Model code of practice for the humane control of rabbits

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Introduction

The aim of this code of practice is to provide information and guidance to vertebrate pest managers responsible for the control of rabbits. Control programs aim to reduce the negative impacts of rabbits using the most humane, target specific, cost effective and efficacious techniques available.

This code of practice (COP) is adopted nationally. Jurisdictions can apply more stringent requirements as long as they retain the principles set out in these codes. The COP should only be used subject to the applicable legal requirements (including OH&S) operating in the relevant jurisdiction.

Background

There is an expectation that animal suffering associated with pest management be minimised. The most humane methods that will achieve the control program's aims must be used. Consideration of animal suffering should occur regardless of the status given to a particular pest species or the extent of the damage or impact created by that pest. While the ecological and economic rationales for the control of pests such as the rabbit are frequently documented, little attention has been paid to the development of an ethical framework in which these pests are controlled. An ethical approach to pest control includes the recognition of and attention to the welfare of all animals affected directly or indirectly by control programs. Ensuring such approaches are uniformly applied as management practices requires the development of agreed Standard Operating Procedures (SOPs) for pest animal control. These SOPs are written in a way that describes the procedures involved for each control technique as applied to each of the major pest animal species. While SOPs address animal welfare issues applicable to each technique, a Code of Practice (COP) is also required that bring together these procedures into a document which also specifies humane control strategies and their implementation. COPs encompass all aspects of controlling a pest animal species. This includes aspects of best practice principles, relevant biological information, guidance on choosing the most humane and appropriate control technique and how to most effectively implement management programs.

This code is based on current knowledge and experience in the area of rabbit control and will be revised as required to take into account advances in knowledge and development of new control techniques and strategies.

Definitions and terms

Pest animal – native or introduced, wild or feral, non-human species of animal that is currently troublesome locally, or over a wide area, to one or more persons, either by being a health hazard, a general nuisance, or by destroying food, fibre, or natural resources (Koehler, 1964).

Welfare – an animals' state as regards its attempts to cope with its environment (Broom, 1999). Welfare includes the extent of any difficulty in coping or any failure to cope; it is a characteristic of an individual at a particular time and can range from very good to very poor. Pain and suffering are important aspects of poor welfare, whereas good welfare is present when the nutritional, environmental, health, behavioural, and mental needs of animals are met. When welfare is good, suffering is absent (Littin et al., 2004).

Humane Vertebrate Pest Animal Control – the development and selection of feasible control programs and techniques that avoid or minimise pain, suffering and distress to target and non-target animals (RSPCA, 2004).

Best Practice Management – a structured and consistent approach to the management of vertebrate pests in an attempt to achieve enduring and cost-effective outcomes. 'Best practice' is defined as the best practice agreed at a particular time following consideration of scientific information and accumulated experience (Braysher, 1993).

Best practice pest management

From an animal welfare perspective, it is highly desirable that pest control programs affect a minimum number of individuals and that effort is sustained so that pest densities always remain at a low level. Over the last decade, the approach to managing pest animals has changed. Rather than focussing on killing as many pests as possible, it is now realised that like most other aspects of agriculture or nature conservation, pest management needs to be carefully planned and coordinated. Pest animal control is just one aspect of an integrated approach to the management of production and natural resource systems. Most pests are highly mobile and can readily replace those that are killed in control programs. Unless actions are well planned and coordinated across an area, individual control programs are unlikely to have a lasting effect. When planning pest management, there are some important steps that should be considered (after Braysher & Saunders, 2002).

1. What is the trigger to undertake pest animal management? Is there a community or political pressure for action on pests and an expectation that pest animals should be controlled? Pest control is unlikely to be effective unless there is strong local or political will to take action and commit the necessary resources.
2. Who is the key group to take responsibility for bringing together those individuals and groups that have a key interest in dealing with the pest issue?
3. What is the problem? In the past the pest was usually seen as the problem. Hence the solution was to kill as many pests as possible. We now know that the situation is more complex. First, determine what the problem is. For example, it may be soil erosion, damage to native vegetation, reduced stock production or low crop yields. Several factors impact on each of these problems and control of pests are often only part of the solution. The following questions then help define the problem:
    - Who has the problem?
    - Where is the problem?
    - How severe is the problem?
    - Will the problem change with time?
4. Identify and describe the area of concern. Sometimes it helps to remove agency and property boundaries so that the problem can be viewed without the tendency to point blame at individuals; groups or agencies. Property and agency boundaries can be added later once agreement is reached on the best approach.

