

Standard Operating Procedure CAM003: Mustering of feral camels

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Background

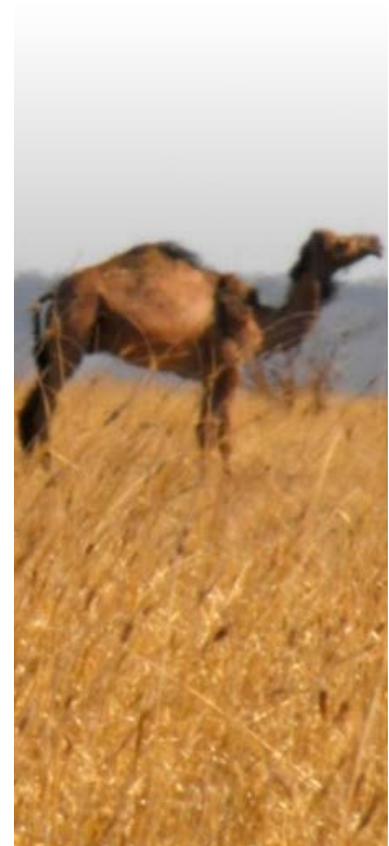
The population of feral camels (*Camelus dromedarius*) in Australia is currently estimated to be around one million with numbers increasing at around 8% per year. At high densities camels can have serious impacts on vegetation and have the potential to cause significant production losses through competition with cattle. They can also damage fences and watering points, particularly during times of drought. Control methods include capture (by trapping at watering points or mustering), exclusion fencing, ground shooting and shooting from helicopters.

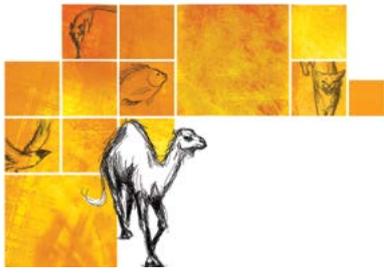
Feral camels are mustered by helicopter, motorbike (or other vehicle) or on horseback, often with the assistance of coacher camels. Once mustered into yards, the camels are usually sold to abattoirs for slaughter which can offset the costs of capture and handling. Small numbers are also sold for live export. Where there is no market for them or where removal may be too costly or impractical, eg in remote areas without access to transportation, camels are sometimes destroyed by shooting in the yards.

This standard operating procedure (SOP) is a guide only; it does not replace or override the legislation that applies in the relevant state or territory jurisdiction. The SOP should only be used subject to the applicable legal requirements (including OH&S) operating in the relevant jurisdiction.

Application

- Mustering should only be used in a strategic manner as part of a coordinated program designed to achieve sustained effective control.
- Mustering may only be efficient and economic when camel densities are high.
- In relatively flat and accessible country, mustering is usually performed on horses or on motorbikes (or other vehicles). In rough, hilly country and more extensive areas, helicopters or light aircraft are used to drive the camels towards a set of yards where a ground team completes the muster.
- Because mobs of camels are scattered and the mob size can often be small, musters are often done over large areas. It is often more effective to accumulate two or more mobs and then herd them to yards for capture. Those that escape capture may be more difficult to catch in subsequent musters.
- Mustering can be a relatively labour intensive exercise compared to other removal techniques and can be more stressful to the camels.
- To ensure that mustering, capture and handling is performed with the least stress to the camels, operators should have a good knowledge of camel behaviour and must have good stock handling skills. They should also be familiar with the terrain they are to cover so that dangerous areas can be avoided.





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- Aircraft operators must ensure that their flying operations comply with requirements of the Civil Aviation Safety Authority.
- Shooting of feral camels should only be performed by skilled operators who have the necessary experience with firearms and who hold the appropriate licences and accreditation.
- Storage and transportation of firearms and ammunition must comply with relevant legislative requirements.

