T and Humphrys S.T. (2008). A review of chemical, biological and fertility control options for the camel in Australia, DKCRC Research Report 51. Desert Knowledge CRC, Alice Springs.
- Litten, K. E., Mellor, D. J., Warburton, B., and Eason, C. T. (2004). Animal welfare and ethical issues relevant to the humane control of vertebrate pests. *New Zealand Veterinary Journal*. 52, 1–10.
- Manefield, G.W. and Tinson, A.H. (2000). Camels - A Compendium. The T.G. Hungerford Vade Mecum Series for Domestic Animals. Series C, No 22. University of Sydney Postgraduate Foundation in Veterinary Science, Sydney.
- NCCAW (2004). The Australian Animal Welfare Strategy. National Consultative Committee on Animal Welfare, Primary Industries Ministerial Council. Document available electronically from the Australian Government Department of Agriculture, Fisheries and Forestry website: <http://www.affa.gov.au/content/output.cfm?ObjectID=3C9C4ACE-B85B-465C-9C508C771F08C87E>
- Ramsay, B. J. (1994). Commercial use of wild animals in Australia. Australian Government Publishing Service, Canberra.
- RSPCA (2004). A national approach towards humane vertebrate pest control. Discussion paper arising from the proceedings of an RSPCA Australia/AWC/VPC joint workshop, August 4–5, Melbourne. RSPCA Australia, Canberra.