5. Trying to deal with the complexity of a very large area can be daunting so it often helps to break the area into smaller management units for planning. These smaller units may be determined by water bodies, mountain ranges, fences, vegetation or soil type that is unsuitable for a particular pest or other suitable boundaries that managers can work to. While it is best to work to boundaries that restrict the movement of pests, this may not be practicable and jurisdictional boundaries, for example, the border of a Landcare group, may have to be used in combination with physical boundaries. Once the management units are identified:
    - Identify as best you can, the pest animal distribution and abundance in each management unit.
    - Estimate as far as is practicable, the damage caused by the pest or pests to production and to conservation.
6. Gather and assess other relevant planning documents such as Catchment Management Plans, Recovery Plans for threatened species and Property Management Plans. Identify any key constraints that may prevent the plan being put into operation and identify all the key stakeholders.
7. Develop the most appropriate pest management plans for each of the management units.

Implementing effective and humane pest control programs requires a basic understanding of the ecology and biology of the targeted pest species and in some cases those species affected directly (non-targets) or indirectly (prey species) by a control program. It is also essential to understand the impact created by the pest i.e. what is the problem? Managers should take the time to make themselves aware of such information by reading the recommended texts at the end of this code of practice. A brief summary follows. This information is extracted from the publication Managing Vertebrate Pests: Rabbits by Williams et al. (1995).

Rabbit facts

Rabbits have a high reproductive potential. Adult females produce 15–40 young a year, but only 1–10% survive past the first year. Generally speaking, spring is the high point of the reproductive cycle and autumn the low with breeding triggered when pastures green up after rain. The last litters are conceived as soil moisture becomes limiting and pastures mature and dry out. At birth the young weigh 35 g each and by the time they first emerge from the warren at 21 days they have increased their body weight by 600% to 210 g each.

The key to the success of the rabbit in Australia is the warren, which provides protection from weather and predators and enables rabbits to inhabit semi-arid and arid country. Contrary to popular belief, rabbits do not dig new warrens readily. Although they usually live in warrens, rabbits readily live above the ground whenever there is adequate shelter. In some areas a high proportion of adult rabbits live mostly above ground. Soils are a major factor influencing local and regional distribution. Soils with a high clay (greater than 40%) content or high silt plus clay content (greater than 50%) are not suitable for warrens as these soils become waterlogged in winter and are too hard to dig in summer. The absence of warrens on cracking clays is due partly to waterlogging but it is also due to burrows collapsing as the soil shrinks and swells with changing water content. Warrens are larger and more dense in the deeper soils on lower slopes and flats.

The optimum habitat for rabbits in Australia is the intermediate rainfall zone, where parasite numbers are low, droughts are uncommon and breeding seasons relatively long. Rabbits occasionally do well in Australia's hot arid zones even though physiologically they are not well adapted to arid conditions. When some green vegetation is available, they readily find the high protein, high water content diet they need to survive and reproduce.

Although rabbit densities are rarely known precisely, low, medium and high rabbit densities approximate, less than 1.0, 1–4 and more than four rabbits per hectare respectively. Spotlight transect counts of low, medium and high rabbit densities in open country with low pasture are approximately less than 5, 6–30 and more than 30 rabbits per spotlight kilometre respectively.

Survivors of a population crash tend to be adult rabbits. After the breaking of a drought, rabbit populations are held at low densities for several years by a combination of native predators, foxes and feral cats. It is not until fox and feral cat numbers decline some time after the crash of the rabbit population, and good seasons return, that rabbit numbers build up again.