Animal Welfare Considerations

Impact on target animals

- Capture and handling increase stress in feral camels as they are not used to confinement or close contact with humans. Operators should endeavour to keep stress to a minimum during these procedures to avoid the following conditions:
 - Capture myopathy
 - Heat stress and dehydration
 - Acute lameness due to injury or damage to tendons, ligaments or bones
 - Fight injuries due to mixing unfamiliar groups or individuals
 - Bruising and injury caused by rough capture techniques and poorly designed handling techniques
 - Stress-induced infections, such as salmonellosis
 - Feeding disruption resulting in ill-thrift or colic, and
 - Abortion in heavily pregnant females
- Mustering must not be conducted if camels are in poor body condition, eg at the end of prolonged droughts.
- To avoid heat stress, mustering should be carried out in the cooler months.
- The tail end of the mob must set the pace rather than being forced to keep up with the leaders.
- Distances that the camels have to be mustered should be kept to a minimum e.g. by using portable yards.
- Feral camels should be handled quietly without force to avoid panic and trampling.
- Camels that are severely injured during mustering or yarding must be killed quickly and humanely
- Whenever possible, avoid mustering when females are calving or have young at foot which are entirely dependent on their mother. This is to prevent dependent, calves being left to die of starvation if their mothers are mustered and the young are left behind. Although births can occur throughout the entire year, calving usually occurs in the six months of June to November. Avoid mustering during the peak calving time of late August - early September. Apart from the welfare implications, control at times of calving will reduce effectiveness as females leave the group for periods up to three weeks to give birth in isolated locations. This is thought to be a strategy to prevent infanticide by bulls.
- If trained dogs are to be used with feral camels they should be used with caution. Dogs may be useful for mustering but may agitate yarded or confined camels. Feral camels may kick out at dogs if they feel threatened or cornered. Trained herding or sheep dogs may be more suitable than traditional cattle dogs as they are less likely to bite.
- Camels must not be hit with objects such as plastic PVC pipe. However, objects such as PVC pipes are useful. They safely extend a stock handlers reach to gently goad camels and provide visual obstruction to help direct camels as required. Electric prodders should only ever be used as a last resort when reasonable actions to get a camel to move have failed. Use of electric prodders for camels is illegal in some states.
- All mature males should be separated from cows, calves and young males, especially if they are in rut.
- Only fit and healthy animals should be selected for transport. Heavily pregnant, very young or weak/sick/injured animals must either be destroyed, given proper veterinary assistance or transported at a later date when they are in a fit condition.
- The loading, transport, unloading, holding and slaughter of feral camels must be undertaken with the minimum amount of stress, pain or suffering. More detailed guidelines on these procedures can be found in the following documents:
 - *Australian Animal Welfare Standards and Guidelines: Land Transport of Livestock* (Animal Health Australia, 2012).
 - *Model Code of Practice for the Welfare of Animals: The Camel (Camelus dromedarius)*
 - *Livestock at Slaughtering Establishments* (SCARM Report 79, 2002).
 - *Operational guidelines for the welfare of animals at abattoirs and slaughterhouses* (AQIS, 1995).

Impact on non-target animals

Mustering is target specific and does not usually impact on other species.

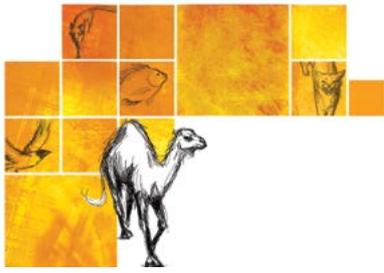
Health and Safety Considerations

- During construction of yards, operators should be wary of the risks of injury from lifting heavy items. Leather gloves and eye protection will help prevent injuries from wire, steel posts and hammers.
- The mustering, confinement and handling of feral camels is not without risk to the operators involved. A first-aid kit should be carried at all times.
- Firearms are potentially hazardous. During culling operations, all people should stand well behind the shooter when shots are being fired. The line of fire must be chosen to prevent accidents or injury from stray bullets or ricochets.
- Firearm users must strictly observe all relevant safety guidelines relating to firearm ownership, possession and use.
- Firearms must be securely stored in a compartment that meets state/territory legal requirements. Ammunition must be stored in a locked container separate from firearms.
- Adequate hearing protection should be worn by the shooter and others in the immediate vicinity of the shooter. Repeated exposure to firearm noise can cause irreversible hearing damage.
- When shooting, safety glasses are recommended to protect eyes from gases, metal fragments and other particles.
- Although normally relatively placid, bull camels during rut should be approached with caution as they can have no fear making them quite dangerous.
- Care must be taken when handling feral camel carcasses as they may carry diseases such as ringworm, mange and melioidosis that can affect humans and other animals. Routinely wash hands and other skin surfaces after handling carcasses. Carcasses can be heavy, so care must be taken when lifting/dragging.

