



## Practical feral pig control

Feral pigs adversely impact large sections of Australian agriculture and the natural environment, costing the economy over \$100 million annually. Most states and territories have clear legislative requirements to ensure that feral pigs are controlled appropriately<sup>1</sup>. The responsibility to reduce feral pig densities on their property rests with the land owner/manager, whether it be park ranger, private landholder or indigenous community.

“ Because feral pig populations have the reproductive ability to double in size annually, control campaigns need to be highly effective to have an impact ”

Research suggests that rapid knockdown of a feral pig population by 70% or more can suppress its growth potential<sup>2</sup>. In Australia, a suite of feral pig control techniques are available. Generally, no single technique will completely remove feral pigs from a given area, so a combination of techniques is usually needed. This factsheet provides an overview of methods commonly used for practical feral pig control in Australia.

**Population dynamics and monitoring:** Successful pig management campaigns are built on understanding the dynamics of the feral pig problem at hand. Information such as habitat conditions, food abundance, pig density, movement and damage all greatly assist the selection and deployment of the most appropriate techniques. Monitoring is also critical to the success of a campaign and it may be done via visual surveys (ground, aerial), thermal infrared imaging or detection by remote motion cameras in the landscape. Observing water-point activity, counting pig removal, measuring bait uptake, or observing reduction in rooting damage are other ways a control campaign can be monitored. Comparing records from before control activities began with those collected during and after a control campaign will determine the effectiveness of the approach and allow aspects to be adapted where needed<sup>3</sup>.

**Poisoning:** Ground-based poison baiting is one of the most economical and effective ways to control feral pigs on a broad scale<sup>1</sup>. Ground baiting can achieve around 70-99% rapid population knockdown across a range of Australian habitats<sup>4,5</sup>. Aerial baiting is also used in some regions of Australia but is typically less effective than ground baiting because feral pigs generally need to become familiar with taking bait first. Despite this, in dry times aerial baiting can be very effective. During an exotic disease outbreak, aerial baiting would be an invaluable tool for rapid and widespread action in quarantined and remote areas. Poison baiting is generally not done in tropical rainforests (about 2% of the total feral pig range) due to abundant non-target species and ready food supply – mainly fruit.

**Toxicants:** In Queensland, New South Wales, Victoria and Western Australia, the odourless and tasteless compound 1080 (sodium fluoroacetate) is routinely used to poison feral pigs. Yellow phosphorous (commercial names: CSSP, SAP) is registered for feral pig control in some Australian states and territories, but because of animal welfare concerns surrounding its use, it is being phased out<sup>6</sup>. Warfarin and cyanide are available for experimental purposes, but both are unsuitable for feral pig control due to issues with humaneness, and taste and delivery<sup>7</sup> respectively. The fast-acting and more humane poison sodium nitrite, a common human food preservative, is highly lethal to pigs and currently undergoing registration in Australia<sup>8</sup>. This new toxicant, which must be specifically formulated, is expected to be available from 2013.



Feral pigs feeding at a 'cluster' bait station, Glenrock Station, NSW. Image: Invasive Animals CRC

**Poisoning process:** Ground baiting is a multistep process. First, unpoisoned food materials such as grain, fruit or manufactured baits (PIGOUT® free-feed) are offered for about 3-10 days every few hundred meters along a trail or at a bait station near recent feral pig activity<sup>4</sup>. This free-feeding step, although taking time and effort, is essential for attracting the local feral pig population and increasing bait consumption<sup>9</sup>. Once baits are taken, feral pigs are slowly drawn into 'cluster bait' stations by retracting bait trails to nearby feeding hot spots. This ensures that toxic baits can then be presented across the smallest possible area.

Toxic baits are introduced to cluster bait stations once free-feed bait uptake levels off, and this is continued until toxic bait uptake ceases (1-3 nights). Feral pigs are often killed within the first few nights of the lethal baiting phase. Follow-up monitoring determines if pigs remain in the area and whether further baiting is needed. There are usually strict protocols for accessing, making and deploying feral pig poisoned baits, and accreditation may be required. Operators should ensure they are familiar with relevant and current state or territory legislation.

