FERRET CONTROL MANUAL
2010

(This version updates the Ferret Control Manual, 2004, Ragg, J.R and Clapperton, AHB Project R-80596)

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Introduction

Up until 1995, ferret control was usually only conducted by the Department of Conservation to protect threatened wildlife. Leg-hold traps (often gin traps) were used, and trapping was restricted to small areas. Little was known about ferret behaviour and ecology in farmland. Once the ferret was recognised as a possible vector of TB, research attention and interest in ferret control escalated, funded by the Animal Health Board. When regional Vector Managers introduced ferret control into their TB programme (mostly from 1999 onwards), there was relatively little available knowledge on which to base ferret control strategy. Ferrets had been recognised as a risk and it was considered sensible to act. Most managers have indicated that they relied heavily on feedback and initiatives from operators.

New Zealand now has operators who are experienced in ferret control. And now there are traps that are specific to ferrets, in contrast to the early days where traps designed for possums were commonly used. This manual updates a previous project that AHB commissioned in 2005. In the last five years, within the contracting environment, ferret control has become a lot more professional, and range of the ferret control devices have also expanded. It is considered valuable to collate current thought and practice so that people who wish to undertake ferret control can access information easily. The main objective for this project was to try to improve the quality of ferret control operations for the benefit of the AHB TB management programme.

In December 2009, a questionnaire was sent to all AHB ferret contractors. The main objective of the questionnaire was to determine current ferret control practices. Most of the questions were designed to assess the effectiveness of the various traps and baits. This manual has attempted to provide a representative view of those contractors (n=18) who responded. There was a surprising range of opinions expressed – and every opinion was not able to be expressed. Most questions were able to be assigned a numeric score. Averages were generated from these scores to determine a ranking. Other questions were either ‘yes’, ‘no’ or ‘don’t know’ and so percentages were generated. Considering the relatively low sample size, the averages or percentages expressed in the report should be regarded as indicative only and are not statistically significant.

Prices of traps and control products were sourced from websites and were accurate at time of report completion (January 2010). Prices are likely to change so please use the pricing as a guide only.
SECTION 1. BACKGROUND INFORMATION ON FERRETS

Ferrets belong to the Mustelidae family, to which weasels, stoats, otters, pine martens, badgers, and skunks also belong. Most members of this family typically have long narrow bodies with short legs, and are characterised by a musky smell. Another distinguishing feature of this family is that the males are often much larger than the females (called sexual dimorphism). Female ferrets can weigh anything between 500 g and 1.1 kg, whereas males weigh from 700 g to 2 kg. Ferrets are easily distinguished from stoats and weasels because of their much larger body size and coloration (weasels and stoats are tan and white). Stoats and weasels look very similar, especially if glimpsed in the field. Stoats have a black tip to their tails which weasels do not have. Weasels are smaller than stoats.

The ferret is very closely related to the polecat found throughout Europe and the UK. It is a domesticated form of the polecat, and is genetically almost identical. Polecats and ferrets are usually distinguished by their responses to humans; the polecat is a truly wild animal whereas the ferret has been domesticated since Roman times. The nature of ferrets is reasonably placid compared with other mustelids. Ferrets that regularly contact humans will quite quickly lose fear of people. Researchers have found that ferrets can become “trap happy” (repeatedly trapped) and tame.

Ferrets exhibit a range of colour types from light tan to animals that appear almost black (due to the presence of dark guard hairs); albino (with pink eyes) and piebald animals are also reasonably common. Coloration can vary from area to area and may have been influenced by the release of fitch farm ferrets into the feral population. Smell and hearing are the main senses of the ferret; eyesight is poor by day but better at night. Ferrets typically amble around with a slightly arched back, at the walking speed of an average person. They have their nose to the ground, circling and zigzagging, concentrating on where their nose is taking them. They often seem oblivious to the goings on around them. Ferrets can swim; they have been known to cross small stretches of water and rivers. They also dig extremely well, but unlike the other mustelids in New Zealand, they are poor climbers.
A male ferret with a cream ‘bib’

The albino ferret becomes distinctly yellow before the summer moult

1.1. The ferret as a conservation pest

Ferrets were introduced to NZ in the late 1870s to control rabbits. The ferret is an opportunistic predator and will prey or scavenge on almost everything that presents itself as a meal. Consequently, the ferret is a predator of many native species. Although rabbit is the main prey of the ferret, if rabbit availability decreases then ferrets will switch their diet to include a wider range of prey species. When this happens, predation of threatened species often increases. Some of the ‘at risk’ species include yellow-eyed penguins, shearwaters, kiwi, braided riverbed species such as stilt and dotterels, skinks, geckos, snails and invertebrates. Ferrets will also eat bird eggs. Ferrets will eat fish occasionally, and eels and frogs have been recorded in their diet. In general, it has been hard to estimate the exact conservation impact of ferrets because of the difficulty in identifying the predator species responsible for the killings. Ferrets will surplus-kill if given the opportunity; there are numerous reports of ferrets raiding hen-houses and killing more than they can eat. The consequences of this behaviour are disastrous if threatened species are targeted and has contributed to the reputation of the ferret as a vicious indiscriminate killer. In most cases, when control is conducted for conservation purposes, the ferret is not specifically targeted and traps and sets are designed to catch all of the mammalian predators that may be present (rats, weasels, stoats, feral cats and hedgehogs).
1.2. The ferret as a vector of bovine TB

1.2.1. History
Bovine tuberculosis (TB) was first identified in a ferret at Taumarunui in 1982. However, this was treated as an isolated incident, and it was not until a 1992-3 survey of ferrets in the Mackenzie Basin revealed a high prevalence that ferrets were seriously considered as having a role in transmitting TB to livestock. A survey conducted throughout Otago in 1995 found tuberculous ferrets on almost every sampled property with an infected herd, and again a high level of infection. Soon there was much debate and interest in the ferret as a possible vector of TB. One of the reasons for looking beyond possums was that in some areas possum control was not achieving the desired reductions in reactor rates or problems continued to persist in areas where there were few possums. In rabbit-prone country, ferrets are abundant, and this coupled with the high prevalence of infection suggested that ferrets were capable of being a significant source of infection. Many farmers thought that ferrets were involved in transmitting TB to stock and therefore there was general support for ferret control programmes from farmers.

Initially there was much scientific debate about the merit of ferret control on the basis of the whether ferrets were spill-over or maintenance hosts. But given the high prevalence of disease in the ferret population and the escalating reactor rates at the time, it was thought prudent to act and so ferret control programmes were implemented to reduce transmission between wildlife and stock. There were few people with any experience in ferret control at the time and so a ‘learning by doing’ approach was adopted. Many possum control contractors became involved in ferret control.

It was quickly realised that annual ferret control only reduced ferret abundance for a very short time. This was in contrast to possums, where possum control would have appreciable and long-term effect on numbers. Also, it was only when possum control reduced abundance to a certain level that reduced transmission rates between possums and stock was observed. With ferrets it is thought that ferret control results in a lower overall prevalence of TB infection in ferret population - and this is the mechanism which results in a reduced rate of transmission between ferrets and stocks.

When Animal Health Board first started trapping ferrets in 1999, the epidemiology of TB in the ferret population is much different to what it is now. The distribution of tuberculous ferrets was large – commonly they were found throughout the Vector Risk Areas (VRAs). Also, high prevalence was typical - in some areas it was discovered that almost all the ferrets were infected with TB. Nowadays, tuberculous ferrets are usually found in localised areas and the prevalence is much lower (less than 5 %).

1.2.2. Geographical spread of TB
The geographical spread of TB has been one of the biggest problems for management in the past. For many years the size of VRAs were increasing. But since June 2004 there has been no increase. In some areas reactor rates have increased but this is thought to be due to within-herd transmission rather than being vector related. The good news is that ferrets are not considered to be spreading TB into TB free areas. Most areas with naturally large numbers of ferrets are already within the established VRAs.
1.2.3. The ferret as an ‘indicator’ of wildlife infection

The changing epidemiology of TB in the ferret populations means that although Animal Health Board is still funding ferret trapping programmes, their strategy towards ferrets has changed. Increasingly, ferret trapping programmes are implemented to recover ferret bodies for disease surveillance. In many areas, ferret populations are sampled as they are often the best species to identify if TB is present in the wildlife population. In most cases, (especially in pastoral habitats) ongoing possum control has resulted in very low possum numbers. Possum populations that have had ongoing population control typically have very low levels of TB infection (around 1%). This means that you need to catch a large number of possums to have any confidence that you have detected the disease if it is present. In contrast, if TB exists in a wildlife population then the prevalence of TB in ferrets is usually an order of magnitude higher than possums. Population control of ferrets doesn’t suppress numbers for long as they have a good reproductive ability. Ferrets are easily trapped and from year to year there is little change in ferret numbers, even in areas with on-going annual trapping. Also, ferrets being a hunter and a scavenger acquire TB from a wide range of sources. All these factors combined make the ferret an ideal ‘indicator’ species. If TB is identified in ferrets, then management can make decision based on that information – and the usual response is to continue to undertake possum control.

In many areas, it is obvious that there are ongoing problems with wildlife infection as herd testing identifies infected stock. But there are some areas where domestic deer and cattle densities are very low or absent and it is not possible to use reactor rates as a first cut to identify areas with possible wildlife infection. In order to identify whether the wildlife is infected, ferret populations are often the first choice to survey as a surveillance tool.

