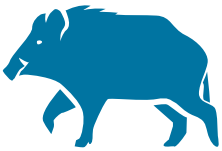


NSWPIG SOP3
Ground shooting of feral pigs

Background

Ground shooting of feral pigs is undertaken by government vertebrate pest control officers, landholders and professional shooters. Although intensive ground shooting operations may reduce the local populations of feral pigs, it is rarely effective for damage control and is not suitable as a long-term control method. Shooting from a helicopter is considered a more humane control method, as mobile wounded animals can be promptly re-located and killed. It is also a more effective method of quickly reducing feral pig populations. Refer to *NSWPIG SOP2 Aerial shooting of feral pigs*.

Shooting can be a humane method of killing feral pigs when it is carried out by experienced, skilled shooters, the animal can be clearly seen and is within range, the correct firearm, ammunition and shot placement is used, and wounded animals are promptly located and killed.

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

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

- Shooting should only be used in a strategic manner as part of a coordinated program designed to achieve sustained effective control.
- Ground shooting is often used as a secondary control method after initial reduction of high density pig populations by aerial shooting and/or poisoning. It is time-consuming and labour intensive and therefore an inefficient method for large-scale feral pig control.
- Ground shooting should not be conducted prior to, or during any other control program e.g., trapping or poisoning, as it can disrupt normal feral pig activity and may cause temporary dispersal of pigs to other areas.
- Ground shooting is not suitable in inaccessible or rough terrain where sighting of target animals and accurate shooting is difficult or when wounded animals cannot easily be followed up and killed.

- Trained dogs are sometimes used to detect or flush out pigs prior to shooting. It is unacceptable to set a dog onto a feral pig with the intention of bringing it down, holding or attacking it.
- Shooting of feral pigs 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 (*See Firearms Act 1996*, Firearms Regulation 2017).

Animal welfare implications

Target animals

- The humaneness of shooting as a control technique depends almost entirely on the skill and judgement of the shooter. If properly carried out, it is one of the most humane methods of killing feral pigs.
- Shooting must be conducted in a manner which aims to cause immediate insensibility and painless death. The appropriate firearms and ammunition must always be used. Shooters should not shoot at an animal unless it is clearly visible, and they are confident of killing it with a single shot.
- When shooting an animal, it must be clearly visible and able to be killed with a single shot due to the difficulty of follow-up shots from the ground, particularly in difficult terrain. A solid rest or support should be utilised to ensure accurate shot placement.
- Only head (brain) or chest (heart-lung) shots must be used. A well-placed shot to the head to destroy the brain will result in instantaneous insensibility and a quicker death compared to a well-placed shot to the chest. Chest shots to destroy the heart can present challenges for accurate placement and may not always result in rapid death. For this reason, under ideal conditions, head shots are preferred over chest shots, however in some situations (e.g., where close approach is not possible; the head is obstructed or cannot be targeted; the animal is already wounded; or a second 'follow-up' shot can be quickly taken), because the chest is a larger target, a chest shot may be the most suitable option. Shooting at other parts of the body is unacceptable.
- Correctly placed head shots cause brain function to cease, and insensibility will be immediate. Death from a shot to the chest is due to massive tissue damage and haemorrhage from major blood vessels. Insensibility will occur sometime after, from a few seconds to a minute or more. If a shot stops the heart functioning, the animal will lose consciousness very rapidly.
- The shooter must be certain that each animal or defined group of animals is dead by physical inspection before another is targeted.
- Wounded pigs must be located and dispatched as quickly and humanely as possible with a second shot preferably directed to the head. If left, wounded animals can suffer from the disabling effects of the injury, from sickness due to infection of the wound, and from pain created by the wound.

- If lactating sows are shot, reasonable efforts should be made to find dependent piglets and kill them quickly and humanely. Piglets that escape after a sow has been shot will usually return to the area within the next few hours.
- If dogs are used to flush feral pigs out from vegetation, they must be adequately controlled to prevent them from attacking pigs. In the event that a dog latches onto a pig, the dog must be called off and be made to stay behind the shooter until the pig has been shot.

