

NATSOP-PIG005

NATIONAL STANDARD OPERATING PROCEDURE: POISONING OF FERAL PIGS USING PIGOUT 1080 BAITS

Reference as:

Terrestrial Vertebrate Working Group (2024) NATSOP-PIG005 National Standard Operating Procedure: Poisoning of Feral Pigs using PIGOUT 1080 Baits.

Available for download at pestsmart.org.au/toolkits/feral-pigs/

Associated documents (referred to as associated CoP and NATSOPs) relating to the NATSOP-PIG005 National Standard Operating Procedure: Poisoning of Feral Pigs using PIGOUT 1080 Baits include:

- National Code of Practice for the Effective and Humane Management of Feral Pigs
- NATSOP-PIG001 National Standard Operating Procedure: Trapping of Feral Pigs
- NATSOP-PIG002 National Standard Operating Procedure: Aerial Shooting of Feral Pigs
- NATSOP-PIG003 National Standard Operating Procedure: Ground Shooting of Feral Pigs
- NATSOP-PIG004 National Standard Operating Procedure: Poisoning of Feral Pigs with Sodium monofluoroacetate (1080)
- NATSOP-PIG006 National Standard Operating Procedure: Poisoning of Feral Pigs with HOGGONE® Sodium nitrite Baits

This document outlines best practice guidelines for the effective and humane management of feral pigs in Australia.

The Code of Practice (CoP) outlines humane control strategies and their implementation while National Standard Operating Procedures (NATSOPs) describe control techniques, their application, and strategies to minimise any harmful impacts.

The national CoP and NATSOPs comprise model guidelines that set minimum animal welfare standards. They do not override CoPs and SOPs in jurisdictions where these documents have been developed, prior to or after the endorsement of these documents, to address specific management issues or to comply with relevant legislation. For example, the national-level CoP and NATSOP for the management of feral pigs are not relevant in New South Wales, which currently has both state-level CoP and SOPs in place (Sharp *et al.* 2022).

This CoP along with associated NATSOPs will be reviewed by the Terrestrial Vertebrate Working Group (TVWG) within 12 months of when they were endorsed, to manage any potential risks to operations throughout the country.

Jurisdictions conducting operations for feral pig control are encouraged to submit reports to the TVWG secretariat for discussion at either the 12 monthly review, or sooner if there are urgent matters that need to be raised. The reports should include:

- whether the national CoP and NATSOPs were implemented in their jurisdiction
- whether the national CoP and NATSOPs were effective
- apparent mistakes or oversights in the national CoP and NATSOPs
- unintended consequences or adverse events that occurred when implementing the national CoP and NATSOPs
- new techniques or modifications to existing techniques as a result of research or registration.

These reports will form the basis of reviews by TVWG.

Acknowledgements

This document is based on the original work by Sharp, Cope and Saunders titled 'NSW Code of Practice and Standard Operating Procedures for the Effective and Humane Management of Feral Pigs' published in 2022. Much of the text presented here is a direct reproduction of the original source. This version primarily involves minor edits and formatting changes to adapt the original material for a national audience.

The TVWG acknowledges the significant research conducted by Trudy Sharp, Holly Cope and Glen Saunders which forms the basis of this text and acknowledge that the intellectual property and creative credit for most of this content remain with them.

Guidance, input and reviews were provided by the multi-jurisdictional membership of the TVWG. Consultation and input were also provided by animal welfare NGOs, National Feral Pig Action Plan's Implementation Committee and Scientific Advisory Panel, Centre for Invasive Species Solutions, and operational and policy government staff.

Coordination was managed by the National Feral Pig Management Coordinator, Dr. Heather Channon.

BACKGROUND

Poisoning with sodium fluoroacetate (1080) is considered to be one of the most effective methods of quickly reducing feral pig numbers. 1080 is an odourless, tasteless concentrated solution that is incorporated into bait material and offered either in bait stations, where many baits are laid in one area, or by cluster style aerial baiting (a number of restrictions apply). Whilst there is no physiological data on the action of 1080 on feral pigs, the Relative Humaneness Matrix (Sharp and Saunders 2011) rated 1080 as relatively less humane than sodium nitrite.

PIGOUT® baits contain a core of 1080 powder surrounded by a matrix of fish-flavoured cereal that has been dyed green to minimise uptake by non-target species.

They are also coated with a biodegradable cellulose skin to further minimise non-target uptake, prevent drying out and increase resilience when deployed from the air.