1.2.4. Pathology

What does a tuberculous ferret look like? Well unless there are open lesions (which are not common nowadays), a tuberculous ferret will look like any other. Many are outwardly very healthy with good body weight. The only possible way to identify tuberculous ferrets is through post-mortem and culture (growing the *Mycobacterium bovis* bacteria).
TB infection causes lesions in the lymph nodes of ferrets. Lymph nodes become enlarged and often small cream-coloured lesions can be seen. The most common site of infection is the mesenteric lymph node (a lymph node draining the intestinal tract). Infection in this site suggests that infection is acquired by ingesting contaminated meat or carrion. Lesions in the respiratory system are less common and usually only occur when the animal has advanced disease. There are many tuberculous ferrets that do not show signs of the disease (called subclinical infection) and the correct disease status can only be determined from histology (microscopic examination of cells) or culturing of tissues (growing the bacteria). In the past, the proportion of ferrets with sub-clinical infection was often very high - with almost every ferret in a population being diseased. The percentage of ferrets with visible lesions (called gross infection) was also very high and a gross prevalence of around 20% was quite common for ferret populations. There is a trend for more males to be infected than females. Adult ferrets are much more likely to be infected with TB than juveniles. TB can cause death, although many tuberculous ferrets will die from other causes, the most significant being starvation.

1.2.5. Transmission of TB from ferrets to stock
The stage of infection (whether lesions are visible or not) does not alter the ability of the ferret to excrete bacteria from their bodies, so even ferrets with sub-clinical infection can be infectious to other animals. Excretion of bacteria means that ferrets are capable of being a vector. In the most comprehensive study of the routes of excretion, about a quarter of tuberculous ferrets were excreting TB bacteria from the mouth, about 16% from faeces, 6% from the respiratory tract and 7% from urine. It is possible for nursing females to pass infection to their young as infection in milk tissue has been observed.

Direct transmission of TB between ferrets and stock is possible if they come into close contact. Ferrets in the last stages of tuberculosis may show weakness, muscle wasting and on
occasions paralysis of the hind limbs - so they may not be able to escape investigation by livestock. In trials with sedated ferrets (to mimic the behaviour of terminally ill ferrets) cattle and deer were interested in the ferrets. Stock came into close contact (sniffing and licking) with the ferret and it was concluded that transmission could occur by this type of interaction. Although ferrets den mostly underground, dead ferrets are often found on the surface, so stock could conceivably come into contact with them after death.

It is thought that environmental contamination (where TB bacteria is excreted into the environment by infectious animals and is then contacted by stock) is a lesser risk in terms of transmission than interactions between wildlife and stock. Concern has been raised though, at the possibility of ferrets contaminating hay and other food stuffs as ferrets frequently use haybarns and other such farm buildings for denning.

From the available scientific evidence, it appears that ferrets are capable of transmitting infection to stock. Ferret control has often resulted in a reduction in the incidence of TB in stock, and this has been demonstrated experimentally. Ferret control results in a change in the age structure of the ferret population, with proportionally more juveniles after control. As the prevalence of TB is lower in juveniles, control therefore results in a lower prevalence of TB in the general ferret population. It seems that this lower prevalence corresponds to a lower rate of transmission to stock. Some farmers have also reported progress in reducing TB levels in stock once they started ferret control.

1.2.6. Ferret to ferret transmission of disease
There has been a long running debate as to whether ferrets are maintenance hosts or spillover hosts. If ferrets transmit infection to each other and do not require constant re-infection from other wildlife such as possums to maintain the disease in their population, then they would be called “maintenance hosts”. If they are becoming infected from other wildlife, and do not transmit infection to each other at high enough rates to maintain the disease in their own population, they would be called “spillover hosts”. The logic is that maintenance hosts should be controlled, and infection in spillover hosts should progressively disappear if the disease is reduced or eliminated in the species that are acting as the source. Traditionally it has been thought that control is not warranted for spillover hosts. The possum is a true maintenance host being able to maintain tuberculosis within the local population at all but the very lowest of densities. Some have argued that controlling the disease in possums will adequately control the disease in ferrets. The evidence gathered so far suggests that ferrets are spillover hosts., but they may be capable of acting as maintenance hosts when they are at relatively high densities (like Central Otago and north Canterbury).

The debate about whether ferrets are capable of being maintenance host often leads to discussion about their behaviour to each other that could result in transmission of disease. Initially many thought that the rate of ferret to ferret transmission would be negligible as they were not considered to be sociable animals. But research has been conducted that suggest that ferrets are probably the most sociable of the mustelid species – maybe due to their history of domestication. Ferrets will occasionally hunt and den together. All combinations of sexes and ages have been recorded together. Often they are coming together because they are sharing carcasses. Typically it would take about 3 days for a ferret to eat a rabbit carcass. Usually ferrets will gorge themselves, sleep and then continue to eat a carcass. Many prey items are more than what one ferret can eat in one sitting and this can result in other ferrets coming along and sharing the carcass. In recorded incidents ferrets often have brief
skirmishes with each other before settling down to eat side by side. If the carcase is tuberculous then it is conceivable that many ferrets can become infected from a single source.

The other risk factors are fighting and cannibalism. The only time that ferrets are overly aggressive to each other is during the mating season. Males will fight with other males over access to receptive females. Bite wounds are rarely seen outside of the mating season. Ferrets are known to cannibalise so death doesn’t necessarily stop the cycle of infection. In fact cannibalism may be the main mechanism of ferret to ferret transmission.

1.3. Aspects of ferret behaviour and ecology relevant to control

1.3.1. Reproductive ability

It is difficult to keep ferret numbers low for long. This is due to their ability to quickly re-invade control areas and to produce large numbers of young. Litter sizes range from six to 14 young per female. Mating usually occurs in August and September. It is thought that an increase in daylight length brings female ferrets into oestrus. Females are commonly wounded at the back of the head and neck during mating and mating behaviour can be violent and prolonged. Gestation is six weeks and most young are born in October and November. Geographical variation in the timing of the birth of ferrets has been observed though, with some ferrets giving birth in December. Juveniles are weaned around eight weeks of age, with most juvenile emergence occurring from late January to early March. Not all young survive to emerge from dens and numbers of emerging juveniles seems to depend on the abundance of prey over the time that females are pregnant and raising their young. When ferret numbers have been reduced through trapping, it has been observed that a greater proportion of juveniles will successfully emerge. This response is called compensatory survival (of juveniles). After emergence, juvenile survival rates can also depend on the density of ferrets, with a greater proportion of juveniles surviving in areas that have received ferret control (artificially low populations). Juvenile ferrets become sexually mature by the winter of their birth and almost all will breed. It is possible for females to breed twice but this happens only rarely. The loss of the first litter may result in double breeding.

![Ferret kits, aged about 4 weeks.](image)

1.3.2. Seasonal changes in ferret numbers

Ferret abundance is highest over the peak of juvenile emergence – during February and March. Ferret numbers show a slight decline from April to June as juveniles die. From June onwards, ferrets can become increasingly hard to catch, especially females. Low trapability can continue until December, although it has been observed that there is variation in the timing, duration, and intensity of this response. Because of changes in trapability it becomes
harder to estimate ferret numbers over winter and spring. Ferret numbers are lowest in November and December, just before juvenile emergence.

1.3.3. Mortality
Between 75% and 80% of ferrets will die within their first year of life. Mortality is still high from then on. An old ferret would be one that is over three years. Only a small proportion of the population survives to breed twice. This means that the majority of a given population consists of animals less than one year old. In general, female ferrets live longer than males. Mortality is reasonably constant throughout the year. Starvation is probably the biggest killer of ferrets. Ferrets have a high metabolic rate, so they need to eat regularly. They do not store energy as fat (except for a couple of months in winter) and so they have few reserves. Disease is another cause of death. After the mating season, males are often in poor condition with open skin wounds from fighting. Male mortality may be high after mating.

1.3.4. Dispersal, movement patterns, activity, home range size
Some juvenile ferrets will always move away from their area of birth (called juvenile dispersal). This response appears to be instinctive and not affected by factors at the site of birth (like prey abundance or existing density of ferrets). Both males and females will disperse. Most juvenile dispersal occurs during February and March. Dispersing ferrets can travel large distances; one male in the Mackenzie Basin was recorded moving 55 km. Ferrets thus have the potential to transport TB from area to area. Ferrets probably follow natural topographical features like rivers and the bases of foothills. It is not known what factors are important in causing ferrets to stop and settle. By winter, almost every ferret will have set up a home range. Males will move extensively during the mating season in search of receptive females. The occurrence of road-kills is one indicator of ferret movements. The majority of road-kills occur in February and March, when juveniles are emerging and exploring their home range or are engaging in long-distance dispersal movements. In August and September, it is common to see road-killed male ferrets, due to their increased movements during the mating season. In the later stages of pregnancy, females will start using one den-site (termed natal den-site) and their movements may be more restricted.

The greater number of males caught in traps is probably not because there are more of them but because they have a greater probability of being caught (due to larger home range sizes, movements and other behaviour). Long-term trap-and-release studies suggest that there are actually more females than males. Females are much smaller than males and when not breeding and raising young they have lower food requirements.

1.3.5. Social organisation
Home ranges of males and females overlap, with no one animal solely occupying an area, except perhaps at low abundance. There is little evidence of territorial behaviour, unlike some other mustelid species. Ferrets space themselves out according to prey resources. Where there is high abundances of rabbits, ferrets will have small home ranges and will often share home ranges with many other ferrets. The typical home range size for a male ferret is in the 100-200 ha range, with female ferrets having smaller home ranges at around 100 ha. Home range size can vary greatly, and home ranges from around 20 ha to over 300 ha have been recorded. It is suspected that at very low abundances, ferrets may not keep to an established home range but will range widely over a large area in search of prey.

From juvenile emergence to independence, it is common to find juveniles loosely associated together, still semi-associated with the natal den site. This is often evidenced by multiple
catches of juveniles at one or two trap-sites in February and March. For a short time, the mother will hunt with her young. After independence ferrets are usually solitary, but they will occasionally hunt and den together. They come into contact mostly because of sharing carcasses. There is no evidence of a pair bond between males and females. Scent plays a part in social communication and ferrets will scent mark objects in their home range. Scent becomes more important during the mating season, allowing males to find females. In the mating season traps that have recently caught ferrets may be more likely to catch other ferrets due to the existence of scent. Ferrets will also make latrines (piles of faeces) outside their dens.