Equipment Required

Yards

- Either portable or fixed holding yards can be used.
- Fixed yards that were originally designed for cattle rather than camels will need to have the following alterations:
 - Increase height of race walls to 1.8 m
 - Increase height of bows over race and the gate slides to 2.4 m
 - Metal loading ramps should be covered with dirt/sand to reduce the hollow sound.
- The entrance should have winged fences to effectively direct camels into the yard. Hessian should be run out from the yard for around 100 metres to form part of the wing fences. This will help prevent camels running into the fences. If possible, the wings should be further extended until they reach natural barriers such as the side of a range or a hill. Ribbon wings made out of flagging tape attached to twine are effective. To deflect approaching camels, one wing fence needs to be longer than the other, commonly 500 m to 1 km long.
- Entrance gates must be wide enough (about 6 m) to allow the easy flow of animals. Yards should be large enough for the camels to enter at a reasonable pace and pull up and settle before encountering fences and panels, and to allow all camels to sit on their sternums at the same time.
- The yard fencing should form both a physical and visible barrier to minimise the potential for injuries. Steel or timber post-and-rail fencing is recommended.
- Barbed wire and narrow gauge high tensile steel must not be used for containment of camels in high pressure areas (eg yards, wings, corridors, and confined spaces) as it can cause severe injury to animals.
- Yards must be maintained and constructed of materials that minimise the risks of injury or escape of camels once inside the enclosure. Projections such as loose wire or sharp edges that are likely to cause injury should be eliminated and fences should be secure and high enough to prevent camels escaping. Hessian draped over vulnerable portions of the yard (eg gates and damaged sections) can be used to deter camels from placing unwanted and additional



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Image: Stuart McEvoy, courtesy of The Australian

pressure on these sections. Removing corner strainers from the fences around holding yards may help prevent damage by camels. Also, removing overhead rails from gateways may help to reduce baulking as camels enter the yards.

- Yards should be located and designed to minimise both dust and boggy conditions.

Choosing a yard site

- Yards should be located close to suitable water.
- A suitable yard site needs to be sufficiently flat to enable the erection of portable yards. If designed to be serviced by trucks, the yard should be set up in close proximity to suitable haulage roads and adjacent to sufficient space for trucks to turn.
- Yards should be set up in a location that prevents the camels from seeing them until it is too late for evasion, for example on the other side of scrub through which the camels are being pushed.
- Where possible, yards should be positioned in a shady area with as much natural vegetation as possible. However, avoid having trees near the entrance of the yards if using a helicopter.
- Yards must be well drained to allow camels to sit down in areas free of surface water after rainfall.

Firearms and ammunition

- For shooting animals in yards, a .44 Magnum with 240 grain jacketed hollow- point or soft -point projectile is recommended. This high calibre is necessary to gain efficient skull penetration. Alternatively, a .308 with 150 grain soft point projectile can be used however there is a higher risk of the projectile exiting the skull compared with the .44 Magnum.
- For close-range shooting of sick or injured animals that are confined to a small yard or stock crate, a captive bolt gun or a .22 Magnum is suitable.

Light fixed wing aircraft or helicopter

- The aircraft must be suited to the purpose and must be registered to perform the task.
- Small helicopters (such as Robinson's) are popular because of their manoeuvrability. Ultralight aircraft could also be used with helicopters but they are less manoeuvrable than helicopters, and so may not be as effective
- The pilot must be suitably licensed and hold the appropriate endorsements for aerial mustering of stock.

Procedures

Mustering

- 'Coacher' camels - domesticated camels that are released amongst feral camels to quieten them - should be used where possible during mustering.
- Motorbikes are useful for pushing camels through scrub, but vehicles and horses are better for containing and quietening camels. Skilled riders on horseback are also used to pursue and direct feral camels into winged yards.
- Camels should not be excessively chased but moved steadily at a continual pace which will prevent them from turning back or baulking at the entrance to the yards. Camels must never be driven to the point of collapse.
- Only muster that number of camels that can be comfortably handled.
- If camels need to be contained (blocked up) outside of yards it is best to do so in a large open area which allows sufficient room to remove and apply pressure as needs to comfortably contain the camels with minimum stress.

