

Background

Feral goats (*Capra hircus*) can have a significant impact on the environment and agricultural production and are a potential reservoir and vector of endemic and exotic diseases. Although often considered a pest, feral goats are also an important resource, harvested commercially, primarily for meat. Control methods include trapping, mustering, exclusion fencing, ground shooting and shooting from helicopters. Radio-collared 'Judas' goats are sometimes used during mustering to locate groups of feral goats. Refer to *GOA005 Use of Judas goats*.

Mustering of feral goats is usually carried out on motor bike or horse with the aid of dogs, although helicopters or light aircraft may be used. Mustering is only effective and economic when goat densities are high. Shooting from a helicopter is a more effective method of quickly reducing feral goat populations. Refer to *GOA002 Aerial shooting of feral goats*.

Once mustered, the goats are usually sold for live export, to abattoirs for slaughter or less commonly, for domestication, which offsets the costs of capture and handling. Where there is no market for them or where removal may be costly or impractical e.g. in conservation areas or remote areas without access to transportation, the goats are sometimes destroyed by shooting in a holding yard or while being held in a mob by dogs.

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 co-ordinated program designed to achieve sustained effective control.
- Mustering is only efficient and economic when goat densities are high. Many landholders therefore opportunistically muster when they notice large groups of goats on their land. Commercial mustering can reduce goat densities to about one goat per square kilometre, after which the return for effort becomes uneconomic. However, with this approach, it is important that goats are not left to build up to undesirably high levels. Monitoring of goat numbers and resource degradation should determine the most suitable time to conduct goat control. In tablelands there may be times (usually in winter) when goats form larger mobs and so are more accessible.
- Mustering is relatively labour intensive compared to trapping.
- In relatively flat and accessible country, mustering is usually performed with horses or motorbikes and with the aid of dogs. In rough, hilly country and

more extensive areas, helicopters or light aircraft can be used to drive the goats towards a set of yards where a ground team completes the muster.

- Not all goats from an area will be mustered. Some animals may be left behind, including does with young kids, and others may become scattered.
- The use of radio-collared Judas goats to locate feral herds increases the effectiveness of mustering control operations particularly when eradication is the aim of the program (refer to **GOA005 Use of Judas goats**).
- Trained working dogs are sometimes used to muster feral goats. It is unacceptable to set a dog onto a goat with the intention of bringing it down, holding or attacking.
- Operators should endeavour to keep stress on the goats to a minimum during mustering, capture and handling. Prolonged stress not only has a negative impact on an animal's welfare but can also decrease carcass and meat quality.
- Aircraft operators must ensure that their flying operations comply with requirements of the Civil Aviation Safety Authority.
- Shooting of goats 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 legislation requirements.

Animal Welfare Considerations

Impact on target animals

- Mustering, capture and handling increase stress in feral goats as they are not used to confinement or close contact with humans. Consequently, these procedures can result in mismothering, feeding disruption, social disruption, heat stress and also abortion in heavily pregnant females. Metabolic, nutritional and parasitic diseases and also changes in environmental conditions are common causes of mortality and morbidity in confined feral goats.
- To avoid heat stress, mustering should be carried out when conditions are cool or mild.
- The tail end of the mob should set the pace rather than being forced to keep up with the leaders. Distances that the goats have to be mustered should be kept to a minimum e.g. by using portable yards.
- Feral goats should be handled quietly and without force to avoid panic and trampling.
- Goats that are severely injured during mustering or confinement must be killed quickly and humanely with a rifle shot to the head.
- Whenever possible avoid mustering when females are kidding or have dependent young at foot. Unweaned kids may be left to die of starvation if their mothers are mustered and they are left behind. Although feral goats have been observed to breed at all times of the year, there are periods when the majority of kidding occurs e.g. in south-west Queensland, kidding mainly occurs in May to June. Mustering should not be performed in spring as this is the time when there is a high proportion of does in late pregnancy or with kids at foot.
- Electric prods must not be used to assist in the handling of feral goats.
- Only trained working dogs are to be used to assist in the handling of feral goats. Trained sheep dogs such as kelpies are preferred as they are not usually

aggressive. As a precaution, muzzles can be fitted to dogs to prevent bite injuries.

- Mixing unfamiliar groups or individuals in yards may result in fighting, stress and injury. Normal social groups should be maintained whenever possible. There should be sufficient holding yards to avoid mixing different groups of stock
- Only fit and healthy animals should be selected for transport. Heavily pregnant, very young or weak/sick/injured animals must either be destroyed, proper veterinary assistance given or transported at a later date when they are more suitable for transportation.
- The loading, transport, unloading, holding and slaughter of feral goats must be undertaken with the minimum amount of stress, pain or suffering. Guidelines on these procedures can be found in relevant state agriculture guidelines e.g. NSW Agriculture Agfact A7.1.12 *Pre-slaughter management of goats* (2003) and in the following relevant Model Codes of Practice for the Welfare of Animals:
 - The Goat (1991)
 - Air Transport of Livestock (1986)
 - Rail Transport of Livestock (1983)
 - Road Transport of Livestock (1983)
 - Sea Transport of Livestock (1987)
 - Livestock at Slaughtering Establishments (2001)
 - Killing or Capture, Handling and Marketing of Feral Livestock Animals (draft)
- Guidelines on the export of live goats can be found in the Australian Livestock Export Standards and the Livestock Export Accreditation Program Handbook (both available from LiveCorp at <http://livecorp.com.au/index1.cfm>).