1.3.6. Prey
The main prey item of ferrets is rabbit, and rabbit abundance is the most important variable affecting ferret distribution and abundance. The areas where ferrets are not present are usually those with high rainfall and little pasture to support rabbit populations. Ferrets are found in pasture, rough scrubby grasslands, tussock grasslands, and the fringes of forests. They are generally absent or at low abundance on developed grassland, continuous forest and at high altitudes.

Young rabbits are especially important for ferrets, and are usually hunted in stops. Most hunting is conducted underground, as ferrets do not have the ability to run fast for long distances. Ferrets will drag carcasses to cover or down into a den. Ferrets cannot keep rabbit populations under control in the semi-arid tussock grasslands of Central Otago but they do have some effect on rabbit populations in the wetter lowland areas like central Canterbury. The seasonality of rabbit breeding (whether rabbits are breeding all year round or just in spring and summer) does have an effect on ferret population dynamics. There is seasonal variation in diet that corresponds to the seasonal availability of prey, with trends driven mostly by rabbit numbers (alternative prey is eaten more when rabbits are scarce). There is also variation in ferret diet across New Zealand that corresponds to changes in availability of prey in different habitats. For example, more rats are eaten in forest habitats. In general, female ferrets are more likely to eat the smaller prey items such as rodents, birds and invertebrates.

Although the numbers of ferrets are broadly correlated with those of rabbits, ferret numbers can be unpredictable (with variations from year to year) and sometimes the relationship between ferrets and rabbits is not clear. The presence of alternative food sources may act as a buffer, allowing ferret numbers to be higher than otherwise expected. Scavenging (including stock carcasses) may play a role in supplementing ferret diet when the availability of prey is low. Ferrets have a reasonably high metabolic rate so they do need to feed frequently. In the winter, they may slow down a little and rely on fat reserves.
1.3.7. What effect does trapping have on a ferret population?
The simple answer is that trapping has only a short-term effect. When trapping is conducted during summer and autumn the reality is that most of those animals trapped would die normally anyway (around 80% of ferrets die each year). Those ferrets that remain after control are then likely to have a better chance of survival, to breed successfully, and raise larger size litters. Control in summer (apart from removing tuberculous ferrets), has little effect on the ferret numbers once breeding occurs. It has been proposed that it may be better to conduct ferret control in winter and spring, when ferret populations are at natural lows – with the animals that are removed being essentially the breeding population. Control conducted during this period may have a bigger impact on future numbers of ferrets. The big problem with this strategy is the low trapability in winter and spring. Consequently, almost all Animal Health Board ferret control programmes cease after May.

Reinvasion means that ferret numbers are not low for long. Sites that receive control during the period of juvenile dispersal (mostly February and March) are likely to be attractive areas for dispersing ferrets to settle. Any settlers are very likely to breed successfully a few months later, so repopulation of control areas can be very quick. Conducting control in the autumn is probably preferable to summer control in terms of reducing risk from dispersing animals. By autumn, some natural mortality has already occurred, most juvenile dispersal has finished, and trapability is still high. Control efforts are not so compromised by reinvasion (compared to summer). Sites controlled in autumn would have reduced ferret numbers until the following summer.
SECTION 2. PRACTICAL ADVICE ON FERRET CONTROL

Ferrets are not difficult animals to trap or to handle. If ferrets are present, then during the period of high trapability (January – June), they should be easily trapped, provided the right trapping methods. Trapping is time consuming and logistically demanding though, and does require a certain amount of “know-how” for success.

2.1. How OFTEN to conduct ferret control
Control using traps is only going to provide a short-term reduction in numbers. Even intensive trapping operations have found it hard to suppress ferret numbers. Because ferret populations can recover quickly, increasing the frequency of control is likely to have more of an impact on ferret numbers than doing a single annual trapping operation. Annual control is probably a minimum requirement to reduce the risk of TB transmission from ferrets. Controlling annually will reduce the proportion of adult ferrets in the population, and so will have an effect on the overall prevalence of infection, translating presumably to a lower risk of TB transmission to stock.

2.2. WHEN to conduct ferret control
The best way to answer this question is to ask another – why are you doing ferret control?

If you are interested in protecting wildlife from predation then the best time is probably going to be when the wildlife are very vulnerable (i.e. when they are nesting and raising young) or when the numbers of ferrets are the highest (time of juvenile emergence). In this scenario, ferret control in the spring and summer is most likely to be the most beneficial.

If you are interested in ferret control to reduce the risk of TB transmission then summer and autumn months will probably be best. This is when AHB conducts its main ferret control programme – through the months February to May. Experience through the years has shown that control conducted during this time period is effective at reducing the transmission risk from ferrets to stock. A possible exception to this would be if stock is going to be moved to a specific area for grazing, then ferret control may be best just prior to the stock arriving.

2.3. How LONG to conduct ferret control
The goal of any control operation should not necessarily concern numbers of ferrets caught but how much of the population has been caught. When trapping ferrets, it is common to catch quite a high proportion of the population quite quickly and then to catch the remaining ferrets for an extended period of time. If population control is the objective then it is important to continue trapping even when catches are low – even though it may not seem worth it. It is only when trap catch goes to zero for a few days that you can be confident that you have caught a high proportion of the trappable ferrets present.

Ten nights of trapping has been used as a standard requirement for population control by scientists and managers. Another strategy is to continue trapping until three nights have passed without catching a ferret. In areas that support high numbers of ferrets, the nil catch/3 nights rule is a more conservative approach (than the 10-day rule) as it is more likely that most trappable animals have been caught. Ferrets will hole up in dens for several days if they have prey, so trapping must be of sufficient duration to ensure that all animals have the opportunity to encounter a trap. Other factors that may affect encounter rates of traps are trap placement, habitat, home range size and the density of traps (the higher the trap density the more chance an animal has to encounter an unoccupied trap). Another consideration is trap...
availability. When trap occupancy rates are high (whether ferrets or other non-targets) then trapping may have to be extended, or the numbers of traps increased so that ferrets have a good opportunity to encounter an unoccupied trap.

Nowadays many of the AHB ferret programmes are for disease surveillance purposes, with the requirement that traps are to be set for five nights. The objective is to catch a sample of the ferret population - which is a different strategy to that of population control. A good proportion of a ferret population will be trapped within the first five days. It is accepted that there will be ferrets remaining in the operational area. This strategy is a balance of effort (nights of trapping) and return (ferret numbers) and enables the ferret population to be surveyed for disease over large areas.

2.4. WHERE to place traps
Traps should be positioned to maximise the probability of a ferret encountering them. To be successful you need to know how ferrets are moving around their home ranges, where prey is abundant, and where ferrets are likely to be denning. Actual ferret sign is hard to observe, so an experienced ferreter will often be paying the most attention to rabbit sign.

How do ferrets move around?
Ferrets are attracted to cover. They are attracted to cover for two reasons: (i) an instinctive need to keep out of sight of other predators and (ii) because prey is also associated with cover.

Ferrets will therefore follow the edges of cover and boundaries where there is a change in habitat. Ferrets move along forest – pasture boundaries. Rabbits are especially common along these features as they can have their holes in the cover and come out to graze the pasture. Setting traps around pine blocks is usually successful, as is setting them along other forest types like native bush and other exotic plantation. In more developed farmland with little desirable ferret habitat, set traps along shelter belts, tree lanes - even lone trees are better than no cover. Scrub cover like gorse, broom, matagouri, manuka etc usually represents good ferret habitat. Often scrub is associated with gullies and other undeveloped areas and supports good numbers of rabbits and other prey species. When ferrets are moving around, they are focused on finding prey, so areas where prey are concentrated will be frequented more often by ferrets. For this reason, the dry sunny faces where rabbits are breeding are good sites to place traps. Successful trappers can identify the ‘rabbity’ areas of a property and target or concentrate traps in these areas. When ferrets are hunting, they will inspect rabbit holes for signs of occupancy and so traps set in areas where rabbit holes are concentrated are likely to be encountered by ferrets.

Bush- pasture margins are good places for traps
Ferrets will hunt along waterways, ponds and bodies of water for bird life. Select dry sites for traps though, avoid boggy or wet ground. Ferrets can and will swim but are more likely to be following these features rather than crossing them frequently. Streams and rivers run down gullies, which are also associated with increased vegetation cover and so placing traps down gullies and water courses are usually successful. Intersections of gullies are also good sites, as well as leading ridges. In areas with high rabbit abundances, the habitat can often be quite uniform, with little cover or natural microhabitat features. Traps set near rocky outcrops or other features are likely to be better than those set in open country. If nothing else it makes finding them easier.

Ferrets often use runs created by other small animals like rabbits and possums. Look along rabbit proof fence lines for the holes that animals are using. Stock tracks are good sites, although some caution needs to be exercised when placing traps near to stock tracks as traps can be disturbed. Ferrets will also use larger tracks created by farm vehicles. As a general rule, the larger the feature the more likely ferrets will use it. It is still worthwhile to look out for other features along the larger tracks that will increase the chances of a ferret intercepting a trap, like small animal runs, cover etc. Ferrets will also make use of bridges, culverts over drains and streams, and raised walkways (manmade or natural) through swampy areas.

As a general rule, a trap site that combines more than one favourable feature will be better than single feature sites. For example, placing a trap along a stream at the point where it intercepts a farm track is generally better than placing the trap along a stretch of the stream.

Open offal pits are common places to trap ferrets. Ferrets may also be attracted to dumps because of the presence of rodents. Ferrets will scavenge sheep carcasses, and it is worthwhile to look at these carcases for signs of scavenging and to set a trap accordingly. Old sheep carcases are not usually successful sites. It is advisable to avoid trapping after rabbit or possum control, if carcases are available for ferrets to feed on. Ferrets are likely to be less attracted to traps if they have other easy options for a meal.