Free-feeding with non-toxic grain bait or PIGOUT® placebo free-feed is performed for a number of days prior to laying poisoned baits and is an important step in most baiting programs.

Although PIGOUT® baits are more target specific than freshly prepared baits, because of the large doses of 1080 required to kill pigs, baiting should always be undertaken with caution. Good baiting technique helps to minimise the risk to non-target species and maximise the effect on targeted feral pig populations.

This National Standard Operating Procedure (NATSOP) is a guide only; it does not replace or override the relevant state and territory legislation, toxin label and permit conditions. The NATSOP should only be used subject to the applicable legal requirements (including WHS) operating in the relevant jurisdiction.

Individual NATSOPs 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 feral pig populations and impacts.

Application

- The handling and supply of PIGOUT® baits can only be conducted by authorised and properly trained persons under the laws of each state, territory, or local government, subject to an authorised officer (AO) risk assessment and an assessment by the bait user of the risks of baiting to non-target species.
- Poisoning with 1080 should only be used in a strategic manner as part of a coordinated program designed to achieve sustained effective control.
- 1080 baiting of feral pigs is considered a relatively inexpensive and effective method of reducing high pig populations.
- PIGOUT® is registered for use in all states and territories in Australia.
- Poisoning is primarily used as an initial control method whilst other methods such as trapping, ground shooting and exclusion are used as follow-up techniques to keep pig numbers at a low level.

- Baiting with PIGOUT® must not be used in areas where there is an unacceptably high risk to humans and companion animals, such as urban/residential environments.
- Use of PIGOUT® is restricted in areas where there is a high risk of poisoning domestic stock and wildlife.
- The best time to conduct a poisoning program is when surface water is scarce, and pastures have dried off. At this time pigs will be concentrated near permanent water points and are more likely to eat bait due to hunger. It can be difficult to get feral pigs to take or find bait when there is abundant alternative food available. To achieve maximum population reductions, it is also recommended that broad scale control programs be conducted prior to breeding, which usually peaks between May and October. In south-eastern Australia, summer or autumn is usually the most effective period for baiting pigs.
- Baiting of feral pigs with PIGOUT® can only be carried out under label conditions issued by the Australian Pesticides & Veterinary Medicines Authority (APVMA) under Commonwealth legislation (*Agricultural and Veterinary Chemicals Code Act 1994*).
- 1080 is a restricted chemical product (under Regulation 45 of the Agricultural and Veterinary Chemicals Code Regulations 1995) and is listed as a Schedule 7 – Dangerous Poison under the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP). These listings require special precautions in the manufacture, handling, storage and use of 1080, along with specific regulations regarding labelling or availability.

Aerial baiting

- Although not specifically covered in this SOP, aerial baiting of feral pigs using PIGOUT® may be applicable in inaccessible and remote areas. Aerial baiting of feral pigs should only be considered when:
 - difficult access makes ground baiting impractical
 - it is the most cost-effective means of control
 - it will form an integral part of a properly planned and executed control program
 - the risk to non-target species has been assessed and all steps will be taken to minimise this impact.
- There are a number of restrictions and legal requirements associated with aerial baiting programs.
 - Aerial baiting must be organised through an agency that has approval to undertake such an activity.
 - All programs involving aerial application of 1080 feral pig baits must follow regulatory guidelines where available, such as the NSW Vertebrate Pesticide Manual for NSW programs.

