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PRIVATE LANDOWNERS' GUIDE TO POSSUM CONTROL

CONTROL TOOLS AND TECHNIQUES

PRODUCED BY National Pest Control Agencies

ABOUT NPCA

NPCA (National Pest Control Agencies) assists those involved in vertebrate animal pest control in New Zealand.

Animal pests are a serious threat to both New Zealand's native flora and fauna and its primary production sector. We help address this threat by providing a co-ordinating forum for all those involved in vertebrate pest management, be it practical pest control and monitoring in the field, strategic management, policy making, pest research or technology development.

OUR PUBLICATIONS

We produce a range of publications containing up-to-date, practical information on animal pest control. They are written by experienced practitioners and updated regularly to ensure they reflect current best practice.

Our publications include:

- best practice guidelines on controlling and monitoring vertebrate pests;
- information about relevant regulations;
- public awareness and education material for schools.

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CONTROL TOOLS AND TECHNIQUES

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The guide may be updated from time to time, so please check that your version is current by checking the publications section on **www.npca.org.nz** or by contacting NPCA direct.

SUMMARY OF AMENDMENTS IN THIS EDITION

This edition includes the following amendments to the previous July 2009 edition.

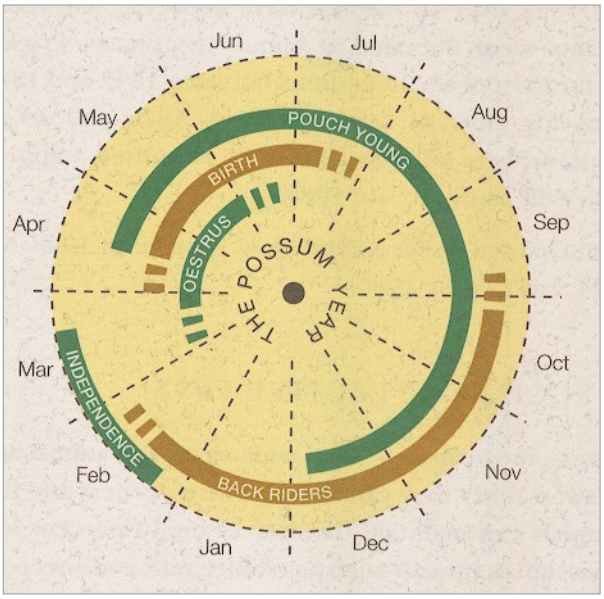
1. Numbering of the main section headings has been introduced for easier referencing.
2. Updates to the live capture traps section (5.3) and the welfare aspects of using traps section (5.5) to update in accordance with amendments to the Animal Welfare Act 1999.
3. Use of 1080 poison restricted to employees of approved organisations.
4. Minor updates to correct organisation names where these had changed and, where necessary, to update website references and links, update references to legislation and by-laws.

CONTENTS

PART 1. ABOUT POSSUMS

The brushtail possum (*Trichosurus vulpecula*) was first introduced to New Zealand from Australia in 1837 to establish a fur trade. Today, they number about 70 million, spread across more than 90% of the mainland.

Possums can live for more than 12 years. Females usually breed after their first year and typically bear one offspring per year in the autumn (March-May). If abundant food is available they may give birth again in spring (September-November).



Typically possum young are born in autumn, carried in the mother's pouch and then on her back until they become independent in late summer.

Diagram courtesy Department of Conservation

Possums are largely solitary and have defined home ranges, but they can share all or part of their range with other possums. The young remain with their mothers for 5-8 months, after which males, and to a lesser extent females, may disperse up to 20 km away.

Possums are omnivores, meaning they eat both plants and meat. Their highly varied diet includes leaves, ferns, fruit, seeds, bark, flowers and flower buds, invertebrates, bird eggs and chicks.

Their ability to eat a wide range of food helps them survive in diverse habitats and when some foods become scarce or disappear. Their ability to breed more often food supply increases and to disperse widely also enables them to spread into new areas and to rebound quickly after control operations. They can survive in a wide range of habitats but reach their highest numbers (as many as 25 / hectare) in podocarp-broadleaf forests and along the margins between native forest and pasture.

PART 2. THE POSSUM PROBLEM

Like landowners all over New Zealand, you may want to control possums on your property.

This booklet provides practical guidance to help you choose the possum control method(s) that will suit you best, together with simple 'how to' instructions for getting started. For those readers who wish to find out more on particular topics, references to other more detailed NPCA publications are provided throughout.

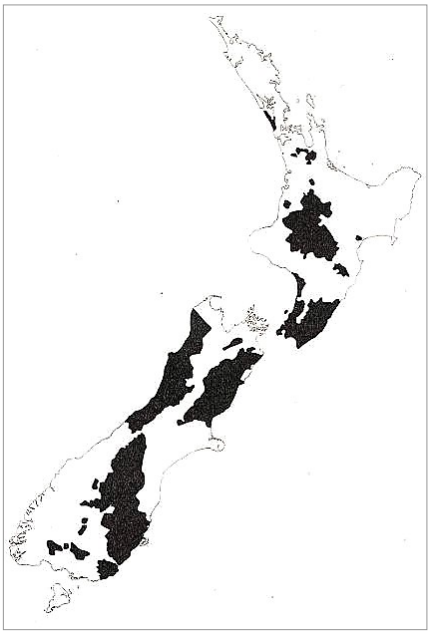
2.1 Why are possums such a problem?

Possums are amongst the most damaging pest animals in New Zealand - spreading Tb, damaging gardens and crops, and threatening native ecosystems all over the country.

2.1.1 Bovine tuberculosis

Possums pose an economic threat to New Zealand farmers, because they carry and spread Bovine tuberculosis (Tb), a bacterial disease that can affect humans (although it is very rare now that dairy products are pasteurised), as well as cattle, deer, pigs, ferrets and cats. New Zealand could be prevented from exporting beef, venison and dairy products to prime markets if Tb is not controlled to required standards.

Bovine Tb is spread to cattle by possums by direct contact; probably when cattle lick or sniff sores on sick possums. The disease is passed easily amongst possums, providing a self-sustaining reservoir of the disease. However, scientists believe that the disease would die out if possum populations were reduced and maintained at sufficiently low numbers.



! Safety tip

Possums with Tb may have small sores under the front and hind legs and around the groin area. The sores may have green, yellowish pus. If you find a dead possum that you suspect has Tb, place it in a plastic bag and store it in a cool place until you can contact your nearest Ministry of Primary Industries (MPI) office.

Remember that you can become infected by handling the possum, so always disinfect any clothing that may have been contaminated and wash your hands and other exposed skin thoroughly.

(Left) Areas where possums can transfer Tb to stock. *Map courtesy Landcare Research New Zealand Ltd*

2.1.2 Damage to agriculture, horticulture and forestry

Possums love to feed on pasture plants, especially clover and herbs, and they may travel up to 1.5 km through forest each night to feed in pasture. Although small on a national scale, pasture losses to individual farmers can be quite substantial.

Possums will also feed on a wide range of exotic plant material and have seasonal preferences, such as spring leaf growth on willow or poplar trees, and autumn fruit and crops. Favourite possum food in the garden includes:

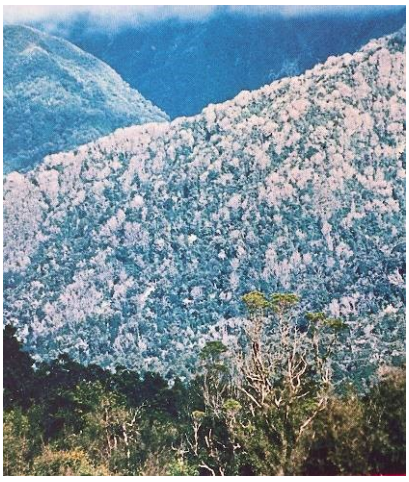
- *Fruits:* apples, citrus fruit, peaches, plums
- *Vegetables*: carrots, parsnips, cabbages, beans, parsley, turnips, corn, swedes, potatoes, peas and silver beet
- *Flowers*: roses, carnations, polyanthus, godetia, cyclamen and gladioli
- *Exotic trees*: willows, poplars, oaks, pines and walnuts.

Possums frequently damage shelterbelts, forestry and erosion control plantings. Damage to pine forests is greatest in young stands, when possums browse the shoots and strip the bark, occasionally killing up to half of the trees.

2.1.3 Damage to natural ecosystems

Possums threaten natural ecosystems by damaging native plants and animals. They collectively eat an estimated 21,000 tonnes of vegetation each night and have strong preferences for certain plants such as rata, fivefinger, fuchsia, kamahi and kohekohe. They eat these preferred plants first until those species gradually disappear from the area. In this way, they can change the species composition of native forests and even cause the total collapse of the forest canopy in places where preferred species were abundant.

Possums also threaten the survival of native birds by competing for food, especially flowers and fruits; competing with birds such as kiwi for den sites; and preying on the eggs and chicks of native birds. , including such rare species as the North Island kokako.



Forest damage caused by possum browse (left) and the rare North Island kokako (right) which is vulnerable to possum predation of eggs and chicks.

