

## NSWGOAT SOP5

### Use of Judas goats

#### Background

Radio-collared 'Judas' goats can be 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 NSWGOAT SOP1 *Ground shooting of feral goats*, NSWGOAT SOP2 *Aerial shooting of feral goats* and NSWGOAT SOP3 *Mustering 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, shot and the radio collar retrieved.

This standard operating procedure (SOP) is a guide only. It does not replace or override the relevant federal and NSW legislation. The SOP should only be used subject to the applicable legal requirements (including WHS) operating in NSW.

Individual SOPs should be read in conjunction with the overarching Code of Practice for that species to help ensure that the most appropriate control techniques are selected and that they are deployed in a strategic way, usually in combination with other control techniques, to achieve rapid and sustained reduction of pest animal populations and impacts.

#### 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. Group sizes are smaller in thick vegetation 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 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 that they may move out of the target area.
- Trained herding/sheep 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 implications

### Target animals

- This 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 can distress Judas goats, and 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 can also cause fear and anxiety, as goats are highly social animals.
- The collar can have negative impacts on the Judas goat if not fitted correctly, causing chafing or constriction. The collar or antenna can occasionally become snagged or entangled in branches/vegetation and impede movement.
- The collar must be fitted correctly to allow it to move up the tapered neck if the animal grows or gets fat. As the neck gets larger, the collar will shift higher up the neck, which prevents constriction. If the collar is initially too tight this movement can't happen, or if it is too loose it can catch in vegetation. Adverse effects of wearing the collar should be monitored, by looking for skin irritation or hair loss under the collar.
- The lightest collar/transmitter available should always be used (less than 5% of the animal's body mass), however, the weight of the collar and transmitter will not normally have a significant impact on the Judas goat, as goats are relatively large animals.
- To prevent hyperthermia, it is preferable to avoid catching and restraining 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. 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.
- Whenever possible, avoid capturing and handling when female goats 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 semi-arid areas, most kids are produced in the cooler months of the year).

- If the goats must be transported to another area, it must be done with the minimum amount of stress, pain or suffering. Guidelines for these procedures can be found in relevant state or federal government guidelines; for example:
  - [Australian Industry Welfare Standards and Guidelines for Goats](#)
  - [Australian Animal Welfare Standards and Guidelines — Land Transport of Livestock](#)
  - [Australian Standards for the Export of Livestock](#)

### **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 for pest animal control](#).

### **Workplace health and safety considerations**

- Take care to avoid accidental injury when capturing and restraining animals. Hands can be injured if fingers get caught between the horns of two goats. Goats can bruise your legs with their horns if they try to run past you. Protective clothing and footwear can reduce the chances of injury. Covering the goat's eyes while handling will calm the animal. Raising one of goat's back legs will also prevent 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 hazardous. All people should stand well behind the shooter when an animal is 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.
- The shooter and others in the immediate vicinity should wear adequate hearing protection to prevent irreversible hearing damage, and safety glasses to protect eyes from gases, metal fragments and other particles.
- Care must be taken when handling goats, as they can carry diseases such as Q fever and scabby mouth (also known as orf) that can affect humans and other animals. Routinely wash hands after handling goats or goat carcasses.
- Operators working with goats and goat carcasses are at risk of contracting Q fever. They can become infected when they inhale droplets of urine, milk, faeces or birth products

from infected animals. Infection can 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.

## 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 lightweight as possible. The total weight (collar, transmitter, battery, aerial and bonding material) must be less than 5% (ideally 3 %) 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 that 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 them 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/ammunition and captive bolt guns for euthanasia

- Smaller calibre rifles such as .22 magnum rimfire with hollow/soft point ammunition are adequate for euthanasia of goats at short range (within 5 m). If shooting animals from a greater distance refer to *NSWGOAT SOP1 Ground shooting of feral goats* for more detailed information.
- Penetrating captive bolt guns (e.g., Cash Special .22, Blitz Kerner .38) are suitable for euthanasia of restrained goats when used by trained and confident operators. The cartridge power and length/diameter of bolt must be appropriate for the species and age of animal.