Animal welfare implications

Target animals

- The toxicity of 1080 is due to the conversion of fluoroacetate to fluorocitrate, which inhibits the tricarboxylic acid cycle – a mechanism necessary for cellular energy production. In general, herbivores experience cardiac failure, whereas carnivores experience central nervous system (CNS) disturbances and convulsions and then die of respiratory failure. Some species, usually omnivores such as pigs, can be equally affected by both CNS and cardiac signs.
- After a pig has ingested PIGOUT® baits there is a latent period, usually between one and several hours, before signs such as salivation, jaw chomping, vomiting, increased lethargy, and laboured respiration are observed. The delayed onset of symptoms associated with PIGOUT® baits, compared to feral pigs poisoned with unbound 1080, is due to the hydrophobic core not completely breaking down until it reaches the duodenum of the animal. Although the precise nature and extent of suffering after ingestion of 1080 is unknown, it is likely that the animal will experience discomfort prior to and during vomiting. Some pigs exhibit signs of central nervous system disturbance including hyperexcitability, squealing, manic running, paralysis or convulsions, followed by coma and then death. Other animals may lie quietly, breathing slowly and laboriously until death. Time to death is variable depending upon amount 1080 absorbed but is usually around 4 to 6 hours after ingestion under field conditions. With sub-lethal doses, pigs can metabolise the poison and survive. Animals surviving a sub-lethal dose may develop an aversion to 1080, decreasing their susceptibility to subsequent poisoning programs. There is presumed to be minimal pain or distress during the latent period; however, nausea and discomfort are likely before and during vomiting. In the later stages, when severe central nervous system dysfunction has developed, it is unknown if animals are perceiving pain. If animals are conscious during the convulsive episodes or if they become conscious afterwards, it is possible that they may experience pain and anxiety. There is also potential for injuries to occur after the appearance of clinical signs.
- Vomiting is a prominent early sign of 1080 poisoning in feral pigs, occurring approximately 1 to 5 hours after ingestion. Some pigs vomit frequently over a number of hours. This high incidence of vomiting has the following implications:
 - Vomitus containing 1080 may cause secondary poisoning of non-target species if they consume the vomit.
 - Vomiting may affect the proportion of 1080 dose ingested, possibly resulting in sub-lethal dosing of target animals, and decreasing the overall effectiveness of the poisoning program.
 - Vomiting does not assure survival from 1080 ingestion.
 - Animals surviving a sub-lethal dose may develop an aversion to PIGOUT®, decreasing their susceptibility to subsequent poisoning programs.
- To minimise the animal welfare implications of leaving dependent piglets to die a slow death from starvation it is preferable not to undertake PIGOUT® baiting programs when

sows have recently farrowed. This will vary with season and area. Peaks in mating often occur in response to the flush of green vegetation that follows heavy rain or flooding, with farrowing occurring 112-114 days later. Weaning age of piglets varies from 2 to 3 months. At times of farrowing, sows tend to move over less distances and are usually more cryptic which may reduce the effectiveness of any pig control conducted at this time.

Non-target animals

- 1080 is toxic to a wide range of species including birds, mammals and reptiles; however, there are marked differences in sensitivity. Dogs are extremely sensitive, and most other mammalian carnivores are highly sensitive to 1080 poisoning. Herbivores are less sensitive, and birds and reptiles increasingly more tolerant.
- Relatively large amounts of 1080 must be distributed in baits to kill feral pigs, creating a serious risk of primary poisoning in non-target species. PIGOUT® baits contain a high volume of 1080 (72 mg per bait), which, for example, is 24 times the concentration used for standard fox baits.
- The overall susceptibility of non-target species to 1080 poisoning is determined by many factors including sensitivity to the poison, body weight, concentration of 1080 in the bait, bait placement, bait type and palatability, timing of baiting and level of exposure to toxic baits.
- Poisoning of non-target species can occur either directly by eating baits intended for feral pigs (primary poisoning) or through the scavenging of tissues or vomitus from a poisoned animal (secondary poisoning).
- PIGOUT® baits are targeted for omnivorous feral pigs, therefore other omnivores, such as brush-tailed possums, foxes and some birds can also be attracted to the bait. Remaining baits should be retrieved when evidence of possum (bait skin hollowed out) or bird (pecking of baits) take is evident.
- Although domestic stock has previously shown little interest in PIGOUT®, bait take by cattle (*Bos indicus*) has occurred. Non-toxic test baits should first be trialled with cattle in situations where destocking is not possible.
- Vomitus containing 1080 has the potential to kill a number of non-target animals. Pigs may vomit repeatedly for a number of hours after 1080 ingestion so it is likely that vomitus could be distributed over a wide area creating a potential hazard for non-target animals that consume vomit. Vomit consumption by non-target wildlife did not occur during PIGOUT® trials; however, the occurrence cannot be ruled out completely.
- To minimise the potential for toxic baits to be lethal to non-target animals, the following baiting strategies are used:
 - *Pre-feeding with non-poisoned bait* – allows an assessment of what animals are eating the baits.
 - *Camera traps* – devices that detect heat-in-motion – can be used to assess visitation. The camera is triggered to take photos as the subject moves within the detection zone i.e., vicinity of bait station.
 - *Bait type* – use of PIGOUT® baits, as they are attractive to pigs (under most conditions), and generally unappealing to non-targets.
 - *Colouring of baits* – PIGOUT® baits are dyed green to reduce attractiveness to non-target fauna, especially birds.
 - *Use of bait stations* – PIGOUT® baits can be placed in a fenced area which excludes livestock and other non-target animals but allows pigs to push through to access the bait. Field trials have shown that this is generally unnecessary, as few non-target species consume baits.

