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POSSUM AND FERRET TRAPS

A REPORT TO INFORM AND ADVISE USERS OF TRAPPING PRODUCTS TO ENSURE APPROPRIATE PRODUCT SELECTION AND USE.



REPORT PUBLISHED BY



National Possum
Control Agencies

ABOUT NPCA

The National Possum Control Agencies was established in the early 1990s to help co-ordinate possum control. In November 2001 a constitution was approved that reaffirmed NPCA's aims and objects and the importance of co-ordination in possum control and vertebrate pest control in general.

OVERALL AIM

To provide a co-ordinating forum that will contribute to the effectiveness of all the agencies involved with the possum and vertebrate pest problem in New Zealand and to assist agencies with:

- protecting the farming industry from the effects of bovine Tb, and
- achieving conservation benefits and positive environmental outcomes.

This report was produced by Southern Pest Management under contract (Project Number R-80655) to the Animal Health Board.

DISCLAIMER

While every effort has been made to ensure the information herein is accurate, the authors and the Animal Health Board (AHB) do not accept liability for any error of fact or opinion which may be present, nor for the consequences of any financial decision based on this information. This report has been prepared in accordance with reasonable standards of scientific endeavour and independently reviewed by three members of AHB's Technical Advisory Group. The authors also have no control over its use by third parties, and shall likewise have no liability to a third party arising from their use of this information.

Any view or opinions expressed do not represent the official view of the Animal Health Board.

PRICING

All prices for traps and trapping products were correct as of July 2007. Please use the pricing in this report as a guide only as prices will undoubtedly change. Users should contact the trap suppliers or visit their websites for up-to-date prices. Most trap suppliers offer discounts for bulk orders, please be aware that most prices shown in this report are for one trap only unless otherwise stated.

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TO ENSURE APPROPRIATE PRODUCT SELECTION AND USE.

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Wellington (Project R-80655) by

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1. ABOUT THIS PROJECT

1.1 Purpose

There is an ever increasing range of options available for possum and ferret control in New Zealand. There is no easily accessed source of information on the various control devices available, apart from what the suppliers and manufacturers provide. The promotion of products means that users were not always being properly informed or in some cases being misled (for example some kill traps have been advertised as humane or that they kill effectively when National Animal Welfare Advisory Committee (NAWAC) testing has proven otherwise). The Animal Health Board (AHB) commissioned this project, believing that it would be valuable for the information on traps to be collated and standardised into a single independent document. Consumers could therefore have an informed decision regarding which trap(s) would suit their situation and requirements. Given the recent proliferation of new traps to the market (particularly kill-traps) the decision to fund a consumer style report should ultimately result in better pest control. Without an independent reference for consumers, the quality of the marketing by manufacturers and suppliers will continue to have a large influence on the choice of consumers, rather the intrinsic qualities of the traps themselves.

We would also like to think that this report will better inform users on the animal welfare aspects, thereby encouraging more appropriate and humane use of traps. The long-term integrity of trapping as a control method is influenced by public perception (both within New Zealand and internationally) and a greater emphasis on appropriate use and animal welfare should be recognised as increasingly important factors.

1.1.1 The importance of trapping as a method of controlling possum and ferrets

Possoms and ferrets are targeted for control by the Animal Health Board. Trapping is the main method of population control for ferrets and AHB currently spends approximately \$2M annually on ferret control. The monitoring of possum control operations is almost entirely based around the use of leg-hold traps and AHB currently spends \$12-14M annually on possum monitoring. Possum control is undertaken through trapping and poisoning but the estimate for trapping possums for control purposes is approximately \$16M annually. So all in all, AHB spends approximately \$30-32M on trapping possums and ferrets as part of their vector control programme. Given the increasing opposition to toxins (particularly 1080), and the issue of bait shyness, trapping is likely to remain a very important control method for AHB.

Possum and ferret control work is also undertaken by farmers, often through LIP (locally initiated programmes) groups. Possum and ferret control for other objectives (i.e. for conservation) is also likely to have benefits for the control of Tb in areas that have the disease in the wildlife population. This assessment of traps should be particularly beneficial to LIPs groups, farmers and other land-owners who want to control pests on their properties. In the past, some of these users have had little background knowledge of pest control issues or the range of control options available before investing in traps and have been heavily reliant on receiving good advice.

1.2 Methodology

1.2.1 Information review

The first stage of this project was a review of information. An internet search of all the manufacturers and NZ suppliers of commercially available possum and ferret traps in New Zealand was undertaken. A standard letter was sent to manufacturers and/or suppliers requesting information on a range of aspects of their products – including instructions on recommended use, setting procedure, any maintenance issues, available componentry, pricing and whether there had been any research involving their products.

The second stage was a review of the published scientific literature that involved trapping possums and ferrets. We were particularly interested in mechanical testing results (for leg-hold and kill traps), any measures of capture rate or target specificity, known effects on non-target species and animal welfare. The NAWAC trap testing reports were a particularly valuable source of independent information.

1.2.2 Seeking information and feedback from contractors

Southern Pest Management (SPM) are the vector managers for the Otago region and Tasman district. Traps were purchased in early 2006 and were distributed to selected SPM contractors for use during their normal control trapping operations. These contractors were later given a questionnaire to fill out in order to assist in the assessment process for each trap. Information was also gathered from SPM contractors during a meeting in December 2006 at Mosgiel. At the start of this session, a simple questionnaire was distributed to the contractors to assess traps on five aspects - capture rate, trap interference rate, non-target capture, animal welfare concerns, and ease of use/time to set. Then contractors gave each trap an overall rating. After this, a discussion on each trap was facilitated. In general, most contractors had used only a limited range of traps and most did not have direct experience with all the traps that are available (particularly those traps that have only recently come onto the market). We have to acknowledge that for some traps we were not able to get much feedback from contractors. And in some cases, some contractors simply did not want to use some of the traps that they were given to trial. Conversely, we were able to get a good amount of feedback on the traps that have been popular with contractors.

In July 2006, Southern Pest Management were contracted to provide 200 possum carcasses to the University of Otago. Brent Rohloff, SPM field officer, trialled traps during the collection of these possums and provided trap assessments for this project.

The accuracy and reliability of the trap assessments are obviously affected by the amount of use a particular trap has had. It was not possible to address this issue satisfactorily within the framework of this project and realistically this can only be achieved by scientifically designed comparative trials involving all the various models of traps. In some cases, where traps have had limited use to date, we have had to rely more heavily on information that the manufacturers or suppliers have provided. For the traps that we did not use or test within the framework of this project, we have indicated this in the trap summaries.

1.3 Trap Assessments

There were four main aspects to the trap assessments: capture effectiveness, animal welfare considerations, non-target captures and logistical considerations.

1. Capture effectiveness

First and foremost a trap must be effective at catching its target animal. While capture effectiveness is obviously very important there have been relatively few studies focusing on capture efficiency. In some cases, we have been able to refer to research that has compared one trap against another but we have been unable to rank the traps according to capture effectiveness.

2. Animal Welfare Considerations

This project has been greatly assisted by consultation with Bruce Warburton of Landcare Research, who has undertaken considerable research on the animal welfare of mammal traps in New Zealand. Landcare Research has been contracted by the Department of Conservation (DOC) and MAF to undertake trials to assess whether individual traps pass or fail the NAWAC trap-testing guidelines. These reports have been a very good source of information for this project as they have been conducted independently and to an accepted international standard. Contractors were also surveyed for their experiences in relation to animal welfare.

NAWAC trap-testing guidelines

The National Animal Welfare Advisory Committee (NAWAC) is a ministerial advisory committee established under the Animal Welfare Act 1999. The Committee's main function is to advise the Minister of Agriculture and Forestry (MAF) on animal welfare matters relating to farm, companion, wild and pest animals. The International Organisation for Standardisation (ISO) developed a standard for testing restraining and kill-traps and this standard has been adopted by NAWAC for testing traps in New Zealand. Go to <http://www.biosecurity.govt.nz/animal-welfare/nawac/policies/guideline09.htm> for a full reference to NAWAC's trap-testing guidelines. Kill-traps must render animals irreversibly unconscious within 3 minutes for 70% of the time and in less than 5 minutes 80% of the time. Traps that perform to this level with 90% confidence are considered acceptable. For a sample size of 10 animals, all must be rendered irreversibly unconscious to meet the statistical requirements of the test. Testing is stopped as soon as three animals fail the criterion. Consciousness is determined using the palpebral (blinking) and corneal reflex that cease when the animal has lost consciousness.

Restraining traps are cage/box traps and leg-hold traps. The NAWAC guidelines for trap testing have two categories for acceptable restraining traps (ISO 1999). Based on a sample size of 30 animals, a trap meets the requirements for a category 'A' trap by causing mild trauma to no more than 10 animals and moderate trauma to no more than two animals. With this same sample size, the trap meets the requirements for category 'B' if it causes moderate trauma to no more than 10 animals and moderately severe trauma to no more than two animals.

3. Non-target capture

Contractors have to consider non-target catch as high numbers of non-targets reduce the availability of traps for the target species and can affect the success of a trapping operation. Increased cost and time to service traplines can be a factor when non-target catch is high. Also it is never good for public relations if you kill a landowners pet. With the increasing numbers of life-style properties, the choice of a suitable trap is particularly important to avoid consequences resulting from the capture of pets and livestock.

Sometimes a trap that can target a number of different species can have advantages. In recent years, multi-species control has become increasingly important with conservation groups often wanting to control a large number of pest species within one area. Conversely, depending on where the trap is used some traps will pose conservation risks, especially in areas where ground birds are present.

4. Logistical Considerations

The size and weight of traps is important to contractors and to any other users who are not leaving traps in permanent positions. For contractors, the size and weight of traps can dictate their investment in plant, particularly vehicles. Bulky or heavy traps require the use of a quad bike or 4WD vehicle to deploy them. One of the main reasons that leg-hold traps have been so popular in New Zealand is that they are easily carried on foot. In the past they have been the only capture effective trap that has been able to be used in difficult or remote country. For contractors, the number of traps that can be carried can have an influence on the amount of time it takes to set up traplines. Trap coverage is important; a trap that can be easily transported and suitable for use in many different habitats is therefore desirable.

2. RELEVANT LEGISLATION/REGULATIONS FOR TRAPPERS

2.1 Animal Welfare Act 1999

The main piece of legislation that relates to trapping and pest control is the Animal Welfare Act 1999 (go to www.biosecurity.govt.nz/legislation/animal-welfare-act/guide). The Animal Welfare Act includes most animals capable of feeling pain and applies to all such animals whether domesticated or in a wild state. The Act is designed to prevent ill-treatment and inadequate care and sets out obligations on people who own or are in charge of animals. It is an offence to kill any animal in a manner that causes unreasonable or unnecessary pain or distress. Unusual and cruel acts and practices towards wild animals (for example pouring petrol over a possum and setting it alight) are covered by the Act as they are acts that occur outside of hunting or killing.

Part 2 of the Animal Welfare Act contains specific provisions concerning the use or inspection of traps and devices. The Act includes an obligation to inspect traps when the purpose is to capture an animal alive. Inspection of kill traps is not required if it can be reasonably expected that the animals trapped are killed instantly. Section 36 required that traps must be inspected within 12 hours after sunrise on the day after the day on which the trap was set. Any live animal found in a trap must be removed, properly attended to, or, without delay, killed. Failure to inspect a trap in accordance with this provision is an infringement offence and attracts a \$400 fine.

Where pest control results in animals being caught alive and contained (i.e. in a cage or trap) and not immediately killed or removed, the obligations in the Act relating to animals in people's care or charge apply (for example, providing food and water appropriate to the circumstances).

NAWAC recommended the prohibition on the use and sale of some traps, which include the Lanes Ace, and large size leg-hold traps. Changes to the Animal Welfare Act 1999 enabled this process of banning unacceptable traps to be undertaken. The Animal Welfare (Leg-hold Traps) Order 2007 comes into effect on January 1st 2008 (go to www.biosecurity.govt.nz/animal-welfare/req/traps/legholdtraps for more information). The new regulations supersede all existing bylaws and there are penalties for breaching them (up to six months imprisonment and/or a fine up to \$25,000 for an individual or up to \$125,000 for a body corporate).

Leg-hold traps cannot be used within 150m of a dwelling without the express permission of the occupier or in an area where there is probable risk of catching a pet. Obvious places where there may be probable risk include parks, recreational areas, beaches, places where people walk their dogs and places where pets are known to be kept. Particular consideration should be made in rural areas, in and around riverbeds, in roadside reserves and in known hunting areas. Persons setting leg-hold traps should refer to local bylaws and dog control policies for areas where dogs must be kept on a leash or otherwise controlled. It should be noted that measures may be taken to reduce the risk of capture of companion animals so that there is no longer a "probable risk". Such measures include, but are not limited to, the use of cubbies or other means of exclusion and appropriate placement of traps. Signage can be

considered but should not be the only measure (this paragraph is a pers comm. from Natalie Nisbett, MAF).

2.2 Wild Animal Control Act 1977

It is illegal to capture and then release a wild animal (which includes possums and ferrets) under section 13 in the Wild Animal Control Act 1977 (also covered by section 56 of the Wildlife Act 1953 in the case of wildlife). Wildlife is absolutely protected under the Wildlife Act 1953 unless specified in Schedules 1-6 and 8 (which includes game and most introduced animals). You must not knowingly hunt or kill or capture any absolutely protected or partially protected wildlife or any game without lawful authority (see section 63(1) Wildlife Act). If a person is prosecuted for hunting or killing wildlife by setting a trap it is not necessary for the prosecution to prove that the defendant intended to commit an offence. However the defendant can avoid liability if he or she can prove that he or she:

- did not intend to commit the offence; and
- the defendant took all reasonable steps to ensure that:
 - (i) in any case where it is alleged that anything required to be done was not done, the defendant took all reasonable steps to ensure that it was done:
 - (ii) in any case where it is alleged that anything prohibited was done, that the defendant took all reasonable steps to ensure that it was not done (see s.68AB Wildlife Act).

2.3 Trapping on conservation land

On conservation land, contractors must not set traps within 60m of any occupied dwelling, hut, picnic area or campsite, nor where stock is likely to have access to them. Traps must not be set within 60 m of recognised walking routes or the bush edge. Carcasses must not be left within 60 m of recognised walking routes or within 400 m of huts, or in streams or watercourses. Trappers must not cut tracks, blaze trees or use aerosol paints (temporary markers are permitted). In areas where kiwi and weka are present, raised sets must be used. Traps must be raised 700 mm above the ground. No lure or bait may be used on conservation land which is known, suspected or found to be attractive to bird life. The use of wintergreen, banana, raspberry, and rose lures is prohibited (this section is from an unpublished Department of Conservation report).

It is illegal to release a pest species that you have caught as a non-target in a trapping operation on conservation land. If any protected wildlife is caught in a trap it must be cared for and handed in, as soon as possible, whether alive or dead, to the nearest Department of Conservation office.

3. SELECTING A SUITABLE TRAP

There are a number of things to consider before buying traps. The first choice you should make is whether a live capture, leg-hold or kill trap is the most suitable for your situation. Some of the questions which you should ask yourself include:

Can you check traps EVERY DAY they are set?

Yes → Leg-holds and live capture traps suitable

No → Choose a humane kill trap

One of the main factors which should govern your decision between the three types of traps should be whether you can check traps daily. **And daily has to mean every day that the trap is set, within 12 hours of sun-rise.** It is a requirement by law, as well as an ethical requirement. No animal, even if it is a pest species, should suffer because of your inability to check your traps, whatever the reason.

If you think there will be times when you can't get around your traps every day (even if it is for a weekend) then you should not choose a live capture trap or a leg-hold trap. This is particularly important for leg-hold traps as animals restrained by a limb are typically much more stressed than animals contained in a cage or box trap. Even animals caught properly will be subjected to a certain amount of discomfort and/or pain (put your finger into a leg-hold trap if you are sceptical). There is also the possibility that the trapped animal has not been caught properly (for example caught across the body) and is therefore subjected to much more injury and/or pain than if it had been caught in the way intended. Non-target animals (particularly hedgehogs) are often not the right size for the trap and therefore the way they have been caught is not always humane. An animal in a leg-hold trap has limited movement or protection and can be vulnerable to exposure from the prevailing weather (hot and cold) as well as interference and attack from other animals.

Live capture traps must also be checked daily. Whilst the captured animal is unharmed and the trap often does offer some protection for the captured animal, there are definitely animal welfare issues if traps are not checked daily. In hot conditions, some of the live capture traps (especially the moulded plastic ones) can heat up very quickly and animals can become dehydrated and distressed in a matter of hours. Even when exposure to the weather is not a contributing factor, death by dehydration or starvation is obviously a totally unacceptable way for an animal to die.

Be realistic in your level of commitment to a trapping programme. Often people will start out thinking that they will check their traps daily and then find out that they can't – or they lose motivation to check traps daily when the trap catch goes down. Whilst you may not intend to cause undue suffering or death to trapped animals, that will be what happens if you can't keep up your obligations. If you have any doubts about your ability to service traps then it would be preferable to choose a kill-trap from the onset.

Are you capable of killing trapped animals humanely?

Yes → All traps suitable

No → Then choose a kill trap

If you choose live capture or leg-hold traps then you must be prepared to kill the animal yourself. This must be done in a quick and humane manner and is another obligation under the Animal Welfare Act. Animals should not suffer because you are squeamish or lack the skills to kill them quickly and humanely. The best way to kill animals caught in live capture traps is to run them into a pillowcase, sack or mesh bag (like an onion bag) and then deliver a blow to the head. Possums can be particularly hard to remove from cage traps - as they will instinctively clasp onto the sides of the trap and/or freeze. Experienced operators can extract animals from cage traps using gloves and then physically restrain them in order to kill them. Depending on the cage trap, it may be possible to shoot the animal without damaging the trap itself. The main ways to kill possums and ferrets are a head or chest shot using a .22 rifle or a blow to the head. Be aware that you need to crack the skull of the animal - and both possums and ferrets can survive substantial blows to the head. If possible, check the animal for signs of life after a few minutes. It may be advisable to cut the carotid arteries to ensure that the animal is dead (although this is probably not suitable for animals that are going to be submitted for disease status examination). Some people have been known to drown animals in live capture traps and this is not an acceptable practice - animals are subjected to too much stress. Another consideration when choosing a method of killing is whether animals are going to be submitted for post-mortem to establish if they are carrying disease. Care must be taken to minimize the damage to the carcass, particularly the lymph nodes that are associated with the jaw. There are also likely to be occasions when you may be required to kill an animal that has been caught in a kill-trap.

Does the operational area have good vehicle access?

Yes → All traps suitable

No → Leg-holds and some models of kill traps suitable

The physical dimensions and weight of the trap become particularly important if access to the operational area is poor. Leg-hold traps have been traditionally popular with contractors because they are small and relatively light. They can be carried on foot into areas that have little or no vehicle access. The live capture traps are usually bulkier and so are less suitable for areas with poor access. Some of the wire cage traps can be folded down but these traps are usually still quite heavy. When traps are bulky or heavy then vehicles (4WD utes and quads) are required to deploy them and vehicle access will govern their suitability. Some of the more recently developed kill-traps have been designed with consideration to bulk and weight and would be suitable for contractors who are working an area on foot.