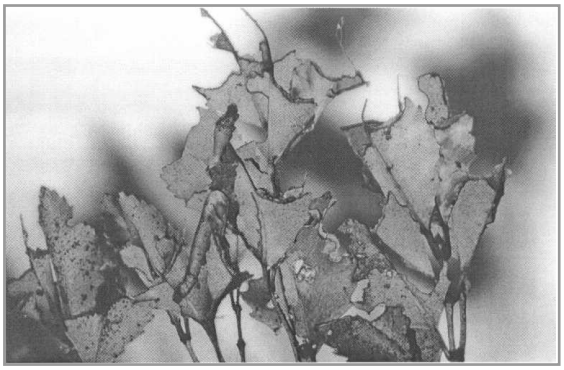
PART 3. ARE POSSUMS A PROBLEM ON YOUR PROPERTY?

3.1 How do I know if possums are on my property?

You are unlikely to see possums because they are nocturnal and sleep during the day BUT you can learn to recognise signs that they are present.

- **Trails:** possums follow regular trails (often called "possum pads" or "runs") into crops. Look for narrow tracks of flattened grass through paddocks, or narrow trails off ridges through forest.
- **Trees:** bark may be worn smooth and claw marks seen on the bark or around the base of preferred trees. Look also for territorial "bite-marks" on the base of trees.
- **Droppings:** droppings are small, rounded pellets about the size of jelly beans. In pine forest, when the catkins turn yellow, look for yellow possum droppings.
- **Foraging damage:** possums often bite the new buds off fruit trees and the new growth of roses. They may also eat the peel of lemon or other citrus fruit and bite or entirely consume vegetables. Possums often leave jagged leaf stumps when they tear the leaves from plants.

Possum trail or run (left) and possum droppings (right).



Possum browse on leaves.

Possum browse on tree fern (left) and unbrowsed fern (right)

3.2 How can I prevent possum damage on my property?

The best way to prevent possum damage is to get rid of the possums! However, there are some other things you can do to protect your garden and trees.

- **Eliminate favoured nesting sites** such as in roofs, under floors, in holes and crevices of trees and stumps, in dry holes in banks and underneath tree roots, flax and dense vegetation. Repair loose weatherboards and block other potential entryways into buildings. Remove dense vegetation and piles of logs and tree stumps.
- **Protect preferred trees** using a metal or plastic band wrapped around the tree trunk. This will only work, though, if the tree's canopy is not linked with other trees. Protect tree seedlings and shrubs with covers or cages.

Metal and plastic sleeves used to prevent possums damaging trees. Photo courtesy Pest Control Research Ltd

- **Spray plants with repellent** to deter possums. Purchase commercial brands such as *Thiroprotect* from garden shops. Alternatively, make your own mixture.

Possum repellant recipe 1	***Possum repellant recipe 2***
5 fresh eggs 600 ml of water 150 ml acrylic paint Stir the mixture well and spray 20 ml per tree.	→ 10 parts melted mutton fat → 1 part kerosene. Mix well and allow mixture to set. Then wipe each tree with lightly greased gloves or a cloth.

PART 4. CONTROLLING POSSUMS

4.1 What method of control should I use?

There are three main options for controlling possums on your land.

1. **Shooting:** Shooting possums can be an effective control method in small orchards and stands of trees surrounded by pasture. As it more labour-intensive, it is usually significantly more expensive than poisoning and trapping and is not economic for larger areas.

   ! **REMEMBER:** shooting is only an option in rural areas and anyone using a firearm is legally required to hold a current firearms license.

2. **Trapping**: In urban areas or close to houses, trapping is the best option for possum control, since neither shooting nor poisons are appropriate for safety reasons. Many local councils restrict the use of leg-hold traps in cities but kill traps such as the Timms trap may be a good option. Trapping is a good option in rural areas where leg-hold or kill traps can be used. By law, leg-hold traps must be checked every day but kill traps can be checked when necessary.

   Traps may also be effective when possums have developed an aversion to poison baits. If previous poison operations have been conducted in your area trapping may be a more effective method.

3. **Poisoning**: Using poison baits is generally less labour intensive than trapping so it can be a more feasible option for sustained control operations and control in large, remote areas.

   ! **REMEMBER:** all poisons present certain risks to the user and to other animals such as stock, pets and native species (especially birds). Consider these risks and, if you decide to use poison, choose one appropriate to the non-target animals you think could come into contact with it. The information in later sections should help you with this decision.

4.2 Can I combine several control methods?

Of course, these three methods are not mutually exclusive and many people choose to combine several different methods to increase their possum kill. For example,

- Shooting can complement trapping and poisoning and will help reduce possum populations at a faster rate. However shooting on its own is less effective than trapping and/or poisoning.
- Different control methods can also be used sequentially to avoid bait shyness or trap shyness. It is common to use a trapping programme to lower possum numbers initially and then to maintain that level of control using poison baits. Alternatively, trapping may be used in areas where poisoning has made the possums bait shy.

The advantages and disadvantages of each method need to be considered in relation to your objectives, the nature and size of the area where you want to control possums and your available resources (time and money).

Note: The following sections provide more detailed information on trapping, poisons and legal requirements. Read this information to help you decide the method or methods that are right for you.

PART 5. TRAPPING POSSUMS

5.1 What type of trap should I use?

Possum traps come in three main categories of possum traps: kill traps, live traps and leg-hold traps. In choosing which category of trap to use you should consider the following questions.

- **Ease of use.** Do I have the expertise to set a trap effectively? Do I have enough time to check the traps after I have set them? Am I prepared to kill the possum once I have captured it?
- **Effectiveness**. How effective is the trap at catching possums?
- **Risk to non-target species.** Will pets, stock and native birds be at risk?
- **Cost.** How large an area will I want to cover? How many traps will I need to use?
- **Animal welfare.** How humane is the trap at capturing or killing possums? Has the trap been banned for sale?

	Kill traps		**Live traps**		**Leg-hold traps**	
Ease of use	✓	Daily checking not legally required.	✘	Daily checking legally required.	✘	Daily checking legally required
			✓	Easy to set.		
	✓	Trap kills the possum.	✘	You have to kill the possum.	✘	You have to kill the possum.
			✘	Bulky, so unsuitable for remote areas or where numerous traps are required.	✓	Lightweight and less bulky, so suitable in remote areas and where numerous traps are required.
Effectiveness	✘	Baits can be eaten by rats which makes them ineffective.	✘	Some possums are wary of entering live traps so not all possums can be captured.	✓	High catch rates can be achieved.
	✓	High catches can be achieved and possums can be reduced to low levels				
Risk to non-target species	✓	Less risk to pets and stock.	✓	Any non-target animals can be released unharmed.	✘	Can capture pets and stock.
	✘	Can catch weka unless a protective cover is used.			✘	Can capture native birds such as kiwi and weka unless set above the ground.

Cost	≈	Cost more than leg-hold traps. Approximately $25 - $30 each	✘	Most expensive option costs $100 - $250 each.	✓	Cost $13 - $16 each
Animal welfare	✓	Use traps that have been shown to be humane using scientific trials. I.E. they render possums unconscious within 3 minutes	✓	Most humane option as possum is only contained within the cage trap. If possum is killed it need to be done so using a humane method.	✘	Least humane option. Possums can spend several hours in the trap with leg-injuries.
Commercial	≈	Less suited to fur recovery unless plucking machine used.	✘	Not suitable for fur recovery.	✓	Suitable for fur recovery.

See the following sections for more detailed information on the types and use of traps for each category.

5.2 Kill traps

Kill traps are a cost-effective method of capturing and humanely killing possums. They do not need to be checked daily to relieve possible animal suffering because the animal is killed when captured. Five types of kill trap are currently available on the market.

5.2.1 Types of kill traps

The Timms Trap	
Materials:	Tough polyethylene plastic with internal metal components.
Size & weight:	Bulky, approx 1.25 kg
Special feature:	Coloured yellow to attract possums.
Set-up:	Use stakes provided to hold trap firmly on the ground. No setting tools required.
Suitability:	Suitable for gardens and around houses, to keep a small number of possums from the area. Unsuitable for large or remote areas as they are bulky, heavy and less effective than leg-hold traps.
Non-target risk:	Unlikely to trap other animals if used correctly.

Possum killed in a Timms trap. Photo courtesy Wellington Regional Council

The Sentinel Trap	
Materials:	Metal spring with plastic cover
Size & weight:	Compact, lightweight (550 gms)
Special feature:	Can also be used as a bait station.
Set up:	Set on ground or on a tree. No setting tools required.
Suitability:	Suitable for remote areas because compact & lightweight.
Non-target risk:	Bird-proof cover prevents native birds such as kiwi and weka from being captured. This is an optional extra and needs to be purchased as an additional attachment.

Sentinel kill-trap and trap cove (left), possum killed in a Sentinel trap (centre) and bird-proof Sentinel trap cover (right - optional extra). Photo courtesy Pest Control Research Ltd

The Warrior Trap	
Materials:	All metal trap
Size & weight:	Compact, 890 gms
Special feature:	Possums are captured and killed by pulling on bait attached to a leather trigger. Cover also acts as spring.
Set up:	Set on a tree. A setting tool is required.
Suitability:	Suitable for remote areas because of compact design.
Non-target risk:	Can catch native birds such as weka if set near ground level.

