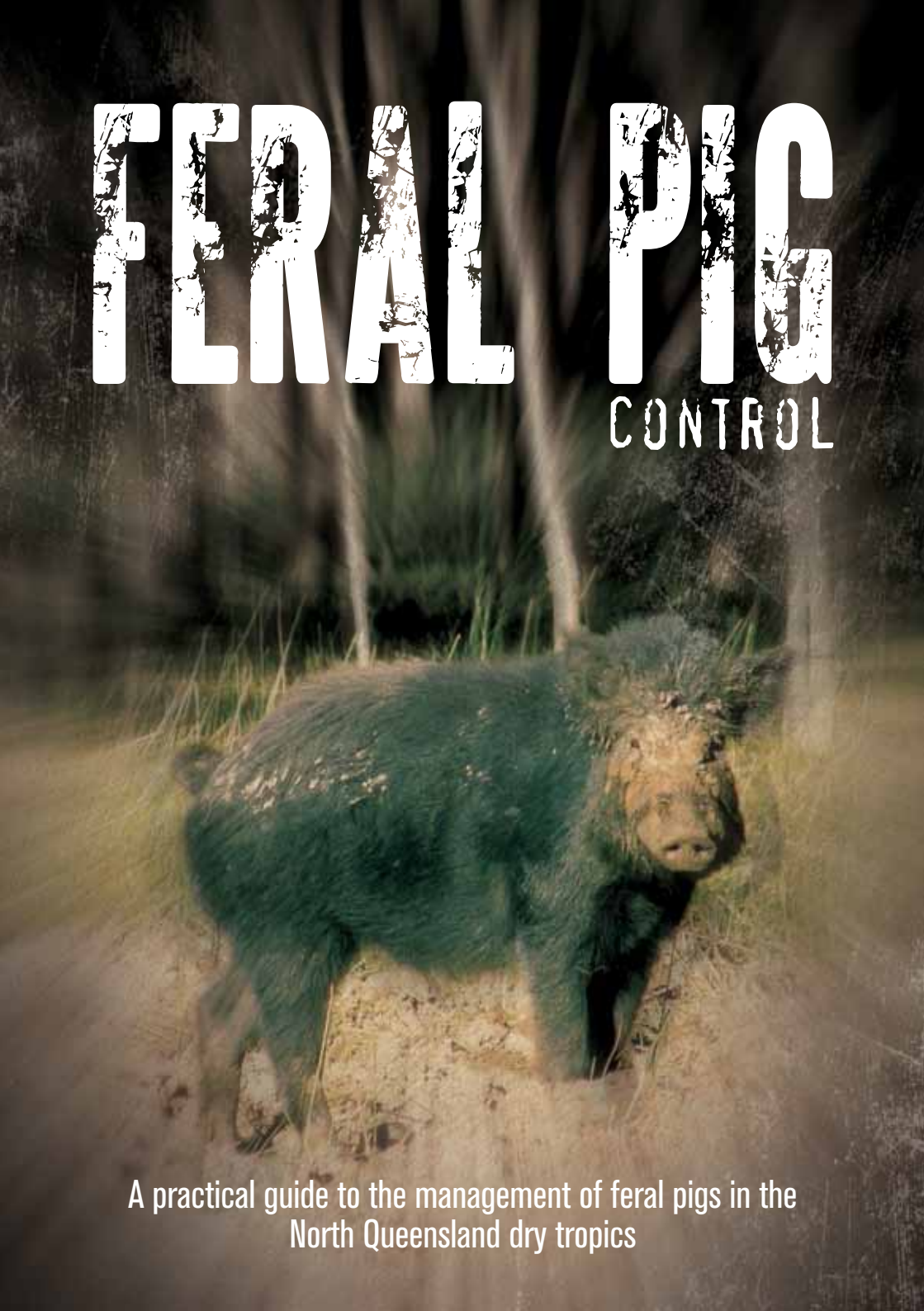
# FERAL PIG CONTROL



A practical guide to the management of feral pigs in the North Queensland dry tropics

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Feral Pig Control

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# FOREWORD

Feral pigs *(Sus scrofa)* are one of the most prolific and potentially the most devastating of Queensland's introduced animal species.

Feral pigs prefer river systems and swamps in the tropics of north Queensland, though they are found in all of the state's habitat types. The dry tropics region usually provides an abundance of food, cover and water – the main habitat requirements for feral pigs. Resulting high pig numbers can cause considerable damage to agriculture and the environment.

Feral pigs are a declared Class 2 pest in Queensland which means they are established and can cause significant adverse economic, environmental and social impacts. It is estimated they cause $80 million in damage to the state's agricultural industries each year.

Feral pigs are also designated as a threatening process under the *Federal Government Environmental Protection Biodiversity Conservation Act 1999.* Under this legislation, landholders must meet requirements in regards to declared pest species.

Under Section 77 of the *Queensland Land Protection (Pest and Stock Route Management) Act 2002*, landholders must take reasonable steps to keep their

property free from feral pigs. Local governments are empowered under Section 78 to issue a non-complying landholder with a notice to control feral pigs, with a maximum penalty of $60,000 for non-compliance. The Act also provides penalties for the feeding, release or illegal keeping of feral pigs.

Welfare animal considerations must be taken into account when developing control strategies. The *Animal Care and Protection Act 2001* provides for the control of pest animals but only when it is undertaken in a way that causes the animal as little pain as is reasonable.

An effective **control strategy** involves reducing the density of feral pigs to a level where the benefits exceed the cost. The benefits could be in the form of reduced economic losses or greater public participation in control operations.

If 70 per cent of a pig population is removed for three consecutive years, then this is theoretically considered to be effective control. In practice, varying environmental conditions and the resulting changes in pig population growth rates make this difficult to achieve. In some cases where good seasons exist, the growth in pig numbers can exceed the reduction that stems from control programs.

Several techniques are available to control feral pigs. **Generally no stand alone technique is sufficient for each situation so a suite of integrated methods is necessary.**

When developing a control strategy, land managers must determine the specific problems pigs are causing and then decide which combination of control options is most suitable to reduce the problem, not just the population.

*These diggings show some of the environmental impacts of feral pigs*

# SUMMARY OF CONTROL TECHNIQUES

## Aerial Poisoning

### ADVANTAGES

- Proven method
- Widely accepted throughout rural communities
- Most cost effective method in extensive or remote areas or where vehicle access is restricted
- Can reduce pig population quickly
- Low labour requirement
- Useful in extensive control operations where the amount of bait material required may be very large

### DISADVANTAGES

- Potential risk to non-target species
- Legislative requirements
- High initial cost of aircraft
- Strategic placement of baits is difficult if pre-feeding is not undertaken

## Ground Poisoning

### ADVANTAGES

- Proven method
- Widely accepted throughout rural communities
- Can reduce pig population quickly
- Cost effective
- Useful for controlling pigs in small refuge areas or where impact is presently occurring
- Amount of bait material to use can be accurately estimated
- Can use mechanical bait feeders to reduce non-target bait take
- Free feeding stations can be used to estimate population size and to monitor the success of the program

### DISADVANTAGES

- Usually requires pre-feeding
- Potential risk to non-target species
- Higher labour requirement
- Legislative requirements
- Requires vehicular access

## Trapping

### ADVANTAGES

- Trapping does not disperse pigs
- The number of pigs controlled is known and carcasses can be removed safely
- Flexible technique that can be fitted into routine property activities
- Traps can be moved or re-used
- Good trapping makes use of opportunities as they arise
- Non-target species accidently captured can be released unharmed
- Long life of traps will defer initial costs of traps
- A range of trap designs are available

### DISADVANTAGES

- High costs to initially build and maintain traps
- Trapping is labour intensive compared with other techniques
- Sustained control of the population may be difficult to maintain
- Sufficient traps must be distributed in a given area
- Difficult to service traps in remote areas

## Aerial Shooting

### ADVANTAGES

- Cost effective
- Effective in open terrain, remote locations or in inaccessible areas
- The cost of control varies with pig density and the efficiency of the operators
- Species specific
- Can use the Judas pig method to locate groups of pigs or identify refuge areas

### DISADVANTAGES

- High cost of aircraft hire
- Need licensed operators
- Ineffective in thick vegetation
- Costs can outweigh benefits as numbers are reduced to low levels