Think about the sites within your operational area where you would like to place your traps (for example, bush blocks when trapping possums, rabbit areas when trapping ferrets). You may find that even if your operational area has generally good access, that the areas you want to target are difficult to get a vehicle to – or off the beaten track. If you are aiming to incorporate checking your traps within your normal daily workload then try to place traps in positions where you don't have to go out of your way to check. If you have to make a special effort to check your traps, then it is probably better to use a kill-trap as it has been noted that many people often start off trapping programmes with high levels of motivation but that invariably declines - resulting in traps going unchecked or maintained in a poor condition.

There are other factors that may restrict your access to your traps, like poor weather, lambing, hunting restrictions, etc. A bit of forward thinking can save a lot of trouble.

Do you have pets or other animals to consider?

Yes → Live capture traps are very suitable

Kill traps and leg-hold traps always carry a certain amount of non-target risk. Leg-hold trapping is not permitted in some urban areas. One of the main advantages of live capture traps are that trapped animals are caught unharmed and can be released without any problems. With the trend for increasing areas of lifestyle blocks and expanding semi-urban areas, the use of live capture traps greatly reduces the possibility of problems. You are not allowed to set leg-holds (and it would be inadvisable to set some kill-traps) within 150 m of farm houses and dwellings. This restriction, which can result in uncontrolled patches within operational areas, can be a particular concern if you are trying to achieve a very low abundance of the target species. When using protective covers or tunnels, bear in mind that they can be dislodged or a persistent animal may still be able to access the trap – so there is always the possibility that small cats or other non-target animals can be caught. It is a public relations nightmare for contractors (and the managers that employ them) to accidentally kill a pet, or for a pet (or stock) to come home with a leg-hold trap attached to its foot. If you are a landowner, it probably wouldn't help your relationship with your neighbours if you use traps that place their pets at risk. Some animals will range widely from home (something that the owners may or may not be aware of). Many cats will range more than 150 m from home. When seeking permission to set kill-traps or leg-hold traps you should make sure that the surrounding residents are aware of where the traps are set. There is little recourse if you find a dead pet in a trap - especially if you have not made the surrounding landowners aware of the risks and gained their permission to trap. From 1 January 2008, leg-hold traps cannot be used within 150 m of a dwelling without the express permission of the occupier or in any area where there is a probable risk of catching a pet (a dwelling does not include a hut on conservation land).

What level of trapping expertise do you have?

None → Live capture traps preferable or some easy-to-operate kill-traps.

With some traps, the experience and expertise of the trapper has a large influence over the capture rate. This is especially the case for leg-hold traps. Leg-hold traps have to be set in a stable fashion, be secured properly, to go off at the right pressure and placed in a position where the jaws of the trap are likely to capture a limb when the trap is sprung (usually this depends on where the lure or bait is placed in relation to the trap). Leg-hold traps can be highly effective in experienced hands, probably the best performing of the trap types. But in the hands of the inexperienced, animals are more likely to be caught in ways that are inhumane and capture rates are likely to be very variable. Live capture traps generally require little expertise to set properly and therefore perform more consistently across a range of expertise. For kill-traps, the level of expertise required to achieve consistently high capture rates will vary greatly depending on the actual kill-trap selected. Some kill-traps like the Timms trap require little expertise, whereas others like the Conibear require a much higher level of skill.

Do you want to catch more than one pest species?

Some traps will catch a range of animals. This may or may not be desirable. Sometimes the amount of non-target catch can interfere with the capture rate of your target species. For example, the capture rate of hedgehogs in summer ferret control operations can be high, which means that there are fewer traps available to catch ferrets. On the other hand, if you are undertaking predator control for the Department of Conservation, then a trap that catches cats, ferrets, stoats and weasels would be desirable. In general, open set leg-holds will be fairly indiscriminate, as are the larger sized live capture traps. Any trap that uses a cover, tunnel or has an entranceway that restricts the size of the animal gaining access to the trap will reduce the range of animals that can be trapped.

If you are using a kill-trap and are only checking traps infrequently, then a trap that catches a wide range of animals may be less suitable. It will take much longer to reduce the population of target animals if a high proportion of your traps are regularly out of commission because of non-target catch.

Some traps are more desirable because they can be used to catch both possums and ferrets. It is a matter of using different baits and possibly moving traps around so that they are in optimal positions for the species you want to catch. If the objective of pest control is to control Tb, then a trap that can be used for both animals saves set-up expenditure.

Are there any contractual requirements?

If you are undertaking pest control services under contract, the contracting agency may have preferences for certain traps. Managers may specify certain traps as being more suitable for some operations, based on historical trapping experience.



4. TRAP ASSESSMENTS: LEG HOLD TRAPS

Leg hold traps are just that; traps with metal jaws designed with the primary purpose of catching and holding an animal by a limb, including the foot.

4.1 Size 1 double-coil leg-hold traps

In this section we will cover the size 1 double-coil spring traps, of which there are approximately five different models available in New Zealand. Due to the generic nature of the traps, the following information applies to all size 1 leg-hold traps. The new regulations prohibiting some leg-hold traps do not apply to these size 1 leg-hold traps (but the 150-metre rule does).

4.1.1 General information & assessment

4.1.1.1 History

Size 1 double-coil leg-hold traps have been used in many parts of the world to catch a range of fur bearing animals and pest species for many years. They were first imported into New Zealand in the 1960's. These were used as an alternative possum trap to the much larger and bulkier Lanes Ace or "gin" trap that was very popular at the time. They are now the standard trap for professional pest control operators. They can be used to trap possums or ferrets when used with an appropriate cover. They have also been adopted as the only trap that can be used for measuring possum populations under the NPCA national possum monitoring protocol (NPCA 2005). These must be set to a certain standard - see the NPCA National Possum Monitoring Protocol for further details (go to www.npca.org.nz to download protocol).

The size 1 double-coil spring trap is a small jaw trap weighing a few hundred grams, two levers on either side of the jaw are powered by one coil spring each (hence the name), one jaw is locked down by a small dog that hooks under a plate or pan. A short chain of around 300 mm in length is attached to hold the trap in place once an animal has been caught.

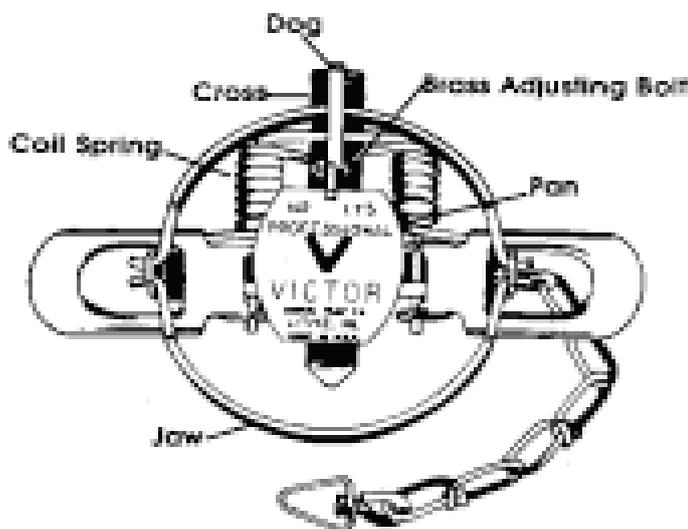


Figure 1. Anatomy of a double coil leg-hold trap

4.1.1.2 Setting traps

From 1 January 2008, leg-hold traps cannot be used within 150 m of a dwelling without the express permission of the occupier or in any area where there is a probable risk of catching a pet. A dwelling does not include a hut on conservation land. See section 2 for further regulations relating to trapping on conservation land.

Possum trap set

In practice possums found in leg-hold traps are generally caught on the limb, wrist, paw, or toe (Warburton 1998). When targeting possums, traps are usually placed at the base of a tree or something similar. The chain is stapled to the tree, the trap is “bedded” (the removal of a small amount of soil from under the trap to ensure the trap is stable). Place the trap about one hand width from the base of the tree, with the dog nearest the tree base. Flour, often with a lure of some sort (cinnamon, curry powder, sugar), is spread up the tree trunk behind the trap to about knee height.



Figure 2. Typical leg-hold trap set (from Environment Bay of Plenty's website)

Traps can be set at the base of “white boards” in tussock country or where suitable bases for traps are not available. Boards are 50 cm long x 10 cm wide and should be sufficiently rough in texture to retain adequate amounts of lure. The white colour will attract possums but in itself is unlikely to retain a possums interest enough to ensure a good capture rate, hence the use of lure.

In areas where kiwi and weka are present, raised sets must be used (Department of Conservation, unpublished report). Traps must be raised 700 mm above the ground. Traps can be set either on platforms or brackets attached directly to tree trunks or to sloping boards set at 38o to 45o to the ground. To be entirely safe from weka and kiwi, sets may have to be raised to 1 m (Thomson et al. 2001). It is generally perceived that traps set above ground do not capture as many possums as traps set on the ground (Thomas and Brown 2000).



Figure 3. Examples of raised sets from Thomson et al. (2001). There are several methods for making raised sets like these - but the recommended one is to use running boards to allow possums to gain easy access to the bait and trap.

The NPCA has developed protocol for making raised sets (NPCA 2005). Chains must be of sufficient length to avoid the possum hanging from a limb. If possums hang from a limb, the possum may be able to pull out of the trap more easily, risk serious injury to their captured limb, and are generally subjected to inhumane conditions if it is left to hang, even for short periods.

Ferret trap set

Traps are placed on the ground and must be covered to limit non-targets gaining access (particularly harriers and cats, very occasionally falcons). Covers should have one entry hole only, with some small holes at the far end to allow air to circulate (and the smell of the bait). Bait is pinned down on the far side of the trap. A small amount of soil should be removed underneath the trap to ensure stability. The trap should be orientated so that the dog/cross is at the back of the set. The trap should be pegged down or similarly secured. Tunnels should be large enough to cover both the trap and bait and they need to be pegged down or a weight placed on them. There are commercial plastic covers available (a list of suppliers of trap covers is provided in the Appendix), or they can be made from a number of different materials including wood, printing plates, or even plastic buckets with a hole cut out.

For both possum and ferret sets, traps should be sprung periodically and re-set. Make sure that the trap site is kept clear of any obstructions and that a clear area is maintained underneath the pan. Some operators believe that it is best to disguise the trap with a thin layer of soil or sand, especially for ferret sets. There does not seem to be any advantage in terms of heightened capture rates and this practice can lead to problems with soil affecting the springing mechanism.

Setting instructions

Place trap on knee or on the ground, push levers down with the outside of hands, ensure the jaws are flat, and flick the dog over so that it is caught under pan. Traps should be set as finely as possible. Flip the free jaw over and from underneath the jaws move the dog so that it is just under the trigger latch.

Pan bolts must be tightened so the pan will hold its own weight and not fall without being depressed. For best results, the pan must be level or slightly above the level of the jaws in the set position.

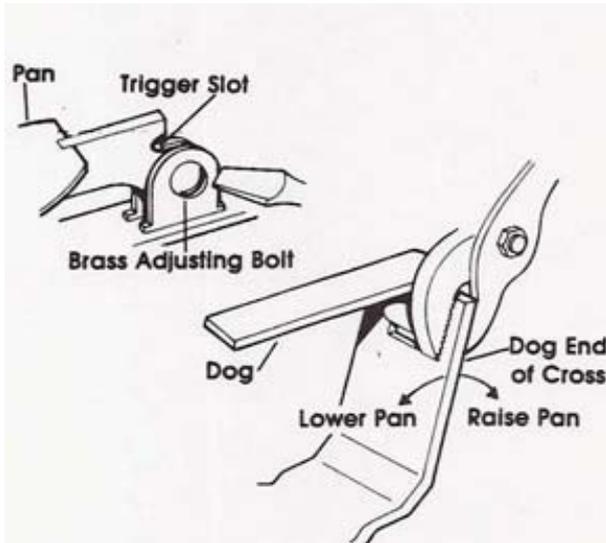


Figure 4. The trigger mechanism of a double coil leg-hold trap. To achieve the right setting of the pan adjust the cross using pliers.

4.1.1.3 Baiting

Bait or lure should never be placed on the trap – animals are sometimes caught by the face or nose if this practice is used.

Baiting - possums

Use a flour and icing sugar mix (about 5:1) and the addition of a lure such as cinnamon, spearmint, eucalyptus etc. If you are monitoring possums please see the NPCA possum monitoring protocol for requirements (NPCA 2005). See the earlier section titled 'Trapping on conservation land' for information on lures/bait allowed on conservation land.

Baiting - ferrets

The best bait for ferrets is fresh rabbit meat. Salted rabbit, hare and fresh fish are also good baits. Other suitable bait includes fresh meat, ox heart or one of the commercially available long-life baits (see Appendix 1 for list of suppliers). It is important to keep baits fresh, baits may need to be changed every couple of days or so. Ferrets will sometimes avoid the trap when entering the cover, grab the bait and get out without setting off the trap. Instances of bait removal can be greatly reduced by pinning the bait inside the cover. Pinning or securing bait usually results in the ferret stepping into the trap while "wrestling" with the bait.

4.1.1.4 Capture effectiveness

How an animal is caught in a trap is a function of:

- How well a trap catches is related to closure speed and clamping force.
- How and whether the trap is baited.
- The jaw spread of a trap can have an effect on capture success particularly if inappropriate sized traps are used for the target species. Additionally, if inappropriately large traps are used, then unacceptable injuries could result.

- Chance or unknown factors, that could include animal positioning when the trap is sprung, individual variation in limb structures and animal size (this section from MAF 2002).

Rating of capture rate

High.

Bait removal issues

Occasional. Flour base lures maybe affected by weather and/or rats.

Sprung traps and escapes

Research has shown that escape rates are lessened with the use of new traps (6% escape rate from new traps compared to 17% from used traps). As spring power declines with increased trap use, escapes may be more common. These escapes are usually the result of possums not being caught correctly when the trap is triggered rather than animals pulling out of the trap. Warburton, Poutu and Domigan (2003) assessed the clamping force and jaw closure time of new size 1 Bridger, Bushmaster, Duke, Sleepy Creek and Victor. Bridger, Duke, Sleepy Creek and Victor traps had similar clamping forces (c. 4.9kg); however the Bushmaster had a significantly higher clamping force. Closure times were similar for the Bushmaster, Duke and Victor, but significantly lower for the Sleepy Creek traps (not measured for Bridger). However, clamping force explained only 36% of the proportion of the escapes, so other factors such as trap bedding, pan position, pan tension and trap site need to be considered when setting traps to minimize escapes.

Commentary

Capture rates are high, traps can be sprung through various causes and possums will sometimes escape from the trap, usually leaving evidence in the way of fur. Ferret escapes are not so common but if baits are not pinned a ferret will sometimes avoid the trap. Capture rates will vary according to how well set the traps are – and how well they are maintained over a trapping operation. Professionals are likely to have better capture rates than inexperienced or casual users.

4.1.1.5 Animal Welfare Considerations

Has the trap been assessed by NAWAC?

Not formally.

Did it pass NAWAC guidelines?

When the Victor trap was assessed as part of a study on the effects of chain-springs (Warburton and Poutu 2002a) it did not pass either Category A or Category B standard for restraining traps. It therefore effectively failed the NAWAC guidelines for restraining traps. None of the other size 1 double coil spring traps have been assessed.

Any animal welfare issues observed?

Damage to the limb of the animal will sometimes occur, usually in the way of bruising. Broken limbs are rare but can also occur. Animals often show signs of struggling and stress. An animal that is restrained is always going to be at risk from interference from other animals, as well as being unable to get protection from the elements, whether that is cold, rain or sun. There are several things an operator can do to reduce injury and stress to the animal. When setting, ensure area is clear of anything that the chain can catch on after the animal is caught, broken limbs can occur when the chain is caught on an object such as a fallen branch. Fitting chain springs can reduce the amount and degree of injury to the possums (Warburton and Poutu 2002a). Longer chains (which are necessary for raised sets) increase the risk of possums injuring themselves if they are used for ground sets.

The capture of non-targets is also an issue with leg-holds, especially the smaller animals like hedgehogs, stoats, weasels, and rats. Often the smaller mustelids, which are sensitive to shock, exposure and stress, will be dead in the trap. In approximately 50% of cases, rats will still be alive, often caught over the hips or the body. Hedgehogs can be especially problematic, as they will often wrap themselves around the trap and are hard to remove. Hedgehogs will more often than not have broken limbs so it is more humane to kill them rather than release them.

Overall assessment of humaneness

NAWAC has identified animal welfare issues associated with leg-holds to include:

- Injury and distress associated with being trapped.
- Escape while potentially injured.
- Exhaustion from lack of food and dehydration if animals are held in the trap for a long time.

An additional issue arises when trappers fail to kill trapped animals quickly and humanely.

The very nature of these traps means that there will always be some welfare concerns. The reason that NAWAC has not recommended a prohibition or restriction on the use of size 1 leg-holds is that they consider that at least one unpadded trap is required for effective control of possums in New Zealand. Leg-hold traps will never be as humane as live capture traps. In comparison to a humane kill-trap, the whole process of being caught in a leg-hold, held for a varying amount of time before the operator returns and then being killed is likely to be much more stressful and prolonged experience. By law you are required to check traps every day and within twelve hours of sunrise. Check leg-hold traps as early in the morning as possible.

4.1.1.6 Non-target captures

Occasionally or commonly caught non-targets

Hedgehogs are very commonly caught, as are rats in possum sets. Raised sets reduce the numbers of non-targets. Cats and hedgehogs are common when using meat baits for ferrets. In some areas, the rate of hedgehog captures can be high and can have an effect on trap availability for ferrets. Hedgehog captures can make servicing traps much more time consuming. There is little one can do to avoid hedgehog capture in ferret sets, as they are similar sizes.

Native, domestic or farm animal concerns

Weka and kiwi are particularly vulnerable to being caught in leg-hold traps. In weka or kiwi areas, traps must be raised off the ground by at least 700 mm. Traps must be set where domestic cats, dogs, and young lambs are unlikely to step into them. Adult sheep and dogs can sometimes pull the chain out of the ground or off the staple and escape with a trap on its foot. Cattle will investigate traps and they usually spring them. Harriers are particularly vulnerable if meat baits are used when trapping for ferrets, and, although it is very rare, New Zealand falcons have also been caught. By using trap covers over the trap and bait, raptor captures can be prevented. Obviously if covers can be dislodged then the risk of adverse non-target captures increases. Make sure trap covers are secured properly. A good place to situate ferret traps is often along stock tracks but this should be balanced up with the risk of stock interference to your trap. Placing traps in paddocks that are not currently stocked or within shelter belts or fenced off areas will avoid problems with stock.