- Camels should be allowed to drop out of groups that are being mustered if required to protect the safety and welfare of the animals or operators. This may include heavily pregnant females, females with dependent calves and other camels, especially those in poor condition, or behaving dangerously. Also, if a female camel continually breaks away and will not move along with the group, it is possible that she may be heavily pregnant or have a dependent calf hidden somewhere. It is best to leave her go and move on with the rest of the group. Animals such as this which are not easily mustered should be culled humanely in accordance with agreed best practice and ensuring that no dependent young are left behind.
- Note that mobs of young bulls can be difficult to muster. Also, some bull camels in rut may fight when unfamiliar groups are mustered together and can disturb muster operations making it advisable to leave or drop them out. Bulls come into rut primarily from April to September. Animals such as this which are not easily mustered should be culled humanely in accordance with agreed best practice.
- All unwanted captured camels should be released immediately (if allowed in state legislation) or destroyed humanely (see below).
- When moving animals in the yard, smaller groups of less than 15 animals will be easier to handle.
- If camels are held in yards for more than 24 hours they must have access to feed as well as water. Low quality hay (oats, wheat or pasture) is preferred. Note that lucerne hay can cause bloating in camels that are not adapted to this type of feed. Yarded camels will require approximately a third of a small square bale of hay per day.
- Camels captured by mustering should be allowed a minimum of 24 hours rest with access to feed and water before they are transported on journeys longer than 8 hours. In the 24 hours prior to transport they must be assessed for signs of injury, disease, inappetence, illness, late pregnancy or distress. Account must be taken of their possible unwillingness to eat unfamiliar feed.
- Camels should not be held in the holding yards for extended periods. If camels are being held for any length of time they should be drafted into a large holding paddock that contains adequate shade, food and water.

Holding camels in yards

- To minimise stress and injury in the yards, mature bulls must be drafted off from mixed social groups of cow/calf/young male herds as soon as possible after capture.
- If mature bulls prove to be troublesome they should be humanely destroyed to protect the welfare of other camels and operators.
- The stress of mustering can cause sweating and water loss, therefore camels must be given access to water as soon as possible after capture, either through yard watering or through succulent feed while being moved or held in open areas. Camels will rehydrate in a few hours following even severe dehydration. Average size camels require up to 30-40 litres of water per day in summer.
- Leaving the camels for a period of time (eg overnight) to explore and move through the yards and races with no pressure allows them to habituate to the new environment and can make them easier to handle.

Loading camels

- Short, straight races and ramps with a minimal incline should be used. Metal loading ramps should be covered with dirt/sand to reduce the hollow sound which can cause camels to balk during loading.

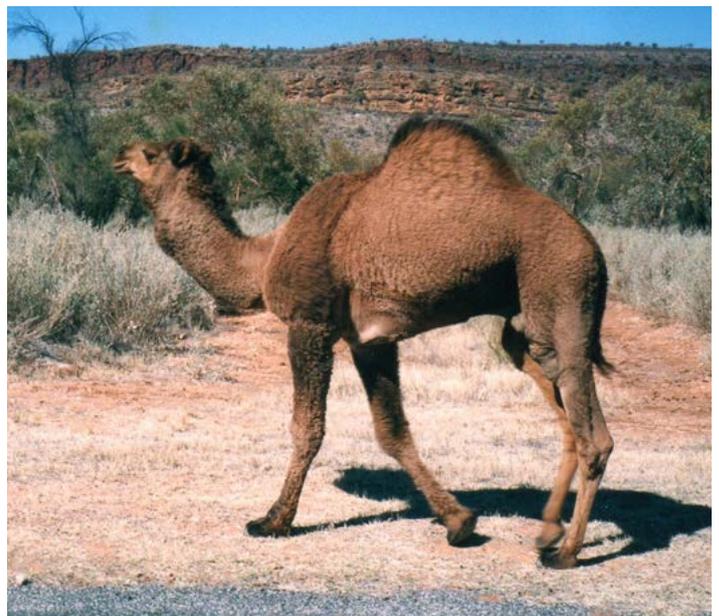
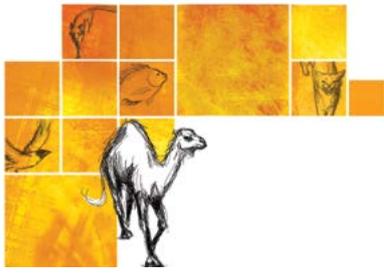