*Traps set along farm tracks are good sites, especially if associated with cover*

Some trappers believe that setting leg-hold traps in rabbit burrows results in higher capture rates. Research has shown that in high rabbit abundance areas rabbit hole sites do not perform as well as leg-hold traps placed under covers. It may be a different story in low rabbit abundance country, where the density of rabbit holes is low and ferrets are more likely to check out rabbit burrows for occupancy. The long-spring traps may be easier to position in rabbit holes. When asked, most contractors did not consider that traps set in rabbit holes performed better than ground set traps.
Denning

After considering how ferrets may be using the area, consider where they may be denning. Ferrets are attracted to cover for denning. They rarely create their own dens, even though they can dig quite well. Rabbit holes are the most common type of den. Ferrets will also den in farm buildings, like woolsheds and haybarns. They may be attracted to these den sites because of the presence of rodents or offal, or because buildings offer warm, dry places to den. Be on the lookout for piles of ferret scats, a good sign there is a den nearby.

Contractors were asked to score the following features in terms of how important they are for catching ferrets (1 = avoided, 2 = no effect, 3 = slight positive effect, 4 = moderate positive effect, 5 = strong positive effect). Scores have been averaged, adjusted and ranked in order.

<table>
<thead>
<tr>
<th>FEATURE</th>
<th>EFFECT ON FERRET CAPTURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long rank grass</td>
<td>Avoided (-0.24)</td>
</tr>
<tr>
<td>Hay paddocks</td>
<td>Avoided (-0.24)</td>
</tr>
<tr>
<td>Stock feed or crops</td>
<td>Neutral (0.00)</td>
</tr>
<tr>
<td>Fencelines without cover</td>
<td>Slight positive effect (0.53)</td>
</tr>
<tr>
<td>Lone trees</td>
<td>Slight positive effect (0.71)</td>
</tr>
<tr>
<td>Yards</td>
<td>Slight positive effect (0.76)</td>
</tr>
<tr>
<td>Large tracts of forestry</td>
<td>Slight positive effect (0.82)</td>
</tr>
<tr>
<td>Tussock/developed farmland ecotones</td>
<td>Moderate positive effect (1.06)</td>
</tr>
<tr>
<td>Foothills or base of hills</td>
<td>Moderate positive effect (1.06)</td>
</tr>
<tr>
<td>Rock torrs</td>
<td>Moderate positive effect (1.29)</td>
</tr>
<tr>
<td>Gullies</td>
<td>Moderate positive effect (1.50)</td>
</tr>
<tr>
<td>Vegetation cover (gorse and scrub)</td>
<td>Moderate positive effect (1.65)</td>
</tr>
<tr>
<td>Woodpiles, bulldozed rubbish heaps</td>
<td>Moderate positive effect (1.71)</td>
</tr>
<tr>
<td>Shelter-belts</td>
<td>Moderate positive effect (1.71)</td>
</tr>
<tr>
<td>Stock tracks</td>
<td>Moderate positive effect (1.76)</td>
</tr>
<tr>
<td>Native tree plantation boundary</td>
<td>Moderate positive effect (1.76)</td>
</tr>
<tr>
<td>Exotic tree plantation boundary (i.e. pines)</td>
<td>Moderate positive effect (1.76)</td>
</tr>
<tr>
<td>Farm vehicle tracks</td>
<td>Moderate positive effect (1.94)</td>
</tr>
<tr>
<td>Stock carcases</td>
<td>Strong positive effect (2.00)</td>
</tr>
<tr>
<td>Fencelines with vegetation cover (i.e gorse)</td>
<td>Strong positive effect (2.12)</td>
</tr>
<tr>
<td>Small animal runs</td>
<td>Strong positive effect (2.12)</td>
</tr>
<tr>
<td>Larger bodies of water (ponds and dams)</td>
<td>Strong positive effect (2.18)</td>
</tr>
<tr>
<td>Farm buildings, haysheds, woolsheds</td>
<td>Strong positive effect (2.25)</td>
</tr>
<tr>
<td>Pipes, drains and culverts</td>
<td>Strong positive effect (2.47)</td>
</tr>
<tr>
<td>Bridges</td>
<td>Strong positive effect (2.47)</td>
</tr>
<tr>
<td>Offal pits, dump sites</td>
<td>Strong positive effect (2.53)</td>
</tr>
<tr>
<td>Water courses (streams, rivers)</td>
<td>Strong positive effect (2.76)</td>
</tr>
<tr>
<td>Where rabbits are breeding or have holes</td>
<td>Strong positive effect (2.81)</td>
</tr>
</tbody>
</table>
Ferrets seem to avoid long rank grass – even so it may be worthwhile to set a trap on an obvious track going through long rank grass areas. Hay paddocks, crops and stock feed paddocks are not considered good places to set traps. In an area with few good places to set traps, a fenceline would be better than nothing. One contractor thought that corners in fences, angle posts, strainers and gates were worth a mention. It has been proposed that places were dogs or other animals scent mark can be good trap sites.

**Other considerations**

When selecting sites for control stations it is advisable to take note of stock. Cattle are curious animals and will often disrupt and damage traps. Also, consider possible contact between trapped ferrets and stock. Transmission of TB could occur when ferrets are unable to escape investigation when caught in traps. Placing traps in areas fenced off from stock, like just inside shelter belts can avoid such problems. Placing traps under the lowest wire of a fence will also help prevent stock disturbance.

With regard to the public, there are a number of considerations. It is common for traps to be stolen if placed in positions where people can easily notice them, especially traps that can be used to catch possums. Also, people can interfere with traps or be distressed about trapped animals. For this reason, marking trap sites with flagging or another obvious means may not be desirable. Most contractors indicated that they did not identify their trap sites. For obvious reasons it would be irresponsible to use some traps (leg-hold and kill-traps) around areas where children or people’s pets are present. Signs should be erected in areas of public and recreational use.

The effect of weather on ferret capture rates was unclear. While most contractors believed that weather had an effect there was no real consensus on the weather conditions that were conducive to capturing ferrets. Many operators thought that ferret capture rates were better after rough or wet weather.

### 2.5. Trap density and coverage

Traditionally scientists and managers favoured a standard density of traps of 10 per km\(^2\) set for 10 nights. For contractors, the numbers of traps that can be serviced in a day will vary according to the terrain, topography, ease of access, land-use practices, property sizes, and numbers of animals to deal with. Most contractors indicated a range of between 80 and 150 traps. Trap coverage rates can also be affected by the number of nights assigned to the operation.

Spacing of traps often depends on the habitat. In the more uniform habitats of Central Otago and Canterbury, trap spacing can follow a simple rule of one per so many metres. Around 200 – 300 m is usually appropriate for most areas. In these habitats, it is still worthwhile paying attention to animal sign and suitable habitat when selecting trap sites. Traps can be placed in regularly-spaced traplines. Using the nearest waypoint function on your GPS is very handy for measuring distances between traps.

In farmland that is a mosaic of different habitat types (crops, plantation, patches of scrub, developed pasture etc) a set trap spacing regime is less appropriate. In these situations, you should consider how ferrets are moving around their home range. For example, there is little point placing a trap in the middle of developed pasture just because your 200 metres is up. The aim should be to have the same density of traps (around 10 per km\(^2\)) but placement is more strategic, with greater emphasis on habitat features. In general, placing traps in a grid
Home range size should be considered when estimating an appropriate density of traps. Home range size is influenced mostly by prey abundance, with ferrets having larger home ranges in low rabbit abundance areas compared to high rabbit abundance areas. In order to trap a ferret, it must have at least one trap within its home range, therefore the smaller the home range size the greater the density of traps required. Obviously, it can take a few days for a ferret to cover its entire home range, so if a small number of traps are being used, then a longer duration of trapping would be required. And if this minimalist approach is being taken, then trap placement becomes all the more crucial. It is very likely that ferrets will use their home range selectively, for example, there will be some areas that they frequently hunt in or move through and others that are hardly used at all. Placing a trap in a site that is hardly used is going to have little chance of catching a ferret even if the trap is within a home range.

In any situation, it is relatively pointless to have traps too close together (< 150 m) unless you are catching juveniles that are emerging from a nearby den. If you are repeatedly catching young ferrets in a particular area, it may be worthwhile setting additional traps nearby.

2.6. Trapping strategies
Most private landowners do not have large numbers of traps - or the time to devote to servicing large numbers of traps. In order to cover an area, it may be desirable to use a ‘rolling front’ approach, with traps moved onto adjacent areas when the trap-catch declines. Contractors also use the rolling front approach, especially with large blocks. This means that each day, traps are checked, and some are pulled in and placed in new positions. The ‘block’ approach is where operational areas are divide up into workable blocks and for each block as many traps as possible are set on the first day and are removed after a set period of time. The rolling front approach means that the workload is more evenly spread out over the duration of the trapping period. With the block approach there are typically long hours associated with the set-up and removal days and shorter days when traps just require to be checked.

If kill-traps or poison bait stations are used, then it is possible to leave traps/control stations in position and check them occasionally. This trapping regime (often using Timms traps) has been used by farmers in the past. One of perceived advantages of this regime is the lower time commitment. With the development of effective kill-traps, especially traps that reset themselves, this regime may have increased application. The position of the control station becomes very important, and at the planning stage, greater consideration needs to be placed on how ferrets are moving around an area. Control using this regime would usually involve a lesser trap density than a normal annual trapping operation. A good long-life bait or lure would be an important component of this regime.