## Fencing

### ADVANTAGES

- No risk to non-target species
- Effective method of reducing damage quickly

- Most suitable for small high value areas
- Can be cost effective with the reduced damage over time generally off-setting the initial cost of the fence
- Generally, the effectiveness of a pig-proof fence is related to how much the landowner is prepared to pay
- Electrification of existing fences is highly cost effective

**DISADVANTAGES**

- High establishment costs
- High maintenance costs
- Subject to failure with adverse weather conditions
- Pigs will sometimes break through fences if a high value food or water resource is inside

## Ground Hunting and Dogging

**ADVANTAGES**

- Species specific
- Can be incorporated into routine property management
- Economic return if commercial companies are available
- Low cost

**DISADVANTAGES**

- Ineffective in controlling pig populations
- Requires access to pig refuge areas
- Animal welfare considerations

## Fertility Control

**ADVANTAGES**

- Species specific
- Humane
- May be useful in small populations

**DISADVANTAGES**

- Contamination of domestic piggeries
- Lack of long-acting contraceptive compounds
- High costs of delivery by baits
- Less effect on population size than when an equivalent number of pigs are killed

- Possible cross mutation to other species – including humans
- Loss of export industry
- There are no commercially available methods

## Biological Control

**ADVANTAGES**

- Species specific
- Humane
- May disseminate by itself
- Very effective population control in some cases

**DISADVANTAGES**

- No agents are presently available in Australia
- Importing exotic agents is high risk
- Potential contamination of domestic piggeries
- Possible cross mutation with other species – including humans
- Loss of export industry

*Free feeding station*

# CONTROL TECHNIQUES

## 1. Poisoning

Poisoning is the most appropriate technique for large scale feral pig population control because of its economy, efficiency and accessibility.

The safe use of toxins effectively removes the bulk of the pig population with the least effort and cost, and is one of the few methods available which may quickly reduce numbers over a large area. While it may not be suitable for all situations, it is especially useful in remote or inaccessible areas.

**Preparing feral pig meat baits.** A toxin (1080) is injected into 500g pieces of meat such as kangaroo (obtained from licensed abattoirs), cattle, horse, goat or offal (such as liver or heart). No bone material may be present in the meat. In Queensland, only authorised persons under the Land Protection (Pest and Stock Route Management) Act can provide 1080.

Though poisoning efficacy is generally around 60 to 70 per cent, population knockdown in Queensland has been reported to be as high as 81 per cent.

Poisoning is widely accepted throughout rural communities as a cheap, reliable and effective control technique. Because it provides a fast and effective initial knockdown, it is far less labour intensive than other techniques. Most landholders do not consider the supply of bait material and distribution costs to be significant. However, some pigs may develop bait shyness and there are legislative requirements, animal welfare implications and risks to non-target species to take into account.

*Preparing feral pig meat baits*

*Placement and timing of baits is critical for maximum uptake*

Use the following techniques to minimise the chance of non-target species coming into contact with baits, while maximising the contact with feral pigs.

- **Bait placement:** bury or wire baits to trees, place under vegetation or camouflage by rubbing in dirt – this will minimise non-target species taking the bait, especially birds. Dyeing baits green or black will also assist.
- **Baiting timing:** distribute in the late afternoon to minimise scavenging birds taking the bait.
- **Bait stations:** pre-feed unpoisoned material at permanent sites prior to placing toxic baits. This may deter other species from feeding at these sites as pigs tend to defend these areas, scaring off some other species.
- **Mechanical exclusion devices** can keep other species from accessing the toxic bait.

An effective poisoning campaign increases the proportion of the pig population that finds baits, decreases the percentage that finds baits without eating them and reduces the number that eat the toxin without dying.

Over time landholders can alter the toxin and bait material used, as well as its distribution, abundance and availability in order to increase the effectiveness of the poisoning campaign. In good seasons, the availability of alternative high quality food may reduce bait uptake.

### 1.1 BAIT MATERIAL

Through a good selection and presentation of bait material, landholders can target feral pigs when using poisons. The most essential task is to increase the detection and palatability of baits. More bait will be available to pigs if they are easily found and target specific.

- Consider the local **diet preference** of pigs. Pigs concentrate on a locally available food source and may ignore 'novel' food such as bait material. Bait used successfully in one location may be ineffective in others.
- In intensive **agricultural areas** such as sugar cane plantations, tropical fruit orchards and crops, fruit based foods are readily available and scavenging of carcasses is rare. In this situation, fruit baits such as mangoes or rock melons work well, whereas meat baits are less effective. Generally, whatever food the pigs are eating is good bait material. In North Queensland, feral pigs readily eat mangoes, making it the principal bait material for the region.
- In drier **grazing areas**, fresh meat baits are preferred as meat is easily obtained and sought out by feral pigs seeking a high protein source. Grain or fruit baits are less effective if the pigs are scavenging cattle carcasses.

**Under Queensland legislation, bait size is regulated. Meat baits must be a minimum of 500g in weight and injected with 72mg of 1080. Meat may be obtained from domestic cattle, sheep, goats or horses; offal from abattoirs or kangaroo meat from pet abattoirs. No meat pieces can contain bone material. For loose grain, the bait material is tumble mixed with a solution of 1080 at 72mg/500g.**

- According to regulations, all grain, cereal or meal poisoned as bait must be **coloured** to distinguish it from unpoisoned material. If 1080 is used, the operator will dye the baits green – this make baits less attractive to birds.
- **Commercially available pig baits** are now available. These baits may be cost prohibitive for wide-ranging baiting campaigns. Commercial baits such as PIGOUT® may be ideal for intensive baiting in small areas. The Invasive Animals CRC, with financial support from Meat & Livestock Australia, is also developing HOG-GONE®, a rapidly-lethal sodium nitrite-based manufactured bait. It is also developing Econobait, a bite sized bait specifically for use in the HogHopper™, and a sodium nitrite concentrate for addition to other bait substrates (instead of 1080).
- A wide range of **bait attractants** has been tested throughout Queensland. Most attractants will increase palatability and detection of bait, encouraging pigs to find the material. However, it is important to exercise caution as the attractants may also lure non-target species. Attractants are predominantly used in grain or fruit-based bait material. Adding meat meal or molasses is the most popular means. Additives such as vanilla, raspberry or banana essence will make baits more attractive but may become cost prohibitive in large campaigns. Creosote, a wood preservative, or old sump oil also works well to increase detection of baits while deterring most non-target species. Only a very small amount of creosote or oil needs to be added.

*Free feeding is essential to attract groups of pigs*

## 1.2 GROUND BAITING STRATEGY

Ground baiting is ideal in agricultural areas for controlling pigs in small sections or where the impact of pigs is being felt.

Ground baiting is generally less expensive than aerial baiting. Ground baiting generally requires vehicular access for distribution. Without vehicle access or in adverse weather conditions, this technique is not possible as an even coverage of bait is needed for all pigs in the area.

Too much time and/or labour may be needed on large remote grazing areas for this type of control.

**To ensure most pigs find and eat the bait:**

- determine the movements and distribution of the pigs and their feeding habits
- ensure enough bait is available for the size of the pig population and the area of control
- use strategies such as pre-feeding with attractive highly palatable material (see free-feeding section below) and placing it where pigs are likely to find it
- distribute larger baits such as meat or mangoes when travelling along available roads and tracks, and throw baits into long grass or under trees to camouflage them from scavenging birds
- distribute smaller types such as loose fruits or grain in bait stations, placing piles every 100 to 500 metres along available tracks.

**Free feeding bait stations** of non-toxic material are essential to introduce the food to the pigs. Areas of fresh diggings, especially on cropping and refuge boundaries, are the best places to begin free feeding. Sheltered areas are preferred to minimise the effects of the weather and disturbance by non-target species.

In **agricultural areas**, choose recent pig activity sites (pig pads, areas of thick cover, creeks and swamp edges, headlands or road verges).

In **grazing areas**, target drainage lines such as creek and river systems, especially those near thick scrub harbourage. Choose sites with adequate vehicle access, as large amounts of bait may need to be carried in.