Image: Judy Blackshaw



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- During loading it is essential that the operators are patient and remain calm. This reduces stress on the animals and makes them easier to handle.
 - Occasionally, some camels, usually older cows will sit down in the race and refuse to get up. Strategies to prevent camels sitting down include:
 - Moving camels steadily along the race and not allowing them to step backwards
 - Limiting the number of camels to no more than three in the race
 - Ensuring that the hump cannot come into contact with overhead rails etc, and
 - Having a camel in a pen off to the side at the end of the race so that it is visible to the animals in the race.
 - Running the camels through the race prior to loading to allow them to get used to the experience.
 - If a camel has sat down in a race and refuses to get up, walk away and leave it for a short period - it may stand up when the pressure to do so has been removed.
 - It is recommended that the rails on the race are secured with bolts which can be removed when required to shift a sitting camel.
 - Electric prodders should only be used sparingly and as a last resort (if their use is allowed within state legislation). Apply prods only to the skin under the forelegs or on the back of the rear legs. Repeated use of electric prodders not only causes suffering but is likely to have the undesired effect of the animal refusing to move at all.
- When there is no market for the captured camels;
 - If camels have sustained serious injury during mustering or in the holding yards;
 - Where dependent young have become separated from their mother;
 - Where camels have a disease or condition that would prevent the animal from being transported, slaughtered or domesticated.
- If camels are free-roaming and not contained in yards then refer to [CAM001 Ground shooting of feral camels](#). If the animals have been captured and are contained within a yard, then follow the procedures described below.
 - Shooting must be conducted to cause sudden and painless death with minimum distress to the animal. Only head shots are acceptable.
 - The shooter should approach the animals in a calm and quiet manner. To prevent unnecessary agitation of the confined camels, other people should keep away from the area until shooting is completed.
 - To maximise the impact of the shot and to minimise the risk of misdirection the range should be as short as possible.
 - Never fire when the camel is moving its head. Be patient and wait until the camel is motionless before shooting. Accuracy is important to achieve a humane death. One shot should ensure instantaneous loss of consciousness and rapid death without resumption of consciousness.
 - Shots must be aimed to destroy the major centres at the back of the brain near the spinal cord. This can be achieved by one of the following methods (see diagrams, p7):

Head Shots

Poll position (rear view)

The firearm should be aimed at the back of the head at the intersection of the skull and the neck and directed towards the mouth. ie perpendicular to the neck line.

Temporal position (side view)

The camel is shot from the side so that the bullet enters the skull midway between the eye and the base of the ear. The bullet should be directed horizontally.

Note that frontal brain shots are not recommended during ground shooting of camels since the shape of the skull can cause bullet deflection.

Transporting camels

- Specific requirements for the land transport of camels can be found in:
 - *Australian Animal Welfare Standards and Guidelines: Land Transport of Livestock* (Animal Health Australia, 2012).
- For information on requirements for the movement of camels within your region or across state and territory borders please refer to your local primary industries officer.

Shooting of camels

- It may be necessary to humanely destroy camels by shooting in the following situations:

Diagram 1: Recommended shot placements for camels.