4.1.1.7 Logistic considerations

Weight	400 – 500 gm
Size	Small, 10 cm across the jaws. Traps are generally carried in bunches of 10.
Tools required	Generally only hammer and staples. For tussock or non-forested country, stakes and backing boards. Where weka and kiwi are present, running boards or some other means of raising traps are required.
Deployment:	50 - 60 traps can be carried on foot along with flour and required tools (although this is much lower if running boards are required or if the terrain is particularly hard going). Well over 100 can be carried on a well set-up quad bike and many hundreds on the back of a ute.
Ease of use	Moderate
Time to set	Moderate, quicker once one masters the technique but slower where backing boards or running boards are required. Setting a leg-hold for a ferret is a lot slower than many other trap types due to the length of time taken to set trap, stake the chain, pin bait and fix a cover over the trap and bait.
Maintenance	Wax, grease or oil once a year. After setting and springing new traps 100 times, clamping force declined by about 40% (Warburton et al. 2003). The significant loss in performance indicates that the springs in leg-hold traps are not designed appropriately for the extent of use that traps in New Zealand get exposed to. Once the clamping force declines to below 4.0 kg then there is greater than 10% chance of an escape occurring. Warburton et al. (2003) suggested that this clamping force provides an arbitrary standard that can be used as a pragmatic benchmark against which trappers can check and maintain their traps. Such maintenance can be done by replacing the springs or by placing wedges between the spring arms and the base plate of the traps.
Malfunction and other issues	Some models malfunction more than others but generally rare.

4.1.1.8 Overall assessment

Suitability for pest control contracting

Very suitable for possuming. The compactness and weight of the size 1 traps are their major advantage. These traps are the mainstay of most contractors “toolbox”, large numbers of these traps can be deployed and are time-proven to be effective at reducing possum numbers. It would be very hard to undertake possum control in some parts of New Zealand without these traps. Where large areas of bush or forest are to be controlled, leg-hold traps are usually the only trap the professional pest control operator will use. They are fundamental for monitoring possum populations. On the down-side they must be checked every day and there are animal welfare concerns. Non-target capture rates can be significant and there are limitations where they can be safely set with regard to stock and companion animals. Traps must be raised 70 cm where ground dwelling birds are present. Captured animals must be killed. Maintenance of springs should be undertaken.

For ferreting, although leg-holds catch well, they pose problems for contractors as there are limitations on where you can safely set them. Many ferret contractors have voluntarily moved away from leg-holds to the live capture traps for convenience and logistical reasons.

Suitability for lifestyle owners, farmers or occasional trapping

Due to the fact that they must be checked every day and that animals caught in the traps must be killed, leg-hold traps are probably not the most practical trap for the casual user. Lifestyle block owners or anyone living in semi-rural areas are probably quite constrained where they can safely set these traps. These traps vary in performance according to the quality of the trap set so inexperienced operators may not have as high a capture rate as professionals.

4.1.2 Victor

Manufacturer	Oneida Victor Inc. Cleveland, USA. www.oneidavictor.com
Supplier	M.S. Woodcraft Ltd, 128 Marine Parade, Mt Maunganui. Ph: (07) 575 5920, Fax: (07) 574 8910 Email: mwoodcraft@free.net.nz
Price	\$13.33 + GST
Other suppliers	Pest Management Services (\$24.50 +GST, discounts for bulk orders) Philproof Pest Control Products (\$18.00 +GST, discounts for bulk orders)



Figure 5. The Victor Trap

The Victor trap is considered by many within the pest control industry to be the gold standard of size 1 traps. The Victor has been used in New Zealand for many years and is widely regarded for its longevity and ease of use. When galvanised, and with regular maintenance, a Victor should give years of service. There are some recent modifications to the Victor which include a redesigned weight adjustment of the pan to target specific animal sizes. Replacement springs and pans are available. 420 gm. NPCA approved.

4.1.3 Duke

Origin	Made in Korea
Supplier	Good Traders Ltd, 2 Brackenfield Place, Parklands, Christchurch. Ph: 03-383-6286 or 027-2742493, Fax: 03-383-6288 Email: goodtradersnz@gmail.com
Price	\$11.95 + GST (sold in packs of 12), \$10.95 +GST (132 +) \$9.95+GST (500+ traps)



Figure 6. The Duke trap

The Duke is one of the cheaper traps in this category and this is possibly reflected in its fit and finish. The Duke is galvanized. Some users have found them difficult to set compared to other brands. Other operators are very happy with their Dukes and believe they are excellent value for money. Dukes have a similar capture efficiency to Victors (Thomas 2001). Pans and springs are available. 400 gm. NPCA approved.

4.1.4 (Bridger) Bush Master

Made by	Bridger Trap Co., Salt Lake City, USA. Manufactured in Taiwan.
Supplier	Trappers Cyanide Ltd, 303 Laidmore Road, RD2, Amberley Ph: 03-3149940, Fax: 03-3149970 Email: mike@traps.co.nz , Website: www.traps.co.nz
Price	\$14.00 +GST, 50-100 \$12.50 +GST
Notes	500 gm. NPCA approved.



Figure 7. The Bush Master trap

The Bush Master has replaced an older style trap known as the Bridger. Being relatively new, Bush Masters are untested in terms of longevity, but appear to be strongly built. Available in zinc-coated or bright steel. The Bush Master has two features not found in the other leg-holds on the market in NZ: a small dome on the dog which aids in the fine setting of the trap and a hinge on the bottom of the trap to which the chain is connected. This hinge helps to reduce the number of escapes from the trap, but does mean more care is needed to get a solid bed when setting the trap. Parts can be obtained from Trappers Cyanide Ltd.

4.1.5 Sleepy Creek

Manufacturer	Sleepy Creek Manufacturing, Inc., Berkeley Springs, USA
Information	www.scmtraps.com
Suppliers	No known NZ suppliers. Some size 1 traps may be in use in New Zealand; 450 gm.

4.1.6 BMI traps

Manufacturer	Butera Manufacturing Industries, Ohio. USA.
Suppliers	Some size 1 double-coil spring BMI traps have been imported into New Zealand but we are not aware of anyone importing them recently.

4.2 Soft-catch (padded) size 1 double-coil leg-hold traps

Padded (also known as 'soft catch') traps are commercially manufactured leg-hold traps with non-abrasive and durable cushioning material firmly fixed to the contact surfaces of its metal jaws. Soft Catch traps significantly decrease injuries to captured possums (Warburton 1992) but they have higher rates of escape than their unpadded counterparts and this factor reduces their efficiency. Like the unpadded size 1 leg-holds, a significant decrease in escape rate was obtained by using new traps (Warburton 1998). The escape rate of the new traps was 15-20% and this is still probably too high for these traps to be accepted for use by professional trappers. Spontaneous trap springing has been recorded for Soft Catch traps - when the jaw padding pulls the trap trigger out of the pan notch and springs the trap.

4.3 Size 1½ double-coil leg-hold traps

Supplier of Padded 1½ Victor traps	M.S. Woodcraft Ltd and Pest Management Services
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Figure 8. A padded size 1½ Victor trap

A trap of size 1½ means a leg-hold trap that measures 10.5 cm across its closed jaws. From 1st January 2008, the sale of all leg-hold traps of size 1½ or larger is prohibited, with the exception of commercially made size 1½ padded-jaw double-coil traps. From 1st January 2009, no double-coil leg-hold traps larger than size 1½ can be used. Due to the fact that these traps are going to be banned soon (as they cause unacceptable pain and distress to captured animals) we will not be covering them in this report (except the Lanes Ace). From 1 January 2011 no unpadded leg-hold traps of size 1½ can be used. Traps cannot be modified to make them padded.

4.4 Long Spring leg-hold traps

Long spring traps are used in the same way that double coils spring traps are. Generally, they are set at the base of a tree with a lured flour blaze for possums. Due to the length of the long-spring trap, more room is needed to ensure a proper, stable bed. They are more bulky than their double coil spring counterparts. The sale of all long-spring of size 1½ or greater is prohibited from 1st January 2008, and from 1st January 2009, no long-spring trap of size 1½ or larger can be used. Due to the fact that these traps are going to be banned soon, and cause unacceptable pain and distress to captured animals when used, we do not recommend their use and they will not be covered by this report (except the Lanes Ace).

4.4.1 Lanes Ace or Gin

From 1 January 2009 it will be illegal to use this trap unless an exemption is obtained from MAFax: The main reason for including this trap in this review is to provide information on the issues associated with its use. Not used or tested within the framework of this project.

Manufacturers	Lanes Hardware Ltd, Australia
Suppliers	No longer imported or sold in New Zealand. It will be illegal to sell these traps after 1 January 2008.



Figure 9. Lanes Ace or Gin trap

4.4.1.1 Description

History

Developed in the UK but banned there since 1958. This trap has been used extensively for possum trapping since the 1920s in New Zealand. In the 1980s, it was largely superseded by the lighter victor traps. It took NZ a lot longer than the UK to address the animal welfare concerns associated with this trap but finally in 2002 the NAWAC started the process to prohibit this trap, along with other size 1½ traps.

Description

Made of steel. Long spring trap with serrated jaws. Has a chain to secure trap.

Springing Mechanism

Leaf spring trigger by a pressure plate.

Typical trap set

A variety of sets were used for possums, often at the base of trees or on leaning logs. The traditional set for ferrets was down a clay pipe.

4.4.1.2 Capture effectiveness

This trap was known to have a good capture rate – one of the main reasons it was so popular with trappers (along with the fact that there were very few other options until more recently).

4.4.1.3 Animal Welfare Considerations

Welfare performance

The trap caused too frequent and excessive trauma to captured possums to pass the NAWAC trap-testing guidelines (Warburton 1982). Even when modified with a chain spring the trap still failed the requirements. The trap has not been tested on ferrets and will not be because it would not possibly pass the NAWAC guidelines.

Any animal welfare issues observed?

Possums are often captured with fractured limbs, ferrets are also often captured with fractured limbs or across the body, or high up on shoulders or hips. Lacerations are common.

Overall assessment of humaneness

Very poor.

4.4.1.4 Non-target captures

Catches the full range of non-target species. The animal welfare concerns of this trap were highlighted when pet cats were caught. Sometimes cats would come home with severely damaged or missing limbs. This trap was banned by many district councils for use in urban areas because of the risks associated with pets and domestic animals. Professional trappers and contractors report a much higher by-catch of rats and blackbirds in this trap than the size 1 double-coil leg-holds. When set on the ground, kiwi and weka were frequently caught.

4.4.2 Sleepy Creek

Manufacturer	Sleepy Creek Manufacturing Inc, Berkeley Springs, USA. www.scmtraps.com
Suppliers	Stock and station agents including CRT
Price	\$23.00



Figure 10. Sleepy Creek trap

The jaw width is the same as the size 1 leg-holds – so this trap will not be prohibited. Looks similar to a double-coil spring trap - except for the long springs that power it. This trap is easy to set although it is more difficult to bed well due to the long springs. The springs can be turned up to 90° from the jaws which can assist bedding. Capture rate and non-target issues would be the same as size 1 double-coil traps. It is possible that the long springs hold their strength better than the springs on the double-coils. Long spring traps must be set by hand or with a trap setter as foot setting may cause damage to the long springs. 230 gm.

4.4.3 Bushmans Best

Manufacturers	Traps imported by Possum Traps NZ
Suppliers	Possum Traps NZ, 31a Ratima Place, Awatapu, Whakatane Ph: 07 3084861 or 0800 863504

	Email: traps@possumtraps.co.nz , Website: www.possumtraps.co.nz
Price	\$8.00. Zinc plated and strengthened \$9.50
Notes	Not used or tested within the framework of this project. Possum Trap NZ markets this trap as being suitable for possums and ferrets.

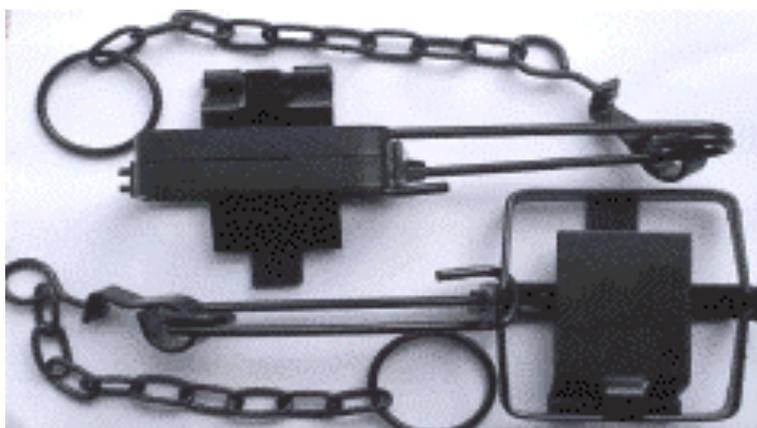


Figure 11. Bushmans Best trap

4.4.3.1 Description

History

Created in early 2006 by Possum Traps NZ, presumably in response to the anticipated prohibition of the Lanes Ace trap.

Description

Similar design to the Lanes Ace trap, although slightly smaller (complies with the NAWAC regulations on jaw size), lighter and has straight jaws. Powered by the long springs but has steel wire coil springs.

Springing Mechanism

Has large flat square pressure plate.

Typical trap set

Ground or raised sets. Possum Traps NZ have written a booklet (\$7.95) which describes trapping methods and various sets for this trap.

Setting instruction:

Place your foot on the handle spring and press down. Lift the pressure plate and when the set edge is just over the jaw, lift your foot slowly off the handle spring.

Baiting

A possum lure (Bushmans Best Eucalyptus Lure) is marketed with this trap.

4.4.3.2 Capture effectiveness

No information on capture effectiveness is available.

4.4.3.3 Animal Welfare Considerations

Has the trap been assessed by NAWAC?

No

Any animal welfare issues observed?

This trap has a short chain to prevent the captured animal running and jerking the captured limb. This reduces the chances of escape and injury by the captured animal. The flat jaw is thought to be more humane than the serrated jaws of the Lanes Ace trap. The trap is lighter than the Lanes Ace which may also improve animal welfare aspects.

Overall assessment of humaneness

Probably similar to other leg-hold traps where leg injuries occur. Given the similar design to the Lanes Ace trap (but with some modifications that are likely to decrease the range and amount of injuries); this trap would probably rank between the size 1 double coil spring traps and the Lanes Ace for humaneness.

4.4.3.4 Non-target captures

Non-target issues are likely to be similar to the double coil spring traps.

4.4.3.5 Logistic considerations

Weight	450 gm
Size	Length 230 mm, open jaws 80 x 100 mm. Chain length is 300 mm.
Tools required	Hammer and staples.
Deployment	Similar to the other size 1 leg-holds – around 50 could be carried comfortably with the associated tools.
Ease of use	Reasonably easy. If you are strong in the wrist then you can set the trap by hand or you can use your foot.
Time to set	Approximately 3 minutes to complete the whole trap set.
Maintenance	The traps are rust proofed so no maintenance is required.
Malfunction and other issues	Few issues of malfunction, very basic trap with few parts.

4.4.3.6 Overall assessment

Suitability for pest control contracting

The price is an attractive aspect of this trap. These traps have not been on the market long so it is hard to assess them in terms of capture effectiveness, longevity, reliability and whether catch efficiency is reduced over time.

Suitability for lifestyle owners, farmers or occasional trapping:

Some operators may prefer long-spring traps, although the long spring makes the trap bulkier.



Figure 12. Scarily, this is not a publicity stunt. This photo taken in 1912 outside the famous Henry Lane Works in Britain - show four of the employees posing with large predator traps destined for export, possibly Africa.

5. TRAP ASSESSMENTS: KILL TRAPS

One of the major advantage of kill traps is flexibility - traps can be checked when it suits the users and serviced when required. Also animals do not need to be killed by the trapper.

These traps are able to be used in a wider range of situations and can used as an ongoing control method or to help maintain populations at a low density after control operations.

5.1 General information & assessment

5.1.1 Capture Effectiveness

For a lot of the kill-traps there is little known about capture effectiveness and in the absence of scientific studies it is difficult to rate many of the traps. The research that has been done has been rather piece-meal in terms of establishing capture efficiencies; typically one trap has been compared to another. Bear in mind that although the capture effectiveness of kill traps may in general be slightly less than leg-hold-traps, their ability to catch animals over a period of time with occasional checking means that the at the end of the day, a good trap occupancy rate is achieved.

Possums

The possums' occasional shyness of bait, coupled with a hesitancy to put their heads into traps, means that kill traps will probably always tend to be less efficient than leg-hold traps (Warburton 1982). Warburton (1982) found that the Conibear 220 had a 44% capture efficiency compared against the Lanes Ace trap (set at 100%). Henderson et al. (2004) found that Set-n-Forget kill traps set at ground level on farmland caught similar numbers of possums as leg-hold traps but the capture efficiency of Set-n-Forgets was not as high as leg-holds in forest habitats. There were fewer escapes from the Set-n-Forget kill traps (0.03%) than the leg-hold traps (1.25%). The LDL 101 (earlier prototype of the Warrior) recorded capture efficiency similar to that of the Victor but the BMI 160 was significantly less (Warburton and Orchard 1996).

Ferrets

Three times more ferrets were caught in the Fenn traps compared to the KBL (Clapperton and Meenken 2000). Ragg (2007) found that Set-n-Forget kill traps were less effective at catching ferrets than Holden live capture traps.

5.1.2 Animal Welfare Considerations

The sad fact is that many animals have suffered in kill-traps that are not humane. Users may have brought traps in good faith that they kill the target animal effectively, only to find out otherwise. In the last few years, there has been more testing of traps to identify which kill traps are humane in their killing action. Even so, this information has not been easily accessible – being mostly in the form of contract reports. Presently there are no requirements for trap manufacturers or suppliers to inform consumers about the results and the process to prohibit traps involves much consultation and is lengthy. Until 1999 (when changes to the Animal Welfare Act were made), there was not the legal basis to prohibit traps that were unacceptably inhumane. Presently NAWAC are going through the process of prohibiting the first round of traps.

The situation is evolving all the time, as more traps undergo NAWAC testing and this report may not remain accurate as to the status of the animal welfare testing for each trap model. Trap manufacturers may also modify traps to make them more humane if testing has revealed problems. In order to make an informed decision, consumers should ask the suppliers for the most up-to-date information on the NAWAC trap-testing of their products.

The animal welfare concerns to date have largely focused on the target animals. The capture of non-target in kill-traps should also be taken into account, especially as the traps are not designed for them and animals can be caught improperly. Warburton and Orchard (1996) found that non-targets (mostly hedgehogs) were more often caught alive than possums in LDL 101 and BMI 160 kill-traps.

It seems that as a general rule, ferrets are harder to kill than possums and presently there is only one trap (DOC 250) that has passed the NAWAC trap-testing guidelines for ferrets. Warburton and Poutu (2003) noted that to consistently render ferrets unconscious within 3 minutes a trap has to have either a high clamping force or can consistently strike the cranium with a high-impact momentum. For traps that rely primarily on clamping force, the neck may not be the most effective target location for ferrets.

5.1.3 Non-target captures

Occasionally or commonly caught non-targets:

With kill traps set for possums, rats can be very problematic. They remove bait, rendering the trap ineffective or they are caught and occupy the trap until it is cleared. In some bush habitats areas, rats are extremely numerous and they can totally compromise the effectiveness of the possum control operation. Some suppliers of traps have manufactured rat resistant baits for their traps (for more details see the 'Baiting' section in each trap assessment). Most suppliers have also manufactured trap covers/shields that are specifically designed for their product. Conibear traps that are set along animal runs may catch a range of non-targets. Bees, wasps and insects can be attracted to jam baits. Henderson et al. (2004) found that for possum sets, elevated kill-traps caught fewer non-target species (0.03%) than ground set leg-hold traps (1.25%).