Adult rabbits live as territorial monogamous pairs, or in social groups of up to ten individuals with separate hierarchies for males and females. Males fight to defend females and females fight to defend access to breeding sites within warrens. As many more young males than females disperse, the warren is a heritage passed on by adult females to female offspring. Resident rabbits rarely move more than 200 metres from their warren. Major causes of death are drought, parasites, rabbit management programs, myxomatosis, rabbit haemorrhagic disease (RHD), and predators such as dingoes, birds of prey, goannas, foxes and feral cats.

Rabbit impact

Before the introduction of myxomatosis and then RHD, rabbits greatly reduced stock productivity and caused profound direct and indirect damage to soils and to native plants and animals. While these biological controls have greatly reduced rabbit densities nationally, damage is still significant. Rabbit damage is worst in the rangelands, where a whole suite of plant species and their dependent animals are threatened with severe range contraction or extinction. The effect of the rabbit in preventing regeneration of native plants is not always obvious. Many of these plants are long-lived but the populations are reaching a stage where many individuals are dying from old age. If rabbits are not controlled before the remaining plants reach the end of their reproductive lives, there will be a long-term decline of the tree and shrub populations in many parts of the rangelands. The extent of the ecological consequences of this are unknown. Significant changes in bird communities and increased soil erosion are likely to be two of the main consequences. There may be no safe rabbit density for some tree and shrub seedlings particularly within 200 metres of rabbit warrens.

As well as causing detrimental habitat change, rabbits threaten native mammals directly through grazing competition and indirectly through intensified predation by cats and foxes after rabbit numbers crash during droughts or disease outbreaks.

The extent to which rabbits reduce the carrying capacity for livestock is not well quantified, although there are numerous anecdotal accounts of increased carrying capacity for sheep following rabbit control. Competition between sheep and rabbits is likely to be most significant when pasture biomass falls below about 250 kilograms per hectare, especially during and coming out of drought. Rabbits, in combination with other wild grazers and livestock, cause damage to the long-term sustainable use of rangeland for nature conservation and pastoralism. Rabbits cause changes in the quality of forage and damage to the flora and habitat of native fauna.

Rabbit control strategies

Rabbit management has historically almost entirely been directed at protecting agricultural production. In more recent times the principles of natural resource management have been widely accepted and promoted, and the need to protect non-agricultural resources recognised. The degree to which control is implemented often depends on how well the problems caused by rabbits are recognised and the resultant priority assigned to rabbit management. By necessity, control effort should be sustained. There are three essential requirements for a pest control technique – necessity,

effectiveness and humaneness. The best strategy is to develop a plan which maximizes the effect of control operations and reduces the need to cull large numbers of animals on a regular basis.

Developing a rabbit management plan

This involves:

- *Defining management objectives*. Objectives are a statement of what is to be achieved, defined in terms of desired outcomes, usually conservation or economic benefits. Objectives should state what will be achieved (reduced impact) where, by when and by whom.
- *Selecting management options*. The management option is selected that will most effectively and efficiently meet the management objectives. The options include: eradication, containment, sustained management, targeted management, one-off action and taking no action.
- *Set the management strategy*. This defines the actions that will be undertaken: who will do what, when, how and where. It describes how the selected pest management options and techniques will be integrated and implemented to achieve the management objectives.
- *Monitoring the success of the program against the stated objectives*. Monitoring has two components, *operational monitoring* – what was done when and at what cost:- this determines the efficiency of the program, and *performance monitoring*:- were the objectives of the plan achieved and if not why not, that is the effectiveness of the program.

Choosing control techniques

Rabbit control techniques have the potential to cause animals to suffer. To minimise this suffering the most humane techniques that will achieve the control program's aims must be used. This will be the technique that causes the least amount of pain and suffering to the target animal with the least harm or risk to non-target animals, people and the environment. The technique should also be effective in the situation where it will be used (e.g. cage traps will have little effect in a rural setting). It is also important to remember that the humaneness of a technique is highly dependant on whether or not it is correctly employed. In selecting techniques it is therefore important to consider whether sufficient resources are available to fully implement that technique.