Ferret control using the permanent position regime may result in a more constant reduction of ferrets than the standard annual trapping operation. The permanent position regime has the advantage of catching invading animals, slowing down the rate of population recovery. It is possible that the most effective control may result from a combination of the two methods, for example: a standard trapping operation in summer or autumn, with permanent position control stations operating for the rest of the year.
2.7. Servicing traps
A trade-off between optimum trap site selection and ease and safety of servicing traps is required. With large numbers of traps to service, time is of the essence and most contractors indicated that they would occasionally walk to a trap. Most contractors used quads and motorbikes for ferreting.

If the area allows it, then setting traps in traplines can make it easier to locate the traps. Setting traps along farm tracks (as long as there is good habitat associated with this feature) can also help reduce servicing time. Simple things like numbering traps and marking traps with flagging, coloured clothes pegs or other means of identification can make a difference to trap rounds. All AHB contracts require that each trap site is GPSed on the day of setting. Therefore trap sites can be easily located by using the GoTo function on your GPS (Garmin models). Many contractors do not use flagging or other markers, relying on finding traps with their GPS.

The Animal Welfare Act requires that you check live capture and leg-hold traps every day. Although kill traps do not legally require daily checking, they probably should be checked daily for animal welfare reasons. Traps should be checked as early as possible in the morning (legally within 12 hours of sunrise). You need to remove any animal caught. If non-pest species are caught uninjured or with no major injuries, then release them. Pest species should be euthanased. Serious injuries or dead native animals must be taken to the nearest Department of Conservation office if possible. After dealing with the captured animal, check the condition of the bait, replacing it if removed or degraded. Check your trap is operational and reset. Remove all fur from the jaws of traps when setting them to enable you to identify an escape in the future. Look for obstacles obstructing access to the trap. Write down all the information required for your record sheets before leaving the trap site.
SECTION 3. FERRET CONTROL OPTIONS

3.1. Trapping

As a general rule, a mixture of trap types is probably the best as individual animals will respond differently to different trap types and there will always be some animals that will avoid one trap type but will go into another. There is certainly an element of curiosity with ferrets, especially young animals. Ferrets will investigate new objects in their home range and have been caught in traps that have not been baited.

Contractors were asked to rank the 3 trap types and live capture traps scored the highest, followed by kill traps. When asked to rank the various individual traps, the following traps scored the highest: 1st = wooden treadle traps (home-made), 1st = Holden live capture, 2nd = Size 1 leg-holds, 3rd = Timms, 4th = K-traps, 5th = KBL. The other traps either scored poorly or too few respondents had used them for the scores to be reliable.

From the below list, contractors were asked why they chose the traps that they did.

1st Non-target issues, including safety of use around housing
2nd The trap had a reputation as an effective ferret trap
3rd = Animal welfare factors
3rd = Logistic factors such as ease of use and set-up time
4th = Robustness (low rates of malfunction or breakages)
4th = Size and weight considerations
No score Trap was recommended to me
No score Influenced by marketing

3.1.1. Live capture traps

Live capture traps have become the most popular trap for contractors. All live capture traps (like leg-hold traps) must be checked within 12 hours of sunrise of the day following when they were set, or last checked. You can make your own ferret trap; plans can be found in King (1973). Some contractors use wood and believe that this natural surface is more attractive to ferrets. Weight and possible warping of wood have been raised as possible issues.

Capture effectiveness

Feedback from contractors has been good regarding capture effectiveness. The research that has been done suggests that they are just as effective as leg-hold traps.

Animal Welfare

These traps are very humane if checked every day. These traps scored the highest by contractors for animal welfare. The only animal welfare problem observed is that some of the molded plastic traps will heat up if placed in the direct sun. This can happen in a matter of hours, especially if there is not much room for the animal inside the trap. Animals have been found in a distressed state due to heat exposure. This can be avoided if consideration is given to finding shady sites for the traps, with regard to positioning the trap so that it is out of the sun when the sun is the strongest. Wire cage traps, especially those with a roof, are usually very humane. Often ferrets will be curled up asleep in them, having dragged in material for a bed. One problem with large wire cage traps is that harriers can damage their flight feathers and cats will (very infrequently) inflict minor facial injury to themselves by banging their faces against the wire sides.
It goes without saying that these traps are not humane if they are not checked daily. Obviously this is not the fault of the trap but of the user if animals become dehydrated, hungry or suffer heat or cold exposure.

**Non-target capture**

These traps can have high rates of non-target capture, especially hedgehogs. There is not much one can do about it. Non-targets can foul up the trap; hedgehogs in particular can make a real mess. The live capture traps do vary considerably in size – the smaller ones designed specifically for ferrets will restrict access to the larger non-targets like harriers, possums and cats. Some of the wire cage traps are larger and so the range of species that can be caught is corresponding wider. This is not necessarily a problem if multi-species control is desired. The good thing about non-target catch using these traps is that animals are unharmed and can be safely released if so desired. Live capture traps have become the preferred trap to use in urban, semi-urban areas, as well as public access areas, around lifestyle blocks and in sensitive conservation areas.

**Logistic considerations**

In general live capture traps are bulkier than other traps. It isn’t necessarily a big issue - as long as a suitable vehicle is used. With some variation depending on the model of trap to be deployed, around 25 can be transported on a quad. This would involve 4 loads if 100 traps were to be set, which is do-able. Weight is generally not an issue for the moulded plastic live capture traps – but weight can become a significant factor for the wire cage varieties. If a trap line has to be walked due to access issues, then these traps are usually not suitable.

**General Assessment of live capture traps**

For AHB contracting, these traps have a proven track record. They can be used safely in almost every situation. Contractors thought the main advantages of live capture traps were ability to use them safely in around housing and children, no harm to non-targets, animal welfare and fresh samples for necropsy. The disadvantages were their bulkiness, capture of hedgehogs and having to kill the animal.

**Holden Live Capture**

Manufacturer and Supplier: Trappers Cyanide Ltd  
Price: $32.50
**K-trap (MkIII)**
Supplier: K-traps Ltd
Price: Approximately $28.00 + GST

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**Holden Collapsible Cage Trap**
Manufacturer and Supplier: Trappers Cyanide Ltd
Price: $79.95 + GST

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**Folding Cage Trap**
Supplier: Pest Management Services
Price: $399.00 (inc GST and freight)
**Collapsible cage trap with treadle**
Supplier: Pest Management Services
Price: $138.00 (inc GST and freight)

![Collapsible cage trap with treadle](image1.jpg)

**Non Collapsible cage trap (Bait hook)**
A standard heavy wire cage trap triggered by a wire bait hook.
Supplier: Pest Management Services
Price: $171.00 (inc GST and freight)

![Non Collapsible cage trap (Bait hook)](image2.jpg)

**Non Collapsible cage trap (Treadle)**
Has a treadle plate mechanism in the base of the trap.
Supplier: Pest Management Services
Price: $240.75 (inc GST and freight)

![Non Collapsible cage trap (Treadle)](image3.jpg)
**Havahart Cage**
Collapsible treadle trap.
Manufacturer: Havahart (Woodstream Corp), USA.
Supplier: MS Woodcraft Ltd
Price: $77.33 + GST for model 1088 and $110.22 + GST for model 1089

NB: Model 1088 is sold through the EasyTek website www.easytek.co.nz for $112.50 inc GST.

3.2. Kill traps

The concept of a kill-trap for ferrets is a very good one. The most logistically demanding aspect of any trapping programme is the need to check traps. Live capture and leg-hold traps require daily checking but with a kill-trap, it is possible to reduce the frequency of trap rounds. Leaving traps in permanent positions and servicing them occasionally is a suitable strategy for some people, especially landowners. It can be an unpleasant job to remove animals that have been dead for some time in the trap though. Some of these traps are not particularly user-friendly, in fact they can be downright scary for the first time user. But like most things, with a little practice, confidence and competency are usually gained.

**Capture Effectiveness**

There has been relatively little research done on capture effectiveness of the various kill-traps for ferrets. As a general comment, if kill-traps are being used for extended periods of time, then even lower capture rates may still result in effective control. Many of the kill-traps available have been designed for possums and some have been used extensively for possuming – with good feedback from operators about their capture effectiveness. But one should always bear in mind that a possum is a very different animal to a ferret and a possum trap that works well for possums doesn’t necessarily translate into an equally effective ferret trap.

**Non-target capture**

The problem with kill-traps is that there are no second chances. Non-targets are either dead or badly injured. Depending on what you have caught, then this may be a problem or not. The rates of non-target capture can influence how regularly traps need to be serviced. The capture of non-targets obviously reduces the availability of traps for ferrets. The design and robustness of the cover (most kill-traps require covers) may influence the amount of non-target capture. In pastoral habitats, the most common non-target will be hedgehogs. Small cats and kittens can often access kill–traps and may not be captured in the manner intended (i.e. caught by a front leg). Harriers can also be at risk from leg captures. Kill-traps should
always be secured to avoid animals removing the trap. Given that there is often no way to avoid risk to non-targets, these traps cannot be used with confidence around housing.

**Animal Welfare**

There are a wide variety of kill traps on the market - but almost all are not humane. A ferret is actually a difficult animal to kill. They have strong thick skulls and musculature that provides a good amount of protection to the vulnerable parts of the body. It is not an exaggeration to state that ferrets have suffered terribly in kill traps in New Zealand. In some cases manufacturers and suppliers of some models of traps have been deceptive - as they have continued to market their traps as humane or effective at killing even when their traps have failed the NAWAC testing. Presently there are no requirements for trap manufacturers and suppliers to inform consumers about NAWAC testing results. MAF has just recently banned the Lanes Ace and other size 1½ traps but that process was very a lengthy one and involved much consultation. At the moment, the reality is that anyone can design and sell a kill-trap in NZ and there are no controls. Potentially consumers suffer as they purchase a trap that does not perform to expectations – and ferrets (and other non-target animals) will most definitely suffer. A very useful site for consumers to access the results of animal welfare trap testing is www.landcareresearch.co.nz/research/pestcontrol/trapdesign/welfare_performance.asp

Contractors often expressed few or minor concerns about some models of kill-traps that have known animal welfare concerns. But it must be pointed out that contractors are often checking their traps long after the animal has sprung the trap. Usually a dead animal is present when the trap is cleared and so the trap is considered to be effective as a kill-trap. In most cases, the users of these traps do not see is how long the animal has taken to die. The NAWAC testing involves direct observation and video-taping the animal entering and springing the trap. The time to loss of corneal reflex and heart rate of the animal is monitored, and if unconsciousness is not achieved in five minutes, then the animal is euthanased.