For ferret sets, kittens and half grown cats can are often able to fit through the holes in trap covers and there is little one can do to prevent some cat kills. Another concern is that cats will sometimes spring traps using a front leg (Poutu and Warburton 2006). If kill-traps are not checked regularly, then cats caught by a limb can suffer greatly, even more so if the trap is not pinned or secured to the trap site properly and the cat escapes with the trap on its leg. Hedgehogs will be a common non-target capture in ferret sets but they are usually easily killed by the trap. Hedgehog capture can be an issue as they can reduce the availability of traps for ferrets. Stoats and weasels may be occasionally caught and killed although some kill traps may be too large to catch them consistently or that these smaller animals are unable to trigger the traps properly in order for the trap to catch them. Possums can be attracted by the meat baits used in ferret sets and depending on the trap design they may be caught occasionally. It can be unpleasant to remove non-targets if they have been in the trap for some time, rigor mortis, bloating or decomposition can make extracting animals tricky – it is always good to carry a pair of gloves for this purpose.

Native, domestic or farm animal concerns

The capture of any native, domestic or farm animal is likely to be of great concern as it is likely to be fatal, or injurious (for larger animals). Traps must be raised off the ground, (like leg-hold traps) if ground dwelling birds are present or trap covers should be used which (preferably) have baffles to prevent the ground birds accessing the trap. Most possum traps have been designed to hang on trees so specialized raised sets are not required.

Depending on the design of the trap or the design of the trap cover (if used) it is possible that some ferret kill-traps can be accessed by cats. Obviously a kill-trap is not going to discriminate between a feral or domestic moggy so traps should not be set close to dwellings. Some kill traps could be a risk to dogs, particularly Timms. Harriers may be at a slight risk of leg captures in some ferret sets, again depending on how well the trap is protected from investigation. Trap covers and trap shields must be secured very well to prevent them being dislodged by stock or by animal investigation, an unprotected kill trap would pose a real risk to children, pets, stock and would increase the possibility of miscaptures to target species.

Children

Almost all kill-traps would pose some risk to small children if they investigate the traps. Ground set traps would be particularly concerning unless protected well by trap covers that are hard to remove. Many of the covers that come with the traps would be inadequate – as they are more suitable for the raised possum sets.

5.1.4 Logistical Considerations

Many of the more recently released kill-traps are as small, compact and light as possible.

This enables them to occupy the same niche as the leg-hold traps (being able to be deployed on foot). One of the recognised issues with some of the kill-traps is user-friendliness. A trap that is easy to set and seemingly safe is a more attractive option than a trap that with one wrong move could take your hand off! Invariably, as people become familiar with the use of a particular trap, they become more confident and their perception of the trap changes. Having said this, one manager found that incidences of field staff being caught out by traps increased once they became less wary of them.



5.2 DOC 250

Manufacturer	CMI Springs, P.O. Box 3963, Auckland Ph: 09-579-4089 , Fax: 09 5792595 Email: rossm@cmisprings.co.nz
Supplier	CMI Springs (supply traps) Haines Pallet Co. Ltd (supply trap & box), 111 Hutt Park Rd, Seaview Ph: 04-5686898 , Fax: 04-5686480 Email: haines.pallets@paradise.net.nz
Price	\$37.00 for trap, \$62.70 for trap and box, \$23.00 for setting tool
Information	www.predatortraps.com
Notes	Suitable for ferrets, stoats, hedgehogs, rats and weasels. Kills by compressing (smashing) the skull.



Figure 13. The DOC 250 trap

5.2.1.1 Description

History

One of a series of traps jointly developed by the Department of Conservation and Phillip Waddington. DOC wanted a humane alternative to the Fenn trap which had been demonstrated not to kill quickly.

Description

Smaller versions of this trap, the DOC150 and DOC 200, target stoats, rats and hedgehogs whereas the DOC250 is large enough to kill ferrets (as well as the smaller species). Trap is made of zinc passivate electroplated mild steel. Box is made of galvanised wire mesh and H4 rough sawn standard pine board timber.

Springing Mechanism

Coil springs. Trap is triggered when the animal stands on a large flat treadle/trigger plate. The trap is 'L' shaped. When set the striking frame is pulled into the vertical position and comes down with much force onto the plate when sprung. A special design feature is the

six parallel striking bars. This enables the trap to have a high chance of striking the target animal in a vital position even if animals vary in size and speed of entry.

Typical trap set

Ground set. This trap must be set in a box. Plans for the boxes can be downloaded from www.predatortraps.com or boxes can be supplied by Haines Pallet Co.

Setting instructions

Traps must be bolted into wooden box. Bait is placed before setting trap. The striking arm is pulled up into the vertical position by an attached setting handle. Pull past the top of the trigger arm, allowing the trigger arm to drop onto the pressure plate. Slowly release pressure, allowing the bottom of the trigger arm to ride up the pressure plate and to catch onto the sear. A safety clip is provided which prevents the striking frame closing during the final setting procedure. The lid of the wooden box is screwed down to prevent children or non-target species accessing the trap.

Baiting

Passive. The bait acts as an attractant only. Bait is placed on the far side of the trap, to attract the animal across the pressure plate.

Capture effectiveness

The DOC200 (same trap, but slightly smaller for stoats) was found to be twice as effective at catching stoats as Mk6 Fenn traps during a recent 3 year DOC trial in the Urewera National Park. Must always be set as a single set (in double sets the force of the first trap going off will often spring the second trap).

5.2.1.2 Animal Welfare Considerations

This trap has passed the NAWAC trap testing guidelines for ferrets, stoats, rats and hedgehogs (Poutu and Warburton 2005). This trap is the only trap on the NZ market that has passed these standards for ferrets. See "Humane Report" at www.predatortraps.com

Overall assessment of humaneness

Excellent. It is very humane as the power of the striking bar means death would be instantaneous in most cases.

5.2.1.3 Non-target captures

Potential non-targets

Hedgehogs, kittens, stoats, weasels and possibly rodents. Non-target capture is generally not a big issue with these traps. The design of the trap will mean most, if not all, non-targets will be killed.

Native, domestic or farm animal concerns

Minimal. The wooden box has been designed to exclude large non-targets like cats and dogs and farm livestock. In weka areas, the wire barriers or other methods need to be used to prevent them from accessing the trap. The offset holes in the wire mesh barriers are designed to reduce the risk of kiwi and weka sticking their beaks into the trap area.

5.2.1.4 Logistic considerations

Weight	While the trap weights 2.8 kg, it must be set within a wooden box (approx 6 kg), which has to be constructed of robust materials in order to withstand the force of the trap when it springs. Therefore the whole unit is heavy. It would be prohibitive for use in situations when traps have to be moved regularly unless vehicle access was easy.
Size	This trap must be set in the DOC standard best practice wooden box (40cm long x 25cm wide x 25cm high) for safety reasons.

Tools required	Screw-driver (for the lid of the box). A setting tool (which makes setting the trap much easier) is available from CMI Springs and Haines Pallets Co. if required.
Deployment:	Definitely requires a vehicle
Ease of use	This trap takes considerable strength to set, and the power of it can be a little scary. Some people would not have the strength or desire to operate this trap without the setting tool. Having said this, the trap is straight-forward to set.
Time to set	Very quick. Once trap is set up in box, it is ready to go and just needs setting
Maintenance	The trap would require cleaning to keep mechanism free of debris. The force of the trap going off may result in deterioration of the wooden box over time.
Malfunction and other issues	The plate may be damaged or dented through the force of the striking arm especially if any material becomes lodged in between.

5.2.1.5 Overall assessment

Suitability for pest control contracting

The weight and bulk of this trap means that it is not suitable for contractors who have to move traps regularly and/or have to transport and set large numbers. Very suitable for permanent positioning trapping regimes though. This trap is currently the only one proven to be humane for ferrets.

Suitability for lifestyle owners, farmers or occasional trapping

Very suitable. This trap would be one of the better choices for these users, as long as they were capable and confident with setting it. Ideally, it would be placed in permanent positions and serviced when required. It poses a very low risk to pets, domestic animals and children (if lid is screwed down properly).

5.3 Set-n-Forget

Origin	Pest-Tech Ltd, P.O. Box 40, Leeston Ph: 03-324-3163 , Fax: 03-324-3163 Email: pest-tech@xtra.co.nz
Price	\$32.00
Notes	Designed for possums and ferrets. Kills animals by striking and clamping them on the skull or behind the head. Clamping force of approximately 25 kg.



Figure 14. Trap (trigger set in position for possums) and possum cover (left). Trap with trigger in position for ferrets (right)

5.3.1.1 Description

History

Designed by Ray Henderson of Pest Tech Ltd. Very similar to the Holden Multi-kill trap. Has been used mostly in AHB possum research projects. Limited use on ferrets.

Description

Made of steel. Resembles a large mouse (snap-back) trap.

Springing Mechanism

A striking arm is released when the trap is triggered.

Typical trap set

Hangs flat on tree truck or on the ground for possums and on the ground for ferrets. Needs a cover for both species. Should be pegged down or secured to site for ferret sets.

Baiting

Active, the animal must pull on bait to trigger the trap. There are different adjustments for the trigger for possums and ferrets (the bait is held further forward for trapping ferrets) The trigger sensitivity can be changed by adjusting a screw. Bait must be threaded onto the bait hook so not all baits are suitable for this trap.

5.3.1.2 Capture effectiveness

Appears to be good for possums - comparable to leg-holds in some habitats (Henderson et al. 2004). Very low rate of escapes observed when trapping for possums (Henderson et al. 2004). Capture effectiveness is not so good for ferrets though (Ragg 2007). Bait removal can be an issue for ferrets as the trigger mechanism is not always sensitive enough - allowing animals to interfere with the bait. In order for this trap to maintain its capture effectiveness it requires attention to maintenance (see malfunction and other issues).

5.3.1.3 Animal Welfare Considerations

Killing effectiveness

The trap has been tested on possums and passed the NAWAC trap-testing guidelines (Poutu and Warburton 2006). It has not been tested for ferrets but field experience indicates that it would not pass (Ragg 2007). It has been tested on feral cats and failed because one cat was captured by a front limb (Poutu and Warburton 2006). However another 10 cats were captured and rendered unconscious within 3 minutes. It has been suggested that the trap could be used for cat control but users should monitor the trap for

mis-captures and if they are found to occur frequently then the trap should not be accepted for feral cat control.

Any animal welfare concerns observed?

Yes. Ferrets have been found alive, even some which have been caught in the manner intended. Ferrets were also caught by limbs. Some suffering (evidenced by signs of struggle) before death has also been observed in ferrets (Ragg 2007).

5.3.1.4 Overall assessment of humaneness

A humane trap for possums but not for ferrets. Limb captures of non-targets and ferrets is a possible concern.

5.3.1.5 Non-target captures

Occasionally or commonly caught non-targets

For ground sets, the cover is not adequate to exclude many non-targets, so non-target capture may be an issue. Hedgehogs are commonly caught. Dogs could be potentially caught as the trap is not far inside the cover. Cats may trigger traps with their paws. Some smaller animals may not be able to trigger the trap as the trigger mechanism may not be sensitive enough and would avoid capture.

Native, domestic or farm animal concerns

Cats and dogs may be at risk. Depending on the protection provided by the cover, harriers may also be of concern.

5.3.1.6 Logistic considerations

Weight	Lightweight - 520gm (600gm with cover).
Size	29 cm x 12 cm. Lies reasonably flat when not set. A plastic cover needs to be used.
Tools required	A setting tool is required and a hammer.
Deployment:	Around 30 traps could be carried on foot.
Ease of use	Good - once the operator has gained confidence with setting the trap.
Time to set	Ferret sets can take some time.
Maintenance	Requires a reasonable input to keep performing well.
Malfunction and other issues	Instances of malfunction have been observed – the striking bar can warp, the axle holding the trigger dog can work free and a relatively high rate of frame and weld breakages have been observed by users.

5.3.1.7 Overall assessment

Suitability for pest control contracting

The biggest advantage of this trap is that it is a relatively small lightweight kill-trap. It has been designed for possum control and performs much better as a possum trap than as a ferret trap. This trap is not recommended for ferret control as there are problems with capture effectiveness and humaneness. Ground set traps may have problems with non-target catch, restricting where they can be used safely.

Suitability for lifestyle owners, farmers or occasional trapping

Suitable for possum control.

5.4 Holden Multi-kill

Manufacturer	Trappers Cyanide Ltd, 303 Laidmore Road, RD 2, Amberley Ph: 03-3149940, Fax: 03-3149970 Email: mike@traps.co.nz , Website: www.traps.co.nz
Price	\$24.00 + GST \$5.00 + GST, Trappers cover - \$12.00 + GST
Notes	Designed for possums and ferrets. Designed to strike ferrets behind the shoulders, preventing them from breathing. For possums, the trap is designed to strike at the back of the skull.



Figure 15. Possum version of the Holden Multi-kill

5.4.1.1 Description

History

Similar to the Set-n-Forget in basic design - resembles a large mouse (snap-back) trap. A major point of difference though, is that for ferret sets a foot plate is fitted instead of the bait trigger system. Limited field use to date. Made of zinc coated steel.

Trigger Mechanism

The trap is powered by two coil springs with the striking arm being held in position by a dog that fits into a trigger mechanism. For possum traps the trap is triggered by interference with a bait hook and for ferrets the trap is triggered when an animal steps onto a footplate.

Typical trap set

Hangs flat on tree trunk or on the ground for possums and on the ground for ferrets. Yellow or black trap cover is used for possum sets. For ferrets there are two options. A faceplate can be attached to the trap cover to prevent entry of cats – and to reduce hedgehog captures. The second, a green Trappers cover is a lidded enclosed box that has two offset holes to prevent the entry and interference of cats, hedgehogs and ground-dwelling birds. The Trappers cover can also be used to house the DOC 150, DOC 200, Mk4 and Mk6 Fenns, and size 1 leg-holds. No pegs or chains are required.

Baiting

Active for possums. Possums must pull on the bait to trigger the trap. The trigger sensitivity can be changed by adjusting a screw. Bait must be threaded onto the bait

hook so not all baits are suitable. Trappers Cyanide sells Possum Superlure, a rat and waterproof bait suitable for this trap and PossumDough, a prefeed. For ferrets, the trap is sprung through pressure on a foot plate – the bait is an attractant only. Mustelid and Cat bait, a solid waterproof and flyproof bait made of dehydrated rabbit, hare and possum sold by Trappers Cyanide is suitable for this trap.

5.4.1.2 Capture effectiveness

Given the limited use of this trap, it is not possible to determine with any reliability capture effectiveness and related aspects. Its performance is likely to be similar to the Set-n-Forget for possums.



Figure 16. Ferret trap sets with a) the face-plate and yellow trap cover and b) Trappers cover. Note the footplate that is used to trigger the trap when targeting ferrets.

5.4.1.3 Animal Welfare Considerations

Killing effectiveness

The effectiveness of this trap for killing possums has not been assessed. The trap failed the NAWAC trap-testing guidelines for ferrets (Warburton and Moffat 2007). The trigger plate size was modified during the testing to increase the probability that the ferrets were struck across the chest rather than the shoulders. Even so, the trap failed to consistently strike the captured animal in a vital location and killed only three of the 10 tested ferrets within the timeframes allowed.

Overall assessment of humaneness

Unable to comment on the humaneness of this trap for possums as it has not been tested but the trap does not humanely and consistently kill ferrets.

5.4.1.4 Non-target captures

Depends on how effective the trap cover is at protecting the trap from non-target interference (we have been unable to assess this). Possum sets are likely to have similar issues to the other kill traps (see section Kill traps/non-target captures).

5.4.1.5 Logistic considerations

Weight	400gms, Possum cover weighs 100 gm, face-plate 60 gm, Trappers cover 800 gm.
Size	25 cm L x 12 cm Website: Lies flat when not set so convenient shape for carrying.
Tools required	Setting tool required.

Deployment:	Around 30 traps could be carried on foot.
Ease of use	Good - once operator has gained confidence with setting the trap.
Time to set	Moderate.
Maintenance	Cannot comment due to limited use.
Malfunction and other issues	Cannot comment.

5.4.1.6 Overall assessment

It is difficult to provide an assessment of this trap given its limited use. The concept is good - the physical dimensions of the trap would make it an attractive option for possum contractors if capture effectiveness and humaneness aspects prove to be good. Not recommended for ferrets as it does not kill consistently.

5.5 Timms

Manufacturer	KBL Rotational Moulders, P.O. Box 827, Palmerston North Ph: 06-358-6477, Fax: 06-3554825 Email: sales@kbl.co.nz , Website: www.kbl.co.nz
Suppliers & prices	Stock and station agents, Mitre 10 (\$49.95) Pest Management Services (\$45.00 +GST) Philproof Pest Control Products (\$41.00 +GST)
Notes	Targets possums, often used for ferrets.

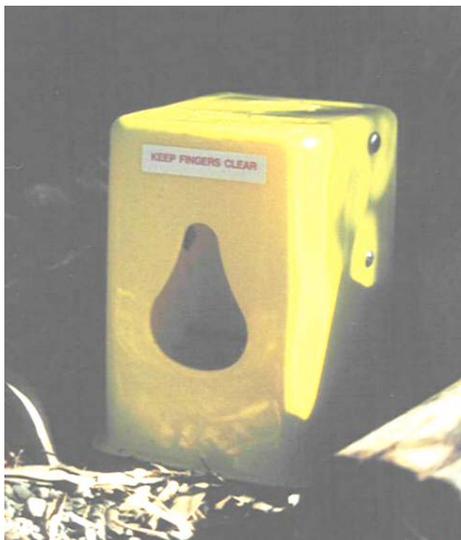


Figure 17. Timms trap

5.5.1.1 Description

History

Until recently, this trap was one of the few kill-traps designed in New Zealand specifically for possums. It has been used widely by farmers and LIPs groups and other casual users

as well as professional pest control operators. Baited with meat, it has had extensive use as a ferret trap.

Description

This box shaped trap is made of yellow tough polyethylene plastic.

Killing Mechanism

When the animal pulls the bait and sets off the trap, the killing bar which is powered by two coil springs rotates upwards forcing the neck upwards into the upper part of the unique keyhole opening. Death is by compression and/or strangulation

Typical trap set

Ground set. Has to be secured to the ground using pins or by placing a rock on the top. Can be set in trees.

Baiting

Active. The trap is set off by the bait being pulled forward. The bait has to be threaded onto a rod so not all baits are suitable. It is important that the bait is secured onto the bar so that it is horizontal rather than vertical. This prevents the possum from tilting its head sideways to bite the bait. If it does tilt its head the trap will not always kill quickly.

5.5.1.2 Capture effectiveness

Occasionally bait will be removed; sometimes the bait will slide down the bait rod. Sprung traps do occur, in most cases, the trap is probably set off by small non-targets that trigger the trap from inside. Possums have been observed escaping from the trap.

5.5.1.3 Animal Welfare Considerations

Killing effectiveness

This trap has been assessed for possums and it just failed to meet the NAWAC trap-testing guidelines because of an escape (Warburton, Poutu and Domigan 2002a). As any escape is counted as a failure to kill effectively, the trap failed the NAWAC trap-testing guidelines – but the remaining nine animals that were caught were all killed effectively. It is very important that the bait is attached to the trigger bar to avoid possums rotating their heads and thus get struck on the sides of the neck. The trap has also been tested for killing ferrets and failed (Warburton et al. 2002). All three ferrets tested were still conscious after 5 minutes and had to be euthanased. It has been tested for killing feral cats and passed the NAWAC trap-testing guidelines (Warburton, Poutu and Domigan 2002b).