Cooperative control

It may not be economic for a property to be independent in equipment and labour for rabbit management. Group schemes and cooperative effort provide economies of scale and social benefits that encourage sustained effort. Cooperative control is likely to be more effective than land managers working on their own and can also encourage financial support from governments.

Rabbit control techniques

The most commonly used rabbit control techniques are lethal baiting, warren fumigation and destruction, shooting, trapping, exclusion fencing and biological control with RHDV and myxomatosis. Fertility control through immunocontraception or by other chemical means is not currently a viable broadscale control option despite considerable research into their development. Other measures, such as the use of LPG technology to kill rabbits in their warrens, are occasionally used but have not been evaluated for humaneness or efficacy.

Cost-effectiveness, humaneness and efficacy for each control technique are useful in deciding the most appropriate strategy. A brief evaluation of the humaneness of control techniques follows:

Humaneness of control techniques

Fertility control

Fertility control is seen as a preferred method of broad-scale rabbit control as it offers a potential humane and target specific alternative to lethal methods. However, the method is not currently available for rabbit control.

Exclusion fencing

The use of exclusion fencing is generally regarded as a humane, non-lethal alternative to lethal control methods. However, the high costs of establishing and maintaining rabbit-proof enclosures, limits their use to the protection of valuable pasture, crops and conservation areas. Although exclusion fencing acts as a barrier to rabbits, in some areas it can have negative effects on non-target species by altering dispersion and foraging patterns, and causing entanglement and electrocution. It can also create a significant hazard to wildlife in the event of a bushfire.

Lethal baiting

Lethal baiting is an important component of integrated rabbit control programs; however, not all poisons are equally humane. Depending on the poison used, target animals can experience pain/sickness and suffering, sometimes for an extended period, before death. Non-target animals including native species, working dogs and stock can also be exposed to poisons either directly by eating baits intended for pest animals (primary poisoning) or through the scavenging of tissues from a poisoned animal (secondary poisoning). Baiting campaigns should be well designed and carefully implemented to minimise any non-target effects. Sodium fluoroacetate (1080) and pindone are the poisons currently used for rabbit control in Australia.

1080

In rabbits, clinical signs of 1080 poisoning include lethargy, laboured respiration and increased sensitivity to noise/disturbance. Convulsions also occur, often with gasping and squealing, followed by death. Time to death is variable depending upon the amount 1080 absorbed but is usually around 3 to 4 hours. 1080 is considered to be a more humane poison than pindone.

Pindone

After ingestion of pindone, rabbits initially show signs of depression/lethargy and anorexia followed by manifestations of haemorrhage including anaemia, laboured breathing, pale mucous membranes and weakness. Bleeding may be visible around the nose, mouth, eyes and anus and animals may pass bloody faeces. Swollen tender joints are common as a result of bleeding into the confined joint space. Discomfort and pain from haemorrhages in internal organs, muscles and joints typically lasts for several days before death. The time to death is around 10 to 14 days after the initial dose. Because anticoagulant poisons take several days to kill, during which time they cause distress disability and/or pain, they are considered inhumane. The use of pindone can only be justified in situations where 1080 cannot be used i.e. in close proximity to urban areas where the risk of accidental poisoning to humans and companion animals is greatest.

Warren destruction by ripping and blasting

Destruction of warrens using explosives (blasting) or ripping is an important component of effective rabbit management. Because warren destruction gives long- term management of rabbit populations, the need for repeated control operations is reduced. It is more humane to perform ripping and blasting when rabbit numbers are at their lowest e.g. after poison baiting, drought or disease outbreak and when they are not breeding. Ripping of the warren causes it to collapse and the rabbits are usually crushed or suffocated. A quick death is more likely when powerful machinery is used in loose soil and the warren is ripped deep enough to cause complete destruction. Failure to collapse

deep warren systems may result in some rabbits becoming trapped in partly destroyed tunnels and then suffocating or starving over a long period of time. Direct mechanical wounding can also occur from the ripping tines.