Setting the Warrior trap (left) and a possum killed in a Warrior trap (right). Photo courtesy Connovation Ltd

The Possum Master Trap	
Materials:	Plastic with metal components
Size & weight:	Lightweight (approx 500 gms)
Special feature:	A spring-activated noose trap.
Set up:	Use on trees or on the ground. Easily set and no setting tool is required.
Suitability:	Suitable for remote areas because of compact design.
Non-target risk:	Can catch native birds such as weka if set near ground level.


The Possum Master trap set on the ground (left) and on a sloping board (right). *Photo courtesy Possum Master Industries Ltd*

5.2.2 How do I use kill traps?

1. Where and when to place the traps

- Place on the ground or on trees and set the mechanism as appropriate to the trap type.
- Locate near possum dens, trails or favourite food sources. Possums will avoid travelling through wet long grass and thick weeds. If possums are living under your roof, try placing traps on the ceiling rafters.
- Possums dislike heavy rain so you need not trap on very wet nights. Try the nights before and after instead.
- Cats and dogs are unlikely to be attracted to kill traps if they are baited correctly (see below). However, if you fear that children or pets might interfere with the trap, un-set the trap each morning and re-set it in the evening.

2. Baiting the traps

- **Fruit and vege baits.** Use apple, citrus, kiwifruit or carrots. These are especially good in Timms traps. Cut into 25-mm chunks (quarters for apples and oranges). If the baits are too small or too large, the possum will not set off the trigger when it takes the bait.

  If you do not catch any possums, replace the bait every 2-3 days. Try varying the bait from time to time, including something different from their usual food. For example, if they love your apple tree, try tempting them with citrus or kiwifruit.
- **Long-life baits**. These are ideal for all kill traps especially the traps where the possums need to pull on the bait to trigger the trap. They do not require checking as frequently as fruit and vege baits. Examples include: peanut butter pushed into grooves on a rat-resistant bait clip (e.g. Sentinel Kill Trap) or long-life cereal baits (called polymer baits) that are specifically designed for kill traps that contain lures, such as cinnamon, aniseed or raspberry.
- **Lures.** Sprinkling a lure (such as almond or vanilla essence, curry, jelly crystals, cinnamon or aniseed) on the bait can attract possums. Alternatively, mix the lure with 1/4 cup flour and sprinkle this mixture in front of the trap entrance.
- **Pre-feeding.** Pre-feeding can help increase your possum catch by enticing possums to visit the traps with no adverse consequences that could scare them off. To pre-feed, place fresh bait in the trap for 1-2 weeks without setting the trap.

! **REMEMBER:** Do **not** bait traps with meat or bread and jam because it may attract cats. If fruit baits are used, it is extremely unlikely that cats or small dogs will be attracted to the traps.

! **PRECAUTIONS:**

- Trigger the trap when near your cat to teach it to stay away, as the loud noise will scare your cat and discourage it from going near when the trap is set.
- As an extra precaution, set the traps only during the night and keep pets inside during this time. Sprinkle pepper outside the traps as an extra deterrent.
- Keep the traps out of reach of children and energetic pets that might turn traps over.

3. Checking the traps

- Kill traps should be checked every 3 to 7 days to empty out dead possums and to reset traps. If this is not done the catch rates will decline. There is no scientific evidence to show that dead possums in or near traps will deter possums from being captured.

4. How to remove and dispose of possums

- Pull up the striking bar until the corpse is free and then remove from the trap by the tail.
- Check for young possums, which may be in the mother's pouch. The most humane method of killing young possums is to crush their skull with a sturdy bar or stick. Alternatively you may take the animal to the SPCA, for humane destruction.
- Wrap dead possums in plastic or newspaper and dispose of them with your household rubbish, or bury the dead animal.

! **REMEMBER:** Always wash your hands thoroughly after handling possums, as they carry parasites and diseases such as giardia and Tb.

More information

See NPCA booklet "*Kill traps: a guideline to trap possums, ferrets, stoats and feral cats using kill traps*" for more detailed information. To order, visit www.npca.org.nz publications section or contact NPCA, ph 04-499-7559 or email npca@xtra.co.nz.

5.3 Live capture traps

Traps such as cage and box traps are designed to capture possums alive without hurting them. They can be used close to houses and in urban areas but the user must be willing to kill the possum and dispose of it. However, if you use a live capture trap you will need to have a plan of action about what you are going to do with the live possum. Options are you take it somewhere and release it or you could shoot it in the cage but this could be dangerous; beware of bullet ricochet!

! **REMEMBER:** It would be unethical to release the possum in another area where it would damage someone else's property or harm native species.

5.3.1 How effective are they?

The possum will not escape from the cage but may become distressed if left for a long period, so cages must be checked daily.

! **IMPORTANT NOTE:** The Animal Welfare Act 1999 requires all set traps must be checked daily within 12 hours of sunrise.

5.3.2 How safe are they?

Other animals may be caught in the cage but can be released unharmed. Pets will not be attracted to a fruit bait and deterrents such as a curry/pepper and flour mix around the cage will keep inquisitive cats away.

5.3.3 How do I use a cage trap?

- Set the cage late afternoon or evening on a known possum "pad run" - a track used by possums - or set at the base of a tree showing possum scratch marks up the bark. Make sure it is in a shady spot by day to protect the possum from the sun the next morning.
- A firm quarter of apple, kiwifruit or orange is a good bait. A coating of cinnamon and flour, and a little of this sprinkled around the cage acts as a lure.
- Change untouched bait every couple of days.
- When you discover a possum has been caught, cover the cage with a sack or cloth until it can be destroyed. It will help stop the animal from becoming distressed. Keep pets and children away - the possum will be frightened and may lash out with its sharp claws.

Baiting a cage trap. Photo courtesy Auckland Regional Council

5.3.4 How do I kill a captured animal?

The requirement for acceptable euthanasia is to render the animal irreversibly unconscious as quickly and painlessly as possible. People will vary in their skills and confidence to apply different techniques. Therefore, three euthenising options are described below.

Shooting

The most humane method of destroying a caged possum is by shooting, as – done properly – it is quick. However, be aware of the following legal requirements and usage considerations,

- Shooting is not an option in urban areas or settlements
- All users of firearms must be licensed or must operate under the direct supervision of a licensed person. Although a licence is not required to legally use air rifles and pistols (provided the user is over 18 years of age), most pistols deliver muzzle velocities less than 120 m/sec, which are insufficient to kill possums or feral cats with a single shot.
- To achieve a humane kill it is important the firearm user knows where to place the shot to achieve maximum effectiveness. The possums head is the most effective place.
- Using firearms at close range or in an area with hard surfaces can pose risks from bullet ricochet to the user or observer, and caution must be observed at all times.

Blow to the head

This involves striking the animal on the head with a hammer, bar or stout wooden stick.

While this method can be very effective, it requires the operator to be confident and strong enough to ensure the blow(s) stun the animal immediately and/or kill it. Although some people can kill possums by using only one or two strikes, less experienced people often use several strikes, resulting in a protracted period of stunning which is not acceptable. Strikes should crush the skull between the ears to be effective.

- If the animal is likely to move before or as it is struck, restrain it first by holding the tail or using a net or forked stick.
- If there is any doubt about whether the animal is dead from blows to the head, the throat should be cut to ensure it dies from blood loss.

Put down by vet

Alternatively, take the caged animal to the vet for euthanising. However, this is an expensive option and the protracted time in the cage will cause the animal undue distress.

! **REMEMBER:** Many possums may be trapped either with a pouch young or a back-rider, and it is important that these are killed humanely either by crushing the skull of larger back-riders, or decapitation of pouch young.

5.3.5 Disposing of possum carcasses

Returning carcasses to the soil replenishes the forest. By burying possums under trees suffering from possum damage, or in your garden, you help recycle nutrients the possums have taken. Ensure carcasses are buried well away from waterways.

5.4 Leg-hold traps

As with all possum control methods, leg-hold traps have advantages and disadvantages.

Advantages:

- lighter and smaller than kill traps so they are easier to place in the field and more suitable to use in remote areas that have difficult access.
- considered to be more effective at catching possums than other trapping methods.

Disadvantages:

- animals other than possums (e.g. pets and flightless birds such as kiwi and weka) may be caught in the traps.
- traps need to be set away from public areas where children or domestic pest are present.
- traps must be checked and re-set every day by law
- the trapper must kill the captured possums
- captured animals are likely to be injured and suffer while caught in the trap.

! **REMEMBER:** Most local bodies have by-laws that prevent the use of leg-hold traps in populated areas because of the risks of harming children or pets. Contact your council to check.

! **REMEMBER:** You should be aware of various restrictions governing the use and sale of leg-hold traps under the Animal Welfare Act.

The Animal Welfare Act states that:

- **BANNED FROM USE:** the long-spring leg-hold traps (such as the Lance-Ace trap) of size 1½ or larger and the double-coil leg-hold traps larger than size 1½ as shown below.

The long spring leg-hold trap (left) and the double coil leg-hold trap right.

- **RESTRICTED IN USE:** the traps shown below cannot be used within 150 metres of a dwelling without the express permission of the occupier or in any area where there is a probable risk of catching a pet animal.

All the double coil traps shown above are the only traps that can be used. However they cannot be used within 150m of a dwelling without the permission of the owner.