Any animal welfare concerns observed?

Yes, particularly ferrets. Ferrets that are caught properly can still be alive, hanging in the trap. Live ferrets can be very tricky to extract from the trap and all efforts must be made to catch them and kill them once the trap mechanism is released. The design of the keyhole shaped entranceway may contribute to the occurrence of live ferrets. Occasionally ferrets will be caught by a limb in the trap – this probably occurs when the animal enters the trap through the keyhole entranceway and triggers the trap from inside. There is evidence that sometimes animals have struggled considerably before death. Observations include removal of the trap from the original position, claw/rub-marks or general disturbance to the trap-site and sometimes the condition of the animal itself or the position in which the animal has been caught. If the trap is set ‘too hard’ for ferrets then they are more likely to be caught over the body (instead of neck). As the trap was designed for possums, the smaller non-targets (like stoats) are sometimes not caught properly – but are often dead due to the strength of the trap. Sometimes animals are caught around the neck but also have limbs in the trap and this may reduce the killing effectiveness of the trap as the blood supply is not clamped off properly. Although

indications of struggling are sometimes observed when trapping possums, few possums have been reported to be alive in the trap.

Overall assessment of humaneness

The trap performs satisfactorily as a possum and feral cat trap. It is not a humane trap for ferrets and should not be used to target them.

5.5.1.4 Non-target captures

Occasionally or commonly caught non-targets

Hedgehogs, stoats and cats. The capture rate of non-targets can be reasonably high, especially if set with meat-based baits. Hedgehogs can be problematic to remove especially if bloating has occurred. Can be regarded as an effective and humane trap for catching feral cats - which is a good or bad thing depending on your circumstances. Although this trap will occasionally catch stoats, they are generally too small to be caught and killed consistently.

Native, domestic or farm animal concerns

The trap design is such that cats are not restricted from accessing this trap so domestic cats are an obvious concern. This trap should not be used in urban and semi-rural areas, nor around farm houses. Small dogs have been killed by this trap.

5.5.1.5 Logistic considerations

Weight	1.25 kg.
Size	260 mm H x 180 mm x 165 mm.
Tools required	None.
Deployment:	Would require the use of a vehicle or quad to deploy large numbers.
Ease of use	Very easy, just pull a string to set.
Time to set	Very quick. Usually takes longer to find suitable weight to place on the trap or to peg it down than it does to bait and set it.
Physical constraints	Reasonably bulky, do not stack together.
Maintenance	The string may need replacement. The bait rod needs to be tensioned properly for the target species (this can be done by bending the bait rod slightly forwards or back).
Malfunction and other issues	A sturdy trap with few instances of malfunction.

5.5.1.6 Overall assessment

Suitability for pest control contracting

A mixed response from contractors. For possum contractors, the size of the trap is the biggest drawback. Many operations require for traps to be deployed by foot and that means that the size of the trap is prohibitive. Contractors like them for their ease of use though. Not recommended for ferret control.

Suitability for lifestyle owners, farmers or occasional trapping

Requires no expertise to set so it has been a popular trap with these users. Recommended for possums but not ferrets.

5.6 KBL Tunnel Trap

Manufacturer	KBL Rotational Moulders Ltd. 15 Keith St, P.O. Box 827, Palmerston North Ph: 06-358-6477, Fax: 06-3554825 Email: sales@kbl.co.nz , Website: www.kbl.co.nz
Supplier	CRT, Mitre 10, Pest Management Services
Price	\$57.50 from Pest Management Services
Notes	Designed for ferrets. Death is by compression and/or strangulation.



Figure 18. KBL tunnel trap

5.6.1.1 Description

History

A further development of the Timms possum trap specifically for targeting ferrets, the tunnel is designed to reduce non-target catch.

Description

Similar to the Timms trap except it has a tunnel leading into the trap which restricts size of the animals entering the trap. Made of yellow polyethylene plastic.

Trigger Mechanism

The killing bar is rotated in an upward arc by two coil springs. When the animal pulls the bait and sets off the trap, its neck is forced upwards into the upper part of trap by a steel striking bar.

Typical trap set

Ground set. Has to be secured to the ground by pegs or by placing a rock on the top.

Baiting

Active. Trap is set off by bait being pulled. The bait has to be threaded or tied onto a rod - so not all baits are suitable.

5.6.1.2 Capture effectiveness

Sometimes the bait will slide down the bait rod. In the case of sprung traps, in most cases, the trap is probably set off by small non-targets that trigger the trap from inside.

The capture effectiveness is thought to be lower than the Timms trap (which doesn't have the tunnel).

5.6.1.3 Animal Welfare Considerations

Killing effectiveness

This trap failed the NAWAC trap testing guidelines for ferrets (Warburton et al. 2002). Three out of four ferrets tested remained conscious after 5 minutes and had to be euthanized.

Any animal welfare concerns observed?

Instances have been observed, similar to the Timms trap, where ferrets are still alive or have been caught by limbs. Considerable suffering would result when kills are not immediate, especially as this trap has been often set in position and checked infrequently. It is very difficult to deal with animals that are still alive in this trap.

Overall assessment of humaneness

Because this trap failed to meet the NAWAC trap-testing guidelines, and field evidence has found that some ferrets captured in these traps are not killed, it is not recommended for use.

5.6.1.4 Non-target captures

Occasionally or commonly caught non-targets

Hedgehogs, stoats and kittens/small cats. Generally, fewer non-targets are caught (compared to the Timms) due to the exclusion of animals by the tunnel. It can be difficult to remove large animals (including ferrets) from the trap if rigor mortis or bloating has occurred.

Native, domestic or farm animal concerns

Low – kittens and small cats can still be caught though.

5.6.1.5 Logistic considerations

Weight	1.35 kg.
Size	42 cm L x 25 cm H x 16 cm Website: A bulky trap that doesn't stack. The tunnel makes it cumbersome and limits how many can be carried on vehicles.
Tools required	None.
Deployment:	Preferably using a vehicle, only a few (< 10) can be carried on a quad.
Ease of use	Very easy – just pull a cord to set.
Time to set	Very quick. Need to thread bait on rod and pull cord to set trap. Pin down.
Maintenance	Very few maintenance issues. Periodic attention should be paid to ensure correct tensioning of the bait rod to maintain proper sensitivity of trap for ferrets.
Malfunction and other issues	Not commonly observed. A robust trap.

5.6.1.6 Overall assessment

Suitability for pest control contracting

Like the Timms, the size of the trap is the biggest limiting factor for contractors (the addition of the tunnel makes it even more bulky and awkward). The biggest concern, however, is animal welfare and we do not recommend this trap on these grounds. There are other more humane kill-trap alternatives (like the DOC250).

Suitability for lifestyle owners, farmers or occasional trapping

The size of the trap means it is more suitable for trapping programmes where traps are left in position long-term. Ease of use makes the trap an attractive option. But considering the animal welfare issues, and that these users are not as likely to check traps daily, then this trap is not recommended.

5.7 Fenn

Manufacturer	AA Fenn, FHT Works, England.
Suppliers & prices	<p>MS Woodcraft Ltd, 128 Marine Parade, Mount Maunganui Ph: 07-5755920, Fax: 07-5748910 Mk6 \$25.50 +GST</p> <p>Trappers Cyanide Ltd, 303 Laidmore Rd, RD2, Amberley Ph: 03-3149940, Fax: 03-3149970 Email: enquiries@traps.co.nz , Website: www.traps.co.nz Mk6 \$25 + GST, Mk4 \$24 + GST, Fenn covers \$24 + GST</p> <p>Philproof Pest Control Products, P.O. Box 4385, Hamilton Ph: & Fax: 07-859-2943, 021-2705896, Website: www.philproof.co.nz Supplies trap with Philproof covers. Mk4 or Mk 6 traps; 1 - 9 \$24.89 +GST, 10-25 \$23.50 + GST. Mk4 or Mk 6 Fenn with single trap cover; 1- 5 \$44.44 + GST, 6 - 49 \$40.00 + GST. Two Mk4 or Mk 6 Fenn traps with a double trap cover 1- 4 \$66.67 + GST, 5 - 49 \$62.22 + GST.</p>
Other suppliers	Pest Management Services and Philproof Pest Control Products
Notes	<p>Mk4 Fenn is designed for stoats and weasels and the larger Mk 6 is more suitable for ferrets.</p> <p>Depending on how far the animal is into the trap when it is triggered, captures can be from single or double strikes and can be anywhere from head to tail.</p>



Figure 19. Fenn trap (left). Fenn traps and Philproof covers (right)

5.7.1.1 Description

History

Used extensively by gamekeepers for mustelid control in the UK. Was developed in the UK as a (supposedly) more humane alternative to the Lanes Ace trap. The Department of Conservation in New Zealand has used Fenns extensively for stoat control, typically setting the smaller Mk4 traps under wooden or Philproof covers baited with eggs. This has been the standard trap-set for conservation-based stoat control until more recently when other more humane kill traps have become available.

Description

Stainless steel trap with brass trigger mechanism. Has a safety catch. Comes in two sizes, the Mk4 which is more suitable for the smaller mustelids and the Mk6 which is a larger trap more suitable for ferrets. Has a chain to secure trap.

Springing Mechanism

Pressure on a large flat trigger plate

Typical trap set

Designed to be set in animal 'runs', burrows or artificial tunnels. Traps must always be set under a cover (approx 75cm long x 20 cm wide x 18 cm high). Typically, two traps would be set cross-wise 25 cm apart with the bait placed between the traps. Traps should be sunk into the ground slightly for stability. Covers should be pegged down. A single entrance tunnel can be used with one trap but this set is probably not as attractive to mustelids, who usually like to be able to run through tunnels.

Setting instructions

Put one thumb through the loop on the jaw and with your other thumb press down on the opposing wire jaw, fully opening the trap. Engage safety hook and flip over the trigger dog. Engage the trigger with the notch on the pressure plate using a finger from underneath the trap to raise the plate. Dig a small depression so that the trigger plate is flush with the ground. Remove the safety catch (carefully! – maybe use a stick) once traps are positioned.

Baiting

Any bait is suitable. Long-life bait or eggs have been typically used by DOC, who service traps periodically. Salted rabbit meat is also favoured bait.

5.7.1.2 Capture effectiveness

The only research involving ferrets found that Fenns were not as effective as KBL traps (Clapperton and Meenken 2000).

5.7.1.3 Animal Welfare Considerations

Both the Mk4 and Mk 6 traps have failed the NAWAC trap testing guidelines for stoats. The performance of these traps was particularly poor - testing of nine stoats found that all but one stoat remained conscious for 5 minutes (animals are euthanased after 5 minutes). Although this trap has not been assessed for ferrets, it is very unlikely that it will kill ferrets humanely especially given how much bigger and more robust ferrets are compared to stoats. There have been plenty of anecdotal reports from operators where live ferrets have been found in these traps, and animals caught by limbs. Observations also include instances where suffering has occurred before death.

Overall assessment of humaneness

Not humane for ferrets, or stoats.

5.7.1.4 Non-target captures

Occasionally or commonly caught non-targets

Rats (especially in bush), hedgehogs, stoats, weasels and kittens. Some home-made wooden covers have been built with wire mesh to further restrict access to the traps but covers that allow ferrets access are going to be big enough for a range of non-targets.

Native, domestic or farm animal concerns

Depends on how well the covers prevent non-target access to the traps and how secure they are (covers that can be dislodged by stock or investigating animals are an obvious problem).

5.7.1.5 Logistic considerations

Weight	500 gm (for Mk6).
Size	The trap itself is reasonably small. 18 cm L x 12 cm W x 12 cm H. Traps are often set in pairs under covers which means the total weight and bulk of each trap set is considerable.
Tools required	Hammer, pegs and/or trowel for digging small hole.
Deployment:	Would need a vehicle or quad to deploy.
Ease of use	Moderate. Probably not the easiest trap to use if you have limited trapping experience.
Time to set	Reasonably time consuming - you need to dig and prepare the site for traps, set two traps, place bait, secure traps to site, place and peg down the cover.
Maintenance	The trigger plate may need occasional cleaning. Some operators recommend coating traps in fishoilene or wax to protect from rust.
Malfunction and other issues	Nothing specific reported.

5.7.1.6 Overall assessment

Suitability for pest control contracting

Given the very poor welfare performance, this trap is not recommended for use for stoats and especially not for ferrets. The need for covers and a pair of traps for each set means that this trap is more bulky than most and takes more time to set. As this is not off-set by high capture effectiveness, there is little reason for contractors to choose this trap over

the others. Also of issue are the animal welfare concerns and problems associated with non-target catch, which would restrict where these traps could be used safely.

Suitability for lifestyle owners, farmers or occasional trapping

While this trap is more suitable for setting in permanent positions, they are probably not the best choice for these users as they are not the easiest traps to operate as well as posing a risk to non-targets. In terms of value for money, there are also better options (i.e. DOC250). The animal welfare issues are also another important consideration.

5.7.2 NoPest

Supplier	Pest Management Services, 5a Arko Place, P.O. Box 751, Paraparaumu, Kapiti Coast Ph: 04 2982766 or 0800 111466 Email: general@nopests.co.nz , Website: www.nopests.co.nz
Price	Mk4 \$22.00, 25+ \$19.00, 100+ \$16.00 Mk6 \$27.00, 25+ \$24.00, 100+ \$21.00. Fenn Mk 4 \$30.00, Fenn Mk6 \$33.00 (all prices GST exclusive).
Notes	Pest Management Services has recently started importing Nopest Mk4 and Mk6 traps from the UK. They are the same design as the Fenn but are slightly heavier and stronger. Not used or tested within the framework of this project.



Figure 20. Nopest trap

5.8 Warrior (II)

Supplier	Connovation Ltd, P.O. Box 58613, 36B Sir William Drive, East Tamaki, Auckland Ph: 09-273-4333, Fax: 09-273-4334 Email: info@connovation.co.nz Website: www.connovation.co.nz
Price	\$29.95
Notes	Suitable for possums. Manufacturers propose that it can be used for ferrets but there is little information available to assess its suitability as a ferret trap. Animal puts its head into the trap, springs it and the jaws exert about 20kg of clamping force onto the neck.



Figure 21. Warrior trap (left) and tree-mounted (right)

5.8.1.1 Description

History

Developed by Lincoln Ventures Ltd (a joint venture between Landcare Research and Lincoln University).

Description

Was originally called the bull-dog because it looks like a big bull-dog clip. The spring is a leaf-spring rather than a coil spring (which most other traps are), and this acts as a cover for the trap and its front extensions form the trap jaws. It is a stand-alone unit that can be used without cover but a coreflute cover has been designed to protect the trap from the weather and to prevent animals trying to access the bait from the side. Wooden covers can be designed for ferret trap-sets.

Springing Mechanism

Triggered by bait hook being pulled forward, releasing the jaws which clamp together.

Typical trap set

Tree/raised sets or ground sets.

Setting instructions

Place trap on ground, slide setting bar over lower jaw and pull firmly upwards while pushing on the trigger bar at back of trap. Slide safety frame between jaws. Bait the trap.

Mount the trap using two screws or nails to hang from the fixing points. Remove the safety frame. Testing the trigger pressure must be done by reaching into the trap when the safety bar is inserted. Trap tension is adjusted via the bolts holding the pivot arms together.

Baiting

Requires active interference with bait. This trap is a little more fiddly to bait than most other traps.

5.8.1.2 Capture effectiveness

Feedback has been good about the capture effectiveness of this trap for possums. No formal testing.

5.8.1.3 Animal Welfare Considerations

Killing effectiveness

The trap (prototype LDL 101) has been tested and passed the NAWAC trap testing guidelines for possums (Warburton and Orchard 1996) but not for ferrets (Warburton and Poutu 2003). For ferrets, the Warrior achieved relatively consistent strikes in the head to neck region but failed to render all animals tested unconscious within 3 minutes. The trap may have had insufficient clamping force to consistently kill ferrets quickly.

Any animal welfare issues observed?

Very few instances of mis-captures with possums.

Overall assessment of humaneness

A humane trap for possums but not so suitable for ferrets.

5.8.1.4 Non-target captures

Refer to kill traps/non-target section. Nothing specific to add about this trap.

5.8.1.5 Logistic considerations

Weight	950gm.
Size	22cm L x 12cm Website: Reasonably compact but heavier than other similar kill traps.
Tools required	Setting bar, safety frame, hammer and nails or screws.
Deployment:	Heavier than similar traps but still feasible to deploy on foot.
Ease of use	Probably one of the scarier traps available. Much easier to use if set in a permanent position on a tree - use the setting tool to set without taking the trap down.
Time to set	Reasonably quick. Changing the bait can be more time consuming, as the safety bar must be inserted between trap jaws.
Maintenance	Robust trap. Maintenance is required occasionally but components can be supplied and traps can be fixed in the field.
Malfunction and other issues	Traps may jam occasionally.

5.8.1.6 Overall assessment

Suitability for pest control contracting

Very suitable for possum control – especially once the operator becomes familiar with operating the trap. Feedback from possum contractors who have used the trap has been mostly positive. Has had relatively little use for ferreting and it didn't pass the NAWAC guidelines so this trap is less suitable as a ferret trap.

Suitability for lifestyle owners, farmers or occasional trapping

Training on how the trap operates and how to maintain it would be preferable otherwise these users may struggle. Good trap in the hands of a competent user.

5.9 Body gripping traps

Body gripping traps used for possums and ferrets in New Zealand include the Conibear 60, Conibear 120, BMI160, Belisle Super X 120, BMI 160, Conibear 160 and 220.

Notes

- Different sizes can target possums, ferrets and feral cats.
- Depends on how it is set as to where it strikes the animal, kills by compression or strangulation. Can result in double strikes (where the trap holds the animal in two places).
- *See below for suppliers' details and information relevant for each model.*

5.9.1.1 Description

History

Used extensively in North America for trapping mammals such as mink, beaver, raccoon, skunk, fisher, marten etc. Limited use in New Zealand.

Description

Made entirely of steel. Comes in a large range of sizes - with single and double springs.

Springing Mechanism

When animal enters the trap, it knocks wires that hang down in the middle of the trap, which trigger the dog that holds the frames together.

Typical trap set

There are a wide range of possible sets. For ferrets, the trap is set in 'runs' or in front of burrows. Similarly, for possums, traps are often placed on runs or objects that possums are using regularly like the base of trees. A cubby set can be used, which is a single entry shortened tunnel, blocked by wire mesh past the trap.

Setting instructions

Extend both springs so they point directly away from the trap. Grip and compress either spring, use safety hook to keep spring compressed. Repeat for second spring. Centre springs over hinge and pull frames together with one hand (can keep them together with the Conibear safety gripper). Position trigger and dog along frame and set trigger in preferred notch of dog. Place trap into position. Release safety catches on springs and safety gripper.

Baiting

Passive or active. If the trap is set so that the animal pushes against the trigger wires to pass through the trap or reach bait then the trap will be triggered passively. However, the trigger wires can be baited (with a piece of carrot or apple for possums) and then the trap is actively triggered when the bait is pulled. If set with a bait, it is important that the trigger wires are such that the animal is struck in a vital position. This will depend on which size

of trap is used. The trap can also be inverted and the trigger wires bent horizontally so a plate or wire mesh can be attached to act as a treadle trigger.