Non-target animals

- Shooting is relatively target specific and does not usually impact on other species. However, there is always a risk of injuring or killing non-target animals, including livestock, if shots are taken at movement, colour, shape or sound. Only shoot at the target animal once it has been positively identified and never shoot over the top of hills or ridges.
- Shooting should be used with caution around lambing paddocks as it may disturb the lambing flock and cause mismothering. Also avoid paddocks containing sensitive livestock e.g., horses and farmed deer. They are easily frightened by spotlights and gunshots and may injure themselves by running into fences and other obstacles.
- If using dogs to locate and flush feral pigs out from vegetation, the following should be observed:
    - Dog handlers must be experienced, and the dogs well trained i.e., they must be easily controlled by a whistle or call, obey the handlers' commands and will not chase or attack non-target animals including livestock. Dogs that are deliberately bred or trained to attack without provocation must not be used.
    - Handlers must not encourage dogs to bring down or attack feral pigs. They should only be used to locate pigs, NOT to capture and hold them.
    - Chest, neck and body plates should be used on working dogs to prevent serious injuries which can be inflicted by feral pigs. If a dog is injured it must receive veterinary attention as soon as possible.
    - Never shoot at a pig until the dog is out of the line of fire.
    - Do not let the dog become fatigued as it is more likely to sustain injury.
    - Where affordable, it is recommended that dogs wear a working radio collar so that they can be located quickly if lost. Lost dogs can suffer from dehydration, starvation and exposure and can have a negative impact on livestock and native fauna if they are left to run wild.
    - For more details refer to *GEN002 The care and management of dogs used for pest animal control.*

Workplace health and safety considerations

- Firearms are hazardous. All participants in the culling program 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.

- Shooting from a vehicle is potentially dangerous. An agreed safety procedure between the shooter and others in the vehicle must be in place to ensure that people do not enter the field of fire or disturb the taking of a shot.
- 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 pig carcasses as they may carry diseases such as leptospirosis, Q fever, brucellosis, sparganosis, melioidosis and tuberculosis that can affect humans and other animals. Routinely wash hands after handling all carcasses. Carcasses can be heavy (>100kg), so care must be taken when lifting/dragging.

Equipment required

Firearms and ammunition

- Large calibre, high velocity centre-fire rifles fitted with a telescopic sight must be used. The minimum firearm and ammunition requirements for the ground shooting of feral pigs are:
  - calibre: .243 inches
  - bullet weight: 80 grain
  - muzzle energy: 1819 (ft-lbs).
- Examples of acceptable firearm and ammunition combinations with maximum shooting distances are included in the table below:

Cartridge	Bullet weight (gr)	Muzzle velocity (ft/sec)	Muzzle energy (ft-lbs)	Maximum distance (metres)
.243	80	3200	1819	200
25-06 Rem	90	3350	2243	200
.308 Win	150	2820	2649	200

Source: https://press.hornady.com/assets/pcthumbs/tmp/1410995911-2019-Standard-Ballistics-Chart.pdf

- Rifle bullets must be of an expanding type designed to deform in a predictable manner e.g., hollow point, soft-point, polymer tip.
- 12-gauge shotguns with heavy shot sizes of SG or SSG, may be effective, but only up to a distance of 20 metres from the target animal.
- The accuracy and precision of rifles should be tested against inanimate targets prior to the commencement of any shooting operation.

Other equipment

- If shooting at night, a handheld spotlight, or a helmet or headband mounted spotlight
- Thermal/night vision monocular and scopes
- First aid kit
- Lockable firearm box
- Lockable ammunition box
- Personal protective equipment (hearing and eye protection)
- Communication devices (e.g., 2-way radios / mobile or satellite phones) are recommended for safety reasons.

Procedures

- Feral pigs must NOT be shot from a moving vehicle as this can significantly detract from the shooters' accuracy.
- It is recommended that during daylight hours shooters familiarise themselves with the shooting zone and the terrain they are to cover at night. Take note of potential hazards or risks and also any landmarks that may help with navigation.
- Be aware that the spotlight only illuminates a small portion of the danger zone and only a fraction of the projectile's range. If possible, a thermal device should always be used to assess any potential risks before a shot is fired.
- Ensure you are in a firm, safe and stable position before taking a shot.
- The best time to ground shoot feral pigs is when they are most active i.e., in the early morning, late evening and throughout the night if spotlights or thermal image devices are used.

