

GOA005 use of Judas goats

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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 used to locate groups of feral goats that are difficult to find by other methods. This technique involves attaching a radio-collar to a feral goat and releasing it with the expectation that it will join up with other goats. Goats are particularly suited to the Judas method as they are a highly social species and will seek the companionship of any other feral goats in the area.

Once the position of the feral herd is established, the goats accompanying the Judas animal are either mustered or destroyed by shooting (refer to **GOA003 *Mustering of feral goats***, **GOA001 *Ground shooting of feral goats*** and **GOA002 *Aerial shooting of feral goats*** for further details on these methods of control). The Judas goat is usually allowed to escape so that it will search out other groups of feral goats. Once eradication is achieved the Judas goat is located, and then shot and the radio-collar retrieved.

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

- The Judas technique is commonly used to locate remnant individual animals or groups of feral goats in low density populations. The technique may also be useful for quickly locating populations of goats in areas where the terrain is rugged or the vegetation is thick. In thick vegetation, group sizes are smaller and even when populations are dense, small groups are harder to locate than larger groups.
- It is most effective when used to mop up remnant populations of feral goats, particularly in rough country, that are proving difficult or costly to control. The technique is not efficient where there are large numbers of feral goats in the area.

- The use of radio-collared Judas goats to locate feral herds increases the effectiveness of ground and aerial shooting and mustering control operations particularly when eradication is the aim of the program.
- The Judas technique requires expensive equipment and skilled operators
- It is preferable to use local feral goats that are familiar with the area and are already part of the social structure of the target population. However, in some situations, feral goats from other areas or introduced farmed goats are used. Most goats that are moved into an unfamiliar area appear to quickly settle into the new herd but there is a risk of causing some stress for the translocated animal. There is also a chance that they may not join up with the local animals or they may move out of the target area.
- Trained dogs are sometimes used to detect, herd or flush out feral goats so that they can be captured and used as Judas goats. It is unacceptable to set a dog onto a goat with the intention of bringing it down, holding or attacking it.

Animal Welfare Considerations

Impact on target animals

- The technique can have negative impacts on the Judas goat through the following:
 - Capture, handling and restraint can cause anxiety and sometimes pain and injury when an animal struggles to escape;
 - Nearby shooting of cohorts – it is possible that goats may be distressed when cohorts are killed. Also, the sound of gunshots and presence of people is likely to cause further fear and anxiety.
 - Repeatedly being isolated and having to find other goats may cause fear and anxiety as goats are highly social animals.
- The collar must be fitted correctly to allow the collar to move up the tapered neck if the animal grows or gets fat. As the neck gets larger, the collar will sit higher up the neck, which prevents constriction. If the collar is initially too tight this movement can't happen. If it is too loose it can catch in vegetation. Ill-fitting collars can also cause chafing or constriction. Adverse effects of wearing the collar should be monitored by looking for irritation or hair loss under the collar.
- The collar or antenna can occasionally become snagged or entangled in branches/vegetation and impede movement.
- The weight of the collar and transmitter will not normally have a significant impact on the Judas goat, as goats are relatively large animals. The lightest collar/transmitter available should always be used (< 5% of the body mass of the animal).
- To prevent hyperthermia, it is preferable to avoid capture and restraint of goats when the weather is hot and/or there is high relative humidity.
- Goats that sustain injuries during capture/restraint that would compromise their survival in the wild should be euthanased quickly and humanely by a rifle shot to the brain.
- If dogs are used to locate and flush feral goats out from heavily forested areas, they must be adequately controlled to prevent them from attacking goats.

- Whenever possible avoid capturing and handling when females are kidding or have young at foot. 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.
- If the goats must be transported to another area it must be undertaken with the minimum amount of stress, pain or suffering. Guidelines on these procedures can be found in relevant State guidelines, for example,
 - 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)
 - Road Transport of Livestock (1983)
 - Killing or Capture, Handling and Marketing of Feral Livestock Animals (draft)

Impact on non-target animals

- The use of Judas goats is target specific and has minimal impact on other species.
- If dogs are used for locating feral goats they 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 in the control of pest animals.***

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
- Take care to avoid accidental injury when capturing and restraining animals. Injuries can occur to the hands when fingers get caught between the horns of two goats. Also, if goats try to run past you they can bruise your legs with their horns. Protective clothing and footwear may reduce the chances of injury during handling. Covering the goat's eyes while handling will calm the animal. Also, raising one of its back legs prevents the risk of injury to both handlers and the goat because it cannot suddenly struggle to escape.
- Most transmitters run on a lithium cell. When lithium is exposed to air, it reacts violently and emits highly toxic fumes. If the lithium cell is accidentally ruptured, e.g. by a bullet when shooting goats, then the area should be avoided for a few hours to allow the fumes to disperse.
- Firearms are potentially hazardous. All people should stand well behind the shooter when animals 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.
- Safety glasses are recommended to protect eyes from gases, metal fragments and other particles.