For effectiveness, the preferred leg-hold trap is the No.1 unpadded trap. Padded traps can be used to reduce injuries to trapped animals but tend to have higher escape rates.

No. 1 leg-hold trap shown with bracket for raising the trap above the ground. Photo courtesy Pest Control Research Ltd

5.4.1 How do I use leg-hold traps?

1. Where to place the traps

- Place each trap next to a tree and securely nail it to the tree so it trap cannot be removed by a struggling possum.
- Clearly mark the location of each trap with flagging tape or coloured alligator-type clothes pegs so the trap can be found later.
- Place traps in areas where you know possums visit, such as near food sources, along possum pads or close to dens. If you are controlling possums over a large area, place traps at evenly-spaced intervals (about 50-100 m) throughout the area in an approximate grid pattern.

Leg-hold trap raised above ground level to prevent the capture of ground birds such as kiwi and weka. Note the chain is attached near the ground so that the captured possum can reach the ground when caught and is not left hanging. Photo courtesy Pest Control Research Ltd.

! **REMEMBER:**

- Leg-hold traps cannot legally be used in most populated areas.
- Avoid using them where stock, pets or children could be caught in the traps.
- If kiwi or wekas are present in the trapping area, place the traps on platforms 70 cm above the ground above the birds' reach.

2. Setting the trap

- First secure the trap to a tree or log to ensure that the trap cannot be removed.
- Place the trap about a hand width's distance in front of the tree.
- Clear the trap site of any vines or saplings that might entangle possums. Do not cover the trap with sticks or rocks.
- If kiwi and/or weka are present, place the traps 70 cm above ground level using a raising bracket to ensure that the birds are not caught (see photo above).
- Possums are nocturnal so set your traps in the evening and check them in the morning.
- Possums dislike heavy rain so you need not trap on very wet nights. Try the nights before and after instead.

3. Checking the traps

- Check each trap within 12 hours of sunrise on the day after it was set.
- Humanely destroy any caught animals.

! **REMEMBER:** The Animal Welfare Act (1999) requires that leg-hold traps must be checked within the above time frame.

4. What baits to use

- Encourage possums to visit the leg-hold traps by smearing a mixture of 5 parts flour and 1 part icing sugar to make a blaze on the tree or log to which the trap is attached. Do this once the trap is set. Make a blaze 10-50 cm above the ground, this will act as a visual attractant to the possum and increase the time it spends at the trap site because it will lick the flour off the tree.
- You may also add a lure such as cinnamon or vanilla essence to this mixture but if possums begin avoiding it you may need to change the lure.

5. How to remove and dispose of possums

- The most humane method of killing a trapped possum is to crush its skull by hitting it on the head with a hammer or a sturdy bar. It may help to place the animal's head against a hard surface such as a tree root or rock.
- Check the dead animal for young possums which may still be alive in the mother's pouch and kill them in the same way.
- Bury or dispose of corpses at least 5 m from the trapping site if you plan to use the trap again.

! **REMEMBER:** Always wash your hands thoroughly after handling possums, as they can carry parasites and diseases such as giardia and Tb.

5.5 Welfare aspects when using traps

Trap users have a duty for the welfare of the animals they capture and should prevent unnecessary pain, suffering or distress, subject to the requirements of the Animal Welfare Act 1999. Some key legal requirements are:

- leghold traps should be checked daily within 12 hours of sunrise (sooner is better);
- no leg-hold traps may be set within 150 m of any dwelling without the occupier's express consent. This includes dwellings on neighbouring properties;
- some trap types, such as the Lanes Ace "Gin" type traps, are prohibited by law. However, the No 1 size coil spring type trap is OK to use;
- all animals that are killed after capture must killed with the minimum of distress.

For more information see http://www.biosecurity.govt.nz/regs/animal-welfare/stds/traps and also 'Live Capture Traps' section above for more on how to kill a captured animal.

More information

See NPCA booklet '*Leghold traps: a guideline for trapping possums, ferrets and feral cats using leghold traps'* for more detailed information, available at www.npca.org.nz publications section.

PART 6. POISONING POSSUMS

Like all poisonous substances, poison baits for controlling possums are dangerous to humans and animals and must be treated with care to prevent accidental poisoning. Poison baits can be easier than traps to use in the field because they are lighter don't need to be checked daily. However, as with traps, they can kill non-target animals such as pets, stock and native birds and they can persist in the environment.

Information is provided in the following section about the main poisons used for possum control to assist you:

- compare and weigh up the advantages and disadvantages of each
- learn how to each type
- learn how to use bait stations.

6.1 Safety aspects of using poisons

When using any of the poisons described in this guide, you should follow the product instructions carefully and take the following precautions.

- Do not eat, drink or smoke while applying baits.
- Wear rubber or PVC gloves when loading bait stations or bags.
- Remove protective clothing and wash it daily after work. Wash your hands and exposed skin after handling baits or possums.
- Before using, learn the symptoms of poisoning relevant to the substance you intend to use.
- Avoid the inhalation of bait dust by wearing a mask, if appropriate.
- Avoid contamination of water supplies with baits or empty containers.
- Burn or bury the empty bait containers.
- Keep unused baits in their original pack, tightly closed and locked in a cupboard - away from foodstuffs and out of reach of children.

! **REMEMBER: Once you have finished poisoning, collect and dispose of all unused bait.**

For more information regarding accidental poisoning

- Ring the National Poisons Centre at 0800 764 766
- Check the internet website www.toxinz.com

Specific safety aspects are discussed in the sections below about poison described in this guide.

6.2 What type of poison should I use?

Poisons the public can use

Five poison baits are currently available to the public for possum control:

- Brodifacoum and Pindone (anticoagulant poisons)
- Feracol®, No Possums Gel Bait, Decal pellets (poisons containing Cholecalciferol).

Poisons requiring a licence

Sodium monofluoroacetate (i.e.1080) and cyanide poisons are also widely used for possum control, but they are controlled substances and can only be used by licensed operators. Information about using cyanide poisons is included in this booklet because, although it is a controlled substance, cyanide is often used by private possum hunters. However, information about using 1080 is not included because its use is restricted to employees of approved organisations, and it is not available for private use.

! **TO OBTAIN A CONTROLLED SUBSTANCES LICENCE (CSL)** you may need to undergo training and will need to demonstrate your knowledge of the relevant substance to an Approved Certifier so that you can obtain an Approved Handler Certificate. For more information see: http://www.epa.govt.nz/hazardous-substances/certifications/people/approved-handlers/Pages/default.aspx

In choosing which poison bait to use, you should consider the following questions.

- **Licence requirements.** Is a controlled substance licence required?
- **Effectiveness.** How effective is the poison at killing possums? For what types of possum populations is the poison appropriate (e.g. low, high, bait-shy populations)?
- **Cost.** How expensive is the poison? How cost-effective is the poison, given the type of population?
- **Risk to non-target species.** What are the potential risks to humans? What are the risks for stock, pets and native birds?
- **Environmental factors:** Are there environmental risks to consider?

Answers to these questions are summarised in the following table and more detailed information about each of the poisons listed is then provided in the following section.

	Brodifacoum (Pestoff®)	**Pindone** (Pindone Pellets for Possums and Rats)	**Cholecalciferol** (FeraCol®, No Possums Cholecaliferol Gel Bait, Decal)	**Cyanide paste baits** (Trappers cyanide)	**Encapsulated cyanide** (Feratox®)
Licence requirements	✓ No licence required	✓ No licence required	✓ No licence required	✘ Licence to use required	✘ Licence to use required
Effectiveness	✓ Effective against possums that have developed bait shyness or when possum numbers are very low.	✓ Effective against possums that have developed bait shyness or when possum numbers are very low.	✓ Effective for reducing medium to high possum populations to low levels.	✘ Possums develop bait shyness which leads to decreased catches.	✓ Effective for reducing medium to high possum populations to low levels
Cost	✘ Expensive if possum numbers are high.	✘ Possums must eat large amounts of bait to be killed.	≈ More expensive than other baits, although prefeeding can make it cost-effective.	✓ The cheapest bait option available.	≈ More expensive than cyanide paste but offers greater safety to the user.
Risk to non-target species	✘ High risk of secondary poisoning of non-target species.	✘ High risk of secondary poisoning of non-target species.	✓ Low toxicity to birds. ✓ Low risk of secondary poisoning.	✓ Low secondary poisoning risk. ✘ Risk of poisoning ground birds such as kiwi and weka.	✓ Safer to use than cyanide paste. ✓ Low hazard to non-target species. ✘ Risk of poisoning ground birds such as weka.
Environmental factors	✘ Persistent in the food chain and high risk of wildlife and game contamination.	✓ Less persistent in the environment than brodifacoum.	✓ Poison does not persist in the soil or water.	✓ Low environmental persistence.	✘ May persist in the environment for 2-3 months.
Animal welfare	✘ Possums take 2-4 weeks to die. Possum die from internal bleeding.	✘ Possums take 2-4 weeks to die. Possum die from internal bleeding.	≈ Possums generally die from a heart attack. However sub-lethal amounts can lead to emaciation.	✓ The most humane poison as it kills possums rapidly.	✓ The most humane poison as it kills possums rapidly.