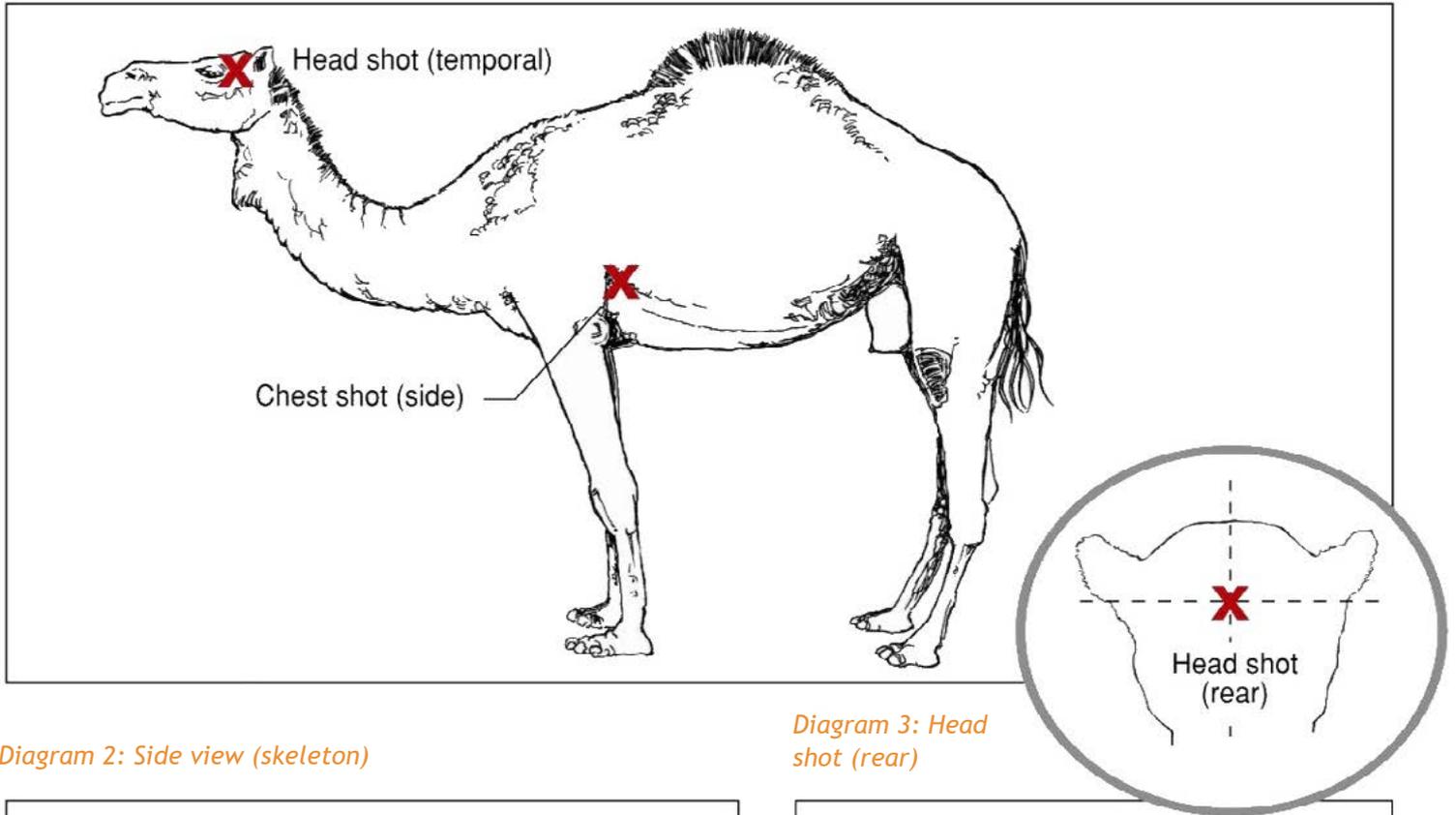


Diagram 2: Side view (skeleton)