**Free feeding stations** allow landholders to monitor the local pig activity and poison or trap at a convenient time.

Knowing the amount of bait being consumed also makes it easier to estimate the amount of material needed for all pigs at the site. Free feeding stations also eliminates time spent searching for good pre-feeding sites and looking for fresh signs of pig activity.

**WARNING: Free feeding meat bait is illegal under government regulation due to the possible transmission of disease. Animal carcasses or food scraps containing meat or meat products must not be fed to pigs unless used with an incorporated toxin or if the pig is prevented from returning to the wild when trapped. No free feeding of meat products is permitted in traps.**

Generally **pre-feeding** will increase the likelihood of successful poisoning. Pigs become used to feeding at the site, increasing the chance that the entire group will be attracted to the bait material.

Continue free feeding with unpoisoned bait until pigs start eating. Then top up baits each night to ensure enough material is available for the estimated number of pigs feeding at each site. There should be enough bait material remaining each morning to cause the pigs to return the next night.

After feeding for three consecutive nights, introduce poisoned bait. Bury poisoned meat and grain baits at, or surrounding, the stations to deter non-target species. Poisoning should continue for four or five days or until no more bait material is taken.

A continued supply of poisoned baits will control pigs that missed the initial baiting or another mob of pigs that may be in the area. Bait should also be replaced when exposed to extreme weather conditions, such as rain, that may reduce the concentration of their toxin.

If **grain** is used, bury the poisoned grain in shallow trenches and place small amounts of this material on top. Pigs will quickly take to rooting for the grain. Buried grain baits retain their attractiveness longer than other baits, and tend not to


*The HogHopper™*

attract non-target species. Feral pigs also prefer rooting up the soil to uncover the grain as this behaviour is part of their normal food gathering activity.

If stock is present, build a wire enclosure to only allow access to the bait by feral pigs. Try not to disturb or disperse the pigs, avoid shooting or using dogs and keep visits to the free-feeding sites as brief as possible.

**Mechanical Bait Feeder** devices have been developed where only pigs can access the bait material. The pigs must lift a device with their powerful nose – other species lack a lifting response or are not strong enough.

The **HogHopper™** is a new and innovative tool to help combat the impacts of feral pigs in all types of terrain. It can be used with any bait type. The unit was developed by the Invasive Animals CRC with financial assistance from the Australia Pest Animal Management Program.

The tool has been tested in many feral pig habitats throughout its development, and offers peace-of-mind baiting. Stock and other wildlife cannot access the toxic bait, with the unit also helping to maintain freshness and palatability. For more information on the product or to purchase units, contact Animal Control Technologies Australia.

### 1.3 AERIAL BAITING

Aerial baiting is the most effective and cost efficient method of pig control in extensive or inaccessible areas. Bait uptake rates have been as high as 81 per cent. In control operations where the amount of bait material required may be very large, the economy of scale principle applies with the cost per bait reduced as the quantity of required bait increases.

Some grazing areas of Cape York regularly bait with 20 tonnes of meat baits; aerial baiting is ideally suited for these extensive control programs.

However, there is no pre-feeding with aerial baiting, the cost of aircraft hire is high, strategic placement is difficult from the air and baits are more available to non-target species.

Modified light planes have large bait bins which can carry up to 350 kg, and drop chutes incorporated in the fuselage. Helicopters are more expensive and carry only small amounts of baits. They are useful for small area applications where accurate placement is required.

For best results:

- Aerial baiting is ideal in grazing areas where vehicle access may be limited. The most effective strategy is baiting along drainage lines, swamps or thick vegetation areas.
- Cost and control effectiveness is improved greatly when adjacent landholders conduct coordinated programs. Baiting large areas means the costs can be spread over a number of landholders. Research has found approximately 80 per cent of bait material will be found within the first two nights. However, in some cases up to 57 per cent of these baits may be taken by non-target species.

**A study using remote cameras and radio transmitters inserted in baits showed the majority of meat baits were removed by scavenging birds. However, most baits were moved less than 20 metres and only partially eaten. Baits were still available to pigs, and birds did not consume enough to consume a lethal dose.**

- Aerially dropping baits in refuge areas during periods of flooding may be very effective in agricultural areas. Pigs forced to move to higher ground during floods will accept baits readily and the high concentration of numbers will reduce costs and improve effectiveness. For grazing areas, targeting watering points during drought periods is also effective.

*Light planes can be modified to carry bait bins and drop chutes*

- Any situation where pigs are forced to concentrate into a smaller area is a trigger for aerial baiting. Local knowledge and observations are important to determine when and where these situations occur.
- Cover, temperature, water and food availability all influence a pig's foraging range. High temperatures and lack of cover will restrict foraging, potentially reducing the number of baits encountered. Strategically dropping baits in the pigs' refuge is much more effective then blanket baiting.

**An aerial baiting project in the dry tropics compared the uptake rates of blanket baiting (baits evenly distributed) and strategic baiting (baits placed in concentrated high pig usage areas near water and feed sources). Seasonal conditions affected bait encounter rates and, consequently, uptake. In the wet season, pigs dispersed and encountered the blanket distributed baits. During the dry season, pigs did not travel as much and did not find blanket distributed baits. In this study, strategic baiting in the pig refuge areas achieved the highest uptake rate (81 per cent of pigs consumed at least one bait).**

### 1.4 AVAILABLE TOXINS

**1080** (sodium fluoroacetate) is a colourless odourless substance and is the most widely used toxin for feral pig control. All vertebrate pest control organisations within Australia use 1080. Sodium fluoroacetate is produced naturally in over 30 species of native Australian plants including Goergina gidgee *(Acacia georgina)* and heartleaf poison bush *(Gastralobium grandiflorum)*.

Compound 1080 is converted in the body to fluorocitrate. This blocks a vital biochemical pathway which is directly involved with the cellular production of energy. The energy supply in cells is reduced to a point where cells lose function and die. For further information see **www.biosecurity.qld.gov.au.**

It is important to note:

- 1080 does not accumulate in the food chain.
- 1080 readily breaks down in the soil to harmless substances through fungal and bacterial action. Rain leaches the poison and warm air temperatures assist in its decomposition. The dry tropics' wet season would promote rapid leaching and decomposition of the bait. Toxin 1080 is difficult to detect by pigs, easy to handle and has a latent period of 4-12 hours which allows pigs to disperse from feeding areas prior to death, thereby not influencing bait-shy pigs.
- Toxic effects do not appear immediately after ingestion because of the time required to convert fluoroacetate to fluorocitrate. In pigs, death results from heart or central nervous system disorders. Species susceptibility varies; birds

show considerable resistance while cold-blooded animals, such as reptiles and fish, are even more resistant. Dogs are the most susceptible of all animals.

- Species sensitivity to the poison, body weight, concentration of 1080, placement, bait type and palatability, timing of and level of exposure to toxic baits are all factors in the death of non-target species. Landholders can significantly reduce this problem by adopting a baiting strategy as outlined previously.

**WARNING: Toxin 1080 is a restricted chemical product.**

**Only authorised officers (approved DEEDI and local government officers who have undertaken practical and written examinations, and received approval from Queensland Health) are permitted to prepare and supply 1080 baits. Toxin 1080 can only be supplied as prepared baits for the purpose of controlling declared pest animals – 1080 concentrate cannot be supplied directly to the public.**

1. **Baits are to be laid on the land described in the agreement.**
2. **No baits are to be laid on any stock route or reserve for travelling stock without local government approval.**
3. **No baits are to be laid within 5 m of a fenced boundary.**
4. **No baits are to be laid within 50 m of the centre line of a declared road.**
5. **No baits are to be laid within 20 m of permanent or flowing water bodies.**
6. **Owners may only lay baits within 1 km of any habitation (this includes schools, dwellings and public facilities, but does not include the dwelling of the person laying the baits) if they first seek written agreement from all habitation occupiers within 1 km of the bait site. At least 80 per cent agreement must be gained before baiting can proceed. The Authorised Person may increase this to 100 per cent written agreement if required as a further risk mitigation measure.**
7. **Owners may only lay baits within 2 km of any habitation (this includes schools, dwellings and public facilities, but does not include the dwelling of the person laying the baits) after they provide written notification to all habitation occupiers within 2 km of the bait site.**
8. **No baits are to be laid within 5 km of a town without Biosecurity Officer approval.**

**Phosphorus** (commonly known as SAP) is a yellow, wax-like substance with a pronounced taste and garlic-like odour. This toxin is now sold as the commercially available CSSP pig poison.