See www.biosecurity.govt.nz/animal-welfare/nawac/policies/guideline09.htm for the guideline on how the trap testing is conducted.

**Logistic considerations**

It has always been desirable for kill-traps to be as compact and light as possible, and many of the kill-traps have been able to achieve this. The only problem is that ferret sets do require a good cover or tunnel to make them safe – and often it is the tunnels or covers that are bulky or heavy. Some of the covers have been designed for possums and are not adequate for ferrets.

**General Assessment of kill traps**

A kill-trap by definition must kill the target animal, and do this consistently and quickly. Apart from the DOC250, there are no kill-traps presently on the market that will do this. The DOC 250 trap is compact and light – but it requires a robust wooden box. The unit is prohibitively large and heavy for contractors – who often have to move traps every 5 days. It is an excellent trap for permanent position trapping though. The DOC250 is probably not suitable for collecting ferrets for disease surveys – as the killing mechanism is severe and often the head will be badly damaged, compromising autopsy and collection of lymph node material. A disadvantage that would apply to all kill-traps is that dead animals may have tissue degradation (especially if traps are positioned in the sun and trap rounds take most of the day to complete), which could influence the ability to accurately diagnose disease.
Contractors thought the main advantages of kill traps were not having to kill the animal and not having to check the trap daily. The disadvantages included risk to pets and children, possible decomposition of carcases and bulk.

**DOC250**
Passed the NAWAC trap testing guidelines. Get further info at [www.predatortraps.com](http://www.predatortraps.com)
*Manufacturers:* CMI Springs
*Suppliers:* CMI Springs $39.00 + GST, $25.00 + GST for setting tool
Haines Pallet Co. Ltd $62.70 + GST, Pest Management Services $76.50 + GST, Connovation $63.00 + GST

**Set-n-Forget**
Tested and failed the NAWAC trap testing guidelines for ferrets.
*Manufacturer:* Pest-Tech Ltd
*Price:* $32.00
Possum Master
Tested and failed the NAWAC trap testing guidelines for ferrets.
Manufacturer and supplier: Possum Master Industries
Price: $45.00 + GST

Timms
Tested and failed the NAWAC trap testing guidelines for ferrets. Passed for cats.
Manufacturer: KBL Rotational Moulders
Suppliers: Farmlands, PGG, RD1, CRT, Mitre 10, Pest Management Services, Philproof Pest Control Products
Price: Approximately $55.00

KBL Tunnel trap
Tested and failed the NAWAC trap testing guidelines for ferrets.
Manufacturer: KBL Rotational Moulders
Suppliers: Farmlands, PGG, RD1, CRT, Mitre 10, Pest Management Services, Connovation
Price: Approximately $50-60
**Holden Multi-kill**
Tested and failed the NAWAC trap testing guidelines for ferrets.
*Manufacturer and supplier:* Trappers Cyanide Ltd

![Holden Multi-kill trap]

**Fenn (Mk 6 for ferrets)**
Not tested on ferrets, tested and failed for stoats.
*Manufacturer:* AA Fenn, FHT Works, England
*Suppliers:* MS Woodcraft Ltd, Philproof Pest Control Products, Trappers Cyanide Ltd
*Price:* Approximately $25.00 + GST

![Fenn trap]

**No Pest (Mk 6 for ferrets)**
Same design as the Fenn trap. Not tested on ferrets.
*Supplier:* Pest Management Services
*Price:* $33.75 + GST

![No Pest trap]
**Warrior**
Tested and failed the NAWAC trap testing guidelines for ferrets.
*Supplier:* Connovation Ltd
*Price:* $35.00 + GST

**Conibear (size 50, 60 or 120 for ferrets)**
Tested and failed the NAWAC trap testing guidelines for ferrets.
*Manufacturer:* Woodstream Corp., USA
*Suppliers and price:*
MS Woodcraft Ltd – $14.22 + GST for size 50-2 and $18.22 + GST for size 60-2
Pest Management Services – $33.00 + GST for size 50 and $41.00 + GST for size 60

**Novel Ways Multi-trap**
Not tested on ferrets.
*Manufacturer:* Novel Ways Ltd
*Price:* $800.00
3.3. Leg-hold traps
When there were few traps designed for ferrets, the leg-hold traps were used extensively. Also, the possum control contractors that expanded into ferreting commonly used their existing possum traps for the job. There are two types of leg-hold traps: long-spring traps (like the Gin) or the double coil. Although these traps can come in a wide range of sizes, most traps that have been used in NZ are either size 1 or 1½ (measuring 10.5 cm across it closed jaws). Since January 2009, long-spring and double coil traps that are 1½ or greater have been banned, except the padded 1½ ‘Soft Catch’ traps. It is illegal to use the Lanes Ace (Gin) trap. The traps that have been banned have been done on the basis of animal welfare concerns – that they cause unacceptable pain and suffering to captured animals.

<table>
<thead>
<tr>
<th>Double coil</th>
<th>Long Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Victor</td>
<td>Lanes Ace or Gin (illegal to use in NZ)</td>
</tr>
<tr>
<td>Duke</td>
<td>Bushmans Best</td>
</tr>
<tr>
<td>(Bridger) Bush Master</td>
<td>Sleepy Creek</td>
</tr>
<tr>
<td>Sleepy Creek</td>
<td>Victor</td>
</tr>
<tr>
<td>BMI</td>
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3.3.1. Rules for successful leg-hold trapping:

*Traps should be set on the ground*
Most importantly, traps should be set on a flat surface and dug in slightly to ‘bed’ the trap. The trap must be stable and there should not be any material under the trigger plate. The trap should be positioned so that the dog of the trap is at the back. Some trappers believe that disguising the trap with a small amount of soil enhances ferret capture rates. This practice can lead to clogging of the trigger mechanism of the trap. Some trappers think that ferrets are attracted to investigate fresh soil. Many contractors will place the trap bare on the ground.

*Traps should be set under a cover*
The capture of harriers, possums and cats can be greatly reduced by the use of a cover. A cover will also help protect the trap from dogs and stock. The most effective tunnel for leg-hold trapping is one that has a single entry. The trap is set at the far end, with the bait secured beyond the trap.

*Traps should be positioned so the ferret is caught by a foot whilst investigating bait or attractant*
Trappers should aim to catch animals by a front leg. The bait should be pinned down behind the trap or hung above the back of the trap. Bait should never be positioned so that the animal is caught by the head. Using natural materials and clearing the entranceway to form
a pathway may also direct the ferret’s attention to the set. A traditional trap set used a natural object such as a tree trunk or fence post as a back and then guided the animal onto the trap using small branches pushed into the ground or rocks (called hazing).

Everything must be pinned down and secured
The trap must be secured well. It is a big concern when a trap is lost from a trap site. Firstly, it can be hard to determine who has taken the trap as there could be a range of culprits (sheep, the farmers dog, a cat etc). Apart from the loss of a trap, if an animal is carrying around a trap then this is an obvious animal welfare concern and potentially a public relations problem. Traps must be secured by a staple into a fencepost, tree or similar or pegged down using a stake or sufficiently long peg. The ground must not be loose. Covers should be pinned down or weighed down with a rock or something similar. The bait must be pinned down beyond the trap. It is all too easy for a ferret to reach across the trap, grab the bait and be gone without triggering the trap. If the bait is pinned down and the ferret has to wrestle with it then there is so much more chance it will forget about the trap and set it off.

Traps must be kept in good working order
Traps that are left set in position for more than 5 days should be sprung and reset – to prevent the trap seizing or becoming less sensitive. Leg-hold traps require regular maintenance. At least once a year they should be waxed, greased or oiled. Trap springs do deteriorate with use so they need to be replaced. There is a greater chance of animals pulling free of the jaws once the clamping force declines (below 4 kg clamping force is considered unsatisfactory). Research suggests that the significant loss in performance indicates that the springs in leghold traps are not designed appropriately for the extent of use that they get exposed to when used professionally in New Zealand. It soon becomes apparent to trappers when there are problems with trap effectiveness by the rate of sprung and empty traps, and trap sets with the bait missing.

Capture effectiveness
The effectiveness of this trap is very dependent on the quality of the set. The more time and care taken, the greater the chances of the trap performing well. This trap can be used to catch wary animals as it can be disguised and the set can be made out of natural objects. These traps must be maintained to keep them performing well, reduced closure speed and clamping force are observed after prolonged use.

Non-target capture
While covers and tunnels certainly help, non-target capture is always going to be an issue with leg-hold traps. Non-target capture can be significant in some habitats and can start to reduce the availability of the traps for ferrets. Hedgehogs can be numerous and there is little that can be done to reduce hedgehog captures as they are the same size as ferrets. They can be hard to remove from the traps as they will often curl up over the jaws. Even though tunnels and covers can reduce non-target capture, persistent animals will always be an issue. A cat can often reach its paw into the trap, dogs and pigs usually have the strength to dislodge a cover and the cover stands little chance if cattle target it. Even the most careful operator can not reduce the risk associated with non-target capture.