When explosives are used for warren destruction, rabbits may be killed or injured by the effects of the blast or by crushing and suffocation from the collapse of the warren. In most cases the time to death is thought to be quick especially when complete destruction of the warren is achieved.

Warren destruction also affects rabbits that are not inside the warren at the time by depriving them of shelter from extreme heat, cold and predators. Most rabbits that are forced to live above ground after their warren has been destroyed will have little chance of survival.

Warren fumigation

Chloropicrin

Chloropicrin (trichloronitromethane) is considered to be highly inhumane and its use is being phased out in all States and Territories. It causes intense irritation of the respiratory tract and profuse watering of the eyes for considerable periods before death. Exposure to chloropicrin that is not immediately lethal has been shown to cause chronic debilitation, with some rabbits taking many weeks to die. Survivors may experience prolonged periods of respiratory distress prior to recovery.

Phosphine

The precise nature and extent of suffering of rabbits after inhalation of phosphine is unknown. Symptoms of phosphine toxicity in humans often include nausea, abdominal pain, headache and convulsions followed by coma. It is not known whether other mammals experience similar symptoms. The time to death will be quicker when high concentrations of phosphine can be achieved throughout the warren. In practice the time taken to achieve adequate phosphine concentrations can be highly variable and is governed by the availability of moisture in the soil and air, or on the fumigation tablets. Phosphine is considered to be more humane than chloropicrin, because it causes less intense suffering and rabbits that escape from fumigated warrens after exposure to sub-lethal concentrations may only experience transient illness, not permanent debilitation. Therefore, phosphine is currently the preferred toxin for fumigation until more humane fumigation methods are developed.

Carbon monoxide

Carbon monoxide is a colourless, odourless gas that causes oxygen depletion leading to unconsciousness and rapid death without pain or discernible discomfort. Fumigation of rabbit warrens with carbon monoxide is currently being investigated as a humane alternative to chloropicrin and phosphine.

Car exhaust fumes

Exhaust from idling internal combustion engines is not acceptable as a fumigant as adequate carbon monoxide concentrations cannot be achieved (particularly with modern car engines) and exhaust contaminants such as hydrocarbons, ozone, nitrogen dioxide and nitric oxides cause severe irritation before death. Also, the exhaust gases produced may be unacceptably hot.

Carbon dioxide

Although carbon dioxide is often used to euthanase other species, it is neither effective nor economical for rabbit warren fumigation. Wild rabbits have a high tolerance to carbon dioxide (i.e. a concentration of 45% CO_2 needs to be maintained for at least 1 hour to kill wild rabbits) Also, CO_2 disperses poorly throughout the warren.

Shooting

Shooting can be a humane method of destroying rabbits when it is carried out by experienced, skilled and responsible shooters; the animal can be clearly seen and is within range; and the correct firearm, ammunition and shot placement is used. Achieving a humane kill with a single shot can be difficult as rabbits are a small target. Wounded rabbits should be located and dispatched as quickly and humanely as possible.

Trapping

All traps have the potential to cause injury and some degree of suffering and distress so should only be used when no practical alternative exists. Traps that contain an animal (e.g. cage or box traps) cause fewer injuries than traps that restrain an animal (e.g. leg-hold traps[1]). Animals caught in a cage trap are not likely to experience significant injuries unless they make frantic attempts to escape. Importantly, non-target animals that are caught in cage traps can usually be released unharmed. Leg-hold traps on the other hand can cause serious injuries to both target and non-target animals such as swelling and lacerations to the foot from pressure of the trap jaws and dislocation of a limb if the animal struggles to escape. If leg-hold traps are used, they must have a rubber-like padding[2] on each jaw which cushions the initial impact and provides friction thus preventing the captured leg from sliding along or out of the jaws. Toothed[3], steel-jaw traps must not be used as they cause significant injury, pain and distress. The use of toothed, steel-jaw traps is being phased out in all States and Territories.