Phosphorus is primarily absorbed through the gastro-intestinal tract where it causes severe irritations and associated pain. It can also be absorbed through the skin.

Symptoms include acute pains, convulsions, liver damage, bloody diarrhoea, skin eruptions, coma, collapse and death. Some pigs in advanced stages exhibit the 'smoking stool' syndrome where they 'smoke' from their mouth, nose and anus.

In pigs, death may take from two hours to five days following the ingestion of a lethal dose.

CSSP is not soluble in water and does not break down readily in the environment. It is toxic to a wide range of bird and animal species, is generally slow acting and inhumane and can cause secondary poisoning from the vomited matter or carcass of poisoned animals.

Phosphorous is considered inhumane and its use will be phased out by 2013.

## 2. Trapping

Trapping can be labour intensive compared to other methods and is not a rapid method of population reduction. However, it can reduce pig populations where other control techniques are not possible, or food or water resources are limited.

Improved trap designs, a better understanding of feeding behaviour, and increasing restrictions on the use of poisons have helped trapping of feral pigs gain acceptance. The flexibility of trapping also means it can be fitted into routine property activities and makes use of opportunities as they arise.

Trapping is particularly effective when integrated with other control measures. This technique is also environmentally friendly and humane, while traps can be designed to be species selective so as to pose minimal danger to non-target species. Any animal that is accidently captured can be released unharmed, while properly designed traps can be moved or re-used as necessary.

Trapping doesn't interfere with normal pig behaviour (unlike shooting or dogging) so pigs are less likely to leave the control area. The exact number of pigs controlled is also known and carcasses can be removed safely.

While there may be substantial costs involved in the initial building or purchasing of traps, and time and labour involved in maintenance, this can be offset by the costs spread over the life of the traps – which can be many years.

**Trapping is particularly suited to small areas of high production as in North Queensland's agricultural areas or in closely settled areas.** Compared to other techniques, the labour component and expense mean it is not practical for large scale control in grazing areas.

Trapping is best for areas which have limited or concentrated resources required by pigs, adequate access, availability of labour and bait materials. Examples of such areas include forest or cover fringes of agricultural areas, or drainage areas close to roads. Trapping should also be considered when poisoning is impractical or as a follow up to poisoning.

Key elements of a successful trapping campaign include appropriate design, suitable placement, maintenance of the door mechanism and regular inspection when the trap is set.

There are several basic trap designs with a multitude of possible variations to suit individual requirements or materials on hand.

Sufficient traps must be distributed in a given area so pigs have a high probability of encountering them. However, it must be noted sustained population control in inaccessible areas may be difficult to maintain by trapping alone. Even an effective trapping program can be out-done by good seasons where there are natural increases due to breeding and migration.

Over time, the success of trapping has varied depending on the operator's experience, local food abundance and the size and distribution of the pig population.

The number and distribution of traps in relation to the home range or movements of pigs play a big role in their effectiveness. A study in woodlands of NSW indicated a trap may only draw pigs from an 800 metre radius - meaning traps should be no more than one kilometre apart. However, the distribution of traps will vary for a number of reasons, with local factors largely determining the quantity and distribution of traps. Insufficient numbers of traps, or areas where they cannot be placed, mean some pigs will not encounter one.


*Traps can be camouflaged to increase trapping success*

## 2.1 TRAPPING STRATEGY

All trap designs are essentially a steel mesh live trap with a one-way gate. The following strategies will maximise the number of animals captured.

- Select the **best site** for the trap. Look for areas of recent pig activity such as fresh wallows, pads or fresh digging. Likely feral pig habitats are swamps, creek lines, forests or refuge areas such as in thick vegetation along creek and drainage lines. Traps can also be erected close to major feral pig pads leading to and from refuge and feeding areas.
- The site should be in **a shady area** with as much natural vegetation cover as possible.
- **Vehicle access** is essential. Carrying large amounts of bait to a trap on foot will soon become tiresome.
- Traps should also be **located in a circuit** to make for easy daily checking. This task could possibly be included in other farm duties or undertaken as a recreational pursuit.
- Establish several **free feeding sites** in potential trapping areas. Deposit small amounts of bait material throughout the immediate area or along trails.
- **Monitor and replenish** bait at these sites for several days. Pigs become accustomed to the bait material and more pigs will be attracted to the site.
- When bait is continually taken from a site then **leave trap materials** there for two to three days to accustom the animals to the smell of the steel mesh. If feeding at the site continues, partially erect the trap (leaving a wide entrance way) and place bait inside the trap.

- If pigs are known to be trap-shy, construct only **three sides of the trap** initially and continue to free feed. When pigs appear to be confident about feeding inside, construct the fourth wall but leave the gate wired open.
- **Erect the door** when the pigs are confidently feeding within the trap, but leave the gate wired open. After a few days of further feeding within the trap, the door can be 'set'.
- **If pigs are hesitant** to enter the trap at first:
  - place bait material outside the door or lay a bait trail to the trap
  - hoe up the ground inside the trap
  - try aromatic attractants such as vanilla essence, aniseed, creosote or sump oil. Use bait that is readily available at little or no cost as large quantities will be required.
  - experiment with a few different baits before one is found that produces good results. The direct feeding of meat to feral pigs in traps is illegal. Bananas, mangoes, pumpkins or rockmelons can produce good results. Try them if they are available in large quantities.
- Where pigs are eating **carrion**, use fermented meat meal or meat pieces enclosed in a mesh or pipe container. Hanging the container from the trap mesh will attract pigs, yet prevent them from eating the meat.
- **Grain and molasses** are often used in trapping situations. Soak the grain in water for at least three to five days to ferment and improve attractiveness to pigs. Grain will swell, so fill the container no more than three quarters full. If possible, add the stomach contents of cattle which contain yeast and bacteria culture to help ferment the grain. Meat meal will add a rotting odour to the grain. When the process is working correctly, the grain will have a very obnoxious odour.
- Pour a small amount of **creosote or oil** over the trap posts to attract pigs to the site.
- A drum of **fermenting grain** or other bait material can be located inside the pig trap. The additional smell of the grain brewing or rotting meat in mesh containers hung on the trap walls will also attract pigs.
- While pigs are being caught at one site, **continue to pre-feed** at others. When the first sites are exhausted, the trap can be moved to another location in order to continue catching pigs without delay.
- Keep human activity at the trap site to a minimum. **Do not use dogs** around these sites.
- **Do not use trip wires** as fewer pigs will be caught and non-target species may be captured.

- Set traps must be **inspected** each morning. Release non-target species as quickly as possible. Destroy or remove trapped pigs from the trap as quickly and humanely as possible.
- The **Judus pig method** may be used in some situations. Older sows are sometimes continually released and learn to keep returning to the trap for food. They invariably keep bringing other group members into the trap.

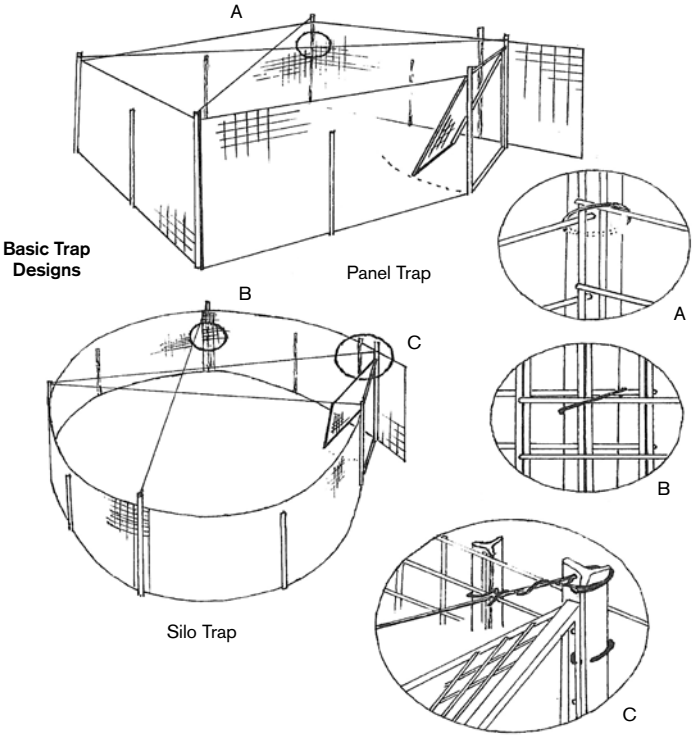
Traps can also be incorporated into fence lines to increase effectiveness as the pigs are funnelled towards the trap.