6.3 Do these poisons persist in the environment?

- *Brodifacoum* is insoluble and is unlikely to contaminate streams or groundwater. It is persistent in soils, which can be minimised by always using bait stations. Brodifacoum is very persistent in animal tissue and can remain in possum liver for up to 8 months.
- *Pindone* is insoluble and is unlikely to contaminate streams or groundwater. It is persistent in soils, which can be minimised by always using bait stations. Pindone is much less persistent in possum tissue compared to brodifacoum.
- *Cholecalciferol* will not easily enter surface water because of its low solubility. Restricting it to bait stations also minimises its spread into waterways. No published information is available for its persistence in soils, although its chemical characteristics suggest that only minimal leaching is likely.
- *Cyanide* paste is rapidly degraded by moisture and so is unlikely to persist for long in the environment.
- *Feratox*® encapsulated cyanide may persist in the environment for 2-3 months but it is unlikely to contaminate waterways if it is used in bait stations.

6.4 Should I pre-feed before poisoning?

If you are planning to use poison baits to control possums, you may need to pre-feed with non-toxic bait to encourage possums to take the bait before switching to the toxic bait..

!	**NOTE:** pre-feeding can also increase catch rates with kill and leg-hold traps, as described earlier in the trapping section.

When possums are presented with a new food, they often eat small amounts of the food at first until they get used to it. If the possums eat small amounts of toxic bait, it may only be enough to make them sick rather than killing them. These animals will develop what is called "bait shyness", making them difficult to kill with the same or other poisons.

Pre-feeding reduces bait shyness, because possums will eat more when the toxic bait is placed out – usually enough to kill them rather than simply making them sick. However, pre-feeding is only appropriate with relatively rapid-acting poisons, such as cyanide and cholecalciferol. It is not necessary to pre-feed when using slow-acting poisons such as brodifacoum and pindone.

Pre-feeding should generally be undertaken for about 3-14 days before you begin poisoning. You should use the same baits that you will use to deliver the poison. Check the sections below for specific recommendations on pre-feeding with each poison.

6.5 About anticoagulant poisons

Anticoagulant poisons work by reducing the blood's clotting ability, thereby causing internal haemorrhaging.

The two commercially available baits that contain anticoagulants are:

- Pestoff® (commonly known as brodifacoum)
- Pindone Pellets for Possums and Rats.

These are both cereal-based pelleted baits. Pestoff® is available with a wax coating that will prolong the life of the bait in wet climates.

Containers of pindone baits (left) and brodifacoum (right. Photo courtesy Pest Control Research Ltd

You do not need a controlled substance license to use brodifacoum and pindone but you are required by law to use these baits *only* in bait stations to reduce the risks to non-target species and to put up warning signs.

The risks of using anticoagulants

Birds and mammals are at risk of primary and secondary poisoning from brodifacoum and pindone Dogs are particularly sensitive and even small amounts (200 g) of the poison can be lethal.

- Keep stock and pets away from bait stations until the bait stations are removed.

There are also increasing concerns about the persistence of brodifacoum in the food chain because it accumulates in the livers of mammals.

- Therefore, do not use brodifacoum in areas where wild pigs are hunted because the poison could be passed to humans.

6.5.1 Brodifacoum and Pindone

What safety aspects should I know about brodifacoum and Pindone?

Brodifacoum and pindone are dangerous to humans if eaten or if the dust is inhaled. Avoid inhaling dust by wearing a face mask. Symptoms of poisoning include:

- blood in the urine, stools or sputum;
- bleeding from the nose, ears or anus;
- pale gums;
- widespread bruising; and
- difficulty in moving.

Seek medical help immediately if this poison is consumed. If it is swallowed, give the patient a glass or two of water and induce vomiting by giving them Ipecac syrup or putting your finger down their throat. Repeat until the vomit appears clear. Do not induce vomiting if the patient is unconscious or convulsing.

Humans could also be exposed by eating the meat (especially livers) of animals that have either eaten brodifacoum or pindone, or eaten the carcasses of other poisoned animals (e.g. wild pigs that have fed on possum carcasses). Brodifacoum and pindone should not be used in areas where hunters might harvest wild pigs. Stock that has been exposed to these poisons should not be slaughtered for human or animal consumption as the meat could be contaminated.

Long-term exposure to brodifacoum may lead to the development of osteoporosis. Repeated exposure to a related anticoagulant (warfarin) has been linked to developmental malformations in pregnant women.

How do I use Brodifacoum and Pindone?

1. Consider using other methods first.

Brodifacoum and Pindone baits are expensive so, if possum numbers are high, first use an alternative control method to reduce the numbers, such as leg-hold trapping, kill-trapping, cyanide baiting or cholecalciferol baiting.

2. Put warning signs in place.

Signage for Brodifacoum

Signs must state that bait is used for possum control using bait stations. Signs must be erected at every normal point of entry and in prominent places on the perimeter of the treatment area. Signs must remain in place for a minimum of 9 months after baiting has ceased but on lands to which the public ordinarily has access, signs must remain in place for 12 months after:

- baits have been retrieved or
- are no longer present.

As well as warning of the danger, signs must:

- state that it is an offence for any person to remove the signs prior to clearance of the area,
- state that it is an offence for any person (other than the operator) to remove baits from the area,
- warn of the potential harm to dogs, and
- warn that feral animals may contain residues and must not be taken for food.

Signage for Pindone

Provided Pindone is used in well-contained ground-based applications using bait stations, signs are only required when it is laid outdoors on land to which the public ordinarily has access. Signs must be erected at every normal point of entry to the public place. Signs must remain for 2 months after baits have been retrieved or, if baits are not retrieved, signs must remain for 8 months after the last baits were applied (no signage required on private land).

3. Fill and maintain bait stations

! **REMEMBER:** Brodifacoum and Pindone can *only* be used in bait stations – by law!

- Pre-feeding is not necessary because the possum will not react to brodifacoum for some time (10-20 days) after ingestion. Thus, they will not associate feeling unwell with the poison and will not learn to avoid the bait (known as bait shyness).
- Use a "pulse baiting" strategy, such as that below, to avoid wasting bait because possums often require two or three feeds to die and they will continue eating bait until they receive a lethal dose (150 grams or a large cupful).
    i. Keep bait stations filled for 3-4 days. Use as many stations as possible so the possums have an opportunity to eat sufficient bait.
    ii. Reload the bait stations every 14 days until possums stop removing bait. This 14-day cycle enables possums that have ingested a lethal dose to die before they consume excess bait.

4. Remove bait when operation complete

! **REMEMBER:** Brodifacoum and Pindone can cause secondary poisoning of birds and mammals (see) so, when you are finished poisoning, remove any unused bait from:

- the bait stations
- the area immediately around each bait station where baits may have been dropped.

! Ensure warning signs remain in place for the required periods (see step 2 above)

Pindone is a first-generation anticoagulant and is:

- less potent and less persistent in the environment than second-generation anticoagulants like brodifacoum;
- effective for controlling possums but possums need to eat more of it compared to brodifacoum to receive a lethal dose;
- useful when possums have developed bait shyness or after an initial control operation that has reduced possums to low numbers.

6.6 About Cholecalciferol poisons

Cholecalciferol is vitamin D_3; it poisons animals by raising calcium levels in their blood and causing a heart attack within 2-6 days. Possums and rodents have a low tolerance to calcium, which makes them particularly sensitive to cholecalciferol.

Three commercially available baits contain cholecalciferol.

- Feracol®, a paste bait.
- No Possums Cholecalciferol Gel Bait, a long-life gel bait.
- Decal, a cereal pellet.

Connovation Ltd range of Feracol baits containing cholecalciferol. Photo courtesy Pest Control Research Ltd

Kiwicare Ltd long-life cholecalciferol Gel Bait available in two bait station types (left and centre) and Decal Possum Bait (right) containing cholecalciferol. Photo courtesy Pest Control Research Ltd

You do not need a controlled substance licence to use cholecalciferol baits but you are legally required to put up warning signs. They can be more expensive than other poisons but can be made more cost-effective as follows:

- pre-feeding can significantly reduce costs for controlling even high-density possum populations.
- possums do not eat large quantities of the bait because of the 'stop-feed' effect of cholecalciferol, which deters possums from eating any more baits after their first encounter.

The risks of using cholecalciferol baits

Low risk of cholecalciferol to non-target species is a key advantage:

- low risk of primary poisoning for dogs, humans, birds and other non-target animals;
- little chance of secondary poisoning (i.e. of dogs or native birds eating possums killed with cholecalciferol) as cholecalciferol is not persistent in animals.
- (See for more information on risks to non-target animals).

What safety aspects should I know about cholecalciferol?

No known accidental deaths have occurred from cholecalciferol poisoning. Long-term exposure may cause:

- calcification in the arteries leading to atherosclerosis;

- calcium being moved from the skeleton into soft tissues, which can lead to fatigue, weight loss, headache, paraesthesia, depression, albuminuria and naematuria; and
- foetal abnormalities, abortions and fertility problems from exposure to very high doses.

Cholecalciferol is unlikely to cause secondary poisoning. However, as a precaution, humans should not eat game from areas where baits have been used for several weeks after the poison is removed.