As well as injuries, trapped animals can suffer from exposure, thirst, starvation, shock, capture myopathy and predation; therefore traps should be placed in a suitable area protected from extremes of weather and must be inspected at least once daily. Trapped animals should be approached carefully and quietly to minimise panic, further stress and risk of injury. Rabbits must be destroyed as soon as possible after capture using cervical dislocation. Non-target animals that are caught but not severely injured should be released at the trap site. If they are injured, but may respond to veterinary treatment, such treatment should be sought. Severely injured non-target animals must be destroyed quickly and humanely.

Biological control

Myxomatosis

The deliberate infection of rabbits with the myxoma virus is no longer a commonly used technique, although fleas, which act as vectors of myxomatosis are sometimes released to enhance the spread of the disease, especially in arid areas. Infection with myxoma virus causes anorexia, subcutaneous swellings around the face and ears, and swollen eyelids and conjunctivitis leading to blindness. Time to death depends upon the strain of virus. Infection with a highly virulent strain causes death within 2 weeks, while rabbits infected with less virulent strains may take up to 4 weeks to die. The severity of symptoms and long interval between infection and death indicate that considerable suffering occurs with this disease.

Rabbit Haemorrhagic Disease

In most rabbits, death from rabbit haemorrhagic disease is sudden. Some animals show no signs of illness prior to death whilst others will have elevated temperature, anorexia, apathy, dullness,

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[1] *Leg-hold* refers to a trap with two hinged jaws held open by a trigger mechanism that when stepped on, closes the jaws, by spring action, around the foot or leg, this catching and restraining the animal.

[2] *Padding* is used to refer to traps that have a non-abrasive surface and durable cushioning material firmly fixed to the jaws i.e. commercially manufactured traps and after market modifications.

[3] *Toothed* includes any jaws that are not smooth i.e. have metal teeth, serrations or spikes.

prostration and reddened eyes. Respiratory signs (e.g. rapid respiration, bloody nasal discharge) and occasionally nervous signs (e.g. convulsions, paralysis, squealing) may be seen in the later stages. Some rabbits (5 to 10%) may show a chronic or subclinical course of disease. These animals may have jaundice, weight loss and lethargy for up to 1 to 2 weeks before dying. Targeted outbreaks of disease are produced in susceptible rabbit populations either by live capture of rabbits followed by inoculation of virus or by distribution of bait (carrots or oats) coated with virus suspension. For the inoculation procedure, effective handling and restraint techniques should be used to minimise the risk of injury and to reduce the intensity of distress to the rabbit.

Table 1: Humaneness, Efficacy, Cost-effectiveness and Target Specificity of Rabbit Control Methods

Control technique	Acceptability of technique with regard to humaneness*	Efficacy	Cost-effectiveness	Target Specificity	Comments
Fertility control	Conditionally acceptable	Unknown	Unknown	Depends on agent used	No products currently registered.
Exclusion fencing	Acceptable	Limited	Expensive	Can be in certain situations	Useful where there is high-value crop/pasture (e.g. market garden/horticultural enterprises) or in conservation areas. Expensive, therefore impractical for broad scale application.
Ground baiting with 1080	Conditionally acceptable	Effective	Cost-effective	Potential risk of poisoning non-target animals	Effective for reducing rabbit populations prior to warren destruction. 1080 ingestion can also kill non-target animals including native species, cats, dogs and livestock. 1080 is toxic to humans; operators need to take precautions to safeguard against exposure.
Aerial baiting with 1080	Conditionally acceptable	Effective	Cost-effective	Potential risk of poisoning non-target animals	Effective for reducing rabbit populations prior to warren destruction. Useful difficult areas in broadscale areas. 1080 ingestion can also kill non-target animals including native species, cats, dogs and livestock. 1080 is toxic to humans; operators need to take precautions to safeguard against exposure.