In the below photo, a trap is incorporated into an existing electric fence, however a non-electric mesh fence is erected 20 metres each side of the trap to avoid scaring pigs.

## 2.2 TRAP DESIGNS

- All traps should use at least 5 mm steel mesh, and no more than a 100 mm x 100 mm mesh size. The Model Code of Practice for the Humane Control of Feral Pigs requires this mesh size as larger mesh will cause serious injury to charging pigs. To prevent pigs from climbing out, traps should have roof bars, or be at least 1.5 m in height. Black or un-galvanised mesh is ideal as shiny mesh can reflect moonlight and may deter pigs. Pigs have excellent colour vision, so avoid bright colours or shiny materials.

- Tie mesh securely to the steel posts to prevent pigs lifting the panels. It should also be tied at ground level and at 20 cm as this is the point of impact from charging pigs.
- Ensure operation of the gate mechanism (tripping the trap) is quiet and allows easy passage of pigs of all age groups.
- Use door trip mechanisms specific to pigs (see later sections).
- Place branches or vegetation over the trap for camouflage and to provide shade for captured pigs. Placing branches/sticks across the top of the door will deter cattle. Hang rope in a loop across the top third of the door to deter cassowaries and emus from entering the trap.
- Place steel posts on the outside of the trap (A). For extra strength, overlap the mesh panels (B). Securely wire detachable gates (if used) to steel posts attached to the mesh (C).



**The Panel Trap** is a series of weldmesh panels (2-3 m x 1.5 m; 100 mm x 100 mm x 5 mm mesh) wired together and supported with steel posts at the corners and panel centres.

The size and shape of the trap can be changed by adding or removing panels to avoid rocks and stumps. Incorporate trees where possible for additional strength.

Panels can also be further braced with cross-wires from the tops of the posts. The door is usually 1 m wide and 1.5 m high, using 100 mm x 100 mm x 8 mm mesh.

The lifting bar gate design for the panel trap can also be used. Note the bait material trail (fermented grain) through the open trap gate. Wire the door back to allow pigs to free feed for three days, then set the door. Panel traps are relatively easy for one person to construct, dismantle and transport.

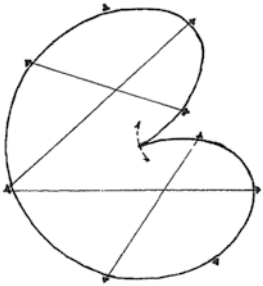
*Panel traps are easy to erect*

**The Silo Trap** is constructed from a continuous mesh. At 10 to 20 m by 1.5 m high, it is stronger than the panel trap. Set posts 1.5 m apart and incorporate available trees and/or tie wires across the top to further strengthen the trap. In soft mud or sand, drive posts in at a 45 degree angle to prevent lifting.

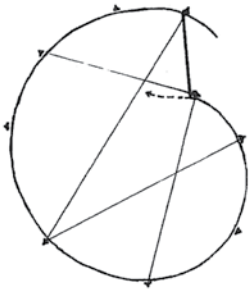
The trap's flexibility will prevent pigs from climbing out or breaking the mesh. The silo trap is more difficult for one person to construct, dismantle and transport than other designs and is more suited to semi-permanent trap sites.

Silo traps can incorporate a number of trap door designs (see below).

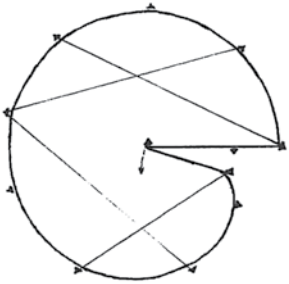
**A Funnel Gate**



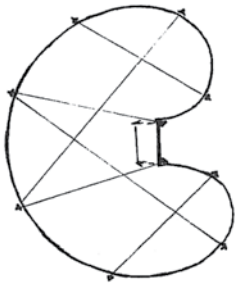
**B Side Swinging Gate**



**C Self Sprung Panel Gate**



**D Vertical Gate**

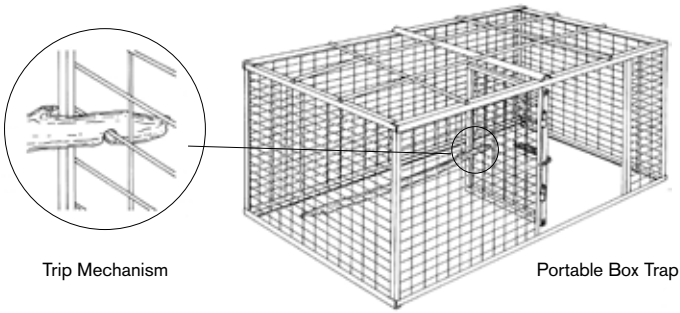


*A silo trap incorporating a funnel gate design*

**The Portable Box Trap** (above) is an efficient and environmentally acceptable method for the control of feral pigs, particularly on smaller properties.

The traps are easily relocated so seasonal movement and availability of food can be fully exploited, with a minimal outlay for materials. If used correctly, this trap is both humane to captured pigs and unlikely to capture non-target species.

- The box trap is designed to fit onto the back of a standard 4WD tray back.
- Placing steel posts at the corners will prevent pigs lifting the trap.
- The target specific gate design allows only pigs to 'trip' the door. The wooden (or equivalent) trip bar (see sketch below) should be at least 10 cm in diameter so the weight will ensure only pigs can lift it. Set the bar 20-30 cm off the ground. Ensure the slot on the door end is wide enough and releases freely, and the fixed end is tied down. A pig will lift the bar with its back and release the spring-loaded gate, while non-target species will generally stand on or jump over the trip bar.
- Distribute bait material throughout the trap until pigs begin feeding, and then continue with free feeding for three days. Then put bait under the bar, with the majority spread throughout the trap, so the entire group enters the box before one attempts to eat the bait under the bar and the entire group is trapped.



Trip Mechanism

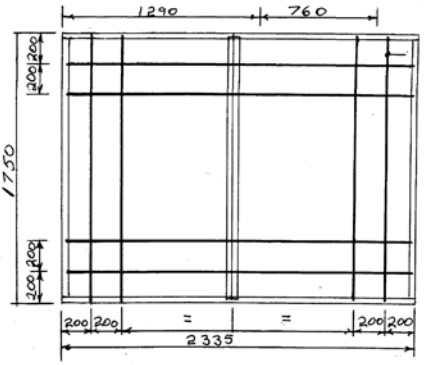
Portable Box Trap

- Dimensions have been calculated to fit a standard 4WD tray and to minimise off-cuts. Any available materials may be substituted. However, consideration should be given to weight and strength. Mesh size should not exceed 100 mm x 100 mm.
- Roof bars are designed to prevent pigs climbing out and could be changed to 200 mm reo mesh sheet. No roof is required if the trap is higher than 1.5 m.
- Use a short piece of chain between the spring and door frame to allow tension adjustment and prevent damage to the spring.
- The gap below the door is important to prevent fouling on diggings.