Depending on the toxicant used, the drawbacks of baiting include animal welfare concerns, development of bait shyness and the risk of primary and secondary poisoning of non-target species. However, careful selection of bait material, and technologies such as new toxins and bait-delivery devices that target feral pigs (HogHopper™)<sup>10</sup> address some of these concerns. Poison baiting is often used in early stages of pig management, as it is the least invasive technique causing minimal disturbance of the population. The more direct techniques such as trapping and shooting can be used as follow-up activities. The best time to bait is when habitat food is least abundant – usually summer in southern Australia and at the end of the dry season (around November) in northern Australia.

**Trapping:** Trapping is a valuable method for managing feral pigs at relatively low densities and where control by poisoning or shooting is not feasible, such as near urban areas. In the wet tropics of Australia, where non-target wildlife species are abundant, trapping is considered the most effective technique for reducing feral pig numbers. Well-designed traps can be pig specific and captured pigs may be used as a commercial resource<sup>11</sup>. Trapping efficiency can range from 28-83% knockdown of a feral pig population<sup>1,5,9</sup>.

**Trap design and process:** Trap designs vary considerably. In Australia, the most popular styles used tend to be silo, panel or box traps. All basically consist



*Remote camera captures feral boar entering pig trap, Kangaroo Island, SA. Image: Invasive Animals CRC*

of an anchored steel mesh enclosure with a lure or bait that the target pigs find attractive. Pigs gain access through a one-way entrance and are then unable to escape. Trapped pigs are killed as quickly and humanely as possible by shooting<sup>6</sup>. Capture rates are heavily influenced by season, natural food availability and trap placement within the landscape<sup>9</sup>. As with poison baiting, free-feeding is an essential step in the trapping process and allows a trapper to coax greater numbers of pigs into the trap before it is set. Hunting activity in the area usually makes trapping less effective.

Disadvantages with trapping relate to the time and cost of initial trap construction and ongoing maintenance of traps. For animal welfare reasons, traps must also be checked regularly to minimise the time that trapped pigs or non-target species are held<sup>6</sup>. Cost recovery via commercial harvest and combining trap inspections with regular property rounds can help manage these drawbacks<sup>11</sup>. Another disadvantage is that some pigs become 'trap shy' and are more difficult to capture. Alternative controls can be used to remove trap-shy individuals.

“ Shooting and hunting are widespread, popular techniques for managing feral pigs ”

**Ground shooting and hunting with dogs:** Intensive ground shooting – both recreational and professional – can be effective in some localised settings where pig numbers are low<sup>1</sup>. Hunting with dogs, also referred to as 'dogging', can make ground shooting campaigns more successful, particularly in dense habitat. Dogging may be useful for locating and removing residual pigs after other control

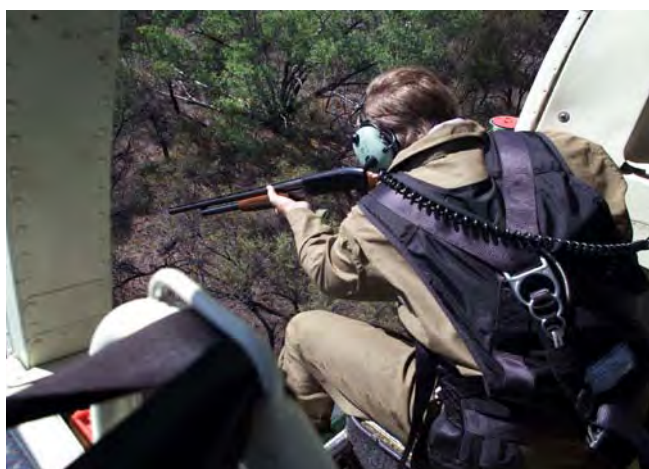
techniques have reduced population densities<sup>12</sup>. In general, the effectiveness of ground-based hunting largely depends on the skills of the hunter and training of the dogs. Due to high labour and time costs, and the localised nature of this form of control, ground shooting and hunting are more suited to short-term management campaigns.