Equipment Required

Transmitting system

- The basic system includes a transmitter, power supply, antenna, material to protect the electronic components and a collar to attach the transmitter to the animal.
- Collars and transmitters should be as light in weight as possible. The total weight (collar, transmitter, battery, aerial and bonding material) should ideally be less than 5% of the animal's bodyweight. Detailed information and advice regarding size and suitability of collars can be obtained from retailers of radiotelemetry equipment.
- Collars should be made of materials which are durable; comfortable and safe for the animal; can withstand extreme environmental conditions; do not absorb moisture; and maintain their flexibility in low temperatures. Common materials used include flat nylon webbing, butyl belting, urethane belting, PVC plastic and tubular materials. The collar is closed with one or two clamps.
- Radio transmitters should always be tested before and after attachment to the animal (before release) to ensure they are functioning correctly.
- Reliable radio transmitters with the longest battery life possible (i.e. around 5 years) should be used. It is preferable that they be fitted with mortality sensors.
- Whip antennae should be incorporated into the collar wherever possible to prevent snagging on vegetation

Receiving system

- The receiving system detects and identifies signals from transmitters. A basic system consists of a battery-powered receiver, a receiving antenna, a recorder (human or mechanical) and accessories such as cables, a speaker or headphones. Although not a complex skill, some training in the interpretation of signal strength and direction is required.

Firearms and ammunition

- If euthanasia of injured animals is required, a smaller calibre rifle such as .22 magnum rimfire with hollow/soft point ammunition is adequate at short range (< 5 metres).
- If shooting animals at a distance, refer to **GOA001 *Ground shooting of feral goats*** for firearm and ammunition requirements.

Procedures

Capture of goats

- Animals to be used as Judas goats should be caught without causing injury and excessive stress.
- It is preferable to capture and release animals from, and to, familiar surroundings. However, in some instances when the goat population is already very low, goats may have to be captured and brought in from other areas.
- Judas goats are usually selected from a herd of goats that have been captured during trapping or mustering, but, sometimes individuals are caught using dogs to bail them up. If dogs are used they should only bail the goat up, not bite or attack. Trained working dogs such as kelpies are preferred as they are not usually aggressive. As a precaution, a muzzle can be fitted to the dog to prevent bite injuries. Once the goat is caught, the dogs should be restrained whilst the collar is being attached.
- Adult goats (i.e. those with 4, 6 or 8 permanent teeth) are preferred. Both female and male goats have previously been used as Judas goats.
- Heavily pregnant females, females with young at foot, very young, very old or weak/sick/injured animals must not be used as Judas animals.

Fitting of collar and releasing of Judas goat

- At least two people must be present when fitting a collar – one to restrain the animal and one to fit the collar. It should not be necessary to anaesthetise the animal for fitting of collars providing the procedure is undertaken quickly.
- The collar should be fitted snugly on the neck to ensure that no irritating movement or rubbing occurs, but at the same time enough space should be left to allow the animal to behave normally and for it not to experience any discomfort while moving or feeding. As a general guide you should be able to slip two fingers between the animals' neck and the collar.
- To reduce the risk of irritation on the neck, the collar should be fastened at the side and any metal fitting should be covered or at least smoothed on the inside.
- The Judas goats should be clearly identifiable (e.g. with brightly coloured paint, highly visible collar or ear tags) so that they can be easily distinguished from other goats in the herd.
- Remove magnet (battery stop) or turn on the collar if it is fitted with a magnetic switch and check transmitter frequency before releasing goat.
- Once the collar has been attached and before release, observe the animal for any unusual behaviour that could indicate that the collar may cause a problem (e.g. affecting balance, impeding movement or causing irritation to the skin).
- In some situations it may be appropriate to give the Judas goats prophylactic vaccinations and anthelmintic treatment.
- The Judas goat is relocated and released in the target area. If the animal needs to be transported in a vehicle it must be appropriately restrained to prevent it from jumping out. Tying only its back legs together so that it can sit up will help to prevent the formation of bloat. Animals should not be tied up for more than one hour and they must be protected from extremes of temperature during transportation.

- It is recommended that the number of Judas goats released should be equivalent to at least 20%, and preferably 30%, of the number of herds initially in the population. However, no more than two Judas goats should be released into a herd area because groups of three will stick together and possibly not join other goats.

Location of feral goat herds

- The Judas goats should be given enough time to meet up with other feral goats. The time needed will vary with season and proximity of placement to herds. Release time should therefore be planned to precede the control program by the time expected for Judas goats to meet and settle with a herd.
- Radio tracking is commenced and when the position of the feral herd is established, the goats are either mustered or destroyed by shooting. Refer to the appropriate SOP for further details:
 - GOA001 *Ground shooting of feral goats*
 - GOA002 *Aerial shooting of feral goats*
 - GOA003 *Mustering of feral goats*
- The process of tracking down the herd and then shooting or mustering, is repeated every four to six months until only the Judas goats remain in the area. The Judas goats are then destroyed by shooting and the collar retrieved.

Further Information

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

Commonwealth	Department of Environment and Heritage http://www.deh.gov.au/
ACT	Environment ACT http://www.environment.act.gov.au/
NSW	NSW Department of Primary Industries www.dpi.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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