By law leg-hold traps cannot be used within 150m of a dwelling without the express permission of the occupier or in any area where there us a probable risk of catching a pet. Leg-hold trapping therefore is restricted to farmland and bush. Due to restrictions where leg-holds can be used gaps in an operational area can sometimes be an issue.
Animal Welfare
Contractors did not rate the leg-hold traps well for animal welfare; interestingly leg-holds scored below most of the common kill-traps. The only double coil trap tested by NAWAC was the Victor and it failed the NAWAC guidelines for a restraining trap. NAWAC have not tried to get any of the size 1 double coil traps banned as these traps are considered too important a method of possum control. NAWAC has identified the following animal welfare issues associated with leg-holds:
- 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,
- Additional issues if the trappers fail to kill the trapped animals quickly and humanely.
The most obvious injury is bruising and swelling of the captured limb. In some cases, broken limbs and lacerations will occur. Ferrets will sometimes bite their restrained limb. Animal welfare concerns are often greater for non-target species. These traps are simply too big for weasels, stoats, rats and hedgehogs. These animals will either be dead in the trap (due to their injuries, shock, stress or exposure) or be badly injured. Don’t release hedgehogs even if they appear OK because more often than not they will have a broken leg. If harriers are caught then their legs are often injured.

General assessment of leg-hold traps
As a general comment, leg-hold traps for ferrets are not considered the trap of choice for ferrets. This is in part due to the animal welfare consideration but also their variability as an effective ferret trap. Whilst leg-hold traps can be effective for ferrets, this can be very dependent on the skill of the operator. Some contractors swear by leg-hold trapping for ferrets and believe them to be the most effective trap type. Many other contractors started out using leg-holds and moved onto other traps. Leg-hold traps are more suitable for the professional trapper. The captured animal must be killed in a competent and quick manner.

Another significant factor which has contributed to the declining use of leg-holds for ferreting has been the limitations on where they can be safely used. Whilst Programme Managers are allowing the use of leg-holds for ferreting, they must be used with covers and they cannot be used around housing. Even the most experienced and careful operators will lose the occasional trap and this can result in a public relations situation.

They are not a simple trap – there are many components to a leg-hold trap set (trap, peg to secure trap, cover, pegs or weight to secure cover, bait, bait hook or peg, hammer). There are a number of factors that affect performance. Compared to other traps they are the most time-consuming to set, although operators can become very fast with practice.

On the positive side, the traps themselves are small, as well as the components, especially if the covers stack into each other. They can be easily deployed using a motorbike or on foot so they are suitable for difficult country where access is an issue. There is also a case for their use in eradication programmes or when ferret populations must be reduced to low densities as these traps can be disguised and used to catch the wary animals that remain after trapping with other traps.

There was a bit of a love - hate relationship with contractors regarding leg-holds. Contractors considered that the advantages of leg-hold included small size, effectiveness, and the
disadvantages included logistics, animal welfare, variability in capture effectiveness, capture of non-targets and restrictions on where they can be used safely.

**Leg-hold traps available for ferrets**
Note that Size 1 traps are recommended for ferrets.

*Victor (double coil)*
Manufacturer: Oneida Victor Inc., Cleveland, USA www.oneidavictor.com
Supplier: M.S. Woodcraft Ltd, $16.00 + GST
Pest Management Services, $27.00 + GST (discounts for bulk orders)
Philproof Pest Control Products, $19.00 + GST (discounts for bulk orders)
Connovation Ltd, $264.00 + GST for 12

*Victor (long-spring)*
Manufacturer: Oneida Victor Inc., Cleveland, USA www.oneidavictor.com
Supplier: M.S. Woodcraft Ltd, $16.00 + GST
Duke (double coil)
Made in Korea.
Supplier: Good Traders Ltd
Price: $12.45 + GST

PCR No.1 (double coil)
Same as the Duke but assembled in China.
Supplier: Pest Control Research Ltd
Price: $11.90 + GST (discounts for bulk orders)

Sleepy Creek (double coil)
Manufacturer: Sleepy Creek Manufacturing Inc, Berkeley Springs, USA
Supplier: Pest Control Research, Pest Management Services
Price: $17.00 + GST
Sleepy Creek (double coil, double jaw)
Manufacturer: Sleepy Creek Manufacturing Inc, Berkeley Springs, USA
Supplier: Pest Management Services
Price: $17.00 + GST

Sleepy Creek (long spring)
Manufacturer: Sleepy Creek Manufacturing Inc, Berkeley Springs, USA www.scmtraps.com
Suppliers: Stock and station agents including CRT
Price: $23.00

Bush Master (double coil)
Manufacturer: Bridger Trap Co., Salt Lake City, USA
Supplier: Trappers Cyanide Ltd
Price: $14.00 + GST (for orders of 50-100 price is $12.50 + GST each)
Supplier: Basically Bush Ltd
Price: $16.50 + GST
**Bushmans Best (long spring)**

*Manufacturer*: Unknown, imported from Australia

*Supplier*: Possum Traps NZ

*Price*: $10.00 (GST inclusive)

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### 3.2. Baits, lures and other attractants

The word bait is often used to describe the attractant in the trap. It does not, however, need to be edible. It needs only to lure the ferret into the trap. Scent is more important than a visual cue for ferrets (but not for stoats). Availability of fresh meat baits can be a problem in some areas. Some operators will shoot rabbits as they do their trap rounds. Most people think that meat baits must be fresh to act as a good attractant, but this is debatable. They do need to emit a smell that is attractive to ferrets. Fresh meat baits need to be changed every three days and maybe more frequently in hot and dry conditions to remain effective. Most operators change the bait within four days. Pre-feeding trap-lines does not appear to be a cost-effective strategy. Contractors were asked to score a number of baits out of 10. The following list is in order of ranking.

1 – *Fresh rabbit* (score of 8.7). Most operators use fresh rabbit. Rabbit is a very good attractant for ferrets as long as it is in good condition. Every ferret knows the small of rabbit. On the downside rabbit will dry out quickly and often becomes maggoty. In normal conditions it will last for approximately 3 days.

2 – *Salted rabbit* (score of 7.6). A good alternative to fresh rabbit is salted rabbit. Research found that salted rabbit was as effective as fresh rabbit and a whole lot more user friendly. It is easy to salt rabbit. Cut the rabbit up as normal, roll each piece in salt and place together into a sealed container. Leave overnight. In the morning it is ready to use although it is probably better to leave for 24-48 hours. The salt will remove a lot of the liquid from the bait and brine will form. The rabbit can be left in the brine for a considerable time – as long as it is in a cool place. You can freeze it if you require more long-term storage. If there is still salt grains evident on the rabbit before use, then wash the rabbit in fresh water. Salted rabbit does not become fly-brown and in the right conditions can last well, which can cut down the number of bait changes. Animals usually do not touch the bait – so it can be reused. One of the problems can be salt damage on traps or vehicles though.

3 – *Hare* (score of 7.3). After rabbit, hares and possums is the next most popular meat baits. Hare numbers are on the increase in many parts of the country and one hare can bait many traps. Hare meat is bloodier and does not dry out as quickly as rabbit and contractors rate it well for performance.
4 – **Possum** (score of 7.3). Possum is typically used when rabbit is difficult to obtain. It is important to use TB-free possums.

5 – **Fish** (score of 6.9). Has a strong smell which is usually attractive to ferrets. Depending on its form it can dry out quickly and lose its effectiveness. One of the big disadvantages is that is unpleasant to handle, somehow vehicles and equipment soon stink of fish. Fish heads were popular with contractors in the past - and presently some contractors are using fish pellets and fish meal.

6 – **Bird** (score of 6.8) was then followed by beef, mutton and offal (scores of 5.8 to 6.3).

**Eggs** (score of 4.8). The main advantage with eggs is that they last a long time. The Department of Conservation used egg as a lure in Fenn traps extensively for stoats. Nowadays this set is not as popular, with the DOC moving towards their DOC series of traps and long-life bait formulations. Eggs do not emit much of an odour and so they are not a good smell attractant (ferrets are more smell orientated than stoats). Some users will puncture the egg to make it more odorous – but this will mean that it inevitably becomes flyblown. Also, eggs have the obvious disadvantage of being easily broken in the transportation process. As a general comment, eggs are not the most desirable lure for ferrets.

**Commercial lures** (grouped score of 4.6). Fresh meat baits are usually preferred. These products have their place though, especially for trapping programmes where bait changes are infrequent. Commercial lures usually last longer and emit a more consistent odour compared to fresh meat baits. Presently there are three ferret lures available. It is likely that long-life baits will continue to improve as development continues.

**Erayz #3**  
Moist paste of pure rabbit  
_Supplier:_ Connovation Ltd  
_Price:_ $12.95 + GST for 500gm tube

**Erayz #8**  
Dehydrated pure rabbit  
_Supplier:_ Connovation Ltd  
_Price:_ $15.95 for 500gm bag, $105.00 for 5kg pail

**Mustelid and Cat Bait**  
Dehydrated meat baits – various flavours of goose, fish and hare are available  
_Supplier:_ Trappers Cyanide  
_Price:_ 35c a piece

Other baits or lures used by contractors included chicken pieces, manufactured pet food, rats, mice, duck, venison, goat, and horse meat. When contractors were asked why they chose the baits that they did the two most popular reasons were effectiveness as a ferret bait and ease of use, followed by ease to obtain and longevity.

**Blood and offal smells on ferret sets**  
A practice that probably originated with the gamekeepers in the UK involves smearing blood or offal around the entrance of covers or in the general vicinity of the trap. It has been advocated for stoat trapping here – and some trappers believe that it enhances ferret sets. It is
a practice that is not going to hurt to do – but the question is whether it is worth doing? Is it practical for contractors to be carrying around blood and offal? Contractors were equally split over this issue. One contractor pointed out that when ferrets are easily trapped, the bait or attractant in the trap will be enough to catch ferrets.