5.9.1.2 Capture effectiveness

Depending on the set and skill/experience of the trapper, these traps can be effective. A trial using BMI160s in a wooden cubby had a capture efficiency equivalent to ground-set leg-hold traps (Morris et al. 2000). Sprung traps and bait removals can be an issue, although protection from non-target interference through the use of cubbys or trap covers does decrease this problem. Conibear 220 had a 43% capture efficiency of possums compared to Lanes Ace and Victors (Warburton 1982).

5.9.1.3 Animal Welfare Considerations

Killing effectiveness

The Conibear 160 and BMI 160 failed (or effectively failed) the NAWAC trap-testing guidelines for possums (Warburton and Orchard 1996). Although not formally tested for possums (testing was conducted before ISO standards were introduced), the Conibear 220 did not perform well with regard to humanness and killing effectiveness (Warburton 1982). The Conibear 120 and Belisle Super X 120 failed the NAWAC trap-testing guidelines for ferrets (Warburton and Poutu 2003a). The Conibear 220 and BMI 160 failed for feral cats (Warburton and Poutu 2002) but a modified Conibear called the Steve Allan Conibear passed (Poutu and Warburton 2001). The Belisle Super X 220 failed for feral cats (Warburton and Poutu 2003b). See below for more specific details for each model.

Any animal welfare issues observed?

Yes. Rather than killing instantly, it can work as a body-holding trap that clamps onto various parts of the animal's body, (shoulder, neck, abdomen, etc.) restraining the animal alive for some time. Obviously considerable suffering would result when this occurs.

Overall assessment of humaneness

Animal welfare is an issue with these traps and none of the models tested have passed the NAWAC trap-testing guidelines. The problem is that body gripper traps may not work as intended unless the animal happens to be the 'right size' for the size of the trap, comes into the trap at the 'right speed' and from the 'right angle' etc. There are too many variables affecting the outcome and so kills are not always 'clean'.

5.9.1.4 Non-target captures

Depends where the trap is set and whether covers are used. Open sets are very likely to catch a range of non-targets and would pose a significant risk to native and domestic animals if set in areas where these animals are present. Otherwise, similar non-target issues as other kill-traps.

5.9.1.5 Logistic considerations

Weight	500gm for the Conibear 60, 1050gm for Conibear 220.
Size	12cm x 15cm for the 60 and 23cm x 20cm for the 220. A compact trap, which lies flat.
Tools required	A 20 inch setting tool. A safety gripper which holds the jaws together can be purchased.
Deployment.	One of the advantages of this trap is that approx 30 can be carried on foot.

Ease of use	Difficult initially, especially for a person who isn't strong or confident. It does get easier with practice though. This style of trap is one of the most popular in the USA and Canada.
Time to set	More time consuming than most other traps. Site selection is vital. The springs can be cocked before venturing into the field which makes them much quicker to set.
Maintenance	Wax once a year.
Malfunction and other issues	The Conibear trigger mechanism is poorly attached and often falls off. The setting tool is vital - without it, the traps are impossible to work (real problem if lost or misplaced). Gaps between the jaws can allow enough room for smaller animals to breathe. Jaws can bend with use and consequently apply lower clamping forces to subsequent captures.

5.9.1.6 Overall assessment

Suitability for pest control contracting

Not recommended for possum or ferret control on the grounds of animal welfare. Some may argue that there may be some situations where this trap would have its place particularly if kill traps are required and access is limited or difficult. Other concerns are the time and skill required to set the trap properly and the possibility of non-target capture.

Suitability for lifestyle owners, farmers or occasional trapping

Would not recommend as they are not humane and require a certain level of skill and experience to be effective.

5.9.2 Conibear (for possums, ferrets and feral cats)

Manufacturer	Woodstream Corp. USA
Supplier	MS Woodcraft Ltd, 128 Marine Parade, Mount Maunganui Ph: 07-575 5920, Fax: 07-574 8910
Price	\$20.50 for No.60, \$29.50 for No. 220-2
Notes	Very popular In North America and is considered superior to other kill traps available. Conibears are made by the same company as the Victor leg-hold traps. MS Woodcraft recommends the use of the 60 (double spring) for ferrets and 220 (double spring) for possums.

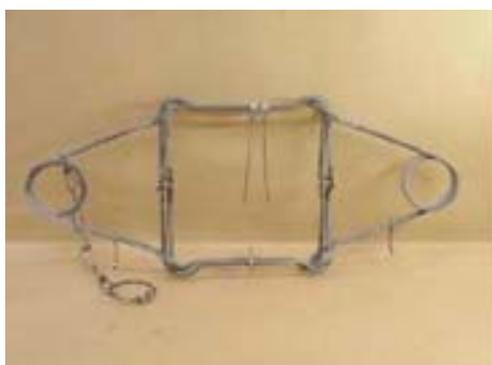


Figure 22. Conibear trap

5.9.3 Belisle Super X 120 (for ferrets)

Manufacturer	Belisle Industries, Quebec, Canada.
Supplier	No known New Zealand supplier.
Notes	Not used or tested within the framework of this project.



Figure 23. Belisle trap

Belisle body traps have been designed for North American mammals like raccoons, badger, otters etc. This trap was tested and failed the NAWAC trap-testing guidelines for ferrets (Warburton and Poutu 2003a). All four ferrets captured in this trap had double strikes. The authors noted that the trap was difficult to set in order for a consistent strike location to be obtained.

5.9.4 BMI 160 (for possums)

Manufacturer	Butera Manufacturing Co., USA.
Supplier	No New Zealand supplier known.
Notes	Not used or tested within the framework of this project.



Figure 24. BMI 160 trap

Tested in 1996 before trap testing standards had been finalised but the trap effectively failed for possums (Warburton and Orchard 1996). The trap failed to achieve a sufficiently high enough number of correct strikes to pass the testing. The trap rendered possums

unconscious quickly when they were caught across the neck but took longer when possums were struck over the shoulders or head. DOC tested this trap for feral cats and it also failed (Warburton and Poutu 2002a).

5.10 Possum Master

Manufacturer	Possum Master Industries Ltd, 52 Sea Vista Drive, Pukerua Bay Ph: 025 641 9156, Fax: 04 239 9445 Email: pmi.leathem@xtra.co.nz , Website: www.possummaster.co.nz
Supplier	Possum Master Industries and Pest Management Services
Price	\$45.00, \$4.00 for cat face-plate
Notes	Suitable for possums. Manufacturers propose that it can be used for ferrets but there is little information available to assess its suitability as a ferret trap. Kills by strangulation via a cord noose, approx 15 kg of pressure is exerted.



Figure 25. The Possum Master (left) with black cat-stop faceplate (right).

5.10.1.1 Description

History

Designed by Harold Weekes, a Taihape farmer, engineer, and inventor in 1995.

Description

Noose (cord) within a UV stabilised plastic shell. An 'all in one' unit that doesn't require an additional cover. Has a fly-arm made of galvanised steel (with a built-in safety catch). Comes in white, blue and black.

Killing Mechanism

When the trap is sprung, the cord noose applies pressure to the circumference of the animal's neck. This cuts off the oxygen supply and perhaps the blood flow to the brain. When the possum is caught the trap will lift off the tree and hang on the cord (this helps with the strangulation process). Presently, this trap is the only trap on the NZ market that uses a cord noose as the killing mechanism.

Typical trap set

Ground or raised/tree sets. Can be set on branches. Killing effectiveness is increased if traps are set 60 cm above a leaning board (see Warburton and Moffat 2007).

Setting instructions

Ensure the safety catch is on. Push bait onto bait hook. Push the flyarm down firmly while pulling the cord forwards. The trigger will locate automatically. Position the noose

cord around the black plastic hooks. Hang trap using a small headed nail and secure cord with a staple. Release the safety catch. Place a flour blaze below the trap.

Baiting

Active; the possum must pull the bait hook. Apple or similar bait is placed on bait hook. Avoid bait extending forward of the trigger (this encourages the target animal to put its head right into the trap). Manufacturers suggest baiting traps with lures inside plastic bags (using discs over the bait hook).



5.10.1.2 Capture effectiveness

There is little information to assess the capture effectiveness of this trap. Some users have reported that sprung traps occur - which may be the result of escapes. NAWAC trap-testing identified that escapes were occurring and particular attention must be paid to the trap set – with traps set 60 cm above the leaning board (see Warburton and Moffat 2007 for more details).

5.10.1.3 Animal Welfare Considerations

Killing effectiveness

The NAWAC testing for possums was conducted with three modifications to the trap set (Warburton and Moffat 2007). Modifications were undertaken to prevent escapes, which appeared to be occurring because the animals were sometimes being held in front of the ears and this may have enabled them to ‘slide’ the noose off their heads. After escapes in the first two trials, the trap supplier recommended that the trap should be attached about 60 cm above the top of the leaning board. In the third trial, the eighth possum remained conscious for longer than three minutes. The trap failed NAWAC trap testing guidelines for both possums and ferrets. Two ferrets were tested but both were conscious at three minutes and still breathing easily.

Overall assessment of humaneness

This trap is not humane for ferrets and failed to consistently kill possums.

5.10.1.4 Non-target captures

A cat-stop faceplate is available to use on ground sets to avoid cat capture. Otherwise this trap would have similar non-target issues as other kill-traps.

5.10.1.5 Logistic considerations

Weight	500gm.
Size	28 cm L x 19cm W x 15 cm H. The shape is a little awkward but they can be stacked on each other.
Tools required	Hammer, nails and staples.
Deployment:	About 10 could be carried in a pack. If setting large numbers, a vehicle would be desirable.
Ease of use	Good. Pretty straight-forward and not as scary as some of the other kill-traps. Must be careful that the fly-arm does not accidentally release and

	hit you in the face.
Time to set	Good.
Maintenance	The rubber hoops holding the cord in place can wear out, or get ripped out and lost. Rats may chew them off.
Malfunction and other issues	It is easy to forget to release the safety clip. The black rubber hooks holding the cord don't always work properly and would need replacing to keep the trap operational.

5.10.1.6 Overall assessment

Suitability for pest control contracting

Although not a large trap, the size could be an issue with contractors who are required to set large numbers. They were considered by contractors to be handy for use around houses etc as they were an effective and safe trap. Problems with humaneness have been identified. As there are other humane kill traps available, this trap is not recommended as the best choice for possums. Not recommended as a ferret trap.

Suitability for lifestyle owners, farmers or occasional trapping

The user-friendliness of this trap makes it attractive option for these users but the concerns about the killing effectiveness remain an issue. Not recommended for ferret control.

5.11 Tunnel Trap

Manufacturer	Trappers Cyanide Ltd, 303 Laidmore Rd, RD2, Amberley Ph: 03-3149940, Fax: 03-3149970 Email: enquires@traps.co.nz , Website: www.traps.co.nz
Price	\$27.00 + GST
Notes	Targets ferrets. Has been used for feral cats. A metal arm (or 'hammer bar') strikes the animal in two places, usually over the body. The killing bar rises when trigger, catching the animal underneath.



Figure 26. Tunnel trap exterior (left) and interior (right)

5.11.1.1 Description

History

Originally designed for mink in the early 80's and manufactured by the R.C. Best Trap Co. in the US (called the Tube Trap). Rob Bushby, Christchurch introduced the design for ferrets and sold the traps through Trappers Cyanide.

Description

An 'all in one' unit where the main trap mechanism is covered by galvanised steel sheet rolled into a tube. All other components are made of galvanised steel. Has holes at either end to pin the trap down.

Springing Mechanism

Large flat pressure plate.

Typical trap set

Ground set. Place trap in slight hollow (use a grubber). Must be pinned down firmly using two No.8 wire staple-shaped pins over the body of the trap. Soil can be placed on the floor of the trap taking care to ensure that the pressure plate can operate freely. Putting two traps together with bait in the middle has been proposed as a set that yields a higher capture rate.

Setting instructions

Bend bar holding trigger to adjust trigger plate height. Do not put hands inside trap to set. Push hammer bar down and clip trigger wire onto pressure plate. Then still holding down, put stick under pressure plate and remove hands. Trigger can be set very fine with this procedure.

Baiting

Passive. The trap can be used baited or un-baited. Bait can be used but the trap itself may be enough of an attractant, as some believe that mustelids love to run through or hide in tunnels and pipes. No provision has been made for placement of bait in this trap.

5.11.1.2 Capture effectiveness

No information available on capture effectiveness.

5.11.1.3 Animal Welfare Considerations

Killing effectiveness

This trap failed the NAWAC trap testing guidelines for ferrets (Warburton et al. 2002). The test was abandoned after 3 ferrets, which were all still conscious after 5 minutes and had to be euthanized.

Any animal welfare issues observed?

The run through design of this trap results in ferrets being struck in a wide range of body positions, many of which do not result in a quick kill.

Overall assessment of humaneness

Very poor.

5.11.1.4 Non-target captures

Unless attempts are made to restrict access then this trap would catch the whole range of non-target species. Some trappers have used them to catch cats. Domestic cats would be at risk from this trap unless some means of restricting access was used.

5.11.1.5 Logistic considerations

Weight	1.3 kg.
Size	Bulky. 38 cm L x 13cm diameter tube.
Tools required	Maybe a grubber to prepare site.
Deployment:	Not feasible to carry on foot, would require a vehicle or quad
Ease of use	Very easy to use and no real strength required.
Time to set	Setting is quick but a small amount of time is required to prepare the trap site and peg down trap.
Maintenance	Occasional cleaning required– the main issue would be to keep the trigger plate free of debris.
Malfunction and other issues	Unknown. Maybe if the cylinder shape becomes warped.

5.11.1.6 Overall assessment

Suitability for pest control contracting

Size could be an issue with some trappers, as well as the risks to non-targets. Although this trap has been commercially available for many years, there has not been a good uptake from contractors. Not recommended for use because of its poor killing performance.

Suitability for lifestyle owners, farmers or occasional trapping

Not recommended.

5.12 Sentinel

Supplier	Pest Management Services, 5a Arko Place, P O Box 751, Paraparaumu, Kapiti Coast Ph: 04 2982766, 0800 111466, Email: general@nopests.co.nz , Website: www.nopests.co.nz
Notes	Designed for possums.



Figure 27. Sentineal trap with cover - flour is cheap; it doesn't hurt to have generous luring of traps (left). The steel spring Sentinel trap (right).

5.12.1.1 Description

History

Modified from Canadian designed LDL101 by Malcolm Thomas of Pest Control Research Ltd, Christchurch.

Description

Steel spring trap. Comes with a coreflute cover. A piece of alkathene pipe or straight stick are required for tree/raised sets. Comes with chain to secure trap to site.

Springing Mechanism

Coil spring which is also an integral part of the trap frame.

Typical trap set

Tree/raised sets and ground sets

Setting instructions

Bait the trap. To set, place feet on bottom (outside) bracket and lift striking bar up and hook trigger wire under the striking bar. Then push the back end of the trigger wire into hole in trigger plate and adjust for sensitivity. For tree/raised sets, nail the alkathene tube (or equivalent piece of wood) to tree and thread the springs of the trap onto the pipe. Then (for all sets) attach trap cover by aligning slots in the coreflute cover, lift up trap cover to cover the trap and tuck the top flap down the gap between the nail and the alkathene pipe. Secure the chain if necessary.

Baiting

Active. Trap is triggered when the possum pulls the bait. This trap can be baited with a solid polymer bait (see above photo) or by using the rat resistant bait designed to be attached to the trigger plate. Peanut butter can then be smeared on baits for added attractiveness. Preferable to lure traps with a flour blaze below traps.

5.12.1.2 Capture effectiveness

Unable to assess capture effectiveness but appeared to be good.

5.12.1.3 Animal Welfare Considerations

Killing effectiveness

This trap passed the NAWAC trap-testing guidelines, with all ten tested possums being rendered irreversibly unconscious within 3 minutes (Warburton and Moffat 2007).

Overall assessment of humaneness

A humane trap for possums.

5.12.1.4 Non-target captures

Similar issues to other kill-traps. Cover is inadequate to prevent animals contacting the trap if set on the ground.

5.12.1.5 Logistic considerations

Weight	450 gm.
Size	A convenient shape, as it folds down flat. 18 cm x 22 cm. Traps do have a tendency to tangle together though and the cover is an awkward shape.
Tools required	Hammer, nails, means to secure the chain (staples). No setting tool needed.
Deployment.	Many traps (around 30) could be carried on foot.
Ease of use	OK – easier to use once one has learnt the technique.

Time to set	Comparable with other similar kill-traps.
Maintenance	Occasional application of wax or grease to prevent corrosion. Re-tempering of steel and welding at joints.
Malfunction and other issues	The covers tend to come off and are light enough for even a moderate wind to blow them away. A new cover is presently being designed. The trap sometimes becomes dislodged from the alkathene pipe. Weakening of spring steel at welds observed - which can lead to a slight gape of jaws. Wear and tear over time could lead to more sprung traps. The bait plate has tabs sticking out either side - if these are over the bar, they can prevent the trap from being sprung (it is easy to forget to release these).

5.12.1.6 Overall assessment

Suitability for pest control contracting

Considered to be one of the better possum kill-traps available. Has been proven to be a humane trap for possums.

Suitability for lifestyle owners, farmers or occasional trapping

An effective possum kill-trap. Some level of skill with operating the trap is required to get consistent catch rates.

5.13 Blitz

Supplier	Connovation Ltd, P.O. Box 58613, Greenmount, 36B Sir William Drive, Auckland Ph: 09-273-4333, Fax: 09-273-4334 Email: info@connovation.co.nz , Website: www.connovation.co.nz
Price	\$36.50.
Notes	Designed for possums and ferrets. Animal places head into trap and is struck by a bar on the back of the head/neck area.



Figure 28. Blitz trap

5.13.1.1 Description

History

Designed by Ian Domigan of Lincoln Ventures at Lincoln University, about to be released commercially by Connovation.

Description

Made entirely of stainless steel except for a cord. A stand-alone unit that incorporates a cover over the trap mechanism.

Springing Mechanism

Trap is triggered by a bait hook.

Setting instructions

Bait the trap first. Place your foot on the back of the trap and pull up on the string (at a 45 angle). Leave string on top of trap (so it doesn't catch when trap is sprung).

Typical trap set

Ground set for ferrets. Ground or raised/tree set for possums. For ferret sets, a pipe placed in front of the trap can limit entry of non-targets.

Baiting

Active. Bait is threaded onto a straight bait hook. Manufacturers recommend Erayze #8 for ferrets or fresh rabbit and a long-life cereal bait or a cork smeared in peanut butter for possums. Cinnamon or curry powder lure can also be used.

5.13.1.2 Capture effectiveness

This trap has had such limited use that it is very difficult to assess its capture effectiveness with any confidence. Bait removal may be as issue as bait can slide off or can be easily removed from the straight bait rod (possibly remedied by securing with a cork). There may be problems with the sensitivity of the trigger mechanism (which can be adjusted).

5.13.1.3 Animal Welfare Considerations

This trap is currently being assessed by NAWAC (November 2007).

5.13.1.4 Non-target captures

Similar issues to other kill-traps. Normal caution would be required as to positioning of this trap. The heavy trigger mechanism will probably mean that smaller non-targets would not set it off.