Target and shot placement

- The objective is to fire at the closest range practicable in order to reduce the risk of non-lethal wounding. Accuracy with a single shot is important to achieve an immediate and, therefore, humane death.
- A feral pig should only be shot at when:
  - it can be clearly seen and recognised
  - it is within the effective range of the firearm and ammunition being used
  - a humane kill is highly probable
  - If in doubt, do NOT shoot.
- Although pigs are comparatively large animals, the vital areas targeted for clean killing are small. Shooters should be highly skilled and experienced at shooting and be able to accurately judge distance, wind direction and speed and have a thorough knowledge of the firearm and ammunition being used.

- The shooter must aim either at the head, to destroy the major centres at the back of the brain near the spinal cord or, at the chest, to destroy the heart, lungs and great blood vessels. This can be achieved by one of the following methods (see also Figure 3).

Head Shots

Frontal position

- This is the ideal site for shooting pigs. The firearm should be aimed at a point midway across the forehead and about 2cm above the level of the eyes. The bullet should be directed in the direction of the tail.

Temporal position

- This shot is useful for older pigs and large boars that can have foreheads consisting of thick bones and a ridge that runs down the centre. 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.

Behind the ear

- This shot is also used for older pigs and large boars that can have foreheads consisting of thick bones and a ridge that runs down the centre. The firearm is aimed at a point behind the ear directed towards the opposite eye.

Chest Shots

Side view

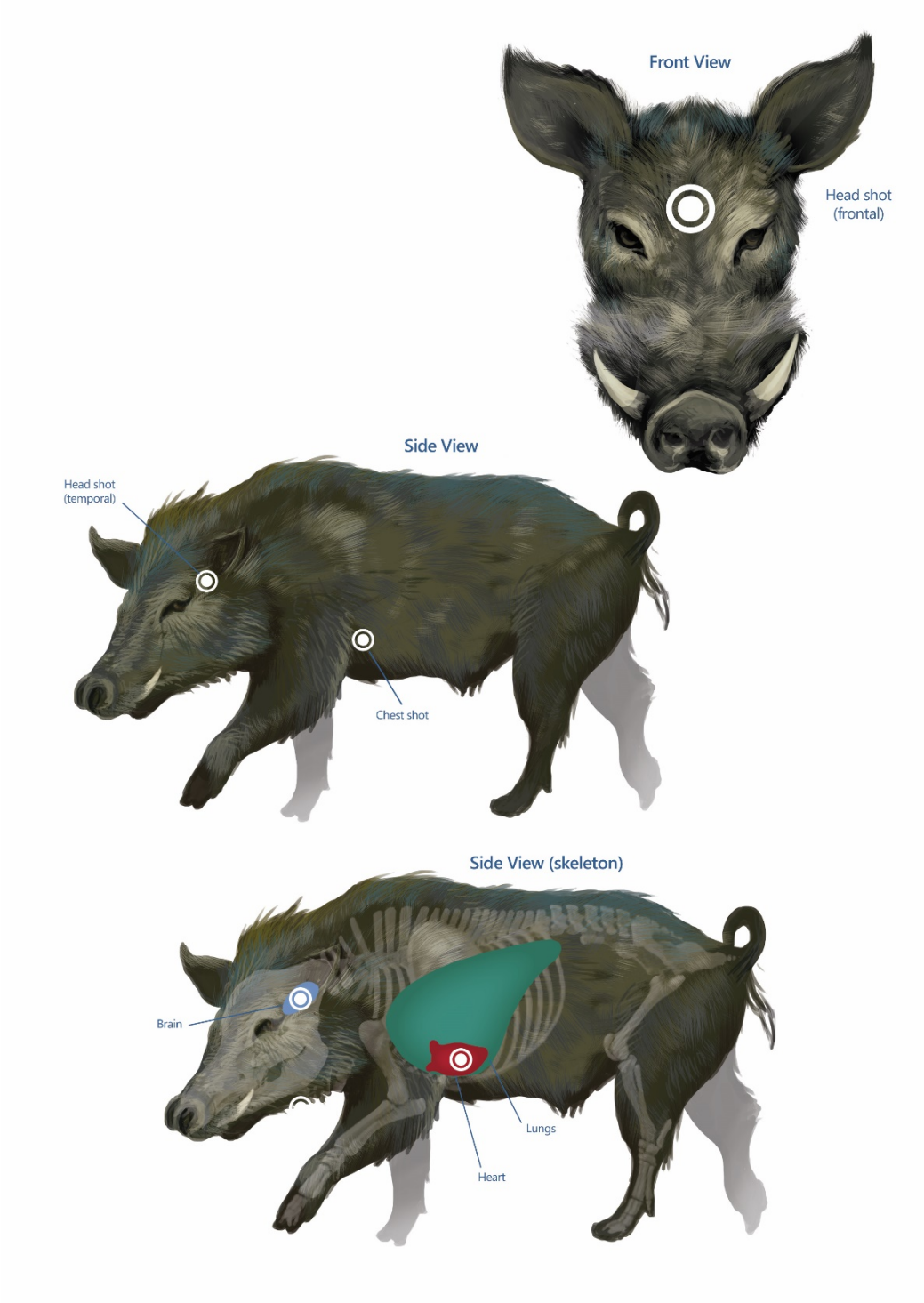
- The firearm is aimed at the centre of a line encircling the minimum girth of the animal's chest, immediately behind the forelegs. The shot should be taken slightly to the rear of the shoulder blade (scapula). This angle is taken because the scapula and humerus provide partial protection of the heart from a direct side-on shot.