Impact on non-target animals

- Mustering is target specific and has minimal impact on other species.
- Dogs used for mustering must receive adequate care at all times. This includes food, water, shelter, safe and comfortable transportation, current vaccinations, worming, flea, tick and heartworm prevention, where appropriate. For more details refer to **GEN002 *The care and management of dogs used for pest animal control.***

Health and Safety Considerations

- Care must be taken when handling goats as they may carry diseases such as Q fever and scabby mouth (orf) that can affect humans and other animals. Routinely wash hands after handling goats or carcasses.
- Operators working with goats and goat carcasses are at risk of contracting Q fever. They may become infected when they inhale droplets of urine, milk, faeces or birth products from infected animals. Infection may also occur from inhalation of aerosols created during slaughter of infected animals or dust from contaminated materials. Blood testing of personnel is recommended to assess previous exposure, followed by vaccination for susceptible individuals

- The mustering, trapping and handling of feral goats is not without risk to the operators involved. A first-aid kit should be carried at all times. Motor bike riders should wear helmets.
- Firearms are potentially hazardous. All people should stand well behind the shooter when goats are being shot. 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 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.

Equipment Required

Yards

- Either portable or fixed holding yards can be used.
- The materials used must minimise the risks of injury or escape of goats once inside the enclosure. Projections such as loose wire or sharp edges likely to cause injury should be eliminated and fences should be secure and high enough to prevent goats escaping.
- Gates must be wide enough to allow the easy flow of animals, particularly bucks with large horns.
- Yards should be designed to minimise both dust and boggy conditions.
- If possible, yards should be positioned in a shady area with as much natural vegetation as possible.
- In extremes of climate (hot or cold) shelter must be provided for goats. This is particularly important for young goats or animals in poor body condition during cold, windy and rainy conditions.
- Details of yard specifications and construction can be obtained from relevant state guidelines, for example:
 - NSW Agriculture Agfact A7.7.2 *Yard design for goats* (2003) by E. Joshua.
 - QLD DPI Note SW 0118 *Goats: Yards* (2003) by Kleemann, D., O'Dempsey, N. and Kelly, M.

Firearms and ammunition

- Smaller calibre rifles such as .22 magnum rimfire with hollow/soft point ammunition are adequate for euthanasia of goats at short range (<5 metres). If shooting animals from a greater distance refer to **GOA001 *Ground shooting of feral goats*** for more detailed information.

Light fixed wing aircraft or helicopter

- The aircraft must be suited to the purpose (e.g. Cessna 182, Hughes 500 helicopter, gyrocopter or ultralight fixed wing aircraft) and must be registered to perform the task.
- The pilot must be suitably licensed and hold the appropriate endorsements for aerial mustering of stock.

Procedures

Mustering

- Goats should not be chased but moved steadily with the slowest animals setting the pace. Goats should never be driven to the point of collapse.
- Only muster the number of goats that can be comfortably handled. The less the number of goats included in any one operation, and the shorter the distance travelled the less stress is likely for the animals.
- If a female goat continually breaks away and will not move along with the group, it is probable that she has dependant kids hidden somewhere. It is best to leave her go and move on with the rest of the group.

Holding goats in yards

- Goats captured by mustering should be allowed a minimum of 48 hours rest with adequate shelter, food and water before they are transported on journeys longer than 8 hours. During this time they must be assessed daily for signs of injury, disease, inappetence, illness or distress. Account must be taken of their possible unwillingness to drink and eat from troughs.
- Goats should not be held in the holding yards for extended periods. If goats are being held for any length of time (no longer than 3 days) they should be drafted into a large holding paddock that contains adequate shelter, food and water.
- To minimise injury in yards, ideally, goats should be segregated into the following groups:
 - Does with kids at foot;
 - Heavily pregnant does and small or young goats; and
 - Bucks

Shooting of goats

- It may be necessary to humanely destroy goats by shooting in the following situations:
 - When there is no market for the captured goats (including smaller animals that are of no commercial value);
 - If goats have sustained serious injury during capture or in the holding yards;
 - Dependant young that are separated from their mother;
 - Previous disease or condition that would prevent the animal from being transported, slaughtered or domesticated.
- 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 yarded goats, 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 goat is moving its head. Be patient and wait until the goat 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:

Head Shot

The horn structures on adult goats make the temporal (side-on) or rear head shots the preferred points of aim. Shots to the front of the head can be used on kids, however this method is not recommended for mature goats as the brain is located well back in the skull.

Temporal position (side view)

The firearm is aimed from the side of the head so that the bullet enters the skull at a point midway between the eye and the base of the ear on the same side of the head. The bullet should be directed horizontally into the skull.

Rear of the head

The firearm should be aimed at the back of the head at a point between the base of the horns and directed towards the mouth.

- Death of shot animals should always be confirmed by observing at least 3 of 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 i.e. by burying and/or burning. Numerous guidelines are available which describe disposal methods e.g. Burton, 1999; AUSVETPLAN Operational Procedures Manual: Disposal (1996); NSW EPA (2001) Guidelines for disposal of dead stock.

Further Information

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

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| Commonwealth | Department of Environment and Heritage http://www.deh.gov.au/ |
| ACT | Environment ACT http://www.environment.act.gov.au/ |
| NSW | NSW Agriculture www.agric.nsw.gov.au |
| NT | Parks & Wildlife Commission www.nt.gov.au/ipe/pwcnt/ |
| QLD | Department of Natural Resources and Mines www.nrm.qld.gov.au |
| SA | Animal & Plant Control Commission http://sustainableresources.pir.sa.gov.au |
| TAS | Department of Primary Industries, Water & Environment www.dpiwe.tas.gov.au |
| VIC | Department of Primary Industries, Agriculture & Food www.dpi.vic.gov.au |
| WA | Agriculture WA www.agric.wa.gov.au |

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