Control technique	Acceptability of technique with regard to humaneness*	Efficacy	Cost-effectiveness	Target Specificity	Comments
Pindone baiting	**Only acceptable when there is no other alternative** Inhumane compared to 1080	Effective	Relatively expensive (compared to 1080)	Potential risk of poisoning non-target animals (esp. macropods and other native species)	Should only be used in areas where it is impractical or unsuitable to use 1080 e.g. urban/residential and semi-rural areas.
Pressure fumigation of warrens using chloropicrin	Not acceptable			Non-target wildlife using warrens are vulnerable	Inhumane and must not be used. Alternatives are available.
Diffusion fumigation of warrens using phosphine	Conditionally acceptable when rabbit populations are low	Variable effectiveness	Expensive	Non-target wildlife using warrens are vulnerable	Labour intensive. Warren is not destroyed therefore it can be easily recolonised. Unsuitable for large areas.
Warren destruction by ripping	Conditionally acceptable when rabbit populations are low	Effective	Cost-effective	Non-target wildlife using warrens are vulnerable	Where warrens are the principal shelter for rabbits, ripping is the most cost effective and most long-lasting method of control. Cannot be used in inaccessible, rocky or environmentally sensitive areas.
Warren destruction using explosives	Conditionally acceptable when rabbit populations are low	Effective	Relatively expensive (compared to ripping)	Non-target wildlife using warrens are vulnerable	Provides long term management of rabbit populations. Requires trained and licensed operators and adherence to strict OH&S requirements. Effective in inaccessible and rocky areas.
Treatment of rabbit warrens using LPG technology (Rid-a-Rabbit®)	Has not been assessed, thought to be inhumane	Unknown	Unknown	Non-target wildlife using warrens are vulnerable	Labour intensive. Warren is not destroyed therefore it can be easily recolonised. Unsuitable for large areas.

Control technique	Acceptability of technique with regard to humaneness*	Efficacy	Cost-effectiveness	Target Specificity	Comments
Ground shooting	Acceptable	Not effective	Not cost-effective	Target specific	Shooting may be effective to control small isolated rabbit populations but is inefficient for general control. It is time consuming and labour intensive and not suitable in certain situations e.g. where dense cover is available, inaccessible or rough terrain, near human habitation.
Biological control with RHDV	Conditionally acceptable	Variable	No cost	Target specific	Effectiveness depends on habitat. RHDV outbreaks should be followed up with conventional control methods to achieve more long-term control of rabbit populations. Bait delivery of the virus is a more humane technique of producing outbreaks of RHD because it does not require live capture and handling of rabbits for inoculation.
Biological control with myxomatosis	Depends upon strain. Highly virulent strains will kill rabbits quickly.	Unpredictable effectiveness. Has become less effective over time	No cost	Target specific	This is a self-disseminating virus that is already widespread in the environment. It is not routinely used as a control technique though natural outbreaks should be followed up with conventional control methods to achieve more long-term control of rabbit populations.
Soft-jawed traps	Conditionally acceptable	Not effective	Not cost-effective	Risk of catching non-target animals	Occasionally used in areas with small isolated rabbit populations but are inefficient for general control.
Toothed, steel-jaw traps	**Not acceptable**	Not effective	Not cost-effective	Risk of catching and causing severe injury and distress to non-target animals	**Inhumane and must not be used. Alternatives are available.**

* Acceptable methods are those that are humane when used correctly.
* Conditionally acceptable methods are those that, by the nature of the technique, may not be consistently humane. There may be a period of poor welfare before death.
* Methods that are not acceptable are considered to be inhumane. The welfare of the animal is very poor before death, often for a prolonged period.

Standard operating procedures

For regional variations on control techniques refer to local legislation and regulations. For additional examples refer to the Humane Pest Animal Control Standard Operating Procedures (SOPs).

SOPs are currently available for the following rabbit control methods on the feral.org web site: http://www.feral.org.au/animal-welfare/

- Inoculation of rabbits with RHDV (RAB001)
- Ground baiting of rabbits with 1080 (RAB002)
- Aerial baiting of rabbits with 1080 (RAB003)
- Ground baiting of rabbits with Pindone (RAB004)
- Diffusion fumigation of rabbit warrens (RAB005)
- Rabbit warren destruction by ripping (RAB006)
- Rabbit warren destruction using explosives (RAB007)
- Trapping of rabbits using padded-jaw traps (RAB008)
- Ground shooting of rabbits (RAB009)

Legislation

All those involved in pest animal control should familiarise themselves with relevant aspects of the appropriate federal and state or territory legislation. The table below gives examples of some of the relevant legislation. This list is by no means exhaustive and is current at September 2012.