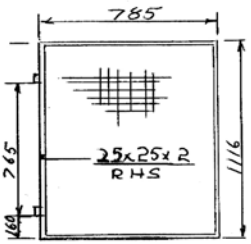
**Materials needed to construct a Portable Box Trap:**

- 5 x 7.5 m lengths of 40 x 40 x 3 mm angle iron
- 1 x 6 m length of 25 x 25 x 2 mm RHS (box section)
- 3 x 6 m lengths of DB 12 bar (reo bar)
- 1.5 x sheets of 3 x 2.4 m of WH423 mesh (75 x 50 x 4 mm preferred)
- 2 x 6 mm cattle gate hinges
- 1 x D latch
- 1 x gate spring (trampoline spring)

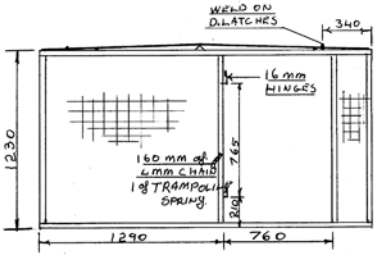
**Portable Box Trap Dimensions**




Top View




Side View




Front View

## 2.4 THE GATE

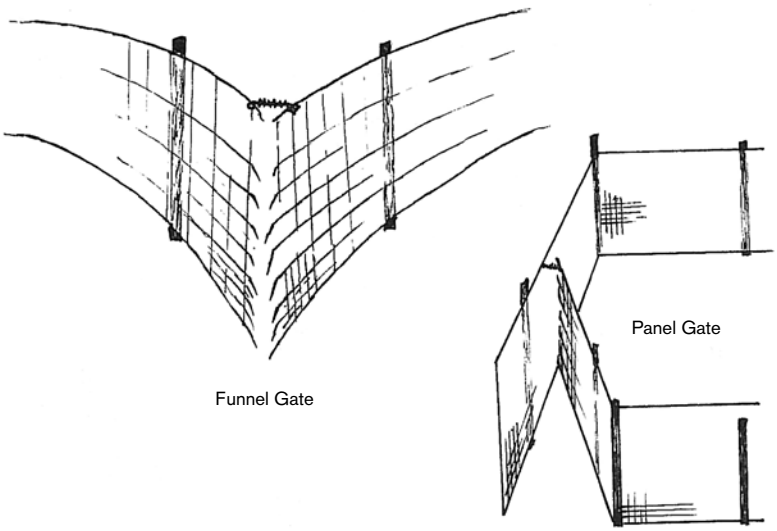
Don't overlook the gate! Trapping efficiency depends on site selection, acceptability of bait, length of pre-feeding and efficiency of the gate mechanism.

The **Self Sprung Funnel Gate** and **Panel Gates** use the ends of mesh positioned in a funnel shape and tied together at the top. These gates are easy to construct, work quietly and are unlikely to jam open if the sprung ends are at least 5 cm above the ground. The pigs push and squeeze their way between the mesh ends into the trap.

Cut the steel mesh – leaving tynes at the end of the gate. These tynes should be pointed and turned slightly inwards to prevent pigs from backing-out when they are part way through. Cut off the bottom rung tynes to prevent fouling. Pull back on the star pickets holding the mesh to lift the funnel off the ground. Don't have too much tension (spring) in the gate.

Many pigs lose interest and confidence when they have to force their way through such gates into the trap. Adjust the tension so pigs can enter easily and the tynes spring back together after the pig has passed through. Place a small stick (15 cm long) between the mesh ends to keep the gate open and more 'friendly' to pigs.

After the first pig enters, the stick will fall. This will close the gap, but a pig feeding inside the trap will encourage others to follow through the gate. For best results, remove or wire open these gates during pre-feeding. This is not the best gate to trap timid or small pigs and is best suited to grazing areas.



**The Side Swinging Gate** (above) may be the best design for agricultural areas and can be used in a silo or panel trap. When adjusted correctly, even small pigs can open and close it easily and quietly, making multiple captures possible.

Adjust the spring so the gate opens effortlessly and closes without slamming shut. The pig specific trip mechanism, shown on page 25, can be used to hold the gate open.

*A vertical gate using a stake as a trip mechanism*

Alternatively, hold the gate partially open by a stick or prop. This will fall away as the first pig enters the trap and the gate will close. This method is not considered target specific to pigs.

**Vertical Gates** (pictured opposite below) pivot at the top, close automatically, and can be extremely robust. They can also be easily modified for wary pigs by using a trip.

A wide range of vertical gate designs are available and landholders can easily manufacture them from available scrap steel. However, a vertical gate is quite noisy when closing. This may frighten pigs entering the trap and deter others feeding close by. Small pigs may have difficulty in pushing the gate open.

The trip mechanism varies according to the gate design but it usually relies on being propped open with a stake (which falls away when the pig pushes the door up when entering) or on a trip wire to activate the gate fall.

Both of these trip mechanisms are not target-specific to pigs and can be easily set off by other animals.

## 3. Shooting / Hunting / Dogging

Pigs are the main feral animal to be hunted in Australia, although hunters seldom effectively control pig numbers and may actually disperse them. However, recreational hunting can provide significant revenue to small communities with the sale of pig carcasses to commercial pig boxes worth over $20 million each year.

**Helicopter shooting** is very effective for reducing pig populations in the short-term. It works best in open terrain, remote locations, and in inaccessible areas such as swamps and marshes where pigs are in reasonable numbers and the habitat is open enough so pigs can be seen from the air.

Helicopter shooting is advocated in contingency plans for eradicating feral pigs during exotic disease emergencies. The increasing availability of small mustering helicopters has made aerial shooting a more economic option, but the cost of control varies with pig density and the efficiency of the operators. Automatic shotguns or semi-automatic large calibre (.308) rifles are the most suitable weapons.

'Judas' pigs may also be used to help locate groups of pigs. This technique involves attaching a radio-collar to a feral pig and releasing it to join up with other pigs. Once its location is identified, any pigs with it can be destroyed, but it is left alive to search out other groups of feral pigs. As with other control techniques, helicopter shooting is not a stand alone control measure and requires other follow up techniques.

**Ground shooting** with rifles, long bows or cross bows, includes individual hunters stalking pigs, groups of hunters chasing pigs into more accessible shooting terrain, spotlight shooting or opportunistic shooting from vehicles. It is applicable only on relatively small, easily accessible areas.

Ground shooting on its own is not effective in reducing the pig population unless shooting is extremely intensive, on a small isolated population, or where pigs are accessible.

There is limited information on hunting in integrated control programs, other than as a mopping up exercise for remaining pigs after other control techniques have been used. Shooting is very labour intensive, can disperse pigs, requires a great deal of skill to be cost effective and cannot be used to control pigs over large areas, particularly when they are at low densities.

Night vision scopes attached to rifles are effective in open terrain. The animals are not aware of where the firing originates – as a consequence a number of animals in a group may be shot before they disperse.

Recreational hunters may kill only 15-20 per cent of the feral pig population in accessible areas annually. Hunters have sometimes introduced pigs to 'clean' areas and may only take adults, castrate males or cut the ears off pigs to make them more difficult to catch with dogs, thus ensuring 'sport' in future seasons. These actions are in direct opposition to effective pig control.

**Dogging** is also very ineffective in reducing feral pig populations. It is best suited to removing the few remaining pigs left after poisoning and trapping campaigns. Hunting with dogs increases the probability of flushing feral pigs, particularly in dense vegetation or in cane blocks. However, research has shown even experienced dogs can miss concealed pigs.

**The Australian Model Code of Practice for the Welfare of Animals – Feral Livestock Animals is recognised under the Animal Care and Protection Act 2001. A full copy of the code is available at www.publish.csiro.au/pid/370.htm**

**The Feral Livestock Animal Code specifically refers to the use of dogs to capture feral pigs.**

- **Acceptable Methods of Capture – Under some conditions e.g in scrub or dense bush, and following trapping and poisoning campaigns, trained dogs can be useful to locate and flush animals out of thick cover. As there is considerable potential for injuries to dogs and pigs, using this technique, operators need to be experienced and dogs well trained.**
- **Unacceptable Methods of Capture – The use of dogs to attack and bring down feral pigs is unacceptable.**

When dogs encounter a mob of pigs, adult boars will usually stand to defend the group while the rest escapes, so very few will be caught. Dogs tend to target these boars enabling the breeding sows to escape.

Dogging also tends to disperse pigs into neighbouring areas, while lost dogs can establish wild dog populations. Dogs may also target other species, including cattle, horses and native animals. Welfare groups consider the use of dogs to pursue and hold pigs as inhumane to both types of animals.

Hunting and dogging may have the benefit of cost recovery, as control of the captured pigs produces an economic return to the landholder or hunter from commercial wild game harvest companies. Commercial hunting of pigs is practiced in the North Queensland dry tropics region when the pig depots (termed chiller boxes) are open.