Additional considerations are that lost dogs have the potential to become feral themselves and harm wildlife and livestock operations. Studies have shown that dogs can pass close (within 100 metres) to pigs without detecting them and that hunting with dogs may remove less than 20% of the pigs present<sup>13</sup>. Hunting can also cause temporary dispersion and altered behaviour of feral pigs, such as greater dependence on cover and more nocturnal feeding habits. Because of this, ground shooting and dogging should be used as a secondary method to other more productive forms of control.

**Aerial shooting:** Aerial shooting by helicopter is more effective than ground shooting and considered very competitive with other control methods on a cost-per-kill basis in the right conditions<sup>1</sup>. Used in a coordinated fashion, aerial culling programs have the potential for large-scale and rapid knockdown (64–80% efficiency<sup>5,14</sup>) of feral pig populations in Australia.

This process involves the helicopter being guided by an experienced pilot and spotter to locate and pursue individuals or mobs of feral pigs. On board, an accredited shooter uses a semi-automatic rifle or pump-action shotgun to deliver lethal chest (the preferred target) or head shots to the animals<sup>6</sup>.

Aerial shooting is a visible, high-profile approach to feral pig control. It can potentially draw landholders and pest



Helicopter aerial shooting. Image: Sydney Morning Herald

animal managers together in a unified approach over large areas. But its effectiveness and cost efficiency depend on high pig densities, good flying conditions and mostly open countryside. Aerial shooting that is used in isolation, as a once-a-year control exercise, may only offer short-term and localised reduction of feral pig numbers<sup>14,15</sup>.

Aerial shooting is a particularly useful option when environmental conditions severely limit access for ground-based controls such as trapping, dogging or poison baiting (eg after flooding, in swampy land). The choice of the best time for aerial shooting is a balance between winter, when pigs are more active than usual in daylight, and summer, when pigs concentrate around water points and light cover.

**Judas pig technique:** Ground and aerial shooting may benefit from the use of 'Judas' pigs, which are radio-collared individuals re-released to associate and reveal the location of pigs in the area. Judas pigs have been used with mixed success in Australia and the United States, mostly for removing remaining pigs in the last stages of eradication attempts<sup>12,16</sup>.

Sows make the best Judas pigs, especially those that are socially connected to pigs in the target area. This is a specialised technique however, that requires telemetry equipment and skilled operators, and is not effective when pig densities are high. Also, re-released sows have the potential to breed and repopulate an area unless they are desexed (spayed/neutered) first<sup>12</sup>.

**Fencing:** Exclusion fencing is a physical, non-lethal way of protecting high-value areas from feral pigs, such as lambing paddocks, grain crops or wildlife refuges<sup>12,17</sup>. Although considered an expensive option and not practicable at a large scale, fencing can be used in a tactical, time-dependent way to restrict feral pig movement.

Fences need to be strong to exclude robust animals like feral pigs. As a result, construction costs can reach about \$3500/km for a pig-specific fence<sup>18</sup>. Electrified strands, as outriggers or staked in front, have been shown to greatly improve the effectiveness and longevity of the fence<sup>17</sup>. Unfortunately, if feral pigs are already habituated to the food source or area being protected, fences are more likely to be breached. Once breakthrough occurs, a fence becomes ineffective.

**Summary:** In Australia, the most successful efforts to manage feral pigs and the damage they cause have tended to involve the lethal techniques of poisoning, trapping, shooting and hunting. Other potential forms of control include habitat manipulation, guardian animals, biological control and contraception. For the most part, these latter techniques remain either untested or impractical for feral pig management. Studies have shown that biological and fertility approaches are unlikely to ever be viable options for feral pig control in Australia, due to potential flow-on into the \$1 billion domestic pork industry. As such, the more traditional control techniques will remain the best options for the foreseeable future.

Effective control of invasive animals rarely works with a single-strategy approach. The listed feral pig control techniques in this factsheet are best used together in a strategic fashion to manage feral pig populations, and reduce their impacts on farms and the environment. The techniques should be appropriately chosen based on environmental conditions, timing, habitat and the desired outcome. For further details on how to successfully design and implement feral pig management strategies please refer to the various resources and guides listed at right or visit <http://www.feral.org.au>.



Exclusion fencing, Kangaroo Island, SA. Image: S. Lapidge

#### Further information:

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