6.6.1 How to use cholecalciferol-type baits

1. Pre-feeding

Pre-feed twice in the two weeks before putting out the poison bait. See for guidance on pre-feeding using bait stations.

2. Put up warning signs

Cholecalciferol applied in biodegradable bait bags

Signs need to be used only when laid outdoors on land to which the public ordinarily has access. Signs must be erected and remain in place until baits are no longer toxic, but must remain for no less than 4 months after the last application of bait.

Cholecalciferol applied in bait stations

Signs need to be used only when laid outdoors on land to which the public ordinarily has access. Signs must be erected and remain in place for no less than 3 months after:

- baits have been retrieved or

- are no longer present.

3. Place bait in bait stations

Place 100g of cholecalciferol baits (or 200 g in areas with high possum numbers) in each bait station.

4. Ma***intain bait supply***

Inspect the bait stations every few days and replenish the bait until no more is taken.

5. Remove baits

See signage requirements in step 2 above.

Note: Cholecalciferol baits can also be used in bait bags or bait tags using the same methods as for Feratox® (see).

6.7 About Cyanide poisons

Cyanide is an asphyxiant; it causes a rapid decrease in oxygen and a rapid increase in carbon dioxide. It begins working within seconds and the animal usually dies within minutes. Cyanide can be applied as either a paste or in an encapsulated form called Feratox®.

The risks of using cholecalciferol baits

Cyanide is highly toxic. It should be handled with extreme caution and only by people with a controlled substance license. Primary poisoning (eating cyanide baits) may pose a risk to non-target animals and to humans, but secondary poisoning (eating animals poisoned by cyanide) is not a problem because cyanide rapidly detoxifies (see for more information on risks to non-target species).

What safety aspects should I know about cyanide?

Cyanide is very hazardous because it releases an acidic gas when exposed to air that is very toxic. Eating cyanide or inhaling the gas can lead to poisoning within seconds. Cyanide may also pose a health risk if the bait gets onto footwear. Avoid inhaling cyanide fumes by working in a well-ventilated area and by not breathing in fumes while opening tubes and laying baits.

Signs of cyanide poisoning include:

- hyperventilation,
- headache,
- nausea,
- vomiting, and
- generalised weakness.

Long-term exposure to cyanide could lead to neurological effects (e.g. Parkinson's disease). Feratox® is safer to use than cyanide pastes because the poison is enclosed in a capsule, so there is minimal risk of inhaling the chemical while the capsules are unbroken.

6.7.1 Restrictions on using cyanide

Cyanide can be used *only by those with a controlled substance licence* (see). The following additional restrictions also apply.

Communications

Wherever cyanide is used, you must:

- seek permission from the Medical Officer of Health;
- advertise the project publicly (if used on public land);
- seek the land owner's consent (if on private land);
- notify the pest management officer at the local regional council;
- put up conspicuous warning signs to clearly mark the land involved that;
- state the name of the person laying the poison, the name of the poison and the dates that it will be laid;
- are placed at every location where people normally gain access to the area.

Locations

Cyanide cannot be laid in the following places without prior consent of the appropriate authority and the medical officer of health:

- on or within 60 metres of a public road or place to which the public are entitled to have access
- inside or within 100 metres of any community, town or city boundary
- any catchment area from which water is drawn for human consumption.

Container disposal

Empty containers must be slashed or burnt and the residue buried at least 60 cm deep.

6.7.2 How to use cyanide paste

1. Pre-feeding

Pre-feeding is important because possums that have been exposed to cyanide can quickly develop bait shyness. (Using only fresh cyanide and burying any remaining baits at the end of the poisoning operation will also help prevent bait shyness.)

To pre-feed, place a mixture of flour, icing sugar and lure at intervals of 3-5 metres on the ground for 2 nights before the poisoning.

2. Warning signs

Signs *must* be used when using cyanide paste regardless of where they are used. Signs must be erected at every normal point of entry to the treatment area. They must remain until baits have been removed or have disintegrated or have been destroyed or are no longer toxic but signs must remain for no less than 2 months after the last baits were applied.

3. Prepare poison

Cyanide paste is supplied in 250g or 500g tubes. Massage the tube well before using it to mix the oil into the paste.

Remove the screw cap and cut the nozzle off with a sharp knife. Ensure that the hole is not too small, otherwise excess pressure may cause the tube to burst.

4. Lay the cyanide paste baits

Lay cyanide paste baits at ground level on possum trails or near preferred feeding areas - *only* where possums have interfered with the pre-feed mixture.

Place baits on a stone or a piece of wood, and cover with a handful of the same flour and icing sugar mix that was used for pre-feeding.

Alternatively place the baits in a small bait station (Romark or KK stations are the best options for cyanide paste).

! **REMEMBER:** keep the baits away from ground moisture because wet baits can release an acidic gas that deters possums.

5. Remove baits

After 2 nights, destroy all the baits by overturning the stone or wood and forcing the bait into the ground. Neglecting to remove all the baits may increase bait shyness and also endanger

non-target animals including pets, wildlife, stock and humans. *This is a major disadvantage of cyanide paste.*

6.7.3 How to use Feratox®

Feratox® eliminates the gas emission problem that occurs with cyanide paste because the bait is fully enclosed within a sealed capsule. Consequently, Feratox® is safer to use, although users must still have a controlled substances license and exercise caution when using the baits.

Feratox® container. Photo courtesy Connovation Ltd

1. Pre-feeding

Pre-feed to avoid bait shyness, using pre-feeding bait called Ferafeed®.

Place pre-feed in either small bait stations (e.g. Sentry, Romark or KK types) or in bait bags. This reduces interference by rats and non-target species and protects the bait from wet weather.

Use about 200g of the pre-feed bait in the bait stations about 1 week before you begin poisoning. (Note: the pre-feed comes as a paste, the Feratox® comes as a capsule.

2. Warning signs

Signs must be used when using Feratox® regardless of where they are used. Signs must be erected at every normal point of entry to the treatment area.

If the bait is applied in biodegradable bait bags, signs must remain until the substance is no longer toxic but for no less than 4 months after baits were last applied.

If applied in bait stations or other ground-based means, signs must remain for no less than 2 months after baits have been retrieved.

3. Lay the cyanide baits

Bait stations: insert 1-6 Feratox® capsules into about 200g of pre-feed, depending on the numbers of possums present. If low numbers of possums are present use 1 to 2 capsules. If high numbers are present use 3 to 6 capsules.

Bait bags: place 2-3 capsules in 20-40g of prefeed in each bag.

Bait tags (Strikers): these are normally sold already containing the Ferafeed® and Feratox®. Follow the manufacturer's instructions.

4. Remove baits

Remember warning signs must remain in place after you remove the baits – see step 2 above.

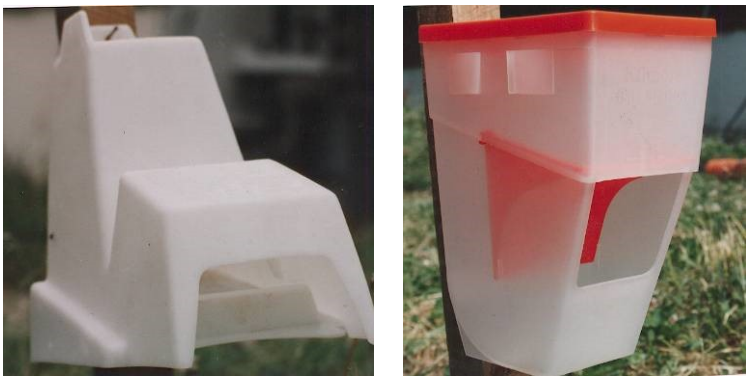
6.8 Using baits in bait stations

All but one of the poisons described in this guide should be used in bait stations (only cyanide pastes can be placed on stones or wood on the ground). Bait stations shelter bait from rain and dew so the baits will last longer. Non-target species such as stock, pets and birds are also at less risk because they have more difficulty accessing the baits.

A good bait station:

- allows possums easy access;
- protects the bait from wind and rain;
- is easy to attach to trees or fences; and
- prevents access by stock, pets, birds, and children.

Bait stations are plastic containers filled with 0.2 - 2 kg of bait. They are usually attached to trees or fence posts and left for some time to allow possums to feed on the bait. The most commonly used bait stations are the Philproof, which holds 1.5 kg of bait, and the Kilmore which holds 2 kg of bait. The Sentry, Romark and KK bait stations are the more popular smaller bait stations and hold less than half a kg of bait.



Philproof (left) and Kilmore (right) bait stations. Photo courtesy Pest Management Services Ltd

Left to right: the smaller Sentry, Romark and KK bait stations. Photo courtesy Pest Management Services Ltd

6.8.1 How to use bait stations

Place bait stations near den sites, along possum pads or near preferred food sources where possible.

Nail bait stations to trees or posts, with the opening about 25 cm above the ground, except where ground-dwelling birds are present.

In areas where ground birds such as weka and kiwi are present, place bait stations with at least 70 cm clearance above the ground. Use stations that spill minimal bait, such as the Kilmore and Sentry, or alternatively, use a bird-proof bait station such as a modified Kilmore or Sentry bait station.