- *Placement of baits* – PIGOUT® baits should always be placed in the prime feeding areas of feral pigs. Limiting the number of cluster bait stations further limits non- target fauna exposure, particularly species with small home ranges.
- *Timing of baiting* – PIGOUT® baits are best laid in the evening as feral pigs are mostly active between dusk and dawn. Baits thus laid will be mostly consumed overnight before non-target animals have access.
- *Collection of uneaten bait and feral pig carcasses* – any uneaten PIGOUT® baits, vomitus and poisoned pig carcasses are collected and destroyed or buried with a minimum of 500 mm of soil.

First aid for dogs

- Care must be taken to ensure that working dogs and pets do not come into contact with 1080. Dogs may eat meat baits, pelleted bait, vomitus from a poisoned pig or poisoned pig carcasses. The prognosis for poisoned dogs is extremely poor unless vomiting can be induced shortly after ingestion of the bait and before clinical signs are evident.
- If a working dog or pet is known to have eaten material containing 1080 but is NOT yet showing signs of poisoning, induce vomiting by giving one of the following emetics by mouth:
 - washing soda crystals (sodium carbonate) – 3 to 5 crystals orally, DO NOT use laundry detergents or powders.
 - table salt – 2 teaspoons of salt in 1 cup of water; more or less depending on the size of the dog.
 - dilute hydrogen peroxide (3% solution) – 3 to 5ml.
 - If the dog has vomited, clean it up immediately as the vomit is toxic.
 - THEN SEEK VETERINARY ATTENTION IMMEDIATELY. The sooner action is taken following poisoning the better the prognosis.
 - If these emetics are not immediately to hand or you are not having success in making the dog vomit it is better to seek veterinary attention immediately rather than waste time.
- If the dog has already begun to show signs of toxicosis (retching and vomiting, frenzied behaviour such as running and howling, convulsions, difficulty breathing etc.), DO NOT induce vomiting, but seek veterinary attention without delay.
- Veterinary intervention aims to decrease 1080 absorption and facilitate excretion; control seizures; and support respiration and cardiac function.
- See *First Aid – 1080 and your dog* for more information: <https://pestsmart.org.au/resources/>

Workplace health and safety considerations

- If poisoning occurs, contact a doctor or the Poisons Information Centre (Ph 13 11 26) IMMEDIATELY. Urgent hospital treatment is likely to be needed. There is no effective antidote to 1080.
- For further information refer to the Material Safety Data Sheet (MSDS), available from the supplier, and resources published by states and territories.
- Care should be taken when handling pig carcasses as they may carry diseases such as leptospirosis, Q fever, Japanese encephalitis (JEV), 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 should be taken when lifting/dragging.

Equipment required

PIGOUT® baits

- PIGOUT® baits have been developed to provide a highly targeted and ready-to-use tool for the management of feral pigs. Each manufactured bait contains 72 mg of 1080 bound in a centralised core. The 1080 has been centralised to prevent toxin intake through minor bait nibbling by possums/rodents or pecking by birds. At least 2cm of bait matrix must be consumed from any one direction before the toxin is reached.
- The effect of 1080 on feral pigs, and in turn individual susceptibility to PIGOUT® baits, varies greatly depending on animal size, health, physical stress and environmental conditions. It is impossible for any one individual bait to reliably kill every feral pig, whose weight may range from 5kg to over 200kg. Furthermore, feral pigs are gregarious, and often feed within a mob. Baiting strategies that take into account such variables must be employed.
- Each PIGOUT® bait contains enough 1080 to kill a feral pig around 20 - 30kg under field conditions. Larger animals require two or more baits, and consequently cluster baiting at bait stations is required for the effective control of feral pigs. It is known that feral pigs will self-regulate bait intake based on body size, as long as sufficient bait is supplied. Large boars for example will take up to nine baits and the average for a mob is often around five baits. The high target-specificity of PIGOUT® baits to feral pigs means such a baiting strategy can remain safe for non-target species.
- Poisoned PIGOUT® baits are dyed green so they are readily distinguishable from human and animal food and to reduce attractiveness to birds.
- Prepared bait must be stored and transported in a secure and safe manner in the supplied PIGOUT® pails. Access must be restricted to approved personnel only. Refer to relevant State and Territory legislation for details.