A disadvantage of this industry is that only pigs of a certain size are targeted and young pigs are generally released to repopulate the area. Another drawback is that live pigs are transported to the chiller box sites, with the risk of pigs escaping into clean areas. Hunters have also been known to release pigs into clean areas so their sport or money sideline is close to where they live.

It must be noted the transport of live feral pigs is allowed only by permit under the Land Protection (Pest and Stock Route Management) Act.

**A study was carried out in Canberra on the effects of hunting pigs with dogs in a national park. Radio tracking of pigs, hunting dogs and hunters showed only 27 per cent of the pigs seen were captured by the dogs. Hunters passed within 100 metres of pigs without the dogs picking up their scent. This control technique only removed 13 per cent of the pig population present.**

## 4. Exclusion Fencing

Fencing can reduce pig damage, but effectiveness generally depends on the cost and quality of materials.

The efficiency of the design, initial and annual costs, the area enclosed, the length of the perimeter, life of the fence, and the value of the area being protected must be considered.

Fencing high value crops or animal enterprises can be cost effective over time and will generally offset the initial outlay. Exclusion fencing is effectively used for feral pig control in Hawaii.

Fencing needs to be constructed before pigs get used to crossing an area. Once pigs are aware of a food or water source inside the area then fencing will generally be unsuccessful.

The most effective pig-proof fences include **commercially fabricated sheep or pig netting** held close to the ground by barbed wire. Continuous maintenance is needed to repair breaches made in the fence by pigs or other animals, fallen timber and floods.

**Electrification** is the cheapest and simplest method of modifying existing fences to pig-proof standard. It increases their effectiveness and minimises maintenance requirements that stem from pig damage.

Electrifying conventional mesh fences can be achieved by incorporating live out-rigger lines at 20 to 30 cm high, and approximately the same distance out from the fence.

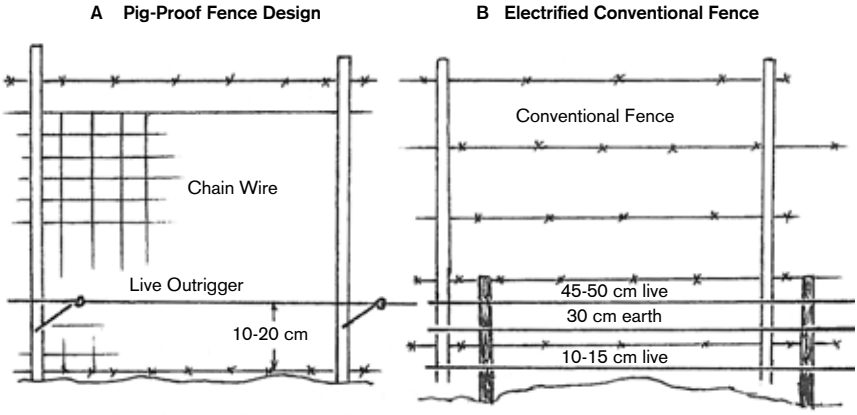
In dry soil conditions, an earth wire should be included below the single wire or conversely midway between two live wires, placed at heights of 10-15 cm and 45-50 cm offset from the netting or electric fence.

The most effective fence design features 8/80/15 hinge joints, steel posts at 5 m intervals, top and bottom barb wires and an electrified outrigger wire 25 cm above ground level.

Vegetation growing underneath an electric fence must be controlled to prevent shorting.

Pigs are most active at night when dew-covered grass is more likely to short out or drain the electric fence.

Pig-proof fences (A) are expensive to construct but are very effective. Electrifying a conventional fence (B) greatly improves its effectiveness and will add years to its life. In moist soil conditions a single live wire, as in (A), will suffice.



## 5. Other Control Techniques

**Biological control** of feral pigs with pathogens has been suggested, but has not been pursued. The main disadvantage is that it would be difficult, if not impossible, to stop the spread of any disease to domestic piggeries – an industry with an annual value of more than $200 million to Australia.

The idea of releasing an **exotic disease** that targets pigs has also been raised. For example, African swine fever would cut numbers of feral pigs by up to 90 per cent. However, the exotic disease would consequently remain in Australia forever, with pig populations gradually building up resistance over several generations.

Diseases would also significantly affect the feral pig industry and the associated loss of export revenue (estimated at over $20 million per year).

Though current research is looking for an **immunocontraceptive** for control of rabbits, foxes and rodents, there is no similar work being considered for feral pigs. There are no long-lasting contraceptive compounds. This would make repeat dosing necessary and add to high bait delivery costs.

There is also a risk that domestic piggeries would be contaminated and lead to cross-mutation with other species – including humans.

# IMPLEMENTING A CONTROL PROGRAM

**The impact of feral pigs**, and not necessarily the number of pigs, must be **reduced** to acceptable levels. Simply reducing numbers to very low levels may not be necessary, achievable or economically viable.

It's difficult to establish a threshold level where pig impact is tolerable compared to the cost involved in further control. The threshold level will vary with different community values and seasonal conditions. Landholders may regard even a low population of feral pigs as unacceptable, whereas hunting groups may feel very low pig levels reduce the quality of their sport.

Some landholders take into account the economic return of their produce or the growth stage of their crop when determining an acceptable level of pig impact.

**Pig ecology** highlights why pigs are difficult to control:

- Pigs are generally nocturnal, wary and camp through the day in thick inaccessible vegetation wherever possible.
- Their reproductive potential means repeated sustained control programs are generally required to reduce pig damage to an acceptable level.
- Omnivorous feeding habits give pigs a wide range of available food sources and make successful pre-feeding or poisoning for an intended control program difficult.
- Home ranges can be large and overlap considerably. Control programs must be conducted over a large area (including several adjacent properties) to be effective.

**Animal welfare** considerations must be taken into account:

- The Animal Care and Protection Act 2001 provides for the control of pest animals only when the control is undertaken in a way that causes the animal as little pain as is reasonable.
- The Model Code of Practice for the Humane Control of Feral Pigs provides guidance on humane control and promotes the importance of ensuring control efforts are effective and targeted. (Refer to links for further information on last page)

## Where to apply control

Pigs require three essential elements – food, water and shelter. Resident pigs prefer a permanent water source where they can drink every day, as well as a food source and shelter from the sun and predators.

Pigs are attracted to wet areas, particularly swamps and riparian areas. In wet areas, soils are easy to dig (conserving energy), food is plentiful (grasses, earthworms, plant roots and insects) and adequate vegetative cover is available (pigs are susceptible to high temperatures).

These pig refuge areas should be targeted first, especially if time and money is limited. There is no point in conducting a broad scale control program if limited resources inhibit control effectiveness. It is much better to concentrate these resources on specific target areas.

## When to apply control

Targeting pig populations when their distribution is restricted because of reduced water, food or cover availability can increase effectiveness and reduce control costs. Pigs are more likely to take baits or enter traps when they are hungry.

Cost effectiveness of aerial shooting increases when pigs home in on limited supplies of water and/or cover. Landholders should target small, isolated or new outbreaks of pigs as these populations are more susceptible to eradication, making control more cost effective.

**Coordination and cooperation** between groups of landowners and other stakeholders (including local government and agricultural industry groups) is essential.

Group action in implementing feral pig control empowers stakeholders with a sense of ownership of the process and the solution. It also encourages enthusiasm and commitment through peer pressure, and is more likely to result in the delivery of adequate technical and financial resources. Effective goal–oriented management is the likely outcome.

**Effective group action** depends upon keeping cohesive groups:

- Start with a group of people who are comfortable together.
- Select a prominent landowner as leader, one who is accepted by all, knows the social structure of the group and knows the common needs of the district.
- Use existing groups such as Landcare to establish a feral pig control sub-committee.
- Keep the group at a manageable size.
- Establish a sound communication structure. Group members may begin to feel left out of the planning and decision making process if all members are not kept informed.
- If possible, liaise with other established pig control groups.
- Establish a line of contact with relevant coordinators available in local councils or government agencies.

*Feral pigs at Cromarty wetlands, south of Townsville*

# CASE STUDY

## Electric Fencing

The Bonanno family lease a 205 acre cane block at Home Hill in the Burdekin region.

Their close proximity to cattle grazing areas and swamp areas means feral pig populations surround the block.

Prior to taking action to control the problem, paddocks that should have yielded 1500 tonnes of cane were only yielding 300 tonnes.