Front view

- The firearm is aimed horizontally at the point midway between the forelegs and immediately below the base of the throat. Frontal shots should only be used for animals in the 'head high' position. Adult males have a thickened cartilaginous shield under the skin which protects the shoulders and ribs during fighting. This shield may interfere with frontal chest shots; therefore, side chest shots are preferred.
- When using a rifle, the target animal must be stationary and within a range that permits accurate placement of the shot. Shots to the head are preferred over chest shots.
- When using a shotgun, the target animal may be stationary or mobile, but must be no more than 20 metres from the shooter. The pattern of shot should be centred on the head or chest. It is essential that the distance to the target animal is accurately judged. To achieve adequate penetration of shot, the animal must be in range. It is recommended that shooters practice estimating distances before a shooting operation.

- The target animal should be checked to ensure it is dead before moving on to the next animal. 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.

Figure 3: Shot placement for feral pigs



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.

References

Aebischer N., Wheatley C. & Rose H. (2014). Factors associated with shooting accuracy and wounding rate of four managed wild deer species in the UK, based on anonymous field records from deer stalkers. *Plos One,* 9: e109698

American Veterinary Medical Association (AVMA). (2020). *AVMA guidelines for the euthanasia of animals: 2020 edition*. American Veterinary Medical Association. Available at: https://www.avma.org/sites/default/files/2020-01/2020-Euthanasia-Final-1-17-20.pdf

American Veterinary Medical Association (AVMA). (2016). *AVMA Guidelines for the Humane Slaughter of Animals*. Available at: https://www.avma.org/KB/Resources/Reference/AnimalWelfare/Documents/Humane-Slaughter-Guidelines.pdf

Bengsen, A., Gentle, M., Mitchell, J., Pearson, H., & Saunders, G.R. (2014). Management and impacts of feral pigs in Australia. *Mammal Review,* 44: 135-47.

Bengsen, A.J., Forsyth, D.M., Harris, S., Latham, A.D., McLeod, S.R., and Pople, A. (2020). A systematic review of ground-based shooting to control overabundant mammal populations. *Wildlife Research,* 47: 197-207.

Choquenot, D., McIlroy, J. & Korn, T. (1996). *Managing vertebrate pests: pigs*. Bureau of Resource Sciences. Australian Government Publishing Service, Canberra. Available at https://pestsmart.org.au/resources/

Gregory, N. (2004). *Physiology and behaviour of animal suffering*. Oxford, UK: Blackwell

Smith, G. (1999). *A Guide to Hunting & Shooting in Australia*. Regency Publishing, Adelaide.

Universities Federation for Animal Welfare (1976). *Humane Destruction of Unwanted Animals*. UFAW, Potters Bar, England.

Woods, J., Shearer, J.K. & Hill, J. (2010). Recommended On-farm Euthanasia Practices. In: Grandin T (ed.) *Improving Animal Welfare: A Practical Approach*. CABI, Wallingford, Oxfordshire, U.K.