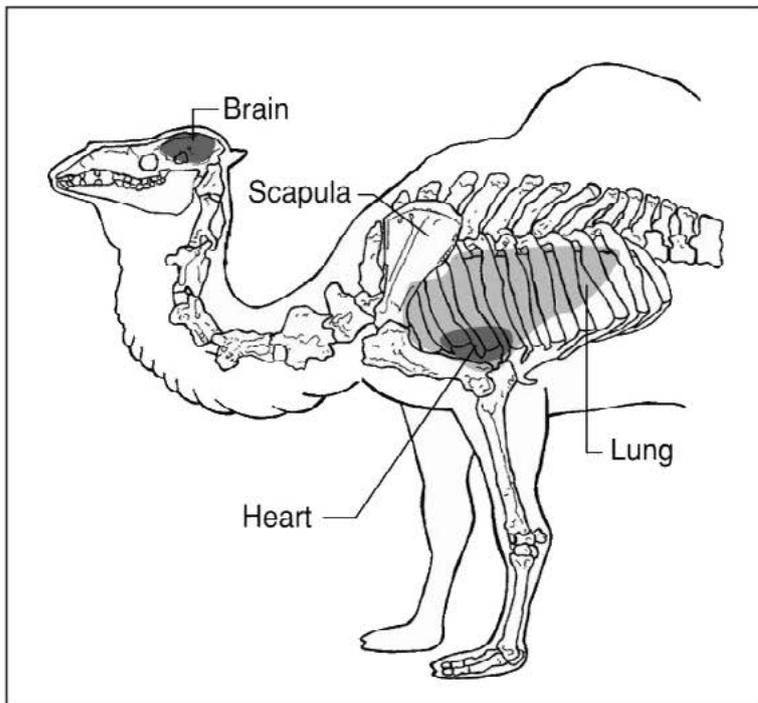
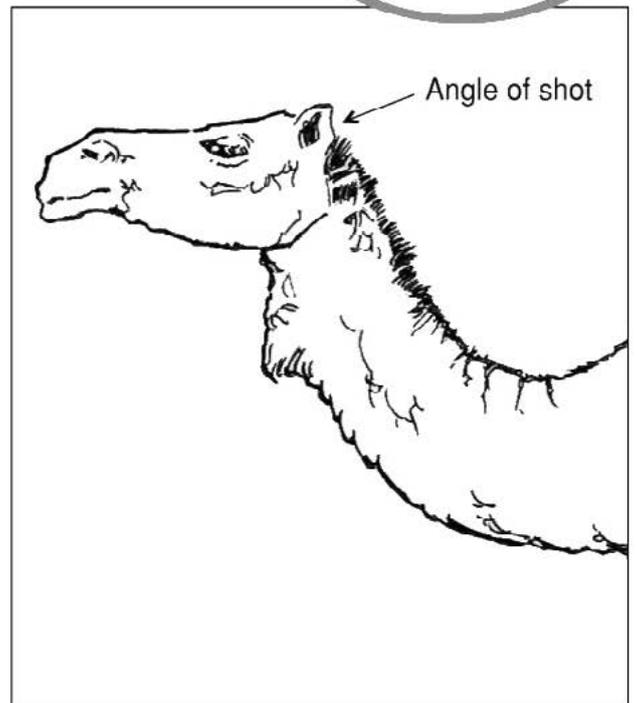
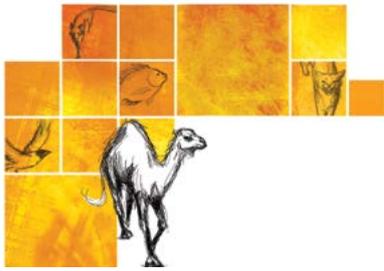


Diagram 3: Head shot (rear)





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- The target animal should be checked to ensure it is dead before moving on to the next animal. Always approach the animal from the dorsal (or spinal) side to prevent injury from kicking legs. Death of shot animals can be confirmed by observing the following:

- Absence of rhythmic, respiratory movements
- Absence of eye protection reflex (corneal reflex) or 'blink'
- A fixed, glazed expression in the eyes, and
- Loss of colour in mucous membranes (become mottled and pale without refill after pressure is applied).

If death cannot be verified, a second shot to the head should be taken immediately.

- When large numbers of animals are to be killed in the holding yard, provisions should be made to dispose of carcasses in an appropriate manner, ie by burying and/or burning. Numerous guidelines are available which describe disposal methods, eg *Procedure for disposal of large animals by composting* (NSW DPI 2008), Burton 1999, *AUSVETPLAN Operational Procedures Manual: Disposal* (2007), *Guidelines for Dead Stock Disposal*.

Further Information

Contact the relevant federal, state or territory government agency from the following list of websites:

- Australian Department of the Environment and Energy
<http://www.environment.gov.au/>
- Australian Department of Agriculture and Water Resources
<http://www.agriculture.gov.au/>
- Transport Canberra and City Services
<http://www.tccs.act.gov.au/>
- NSW Department of Primary Industries
<http://www.dpi.nsw.gov.au>
- NT Department of Land Resource Management
<http://lrm.nt.gov.au/>
- Qld Department of Agriculture, Fisheries and Forestry
<http://www.daff.qld.gov.au/>
- Biosecurity SA, Department of Primary Industries and Regions
<http://www.pir.sa.gov.au/biosecuritysa>
- Tas Department of Primary Industries, Parks, Water and Environment

<http://www.dpiw.tas.gov.au/>

- Vic Department of Primary Industries
<http://www.dpi.vic.gov.au/>
- WA Department of Agriculture and Food
<http://www.agric.wa.gov.au>

Also refer to: www.pestsmart.org.au

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Image: Gillian Fennell