Procedures

- An authorised officer (AO) must conduct a risk assessment to determine if it is appropriate to supply 1080 baits to any person. Risk assessments should consider threats to non-target species particularly domestic dogs, human health and the environment.
- AOs must conduct a risk assessment of planned group baiting programs where baiting occurs less than the prescribed minimum distances as detailed on the product label, and as specified by state and territory legislation.

- Users of 1080 must always refer to specific permit, approved label and relevant state and territory orders for up-to-date information on conditions of use including distance restrictions, public notification and bait preparation, distribution, storage, transportation and disposal.

Disposal of carcasses

Reasonable steps should be taken to collect and dispose of carcasses poisoned using 1080, where recovered, to minimise disease risks associated with using meat to attract other pigs.

For further information about disposal of carcasses in some states and territories refer to:

- NSW: https://www.dpi.nsw.gov.au/data/assets/pdf_file/0003/1299603/animal-carcass-disposal.pdf
- South Australia - https://www.epa.sa.gov.au/files/7566_onfarm_disposal.pdf
- Victoria: <https://agriculture.vic.gov.au/biosecurity/pest-animals/invasive-animal-management/integrated-feral-pig-control>

Further information

- ACT - [Wildlife management](#)
- NSW Pesticide Control (1080 Bait Products) Order:
<https://www.epa.nsw.gov.au/your-environment/pesticides/pesticides-nsw-overview/pesticide-control-orders>
- NSW DPI Vertebrate Pesticide Manual:
<https://www.dpi.nsw.gov.au/biosecurity/vertebrate-pests/publications/nsw-vertebrate-pesticide-manual>
- NT - [Controlling wild dogs and pest animals with 1080 poison](#)
- QLD - [Landholder authorisations for invasive animal control | Queensland Health](#)
- SA - <https://pir.sa.gov.au/biosecurity/introduced-pest-feral-animals/using-poison-baits-in-south-australia/baiting-for-feral-pigs>
- TAS - <https://nre.tas.gov.au/biosecurity-tasmania>
- VIC - only commercially manufactured, shelf stable 1080 bait formulations such as PIGOUT can be used for feral pig control.
<https://agriculture.vic.gov.au/biosecurity/pest-animals/invasive-animal-management/integrated-feral-pig-control>
- WA - Characteristics and use of 1080:
<https://www.agric.wa.gov.au/1080/1080-characteristics-and-use>

For more information on PIGOUT baits from the manufacturer refer to:

- <https://static1.squarespace.com/static/5a5ebfbed74cff30017f4e32/t/5b04e48d575d1fad81a19f8a/1527047325748/PIGOUT+Brochure.pdf>

Relevant legislation

- Australian Capital Territory - Environmental Protection Act 1997 and Medicines, Poisons and Therapeutic Goods Act 2008- [Legislation, policies and guidelines - Environment, Planning and Sustainable Development Directorate - Environment \(act.gov.au\)](#)
- New South Wales - Pesticide Control (1080 Bait Products) Order 2020 - PESTICIDE ACT 1999 – PESTICIDE CONTROL ORDER UNDER SECTION 38 - 1080 Bait Products ([nsw.gov.au](#))
- Northern Territory: Agricultural and Veterinary Chemicals (Control of Use) Act - <https://legislation.nt.gov.au/en/Legislation/AGRICULTURAL-AND-VETERINARY-CHEMICALS-CONTROL-OF-USE-ACT-2004>
- Queensland - Medicines and Poisons Act 2019, <https://www.health.qld.gov.au/system-governance/licences/medicines-poisons>. Departmental Standard - Dealing with restricted Schedule 7 poisons for invasive animal control. (https://www.health.qld.gov.au/data/assets/pdf_file/0020/1330814/fs-rural-landholders-invasive-animals.pdf) <https://www.health.qld.gov.au/system-governance/licences/medicines-poisons/medicines-poisons-act/legislation-standards>
- South Australia - Controlled Substances (Pesticides) Regulations 2017 - ([https://www.legislation.sa.gov.au/lz/path=/c/r/controlled%20substances%20\(pesticides\)%20regulations%202017](https://www.legislation.sa.gov.au/lz/path=/c/r/controlled%20substances%20(pesticides)%20regulations%202017))
- Tasmania - Agriculture and Veterinary Chemicals (Control of Use) Act 1995 - (<https://nre.tas.gov.au/Documents/PestRegister.pdf>) <https://nre.tas.gov.au/agriculture/agvet-chemicals/legislation-and-subordinate-legislation>
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