5.13.1.5 Logistic considerations

Weight	1.8 kg.
Size	24cm L x10cm W x 14cm H. A convenient size and shape.
Tools required	None.
Deployment:	This trap is more heavy than large so that there would be limits on how many could be carried on foot (< 10).
Ease of use	One of the more attractive kill-trap in terms of ease of use. Just pull the cord to set, does not require any strength to set and not at all scary to operate.
Time to set	Very quick.
Maintenance	A robust trap with seemingly few things that could go wrong with it.

Malfunction and other issues	Care must be taken so that bait does not slide off the straight bait holder – maybe use a cork. Make sure that the string is left ‘free’ and is not caught under the body of the trap.
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5.13.1.6 Overall assessment

Suitability for pest control contracting

Good concept but very little is known about its capture efficiency and other relevant issues - as it has had little use in the field. Advantages would include size (compared to the popular live capture traps), robustness, simplicity and ease of use. NAWAC trap-testing needs to be undertaken before this trap could be recommended.

Suitability for lifestyle owners, farmers or occasional trapping

This kill-trap is very easy to use and quick to set which makes it an attractive option for people who don't have a great deal of experience or confidence using traps. Need to resolve capture effectiveness issues and animal welfare testing before recommending this trap though.



Note: at the time of final submission of this report, this trap is being redeveloped in order to increase its killing effectiveness. Contact Ian Domigan at Lincoln University (03-325-3820) for up-to-date information.

5.14 Hammer

Supplier	Connovation Ltd, P.O. Box 58613, Greenmount, 36B Sir William Drive, Auckland Ph: 09-273-4333, Fax: 09-273-4334 Email: info@connovation.co.nz , Website: www.connovation.co.nz
Price	\$35.
Notes	Not used or tested within the framework of this project. Designed for ferrets, stoats and rats. Animal places head into trap and is struck by a bolt than smashes the cranium.



Figure 29. Hammer trap

5.14.1.1 Description

History

Designed by Ian Domigan of Lincoln University, about to be released commercially by Connovation Ltd. This trap was a winner of the top gold award at the Mystery Creek National Field Day. To date this trap has had very limited field use. It is currently under redevelopment - contact Ian Domigan at Lincoln University (03-325-2811) for up-to-date information.

Springing mechanism

The trap mechanism is based on two trigger systems. The primary trigger, activated by the animal itself, releases a spring-powered arm. This in turn activates the blank charge which produces a large amount of gas that drives the captive bolt down onto the animals head. The trap power can be varied according to the strength of charge used.

Setting instructions

Bait the trap, and then load the trap with a blank charge. Release safety.

Typical trap set

Ground set for ferrets.

Baiting

The baiting mechanism is still under development – but will be either a bait pull or a treadle. Manufacturers recommend Erayze #8 for ferrets or fresh rabbit as bait.

5.14.1.2 Capture effectiveness

This trap has had such limited use that it is not possible to assess its capture effectiveness.

5.14.1.3 Animal Welfare Considerations

An earlier version of this trap, the 'single shot trap' was assessed by NAWAC and passed for ferrets, stoats and rats.

5.14.1.4 Non-target captures

Unknown - but likely to have similar issues as other kill-traps.

5.14.1.5 Logistic considerations

Weight	1 kg.
Size	30 cm L x7 cm W x 15 cm H. A convenient size and shape.
Tools required	None.
Deployment:	This trap is more heavy than large so that there would be limits on how many could be carried on foot (< 12).
Ease of use	Easy to set, no strength required (as the blank change powers the killing mechanism). Care should be taken with the blank charges though.
Time to set	Very quick.
Maintenance	Need to ensure that charges are kept dry. The addition of Vaseline on the charge should prevent moisture problems. Robust body.
Malfunction and other issues	As long as setting procedures are followed there should be little issues. Moisture may affect functioning of the blank charge.

5.14.1.6 Overall assessment

Suitability for pest control contracting

Very little is known about this trap apart from an earlier version passing the NAWAC trap-testing. The capture efficiency and other relevant issues are unknown. We were unable to assess this trap with any confidence but it does seem to be a promising concept.

5.15 Carac Kill trap

Manufacturer	Carac Couplings, 53 Bridge Street, Eltham Ph: 06-7648254, Fax: 06-7648253 Email: carac@xtra.co.nz , Website: www.caracnz.com
Price	\$39.95(100+ \$34.50)
Notes	Designed for possums. Not used or tested within the framework of this project.



Figure 30. Carac kill trap

5.15.1.1 Description

History

Developed by John Burling of Carac Couplings, with trialling and assistance from George Gallop, Taranaki Regional Council. Production to date has been reasonably limited.

Description

Solid galvanised steel trap with two large coil springs. Jaws are 3mm thick.

Springing Mechanism

Active. Trap is sprung through interference with the bait hook.

Typical trap set

Ground or tree set.

Setting instructions

Pull the handle back, set the safety catch, attach trap to tree by hanging on a nail and securing with staples. Secure to the ground with pegs. Remove safety catch.

Baiting

Bait can go on hook or it can be wedged behind a rod.

5.15.1.2 Capture effectiveness

Unable to assess the capture effectiveness of this trap.

5.15.1.3 Animal Welfare Considerations

Has the trap been assessed by NAWAC?

No.

Overall assessment of humaneness

Being relatively new, little is known about the humaneness of this trap.

5.15.1.4 Non-target captures

Probably similar to other kill-traps. Unable to comment.

5.15.1.5 Logistic considerations

Weight	1.5kg.
Size	140mm x 140mm x 240mm.
Tools required	Hammer, nail and staples.
Deployment:	Operators would be restricted as to how many could be carried.
Ease of use	Simple, just pull the handle to set.
Time to set	Just over a minute. Resetting takes approximately 30 seconds.
Maintenance	May be necessary to change the coil springs – maybe after 3 years of use.
Malfunction and other issues	The safety catch can become loose and require tightening with a 6 inch crescent.

5.15.1.6 Overall assessment

Many aspects of this trap were not able to be assessed so we cannot provide an overall recommendation. The weight of this trap is the main perceived disadvantage – limiting its use to small jobs or deployment by a vehicle or regimes where traps are left in position. To date this trap has not been used on ferrets.

5.16 Zap Trap

Manufacturer	Electropar Ltd Ph: 0800733 735, Fax: 0800 733 736 Email: info@zaptrap.co.nz , Website: www.zaptrap.co.nz
Price	\$650.00
Notes	Designed for possums Not used or tested within the framework of this project. Kills by electrocution. Instantly fatal.



Figure 31. Zap Trap

Description

History

Initially known as Electrostrike, made by Merv Allen and Hamer Electric. Patents were brought by Electropar Ltd, who renamed it the ZapTrap and began producing it commercially in 2002.

Description

The Zap trap is an electronic trap that kills possums instantly through electrocution. Once the possum is killed, the base of the trap opens and the possum drops to the ground. The trap then re-sets itself. The trap is battery powered and can kill up to 80 possums per battery charge. The trap can keep operating for many nights. The trap turns off during the day to minimize any risk to diurnal species that may enter the trap. Has an electronic control panel underneath the main cover, including an indicator for faults.

Typical trap set

Has to be placed in permanent position, preferably in areas of high possum activity. Requires a ramp so that possums can easily access the trap.

Setting instructions

This trap self-sets. Bait the trap. Switch on the trap with the on/off switch. Run a test of the electronics before arming the trap. Check that the trap-door is latched back into position (if it is latched you will not be able to push it down). To arm the trap, push and hold the 'mode' button until red light flashes.

Baiting

The manufacturers recommend using fruit jam. Has a bait box for jam.

5.16.1.1 Capture effectiveness

Whilst it does kill possums, it is difficult to assess the capture effectiveness of this device against the other methods of controlling possums.

5.16.1.2 Animal Welfare Considerations

The original Electrostrike trap was tested and passed the NAWAC trap testing guidelines. However, it was noted that with repeated use it was possible for some possums to be rendered unconscious and dropped from the trap, and then regain consciousness. To minimize the risk of this happening it is important that the electrodes are kept clean. Because the animals can receive significant trauma (i.e. cooked flesh around the wrists), it is important that no animal survives.

5.16.1.3 Non-target captures

Bees and insects can be attracted to the jam bait. Rats can also be problematic and the manufacturers recommend moving the trap to high possum activity areas - so that possums encounter the trap before the rats.

5.16.1.4 Logistic considerations

Weight	Considerable.
Size	Actual trap size is 60 cm x 25 cm. It is on a stand which raises it to 80cm off the ground.
Tools required	None.
Deployment.	Not easily moved around and would definitely require a vehicle. Could only be carried a relatively short distance.
Ease of use	Reasonably simple – but if a fault occurs, then some technical input is required.
Time to set	Once you have learnt to operate this trap, subsequent set-ups should be quick.
Maintenance	Obviously the battery has to be recharged – which means bringing it in from the field. Spray the trap with fly-spray if bees and insects are attracted to the jam. Ensure electrodes (foot plates) are kept clean.
Malfunction and other issues	The most common problem is items such as wet leaves or surplus jam entering the trap and causing it to false trigger. Regular inspections of the bait and footplate area to remove any debris are required. Although it can handle rain, water should not get into the control box. Direct wind and rain can cause it to false trigger. Dead possums need to be disposed of from underneath the trap. Rats can become stuck in the trap because they are not heavy enough to release the trap door (that drops them out underneath). If the battery is not charged then the trap will not operate. If the trap is not operating properly then it needs to be run through a test cycle. The trap will become 'live' for a short period when being run through the test cycle. Due to the potential shock hazard it is important to make sure the trap is not accessed by unauthorized and untrained operators (it can be locked).

5.16.1.5 Overall assessment

The expense and problems with size and mobility make it impractical for contractors. Probably better suited to lifestyle block owners or for specialised protection (i.e. orchards). Because of the electrical risk, it would not be suitable for areas where children were present.

5.17 Multi-trap

Manufacturer	Novel Ways Ltd, 436 Morrinsville Rd, RD4, Hamilton Ph: 07-8566270, Fax: 07-8566439 Email: gbl@novel.co.nz , Website: www.novel.co.nz/possumtrap
Price	Currently not commercially available and would cost around \$5000 for small orders, with a significant reduction for large orders (\$1000 for 100).
Notes	Designed to target possums. Option to control mustelids is currently being developed. Not used or tested within the framework of this project.



Figure 32. Multi-trap

5.17.1.1 Description

History

Initial design by Graham Lynch, with more recent development by Novel Ways staff and students from Waikato University.

Description

Digital voices lure possums to the trap. A jam lure gets them to stick their head into an opening. A sensor then activates a sliding door that jams their head. The possum is held for 10 minutes (dies from suffocation) and then is dropped out of the trap. The trap then re-sets itself. The liquid bait is automatically dispensed by a mechanical pump. Trap is closed during the day and recharges its batteries from solar panels. Mounted vertically 1m above the ground on a tree, fence, or purpose built post.

5.17.1.2 Non-target captures

Field trials by Novel Ways have found few problems of non-target capture. Unless the trap is specifically baited for cats, it is unlikely they will enter the trap.

5.17.1.3 Logistical considerations

Weight	Heavy - 10kg fully armed.
Size	60 cm x 35 cm x 20 cm
Deployment.	It would be possible for a fit person to carry two traps.
Time to set	Set-up time is approximately 1 hour, best conducted at base before transport into the field.
Maintenance	Bait supply and disposal of carcasses are the main requirements for servicing the traps. The batteries need to be checked weekly. Every two months the killing mechanism needs to be lubricated.
Malfunction and other issues	Wasp invasion can be a problem and a commercial insect spray applied inside the trap can be required.

5.17.1.4 Overall assessment

More suited for research projects or for specialized control. Needs to be field tested to assess capture effectiveness and other issues.

6. TRAP ASSESSMENTS: LIVE CAPTURE TRAPS.

6.1 General information & assessment

6.1.1 Capture effectiveness

Again, like most other traps there is not a lot of research that can be used to assess the capture effectiveness of live capture traps. What little research has been done indicates that the live capture traps are as effective as leg-hold traps for ferrets (Cross et al. 1998, Moller et al. 2000, Ragg 2007). Ferret contractors also believe them to be catch effective. In general live capture traps are probably used less frequently for possum control and are thought to be less capture effective compared to leg-holds or some kill-traps.

6.1.2 Animal Welfare Considerations

As a general rule live capture traps are very humane. Animals are not hurt or overly stressed in the traps. It is quite common to find ferrets curled up asleep in them. The only instance where they are not humane is when people do not check them daily. Obviously death by exposure, dehydration or starvation is very inhumane. This is obviously not a fault of the traps themselves but the users. Traps should be checked within 12 hours of sunrise of the day following when they were set, or last checked. Some of the moulded plastic traps should be situated out of direct sunlight as they can heat up and animals have been found in a distressed state in them.

6.1.3 Non-target capture

These traps can have reasonably high rates of non-target capture. This can be a problem as non-targets occupy traps that are then not able to catch the target animal. It can certainly add time to your servicing of traps if you continually have to deal with non-targets. Also, because animals are caught alive, you may find yourself doing a fair bit of killing if the non-targets are pests themselves. You are legally obliged to kill any possums you catch. High captures of non-targets usually result in high rates of replacing bait. Hedgehogs can be a particular nuisance in ferret control operations in some areas. Even if hedgehogs don't eat the bait they foul it up and it needs to be replaced anyway. In terms of risk to native, domestic animals and livestock, these traps are very good. You can release animals unharmed. They are very good around lifestyle blocks, urban and semi-rural areas. Pest control managers often encourage contractors to invest in these traps, as there have been few instances where their use has resulted in public relations problems.

6.1.4 Logistical Considerations

One of the disadvantages of the live capture traps is the bulkiness of them. Having said this, this is not necessarily a big deal to ferret control contractors as they have to use a vehicle anyway due to the large amount of ground that needs to be covered to check their trap-lines. A trap-line of 50- 60 km is not uncommon. The live capture traps have become the most popular trap for ferreters due to their ease of use and reliability. For possum contractors, the size and weight of these traps is prohibitive, and they are usually not used at all, at the most a few might be kept on hand to use around dwellings. Any trapping regime where they can be left in position is fine. Possums can be difficult to extract from the wire cage traps so they may not be the easiest trap for some inexperienced users.

6.1.5 Summary

These traps are best suited to contractors who are obliged to check their traps every day. Whilst they are a very effective style of trap and are very user-friendly, they are less suited to farmers, lifestyle block owners or casual users as these traps require daily checking - and best intentions aside, there are few people who can sustain this level of effort and commitment.

6.2 Holden Live Capture

Manufacturer	Trappers Cyanide Ltd, 303 Laidmore Rd, RD2, Amberley Ph: 03-3149940, Fax: 03-3149970 Email: enquires@traps.co.nz , Website: www.traps.co.nz
Price	\$32.50 + GST
Notes	Designed for mustelids



Figure 33. Holden live capture trap. (Interior views centre & right.)

6.2.1.1 Description

History

This trap is similar in design to the Whitlock Weasel trap, described in King (1973). The Holden live capture trap has become the most popular trap for ferrets in New Zealand, with Trappers Cyanide Ltd reporting over 30,000 traps sold.

Description

Body of the trap is made of yellow polyethylene. Ramp and removable back grill are made of galvanised steel.

Trigger Mechanism

Treadle. Animal enters trap via an upward sloped ramp which has a pivot halfway. Animal is trapped when the ramp pivots downwards, and the raised front end locks into place by a metal pin. Simple and effective design.

Typical trap set

Ground set.

Setting instructions

Throw bait to the back of the trap (making sure it is past the point where the ramp comes down). Place trap on ground - preferably under cover with some means to stabilise the

trap (i.e. rock, pinned under the bottom wire of a fence or pushed into a bush). Make sure the ramp is in the set position.

Baiting

Passive. The ferret doesn't contact the bait until it is caught - so the bait must be a strong smelling attractant.

6.2.1.2 Capture effectiveness

Thought to have a good capture rate by contractors – and comparable to leg-hold traps (Ragg 2007). Very rarely, bait removal can occur - but mostly only if the trap is knocked over. The occurrence of sprung traps is also rare. Some users have thought that maybe large male ferrets are less easily caught as the space above the pivot is small. In general, this trap performs consistently well with very few issues.

6.2.1.3 Animal Welfare Considerations

Has the trap been assessed by NAWAC?

No.

Any animal welfare concerns?

Caution should be exercised when selecting trap sites as traps can heat up quickly if placed in strong sun. The capture of half grown cats can be a concern as there is very little room for them.

Overall assessment of humaneness

Like all live capture traps, this trap is very humane if checked daily (which is mandatory).

6.2.1.4 Non-target captures

Hedgehogs, rodents, small cats, stoats and weasels are all caught. This trap is sensitive enough to catch small animals such as mice, although once ferret scent is established in the trap, rodents are less likely to be caught. It is an effective trap for stoats and weasels so it is a good choice to use if you want to catch all three mustelid species. Hedgehogs are commonly caught in this trap and their capture can become an issue as they foul up traps and occupy traps that are then not available for your target animal. Kittens and half-grown cats can also be caught. Cat capture rates are generally low as adult cats are excluded.

6.2.1.5 Logistic considerations

Weight	1.4 kg.
Size	59 cm L x 16 cm H
Tools required	None. Sack or large pillowcase for handling animals.
Deployment:	One of the more bulky ferret traps that would require a quad or ute for deployment of large numbers of traps.
Ease of use	Extremely easy. Does not require any expertise to set.
Time to set	Very quick, just throw bait in and place trap on the ground.
Maintenance	Some occasional cleaning to ensure the ramp is not obstructed. Some contractors have drilled a hole in base to avoid pooling of liquid.
Malfunction and other issues	Sometimes the animal can escape if they can nudge the back grill up. This occurs when the latch holding the back grill in the locked position loosens. The grill can also be lost when transporting traps. If the trap is

	knocked over onto its side then animals can enter, remove bait and exit without being caught. Older versions of this trap had issues with the pin holding the ramp working free. Newer version is perceived by contractors as being less robust.
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6.2.1.6 Overall assessment

This trap is highly regarded by professional contractors. Probably the most popular ferret trap used by contractors. Recommended.

6.3 Pest Management Services Wooden trap

Supplier	Pest Management Services, Pest Management Services, 5a Arko Place, P O Box 751, Paraparaumu, Kapiti Coast Ph: 04 2982766, 0800 111466, Email: general@nopests.co.nz , Website: www.nopests.co.nz
Price	\$47.00 + GST (\$37.60 + GST for 10+).



Figure 34. Pest Management Services wooden trap

The trap is baited via a small door which you open so that the bait can be placed on a hook inside. Some operators believe that the natural wooden surface is more attractive to animals. Issues of warping or swelling of timbers (causing the ramp to become sticky) have been raised.

Plans for making your own treadle trap can be found in King (1973).

6.4 K-Trap

Supplier	K-Traps Ltd Ph & Fax: 05084TRAPS
Price	\$32.00.
Notes	Designed for mustelids. Can also be used as a tracking tunnel.



Figure 35. K-Trap

6.4.1.1 Description

History

Designed by contractor Andy Kinley from Southland. Used extensively in the lower South Island.