- Captive bolt guns should be regularly cleaned and maintained in optimal working condition according to the manufacturer's instructions. Cartridge blanks must be stored properly so that the propellant does not deteriorate.

## Procedures

### Capture of goats

- Animals to be used as Judas goats should be caught without causing them 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 might 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. Sometimes, individuals are caught using dogs. 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 while the collar is being attached.
- Adult goats (i.e., those with 4, 6 or 8 permanent teeth) are preferred for use as Judas animals. Both female and male goats have previously been used successfully as Judas goats.
- Females can be sterilized and then put into a chemically induced oestrus (termed Mata Hari goats) to stimulate sex pheromone production and lure wary males and their mixed-gender social groups from hidden locations.
- 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 should 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 done quickly. Blindfolding the animal should help to keep it calm.
- The collar should be fitted snugly on the neck to ensure that no irritating movement or rubbing occurs. 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 animal's 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 might 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 collared 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 is 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.
- Comprehensive information on the use of radio collars can be found in [A Manual for Wildlife Radio Tagging](#).

### **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 the season and how far away the herds are. 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 then begun and when the position of the feral herd is known, the goats are either mustered or destroyed by shooting. Refer to the appropriate SOP for further details:
  - *NSWGOAT SOP1 Ground shooting of feral goats*
  - *NSWGOAT SOP2 Aerial shooting of feral goats*
  - *NSWGOAT SOP3 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 goat/s remain in the area. Those goats are then destroyed by shooting and the collar retrieved.