### THE SOLUTION

The previous lessee of the block constructed an electric fence to protect the cane from major pig damage.

The three kilometre long fence is made up of four electrified strands, two un-electrified top strands, and one bottom strand made from barbed wire.

It was built 10 years ago for approximately $50,000. No pig damage has been experienced since the fence was constructed.

### SWEET RESULTS

Since the fence was constructed the tonnage from the entire cane block has nearly doubled from 4500 tonnes to 8000 tonnes.

Based on the initial outlay of $5000 per year ($50,000 over 10 years) plus annual maintenance costs of $1500, the average expense amounts to $6500 per year. In return, they harvest an extra 4000 tonnes of cane worth $200,000 in good years.

Sam Bonnano says the fence had been paid off many times over the past 10 years.

“Without the fence it is worthless to grow cane here,” he says.

“Fence maintenance is vital. It’s necessary to keep the grass growth down and make repairs after flooding.

“You must maintain the fence or the whole technique becomes useless.”

The fence line is sprayed with herbicide four to five times a year at an annual cost of about $1500 and a day’s labour for each inspection.

# CASE STUDY

*Waste bananas are used as bait material in the Hinchinbrook region*

## A Regional Approach

### HINCHINBROOK COMMUNITY FERAL PIG MANAGEMENT PROGRAM

A desire to reduce the economic, environmental and social impacts of feral pigs in the Hinchinbrook Shire Council area led to a regional program being established in 2009.

Financial support for the program came from the Queensland Government (Parks and Wildlife Service and Forestry Plantations QLD), Hinchinbrook Shire Council, regional organisations (Terrain NRM, Herbert Cane Productivity Services) and private organisations (Elders, Rewards Management). The total budget for 2009/10 was $105,000.

### CONTROL TECHNIQUES

The program incorporated an integrated approach using trapping, aerial shooting and poisoning control techniques.

A Feral Pig Management Officer was also employed to handle day to day activities including the issuing and coordination of traps, and providing training when required. The officer is also responsible for the administration of 1080 baiting, along with the bait supply program and data collection.

The program is designed to:

- coordinate feral pig management throughout the region
- assist landholders to establish their own control programs
- assist in the formation of landholder groups
- collect data on control activities
- provide a source of low cost bait supply
- improve management of feral pig issues throughout the region.

## LANDHOLDER RESPONSIBILITIES

Participating landholders are responsible for trapping tasks such as maintaining, setting and checking traps, as well as pre-feeding and poisoning tasks. They also need to notify neighbours and check poison sites.

In addition, landholders need to maintain monthly data sheets and assist in the bait delivery system. Waste bananas are used as bait material and are collected from a source in the adjacent shire before being transported to Ingham for use in the program.

During 2009/10, around 750 pigs were trapped and a further 436 were baited.

# CASE STUDY

## Forming a cooperative group

After suffering continual devastating crop losses from feral pigs, a group of 18 adjoining landholders at Horseshoe Lagoon near Giru formed a cooperative group to control their feral pig problems.

An estimated 15 to 20 per cent of cane stalks were being damaged by feeding pigs, and in one case a 127 hectare block experienced losses valued at more than $50,000.

### THE SOLUTION

By forming a group in 2009, the landholders were able to use a combination of pig control techniques, including aerial and ground shooting, electric fencing, trapping, and poisoning.

The group has a coordinator and meets twice a year to discuss pig control, usually in conjunction with other meetings. To cover costs, each group member pays a levy of $2 per hectare.

Helicopter shooting is conducted over pig refuge areas – usually at the end of crushing.

In 2009, around 100 pigs were shot during five separate flights (a total of five hours). A professional helicopter service was used with a professional shooter at a cost of $1100 per hour. In these circumstances, each landholder is billed on a pro-rata basis according to the size of their holdings.

Some of the properties use poisoning, particularly those with mango trees. Mangoes are the preferred food source for pigs, and they will travel great distances to feed on mangoes once they are aware of their availability. The preferred method is to inject them with 1080 and put the poisoned fruit under the fruit trees. This happens several times over the fruiting season.

A five kilometre electric fence was also constructed at a cost of $37,000 and is very effective in preventing sugar cane damage by pigs. No pigs have been seen inside the electric fence.

In addition, maintenance spraying to control grass is conducted six times a year using quad bikes fitted with spray units.

Trapping has been used, and is managed as part of the normal farming routine. Traps are placed outside of the electric fences, and non-electric wing fences funnel the pigs into the traps.

Ground hunters with dogs are sometimes used in between other techniques, though only selected hunters are allowed access. Ground shooting is also used on an opportunistic basis.

# CASE STUDY

## Using aerial shooting

Michael and Natasha Penna have a 1300 acre mixed enterprise irrigated farm on the Burdekin River, north of Charters Towers.

The couple grow 2500 tonnes of potatoes annually, with some forage sorghum and corn. They also have a small herd of grazing cattle.

Initially the Pennas did not experience problems with feral pigs. However, once the pigs began to damage their crops of highly palatable potatoes about a decade ago, the feral animals continued to reinvade.

Mike believes pigs enter his property from surrounding riparian areas, and from the large cattle grazing land along the river in particular. He now has a continual reinvasion problem from adjacent uncontrolled areas.

The majority of damage is caused when pigs dig up the newly planted seed potatoes. To replant the areas would be economically unviable. Each season, about one hectare of potatoes is lost. This amounts to about 30 tonnes, and a loss of $10,000 annually.

### SETBACKS

Ring-lock fencing was erected to help control the problem. This was generally successful but had high maintenance costs because wallabies and pigs often made holes in the fence.

Mike electrified sections of the fence, but again this was associated with high maintenance and labour costs. He also carried out ground shoots.

Trapping proved to be unsuccessful, as the area's plentiful food supply means pigs have no need to enter traps. Pigs didn't respond to carcasses or meat baits, and the use of CSSP mixed with corn/molasses and pumpkins resulted in limited success.

After Mike's cattle started eating the bait he stopped using CSSP.

## THE SOLUTION

Poor results from a range of techniques meant aerial shooting was the next step.

The success rate has been high. In the first hour of flying, Mike shot nearly 30 pigs. This totally stopped all pig damage for the following growing season. He now shoots several times a year as the need arises.

Mike has a shared costs arrangement with a neighbour. Each shoot usually lasts up to two hours, depending on the pig population and the amount of searching required. The cost of the helicopter is approximately $800 per hour.

For annual costs of $2500-$5000, Mike estimates he now saves $10,000 worth of potatoes.

In addition, there are no maintenance costs for electric fencing and reduced maintenance costs for the ringlock fencing.

# LINKS TO FURTHER INFORMATION

- Mitchell J 2008, *Feral Pig Control Manual*, Biosecurity Queensland <www.dpi.qld.gov.au/4790_18481.htm>
- Mitchell J 2010, *Experimental Research to Quantify the Environmental Impact of Feral Pigs within Tropical Freshwater Ecosystems*. Dept of the Environment, Water, Heritage and the Arts. <www.environment.gov.au/biodiversity/invasive/publications/feral-pig-impacts.html>
- Sharp T, Saunders G, *Model Code of Practice for the Humane Control of Feral Pigs*, NSW Dept of Primary Industries <www.environment.gov.au/biodiversity/invasive/publications/pubs/cop-feral-pigs.pdf>
- CSIRO 2003, *Model Code of Practice for the Welfare of Animals: Feral Livestock Animals* <www.publish.csiro.au/pid/370.htm>
- Dept of the Environment and Heritage 2005, *Threat Abatement Plan for Feral Pigs* <www.environment.gov.au/biodiversity/threatened/publications/tap/pig.html>
- D Choquenot, J McIlroy, T Korn 1996, *Managing Vertebrate Pests: Feral Pigs* <www.daff.gov.au/abare-brs/aparp/managing_vertebrate_pests_feral _pigs>
- Additional general information can also be found at **www.feral.org.au**

*Free feeding station*

FERAL PIG CONTROL

NQ Dry Tropics
LAND & WATER SOLUTIONS

**NQ DRY TROPICS**
2 McIlwraith Street,
Townsville QLD 4810

PO Box 1466
Townsville QLD 4810

Blueprint FOR THE BUSH

Burdekin Shire Council

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