Description

Body of the trap is made from yellow UV resistant PVC. The back grill is removable. Two rubber bands are required to tension the springing mechanism. Has a steel bait hook.

Trigger Mechanism

The animal is trapped when the door (that is triggered by the bait hook) swings down behind the animal. Two rubber bands provide tension between the bait hook mechanism and the door.

Typical trap set

Ground, with some means to stabilise the trap

Baiting

Active – the animal is required to pull the bait hook to trigger trap. Bait hook is reasonably big so not all bait can be hung satisfactorily.

6.4.1.2 Capture effectiveness

Trap performs well – similar to the Holden live capture trap in capture effectiveness, occasionally there are indications of trap interference resulting in no capture (bait removal or sprung traps)

6.4.1.3 Animal Welfare Considerations

Has the trap been assessed by NAWAC?

No.

Any animal welfare concerns?

The K-Trap could heat up if placed in sunny positions. Slightly more room in this trap for captured animal than the Holden live capture trap.

Overall assessment of humaneness

Like other live capture traps, this trap is very humane if checked daily (which is mandatory).

6.4.1.4 Non-target captures

A versatile trap – it is a good trap for catching stoats and weasels. Hedgehogs can be problematic and can make a mess inside trap. Cat capture rates are generally low as the size of the trap excludes adult cats.

6.4.1.5 Logistic considerations

Weight	700gm for Mk1 version (which was made of lighter plastic than Mk2).
Size	62cm L x 16cm H x 12cm Website: The trap is bulky, although they have been designed to fit together. It is an irregular shape and there are parts that can catch.
Tools required	None. Sack or large pillowcase for handling animals is necessary.
Deployment.	Would require a quad or ute for deployment of large numbers of traps
Ease of use	Easy. Place bait on hook, fit bait hook, set trap, secure on ground. The back grill can be removed and animals can be run into a pillowcase or sack.
Time to set	Quick, although occasionally the rubber band set-up and bait hook fitting can be a little fiddly. Have to place arm inside trap to set, sometimes difficult with bulky wet weather gear.
Maintenance	The rubber bands need replacement – can be made from car inner tubes.
Malfunction and other issues	The trap has working parts that it can malfunction. The rear door needs to be secured as it can be nudged up by animals. The first commercial releases of this trap were reasonably flimsy but now the main body of the trap is made of much thicker PVC and many of the problems initially experienced with this trap are now overcome. The rubber bands need to have the proper tension so that the springing mechanism works properly and the door falls down.

6.4.1.6 Overall assessment

Very suitable for ferret control contracting. Compares well with the Holden live capture trap. Recommended.

6.5 Collapsible cage traps

Suppliers	Trappers Cyanide Ltd and Pest Management Services
Price	\$79.95: Trappers Cyanide Ltd \$155.00: Pest Management Services
Notes	Suitable for possums, ferrets and feral cats.



Figure 36. Collapsible cage trap

There are two models of collapsible cage trap currently on the market in New Zealand. They are very similar in design and have been grouped together for the purposes of this review.

6.5.1.1 Description

History of use

Initially designed by Bruce Warburton and manufactured by Grieve Wrought Iron, Christchurch. This trap has been used extensively for possum and ferret research, as animals are unharmed and not usually stressed. Also used by District Councils for animal control in urban areas.

Description

Cage sides and bottom are made of galvanised steel wire. A sheet metal roof provides shelter. Has a sheet metal spring loaded door which folds.

Springing Mechanism

A bait hook hangs down at the back of the trap. When triggered, the spring-loaded door unfolds and prevents escape of the animal.

Typical trap set

Ground set.

Baiting

Active. Requires active interference with the bait hook, which is a curved wire. The bait hook can be moved in any direction to set the trap off (which is advantageous – as most trigger mechanisms operate in one direction only). The bait needs to be attractive and palatable – so that animals bite into it (if not animals may just sniff the bait and back out of the trap). Fresh meat baits are best for ferrets and pieces of apple for possums.

6.5.1.2 Capture effectiveness

Considered to have a good capture rate by users. This trap performed well for research projects, animals were unharmed and unstressed. Occasionally animals will remove bait from the hook without setting off the trap. Sometimes, bait hooks are carried off. Sprung

traps also occur occasionally, usually the result of small animals (like rodents, stoats and weasels) escaping between the wires. Sometimes the trap is set off by animals interfering with the trap from outside or by stock disturbance. One of the few traps that can catch more than one animal at a time. Multiple catches of ferrets have been recorded, especially young animals that have not reached full independence.

6.5.1.3 Animal Welfare Considerations

Has the trap been assessed by NAWAC?

No.

Any animal welfare concerns?

No. The trap is roomy enough for the animal to be comfortable. Stress levels are probably as low as possible for a captured animal. Ferrets will often drag bedding into the trap and are found asleep. Roof provides shelter/shade and the wire sides mean that traps cannot heat up. Exposure to bad weather is still a possibility though. Captured animals are protected from interference. Occasionally cats may hurt themselves by rubbing their faces along the wire sides and harriers can sometimes damage their flight feathers. Rarely, animals have been caught by the tail in the door, which can result in injury to the tail.

Overall assessment of humaneness

A very humane type of trap.

6.5.1.4 Non-target captures

A reasonably good trap for catching cats. Stoats, particularly the smaller females, can often escape. Hedgehogs are often caught. As a general comment, this trap is accessible to the whole range of non-targets so catch rates can be high. Birds (magpies, blackbirds and thrushes) can be caught. Harriers can be caught, which can be of concern if they damage their flight feathers. They can be difficult to extract from the trap (requiring gloves). Otherwise this trap poses no risk to non-targets. Stock (particularly cattle) will sometimes investigate and disturb the traps, and occasionally they may damage them.

6.5.1.5 Logistic considerations

Weight	Heavy - approximately 4.3 kg.
Size	The trap folds down to a reasonably small size (60 cm L x 26 cm W x 5 cm H). When set the trap height is 28 cm. The weight is the main problem with this trap rather than the physical dimensions.
Tools required	None, although gloves are desirable for handling animals. A sack or large pillowcase is required to run animals into in order to kill them. Cable ties to secure the front and back sides of the trap are handy.
Deployment.	Requires the use of a vehicle or quad.
Ease of use	Easy to set. Possums can clasp the sides making them difficult to handle once caught in this trap. In general, because the trap is reasonably large, the need for good animal handling skills is greater as the animal can move around. The easiest way to kill captured animals is to place a sack over the door and run the animal into the sack.
Time to set	Quick to set up.
Maintenance	As a general comment, if traps are not maintained properly then they may not perform consistently over time or hold animals well. Periodic attention should be paid to welds and replacing wires if necessary.

Malfunction and other issues	The door can become sticky, so that it doesn't close fully. Wires can break allowing greater possibility of escape through gaps in the sides or the trap sides don't join up together neatly in the corners. It is reasonably easy to lose the bait hook. Animals have been known to drag the bait and hook away occasionally. If the trap suffers damage whereby the rectangular shape of the trap is affected, this can cause malfunction of the door or gaps between the sides of the trap. Sometimes the tabs that keep the sides together break off – when this happens the sides will have to be secured together (cable ties work well).
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6.5.1.6 Overall assessment

It is a very safe trap to use if non-target catch is an issue. It is one of the more expensive traps and its weight is probably the biggest constraint for use in the contracting situation. This trap is very suitable for trapping in semi-rural or in areas with lifestyle properties as the trap poses a very low risk to captured animals. Good for permanent position trapping as long as daily checks are carried out. Probably the most humane trap that is available for pest control. Recommended for both possums and ferrets.

6.6 Treadle activated collapsible cage traps

The advantage of a treadle is that some animals are not inclined to interfere with a bait hook – like rabbits. Treadle traps are therefore more versatile, able to be used for a wide range of animals. Also, with bait-hook activated traps, there will be instances where animals will enter the trap and sniff at the bait, and then back out without triggering the trap. Stock interference can be an issue with these traps or if smaller animals climb on them – as a bump can set them off. Some operators think animals would be reluctant to enter these traps but the capture rates observed belie this idea.

6.6.1.1 Collapsible cage trap with treadle

Supplier	Pest Management Services
Price	219.00 +GST
Notes	Not used or tested within the framework of this project.



Figure 37, Collapsible cage trap with treadle

6.6.2 Havahart cage trap

Supplier	MS Woodcraft Ltd
Prices	Havahart 1088 (ferret-size), 2.3 kg, 61 cm L x 22cm W x 20 cm H; \$77.33 + GST Havahart 1089 (ferret and possum), 4.6 kg, 81 cm L x 27cm W x 32 cm H; \$119.11 + GST
Information	www.havahart.com
Notes	Not used or tested within the framework of this project



Figure 38. Havahart cage trap

6.6.3 Super-Slam possum cage trap

Manufacturer	Acto Agriculture NZ Ltd, 40 Spartan Road, Auckland 1702 Ph: 09-266-2333, Fax: 09-266-4333
Suppliers	Stock and station agents and Pest Management Services
Prices	\$64.25 + GST from Pest Management Services.
Notes	Not used or tested within the framework of this project. When the possum enters the trap it knocks the trap frame forward, releasing the closing gate. Bait is placed in the plastic bait box.



Figure 39. Super-slam possum cage trap

6.7 Non-collapsible cage traps

The collapsible cage traps have obvious advantages over the non-collapsible versions in terms of storage and transportation. But once set in the field, there is probably no difference.

Not used or tested within the framework of this project.

6.7.1 Non-collapsible cage trap with treadle

Supplier	Pest Management Services
Prices	\$222.00 +GST



Figure 40. Non-collapsible cage trap with treadle

6.7.2 Non-collapsible cage trap with hook

Supplier	Pest Management Services
Prices	\$182.00 +GST



Figure 41. Non-collapsible cage trap with hook

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Andrew MacPherson, Department of Conservation, Wellington

Darren Peters, Department of Conservation, Wellington

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Natalie Nisbett, Ministry of Agriculture and Forestry, Wellington

Kim King, University of Waikato

Greg Corbett, Environment Bay of Plenty

Penny Fairbrother, Animal Health Board, Wellington.

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9. APPENDIX 1. SUPPLIERS OF PEST CONTROL PRODUCTS IN NEW ZEALAND.

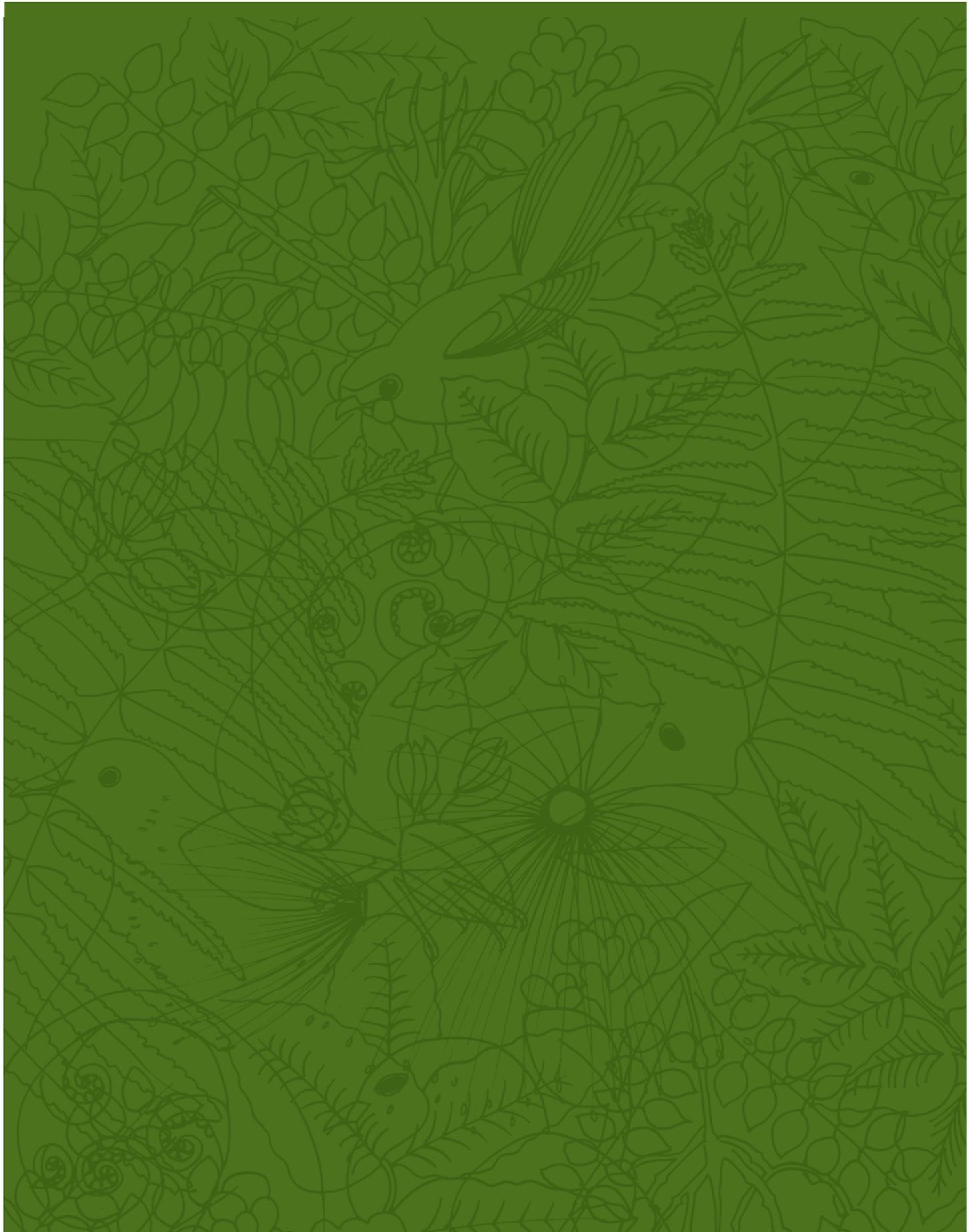
Below are suppliers of traps and non-toxic baits for traps, as well as other trapping products.

Supplier	Traps	Baits	Other products
Animal Control Products 101 Heads Rd, Private Bag 3018, Wanganui Ph: 06 344 5302, Fax: 06 344 2260 Email: info@pestoff.co.nz , Website: www.pestoff.co.nz		Toxic baits	Products for control of pests using poison technology
Carac Couplings 53 Bridge Street, Eltham Ph: 06-7648254, Fax: 06-7648253 Email: carac@xtra.co.nz , Website: www.caracnz.com	Carac kill trap.		
CMI Springs P.O. Box 3963, Auckland Ph: 09-579-4089, Fax: 09-5792595 Email: rossm@cmisprings.co.nz	DOC 150, DOC 200 & DOC 250		
Connovation Ltd 36B Sir William Drive, P.O. Box 58613, Auckland Ph: 09-273-4333, Fax: 09-273-4334 Email: info@connovation.co.nz , Website: www.connovation.co.nz	Blitz and Warrior	Revolution 213 (pre-feed paste for possums), Smooth in a tube (Pre-feed for cyanide paste), Erayz # 1 paste (pre-feed paste/lure for kill-traps), Erayz #3 paste (long-life paste for mustelids), Erayz #9 Rabbit jerky (dehydrated version of Erayz #3 for mustelids), Ferafeed (possum lure).	

Supplier	Traps	Baits	Other products
Electropar Ltd Ph: 0800 733 735, Fax: 0800 733 736 Email: info@zaptrap.co.nz , Website: www.zaptrap.co.nz	Electrostrike		
Good Traders Ltd 2 Brackenfield Place, Parklands, Christchurch Ph: 03-383-6286 or 027-2742493, Fax: 03-383-6288 Email: goodtradersnz@gmail.com	Duke size 1 leg-hold		
Haines Pallet Co. Ltd 111 Hutt Park Rd, Seaview Ph: 04-5686898, Fax: 04-5686480 Email: haines.pallets@paradise.net.nz	DOC 150, DOC 200 & DOC 250		Trap covers for DOC traps
KBL Rotational Moulders 15 Keith St, P.O. Box 827, Palmerston North Ph: 06-358-6477, Fax: 06-3554825 Email: sales@kbl.co.nz , Website: www.kbl.co.nz	Timms and KBL		
Kinley Pest Solutions Ph: and Fax: 05084TRAPS	K-trap.		
MS Woodcraft Ltd 128 Marine Parade, Mount Maunganui Ph: 07-575 5920, Fax: 07-574 8910	Victor size 1, Soft-catch Victor 1½ and other Victor traps (total 27 versions), Conibear 50, 60, 160-2, 2220-2 and 280-2, Mk4 and Mk6 Fenn, and a range of Havahart cage traps including the 1088 and 1089		

Supplier	Traps	Baits	Other products
<p>Pest Management Services 5a Arko Place, P.O. Box 751, Paraparaumu, Kapiti Coast Ph: 04 2982766 or 0800 111466 Email: general@nopests.co.nz , Website: www.nopests.co.nz</p>	<p>Comprehensive selection of traps including Victor size 1, Soft-catch Victor 1½, Timms, KBL, Mk4 and Mk6 Fenn, Nopest Mk4 and Mk6, Sentinel, PossumMaster, wooden box trap, SuperSlam possum cage trap, non-collapsible cage trap with hook or with treadle, collapsible cage trap with hook or with treadle.</p>	<p>Smoked Salmon Ferret Lure, Possum Lure Oil and Possum Lure Paste</p>	<p>Fenn trap cover</p>
<p>Pest-Tech Ltd P.O. Box 40, Leeston Ph: 03-324-3163, Fax: 03-324-3163 Email: pest-tech@xtra.co.nz</p>	<p>Set-n-Forget</p>		
<p>Philproof Pest Control Products P.O. Box 4385, Hamilton Ph: and Fax: 07-859-2943, 021-2705896 Website: www.philproof.co.nz</p>	<p>Fenn MK4 and MK6 traps, Timms and Victor size 1 leg-hold traps</p>		<p>Philproof ferret and stoat trap covers: single trap cover Mk1, single trap cover Mk2, double trap cover</p>
<p>Possum Master Industries Ltd 52 Sea Vista Drive, Pukerua Bay Ph: 025 641 9156, Fax: 04 239 9445 Email: pmi.leatham@xtra.co.nz Website: www.possummaster.co.nz</p>	<p>PossumMaster</p>		
<p>Possum Traps NZ 31a Ratima Place, Awatapu, Whakatane Ph: 07 3084861 or 0800 863504 Email: traps@possumtraps.co.nz Website: www.possumtraps.co.nz</p>	<p>Bushmans Best</p>	<p>Bushmans Best possum lure</p>	

Supplier	Traps	Baits	Other products
<p>Progressive Plastics P.O. Box 1379, Dunedin Ph: 03-477-6999 Email: panstey@es.co.nz</p>			Plastic trap cover
<p>Trappers Cyanide Ltd 303 Laidmore Road, RD 2, Amberley Ph: 03-3149940, Fax: 03-3149970 Email: enquires@traps.co.nz Website: www.traps.co.nz</p>	Holden Multi-kill, Holden live capture trap, Holden Collapsible cage trap, Bushmaster size 1 leg-hold trap and parts, Mk4 and Mk6 Fenn and Tunnel trap.	Possum Superlure (long-life bait for traps), Possum Dough (pre-feed) and Mustelid and Cat Bait (long-life bait for traps).	Green Box trap cover



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