Possum feeding from a bait station. Photo courtesy Landcare Research N.Z. Ltd

Left: ground birds such as weka and kiwi can feed from bait stations so they need to be raised 70 cm above ground. Right: A possum feeding out of a modified Kilmore bait station fitted with a bird-proof cover attachment. Photos courtesy Landcare Research N.Z. Ltd and Pest Control Research Ltd

6.8.2 How to use bait bags and bait tags

Staple bait bags and bait tags to trees about 25 cm above the ground.

To attract possums, smear a mixture of 5 parts flour to 1 part icing sugar on the tree trunk above the bag or tag.

Every few days, replenish this blaze and replace any missing bags or tags.

Example of a bait bag (left), a Striker bait tag (middle) and a possum eating a Striker (right).
Photo courtesy Pest Control Research Ltd

PART 7. AVOIDING NON-TARGET SPECIES

Whichever control method you decide to use against possums, you will need to take precautions to avoid harming or killing other animals including pets, livestock and native birds. This section reviews the steps that you must take to ensure that the effects on non-target species are minimised. The safety risks to humans are covered separately in earlier sections of this guide.

7.1 How can I avoid trapping non-target species?

There are 23 native bird species and five introduced bird species that have been caught in leg-hold traps in New Zealand. The most commonly caught birds are blackbirds and song thrushes, which feed on the ground, but weka and kiwi may also be caught. In areas where these latter birds are present, traps must be raised at least 70 cm above the ground using raising brackets or leaning boards.

A leg-hold trap set on a leaning board to prevent the capture of ground birds such as kiwi or weka. A flour and icing sugar blaze is used at the base of the board and above the trap. Photo courtesy Landcare Research NZ Ltd

Stock is unlikely to get caught in leg-hold traps but dogs and cats should be kept out of areas where traps are set. Do not bait traps with items such as meat or bread and jam that could be attractive to pets.

7.2 How can I avoid poisoning non-target species?

There are two ways that poison baits may kill non-target birds and mammals.

- *Primary poisoning* may occur if they eat the actual baits.
- *Secondary poisoning* may also occur if they scavenge on possums or rat carcases killed by the poison.

To avoid primary poisoning, the following measures for all poison baits can be taken:

- Use baits containing a green dye so that they are unattractive to birds;
- Use baits containing cinnamon oil as a repellent to some birds and invertebrates;

- Place baits in bait stations (except for cyanide paste), and raise the bait stations out of reach of ground-dwelling birds such as kiwi, weka and robins when in their habitats; and
- Remove remaining baits immediately after the control operation is complete.

Risks to non-target species of the poisons described in this guide are discussed specifically below.

Brodifacoum

Brodifacoum baits are palatable to a range of other animals, including rats, mice, pets, stock and 33 native bird species. Brodifacoum should always be used in bait stations and stock must be excluded from the poisoned area because the stock may knock the bait stations and dislodge some bait so it can be eaten. Stock that has eaten brodifacoum baits should not be slaughtered for human consumption for at least 9 months after exposure to the bait. This is to prevent brodifacoum residues being present in meat destined for human consumption.

If you suspect livestock or pets have consumed bait, immediately take the animal to a veterinary surgeon, who may administer an antidote (Vitamin K_1). Symptoms of poisoning include: difficulty moving, pale gums and bleeding from the nose, mouth, ears or anus.

Brodifacoum also poses the highest risk of secondary poisoning of any of the poisons described in this guide. Birds such as owls and other raptors, cats and dogs, mustelids, deer, wild pigs and stock may all be poisoned by scavenging on possum and rodent carcasses. Brodifacoum can persist in mammal livers for at least 9 months, so the risk of secondary poisoning is high, even for humans. For this reason, brodifacoum should only be used in bait stations and be used only for controlling low-density or bait-shy possum populations.

Pindone

Pindone baits are palatable to a range of other animals, including rats, mice, pets, farm stock and 33 native bird species. Pindone should always be used in bait stations and stock must be excluded from the poisoned area to prevent stock from knocking the bait stations and dislodging bait, which they might then eat. Stock that has eaten brodifacoum baits should not be slaughtered for human consumption for at least 1 month after exposure to the bait. This is to prevent brodifacoum residues being present in meat destined for human consumption.

Pindone is less persistent in animal tissue so the risk of secondary poisoning of animals and birds that eat possum carcasses is much lower than the risks associated with brodifacoum.

Cholecalciferol

Cholecalciferol has a very low toxicity to birds and so the risks to native species are much lower than for other poisons. However, it is toxic to pets and stock if eaten in large enough amounts, so always place the bait in bait stations. Care should be taken to prevent dogs eating baits containing cholecalciferol as it is difficult to reverse the effects of cholecalciferol poisoning.

Cholecalciferol is not stored at high concentrations in animal tissue and so animals are at little risk of secondary poisoning if they eat possum carcasses. Dogs and cats must feed on possum carcasses for some days to be poisoned, and so the risk is low compared to other poisons.

Cyanide

Birds are at less risk from cyanide than from traps or other poisons but cyanide paste baits may still pose some risk to kiwi, weka and tomtits. The paste baits must be laid off the ground in areas where kiwi and weka are present. Cases of cyanide paste baits killing sheep, cattle and

dogs have been reported, so stock and pets should be kept out of the poisoned area.

Feratox® kills weka and its use is restricted where weka are present, especially in Westland and Tasman. Anecdotal reports indicate that Feratox® can kill hedgehogs, cats, stoats and small dogs. Feratox® should only be used in bait stations, bait bags or bait tags.

Cyanide does not build up in animal tissues and so the risks of secondary poisoning are very low. Nevertheless, paste baits should be destroyed after 2 nights and Feratox® pellets should be removed after completion of the poisoning.

PART 8. LEGAL REQUIREMENTS AND RESTRICTIONS

You need to consider three key legal restrictions when planning possum control on private land.

1. Location

Certain traps and poisons can be used in only some areas. You should be aware of local by-laws that might restrict the options available to you for controlling possums on your property. For example, in most urban areas poisons and leg-hold traps are not permitted. In areas with ground-dwelling birds such as kiwi and weka, precautions should be taken such as raising traps or bait stations above the ground. (See also location requirements specific to cyanide under 'licensing requirements' below.)

2. Animal welfare

If you are trapping, you should be familiar with the restrictions of the Animal Welfare Act (1999). It requires that all live traps and leg-hold traps be inspected within 12 hours of sunrise each day they remain set. (Kill traps do not need to be inspected daily.) Trapped possums must be removed and killed as soon as possible and in a way that minimises pain and suffering. You also need to know which traps can be legally used and which traps have been banned.

3. Licensing requirements

If you wish to use cyanide, *you must obtain a controlled substances license for cyanide use*. All of the other poisons listed in this guide are available for use by the general public. All cyanide users should review the Pesticides (Vertebrate Pest Control) Regulations (1983), which gives the following stipulations for using cyanide.

1. Operators must have a license to use cyanide.
2. Operators should keep cyanide in labelled containers with serial numbers. Containers must be closed and stored securely in a locked cupboard.
3. Cyanide must be used according to the approved label and instructions provided.
4. Notices must be placed at all locations where the public have access to the poisoned area. The signs must remain until all baits have been destroyed.
5. Livestock must not have access to the bait.
6. Empty cyanide containers should be disposed of immediately by burning, burial or return.
7. The Regional Council should be notified of the proposed poison operation.
8. Cyanide cannot be laid in the following places without prior consent of the appropriate authority and the medical officer of health:
   - on or within 60 metres of a public road or place to which the public are entitled to have access;
   - inside or within 100 metres of any community, town or city boundary; and
   - in any catchment area from which water is drawn for human consumption.

4. Requirements for warning signs – legal requirements and obligations when using poisons

BAIT CONTAINING	TYPE OR USE	PLACE WHERE LAID	SIGNAGE REQUIREMENTS
Brodifacoum	Using bait stations	Any place (signage is mandatory)	Signs must be erected at every normal point of entry and in prominent places on the perimeter of the treatment area. Signs must remain in place for a minimum of 9 months after baiting has ceased but on lands to which the public ordinarily has access, signs must remain in place for 12 months after: - baits have been retrieved or - are no longer present. Signs must state that it is an offence for any person to remove the signs prior to clearance of the area, that it is an offence for any person (other than the operator) to remove baits from the area, must warn of the potential harm to dogs and must warn that feral animals may contain residues and must not be taken for food.
Pindone	Using bait stations	Only when laid outdoors on land to which the public ordinarily has access.	Signs must be erected at every normal point of entry to the public place. Signs must remain for 2 months after baits have been retrieved or if baits are not retrieved, signs must remain for 8 months after the last baits were applied (no signage required on private land).
Cholecalciferol	When laid in a bio-degradable bait bag.	Only when laid outdoors on land to which the public ordinarily has access.	Signs must be erected and remain in place until baits are no longer toxic , but must remain for no less than 4 months after the last application of bait.
Cholecalciferol	Contained ground based applications.	Only when laid outdoors on land to which the public ordinarily has access.	Signs must be erected and remain in place for no less than 3 months after: - baits have been retrieved or - are no longer present.
Cyanide paste	Paste baits	Any place (signage is mandatory)	Signs must be erected at every normal point of entry to the treatment area. Signs must remain until baits have been removed or have disintegrated or have been destroyed or are no longer toxic but signs must remain for no less than 2 months after the last baits were applied.
Feratox	Encapsulated pellet baits	Any place (signage is mandatory)	Signs must be erected at every normal point of entry to the treatment area. If applied in biodegradable bait bags, signs must remain until the substance is no longer toxic but for no less than 4 months after baits were last applied. If applied in bait stations or other ground based means, signs must remain for no less than 2 months after baits have been retrieved.