### **Euthanasia of goats**

#### **Shooting**

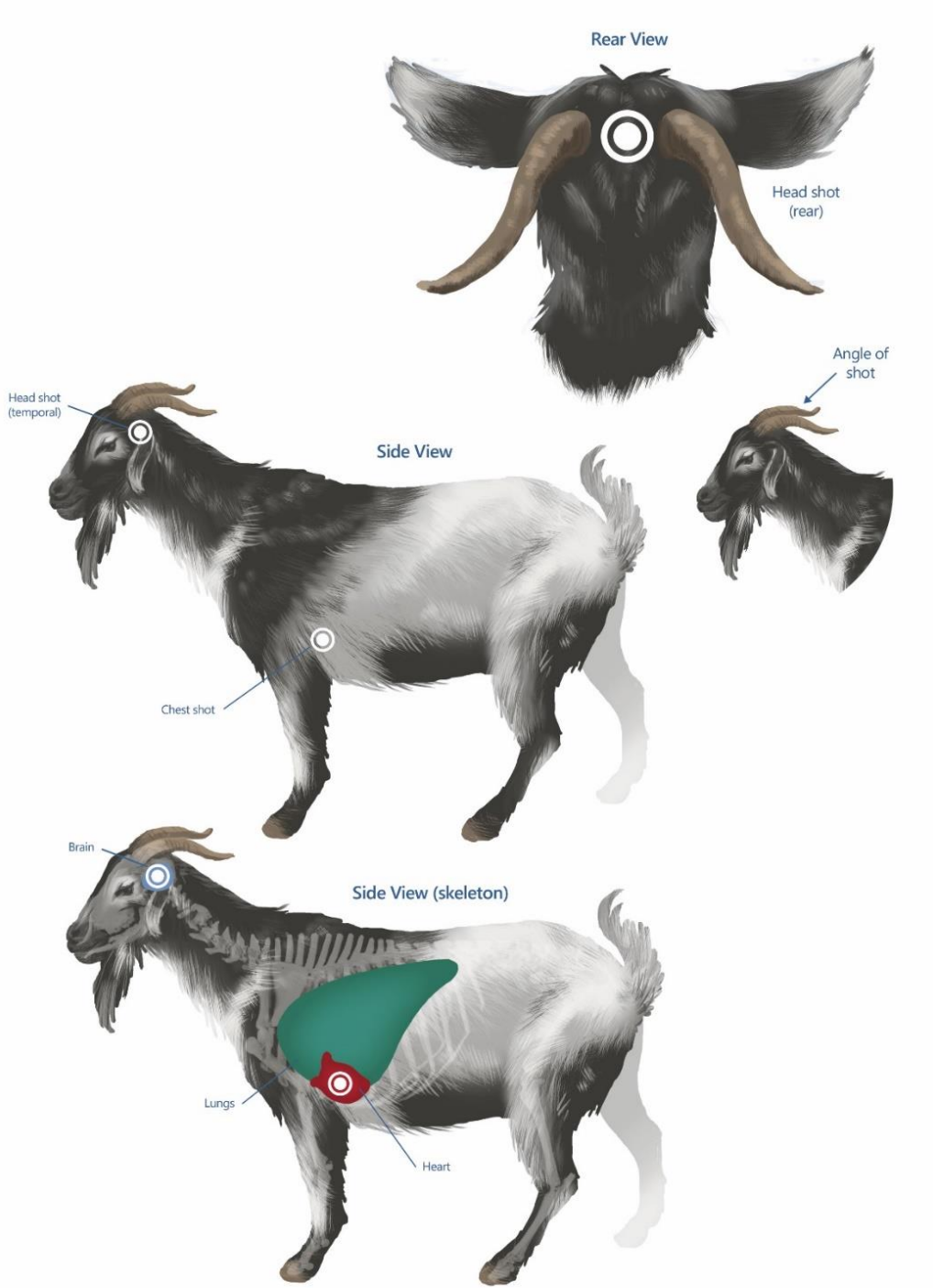
- Shooting is the most acceptable method of euthanasia for goats and must be done to cause sudden and painless death with minimum distress to the animal. Only head shots are acceptable.
- The shooter should approach the animals in a calm and quiet manner. To prevent unnecessary agitation of the yarded 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. The horn structures on adult goats make the *rear (or poll)* head shot the preferred point of aim. Shots to the front of the head can be used on kids but this method is not recommended for mature goats as the brain is located well back in the skull.
- Rear (or poll) shots are performed by aiming the firearm at the back of the head at a point between the base of the horns and directed towards the throat and mouth.
- To ensure maximum impact and the least possibility of misdirection, projectiles should be fired at the shortest range possible, but not with the barrel in contact with the animal's head.
- Death of shot animals can be confirmed by observing a combination of the following:
  - no heartbeat
  - no breathing
  - no corneal reflex (no blinking when the eyeball is touched)
  - no response to a painful stimulus (e.g., a pinch of the ear tip).
- If death cannot be verified, a second shot to the head should be taken immediately.

### **Captive bolt gun**

- In some situations (e.g., where it is unsafe to use a firearm) it may be more appropriate to use a captive bolt gun for euthanasia of goats.
- Captive bolts cause insensibility by disrupting the cerebral cortex, with death occurring due to disruption to the brain stem.
- Captive bolts must only be used by suitably trained operators who can confidently handle and operate the device and know the correct anatomical landmarks on the head. They must also be able to confirm death, recognise ineffective shots and take quick action when a shot goes wrong.
- A penetrating captive bolt stunner is recommended because it is more reliable at delivering an effective stun.
- The animal must be well-restrained, and the captive bolt gun pressed firmly on the head in the *poll* position before being discharged. Frontal and crown shots must not be used.
- Captive bolt guns can only cause stunning, or loss of insensibility, that may be temporary and not lead to death. Stunning must therefore be followed by a secondary method to cause death, such as bleeding-out.

Figure 5: Shot placement for feral goats. Head shot (rear / poll) should be used for euthanasia at close range



**Note that shooting an animal from above or below the horizontal level as depicted here will influence the direction of the bullet through the body. Adjustment to the point of aim on the external surface of the body may need to be made to ensure that the angled bullet path causes extensive (and therefore fatal) damage to the main organs in the target areas.**



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