Commonwealth	*Agricultural and Veterinary Chemicals Code Act 1994* *Environment Protection and Biodiversity Conservation Act 1999*
ACT	*Pest Plants and Animals Act 2005* *Medicines, Poisons and Therapeutic Goods Act 2008* *Animal Welfare Act 1992* *Nature Conservation Act 1980* *Animal Diseases Act 2005* *Prohibited Weapons Act 1996* *Firearms Act 1996* *Environment Protection Act 1997*
New South Wales	*Prevention of Cruelty to Animals Act 1979* *Pesticides Act 1999* *Rural Lands Protection Act 1998* *National Parks and Wildlife Act 1974* *Threatened Species Conservation Act 1995* *Wild Dog Destruction Act 1921* *Game and Feral Animal Control Act 2002* *Deer Act 2006* *Non-Indigenous Animals Act 1987* *Exhibited Animals Protection Act 1986*
Northern Territory	*Animal Welfare Act* *Territory Parks and Wildlife Conservation Act* *Poisons and Dangerous Drugs Act*
Queensland	*Animal Care and Protection Act 2001* *Health (Drugs and Poisons) Regulation 1996* *Land Protection (Pest and Stock Route Management) Act 2002* *Nature Conservation Act 1992*
South Australia	*Animal Welfare Act 1985* *Natural Resources Management Act 2004* *Controlled Substances Act 1984* *National Parks and Wildlife Act 1972* *Dog Fence Act 1946* *Fisheries Management Act 2007*
Tasmania	*Animal Welfare Act 1993* *Vermin Control Act 2000* *Poisons Act 1971* *Agricultural And Veterinary Chemical (Control of Use) Act 1995* *Nature Conservation Act 2002* *Police Offences Act 1935* *Cat Management Act 2009*

Victoria	*Prevention of Cruelty to Animals Act 1986* *Catchment and Land Protection Act 1994* *Agriculture and Veterinary Chemicals (Control of Use) Act 1992* *Drugs, Poisons and Controlled Substances Act 1981* *Wildlife Act 1975* *Flora and Fauna Guarantee Act 1988* *National Parks Act 1975*
Western Australia	*Biosecurity and Agriculture Management Act 2007* *Animal Welfare Act 2002* *Agriculture and Related Resources Protection Act 1976* *Wildlife Conservation Act 1950*
Other relevant legislation	Firearms Acts Occupational Health and Safety Acts Dangerous Goods or Substances Acts Dog Acts Civil Aviation Acts

Note: copies of the above legislation and relevant regulations may be obtained from federal, state and territory publishing services.

Further Information

Contact the relevant federal, state or territory government agency from the following list of websites:

Australian Department of Sustainability, Environment, Water, Population and Communities
http://www.environment.gov.au/

Australian Department of Agriculture, Fisheries and Forestry
http://www.daff.gov.au

ACT Territory and Municipal Services Directorate
http://www.tams.act.gov.au/live/environment

NSW Department of Primary Industries
www.industry.nsw.gov.au

NT Department of Natural Resources, Environment, the Arts and Sport
http://www.nt.gov.au/nreta/parks/

Qld Department of Agriculture, Fisheries and Forestry
http://www.daff.qld.gov.au/

SA Biosecurity SA, Department of Primary Industries and Regions
http://www.pir.sa.gov.au/biosecuritysa

Tas Department of Primary Industries, Parks, Water and Environment
http://www.dpiw.tas.gov.au/

Vic Department of Primary Industries
http://new.dpi.vic.gov.au/

WA Department of Agriculture and Food
http://www.agric.wa.gov.au

Also refer to:

Invasive Animals Cooperative Research Centre http://www.invasiveanimals.com/index.php

and http://www.feral.org.au

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