More information

See NPCA booklets:

- "User Guide to Legislation Relating to Vertebrate Pest Control" for more detailed information on legal requirements regarding the use of vertebrate pesticides and traps and B2 Vertebrate Toxic Agents – Minimum requirements for safe use and handling.
- "Signage: minimum requirements for signage where vertebrate toxic agents are laid outdoors for pest control"

These are available at www.npca.org.nz in the publications section.

YOUR NOTES

APPENDIX 1. Buying possum control equipment

Pest Control Research Ltd

- Compiled this booklet and undertakes research on possum control for the Animal Health Board, Department of Conservation, Regional Councils and private companies.
- Sell bait, the Kilmore and Sentry bait station the Sentinel Kill Trap, PCR no. 1 leg-hold traps and Pindone Possum Rat and Rabbit bait in addition to WaxTags for possum monitoring and a range of field equipment for pest control.

Contact: Pest Control Research Ltd
PO Box 7223
Christchurch
Phone: (03) 372 1580
Email: info@pcr.co.nz Website: www.pestcontrolresearch.com

Pest Management Services

- Supply most possum baits including Pindone Possum and Rat bait, Feratox®, Feracol® and Pestoff.
- Sell a comprehensive range of possum traps including bait stations, lures and night shooting equipment.

Contact: Pest Management Services
PO Box 11-097, Christchurch 8443
Unit 3, 4-6 O'Briens Road, Sockburn, Christchurch 8042
Phone: 0800 111 466
Email: sheryle@nopests.co.nz Website: www.nopests.co.nz

Connovation Ltd.

- Manufacturers of Feratox®, Ferafeed®, Feracol® cyanide paste, cyanide prefed paste, leg-hold traps raising brackets and the Warrior kill trap.

Contact: Connovation Ltd.
PO Box 58-613, Greenmount, Manukau 2141
Phone: (09) 273 4333
Email: duncan.m@connovation.co.nz Website: www.connovation.co.nz

Animal Control Products Limited

- Manufacture a wide range of possum baits such as Pestoff brodifacoum baits, cyanide paste, cyanide prefeed paste (Wonderlure) and RS5 prefeed.

Contact: Animal Control Products Limited
101 Heads Road, Wanganui 4501
Phone: (06) 344 5302
Email: info@pestoff.co.nz Website: www.pestoff.co.nz

Kiwicare Corporation

- Manufacture the long-life Kiwicare Nopossum Prefeed Jel Bait that can be used in kill-traps.

Contact: Kiwicare Corporation
PO Box 15050, Aranui, Christchurch 8643
Phone: (03) 389 0778
Email: info@kiwicare.co.nz Website: www.kiwicare.co.nz

Philproof Pest Control

- Sell Philproof bait stations, possum bait, traps and other pest control products.

Contact: Philproof Pest Control
PO Box 4385, Hamilton East, Hamilton 3247
Phone: (07) 859 2943
Email: philproof.feeders@clear.net.nz Website: www.philproof.co.nz

Maurice Woodcraft Ltd

- Sells the Victor No. 1 leg-hold trap and a range of live-traps.

Contact: Maurice Woodcraft Ltd
128 Marine Parade, Mt Maunganui 3116
Phone: (07) 575 5920
Website: www.victortraps.co.nz

Possum Master Industries Ltd

Sell the Possum Master kill trap.

Contact: Possum Master Industries Ltd
52 Seavista Drive, Pukerua Bay, Porirua 5026
Phone: (04) 239 9443 Fax: (04) 239 9445
Email: pmi.leatham@xtra.co.nz Website: www.possummaster.co.nz

Trappers Cyanide Ltd

Sell Trappers Cyanide paste, Romark bait stations, Bridger no. 1 leg-hold traps a collapsible possum cage trap, and long-life polymer baits specifically designed for use in kill traps.

Contact: Mike Holden
Phone: (03) 314 9940 Fax: (03) 3149970
Email: sales@traps.co.nz Website: www.traps.co.nz

Goods Traders Ltd

Sell Duke no.1 leg-hold traps.

Contact: Good Traders Ltd
2 Brackenfield Place, Parklands, Christchurch 8083
Phone: (027) 274 2493
Email: goodtradersnz@gmail.com

EVALUATION AND FEEDBACK FORM

NPCA Publication A3: Private Landowners' Guide to Possum Control, Practical advice on tools and techniques for controlling possums on private land, November 2015 edition

Name: ………………………………………………………………… Date: …………...….…………..

Address:……………… ……………………….……………………………………………….………

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Email:…………………………………………………………………………………………………..…

Phone:…………………………………..….…...… Fax:……………………..…………………………

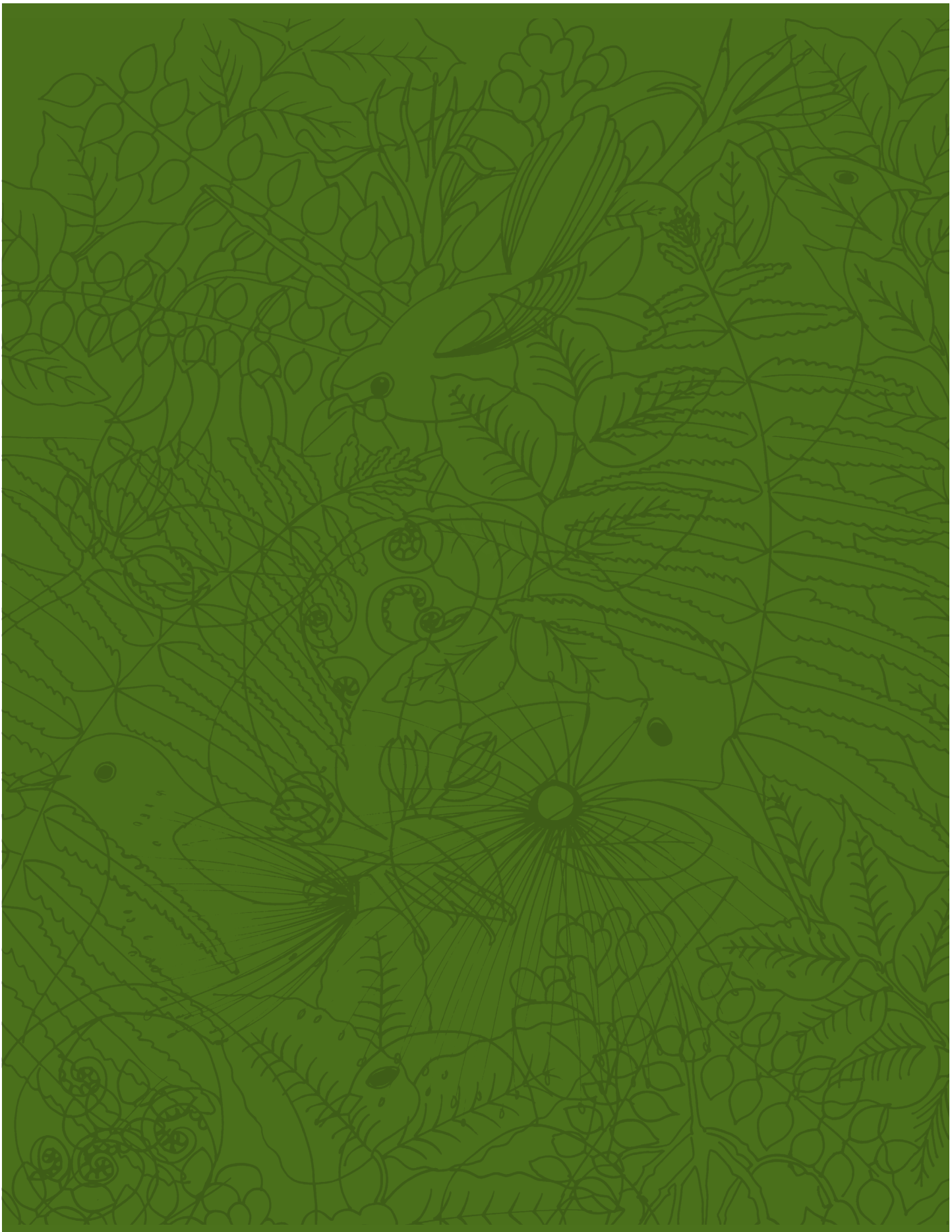
The NPCA welcomes any feedback and comment you might have on this guideline, so we can further improve or develop it. Please quote the page and reference that your comment(s) relates to, provide a short comment and return to:

NPCA, PO Box 11-461, Wellington 6142
Tel: (04) 499 7559 Fax: (04) 473 7991 Email: npca@xtra.co.nz

Note: This form can be downloaded from the website: www.npca.org.nz .

Page Ref	Comment

EVALUATION AND FEEDBACK FORM (cont)



www.npca.org.nz

National Pest Control Agencies