**Scent trails**
Ferrets use their noses to find prey and so some have thought that a scent trail that leads to a trap would increase the encounter rates of ferrets and traps and therefore enhance ferret capture rates. Scent trails can be made by dragging a partly eviscerated rabbit or possum carcase behind a motorbike. Research found that making scent trails did not have a significant effect on ferret capture rates. Most contractors did not consider it worthwhile to do.

**Ferret scent**
Almost all contractors believed that recent ferret scent on trap enhances ferret capture rates. The scent from ferret anal glands has been used experimentally as a lure for traps but has not shown improved capture rates compared to natural baits. Real anal gland scent is more attractive than synthetic versions. In long-life formulations, the lure can remain effective for weeks.

**Other animal scents**
The majority of contractors believed that the presence of any animal scent in traps enhanced ferret capture rates. It is not necessary to clean traps, in fact as long as debris is not obstructing the mechanism; it is probably preferable to leave traps smelly and dirty. Bait should be removed from traps before transporting to a new operational area.

**Human scent**
Whether ferrets are adverse to human scent is unknown. If human scent does have an effect it is likely to be stronger in the periods of low trapability. Forty percent of contractors thought human scent on traps had an effect on capture rates with the remaining contractors being equally divided between ‘no’ and ‘don’t know’. The most practical way to reduce human scent around trap sites would be the wearing of leather gloves.

### 3.3. Covers, boxes and tunnels
There are two main reasons for using tunnels and covers: i) to orient the ferret over the trap properly and ii) to reduce non-target catch and interference.

Non-target animals occupy traps that are then not available to catch ferrets and servicing traps with non-target species increases the time of your trapping rounds. Humaneness, public relations, and captures of pets are also concerns. Because traps are often not designed to catch these non-target species, animals are often caught in an inhumane fashion. Catching hedgehogs in leg-hold traps is a noteworthy example. Hedgehogs are a common non-target species and it can be difficult to avoid catching them, especially as they are around the same size as ferrets. Using tunnels and trap covers will screen the larger animals.

Kill-traps and leg-hold traps should always be placed under tunnels or covers to reduce non-target captures. Using covers or tunnels may also make the set more attractive to the ferret – as some people believe that ferrets are attracted to running through tunnels, drains and piping. Tunnels or covers may also act as an attractant, making the trap set more visible. Ferrets are a
naturally curious animal and they may be more likely to stop and investigate an object like a cover, especially during the period of high trapability.

There are plastic covers available commercially (see below), or you can use buckets with a small hole cut-out, old drench containers or construct your own wooden, metal (printers plates are suitable) or mesh covers. Tunnels made from Novaflo or old clay pipes have been used, but they can be problematic as traps need to be placed on a flat surface. The tunnel diameter should be at least large enough to ensure access to large male ferrets. Some operators believe that it is important for covers to be bottomless (so that the ferret is walking on soil) or to have soil placed in the tunnel.

All box traps or tunnels should be stabilised, by being dug into the ground, pegged down, weighted down with rocks or clods, or positioned under the bottom wire of a fence, etc.

**Philproof Double trap cover**
Designed to cover two Fenn traps (Mk6 or Mk 4). Stackable. Made from UV protected plastic.  
*Supplier:* Philproof Pest Control Products (also Pest Management Services)  
*Price:* $22.00 + GST, $20.00 + GST for orders of 6 or more

**Philproof Single trap cover Mark I**
This cover has a longer entrance to ensure non target species cannot access the traps. Designed for the Fenn trap (Mk6 or Mk 4). Stackable. Made from UV protected plastic.  
*Supplier:* Philproof Pest Control Products (also Pest Management Services)  
*Price:* $20.00 + GST, $19.00 + GST for orders of 6 or more
**Philproof Single trap cover Mark II**
This cover has enough room underneath to place one Fenn trap (either Mk6 or Mk 4). Cover can also be used with traps such as Victor Professional, T-Rex, Scentinel, DOC 150 and Conibear. Stackable. Made from UV protected plastic.
*Supplier: Philproof Pest Control Products*
*Price: $21.00 + GST, $20.00 + GST for orders of 6 or more*

**Trappers Box**
Will house most traps including leg-holds, Fenns, DOC150 and 200. Stackable. Different removable grills for different traps. Made from UV polyethelene.
*Suppliers: Trappers Cyanide Ltd*
*Price: $22.00 + GST*

**14TR27 box**
Wooden and wire mesh box for housing the DOC250 trap.
*Suppliers: Pest Management Services*
*Price: $36.00 + GST*

Haines Pallet Co. Ltd also supply boxes to house the DOC250 for $21.00 + GST. Instructions to make your own box can be downloaded from [www.predatortraps.com](http://www.predatortraps.com)
Progressive Plastics cover
Single entry trap cover designed for leg-hold traps. Made from ABS plastic (can be painted).
Price: $12.50 (discount for orders of 100+)

3.4. Alternatives to trapping
3.4.1. Direct poisoning
The only vertebrate pesticide product registered for use on ferrets in New Zealand is PestOff Ferret Paste (Animal Control Products). This contains the anticoagulant diphacinone that can be used without a Controlled Substance licence. There is presently an application to ERMA from Connovation to import para-aminopropiophenone (PAPP) for cat and stoat control. Under the Hazardous Substances and New Organisms (HSNO) Act, certain substances can only be used by people who have a Controlled Substances licence. This licence ensures that high risk substances are only possessed by fit and proper persons, much like a firearms licence does. Controlled Substances licences are issued by ERMA New Zealand, A test certifier, who issues Approved Handler Test Certificates, can assist with a licence application. For acute toxins like 1080 and cyanide, operators must have a current Controlled Substances licence or be supervised by a licence holder. Currently licences can be obtained from the Environmental Risk Management Authority (ERMA), see www.ermanz.govt.nz/hs/compliance/index.html for information.

Presently, there is no bait station designed specifically for the delivery of poison to ferrets. Any toxin should be placed under a tunnel or cover to restrict access of non-targets.

If using PestOff Ferret Paste there it is a legal requirement to place signs to warn the public about the possible risks. The sign should be dated, toxin identified and contact details of the operator provided. Signs should also be removed once there is no risk. Check with the local council for other legal requirements for the use of poison, such as notifying neighbours, contacting the Medical Officer of Health, and instruction on how close you can place poison stations to roads, water supplies etc.

Pest-Off Ferret Paste
Supplier: Animal Control Products
Price: $13.00 + GST per 500gm tube
3.4.2. Secondary poisoning
As ferrets are scavengers, they are susceptible to secondary poisoning if they consume the carcases of prey that have been poisoned. About 15% of ferrets were found to die immediately after rabbit poisoning operations using 1080. 1080 degrades quickly so it does not tend to accumulate in the environment. Talon (active ingredient brodifacoum) kills a greater proportion of ferrets secondarily. It is an anticoagulant poison (causing internal bleeding) and is slow acting; predators will continue to eat prey with the poison accumulating until a fatal dose is reached. There are concerns about long-term persistence of brodifacoum in the food chain, so brodifacoum poisoning as a control method targeting ferrets is not considered acceptable. Ferrets are thought to die of pindone secondary poisoning but data is scant and the proportion of ferrets that die is unknown.

3.4.3. Trained ferret dogs
The Animal Health Board, with the help of Scott Theobald of the Department of Conservation investigated the technique of using dogs that were specifically trained to find ferrets. Four experienced contractors and their dogs were given support and training. Whilst three dogs obtained certification it became clear that they would be unable to compete cost-effectively with trapping for the purposes of ferret control. It was thought they would have a use in disease surveillance programmes and to give a preliminary indication of ferret presence in blocks planned for ferret control. The problem is that dogs must be working regularly to locate ferrets to keep their interest and reliability and this was not happening – so the ferret dog programme has been discontinued.

3.4.4. Habitat modification
One of the methods of preventing predation of threatened species has been to modify the immediate habitat around breeding areas. The Department of Conservation implemented buffer zones of long grass around yellow-eyed penguin breeding areas and removed willows from the braided riverbed habitat where stilts and dotterels nest. This management response has provoked some controversy and has had mixed results. Habitat modification lowered the rates of predation in the braided riverbed habitat of the MacKenzie Basin but not the coastal grassland habitat of Otago Peninsula. Habitat modification would have very limited applicability for most farmland.

3.4.5. Manipulation of prey
As rabbit numbers largely determine the numbers of ferrets, successful rabbit control usually results in fewer ferrets once they have gone through a breeding cycle. Rabbit control doesn’t usually result in the death of many of the existing ferret population as they readily shift their diet to other prey species. Reduction in ferret numbers results from breeding failure, with few juveniles emerging the following summer. To cause the greatest impact, attention needs to be paid to alternative (non-rabbit) sources of food, including stock carcasses.

3.4.6. Night-shooting
Night-shooting on its own is not an effective method of population control. Generally, too few ferrets are spotted to make it worthwhile. Ferrets have eyes that show up as green in spotlights.

3.4.7. Feral cats
In some situations, it may be advantageous to avoid killing feral cats. Cats compete with ferrets for food and a healthy cat population could reduce the amount of reinvasion and successful breeding by ferrets. Obviously, this needs to be considered against any adverse
effects cats may be having, i.e. spreading disease (especially toxoplasmosis), and preying upon threatened native species. Cats are not as naturally susceptible to TB as ferrets and usually the level of TB in cat populations is less than 1%. Leaving the cat population intact therefore should not compromise a TB mitigation programme. Get advice from your local council.
SECTION 4. OTHER OPERATIONAL CONSIDERATIONS

4.1. Data recording
If data on ferret trapping are not recorded, then it is very difficult to determine the level of control achieved, prevalence of infection, and many other important parameters. The most basic information required to make any sort of assessment is the number of ferrets caught for every night of trapping and the number of traps available to catch ferrets for every night. These data can allow comparisons to be made from year to year and can provide an indication of disease levels in the ferret population if animals are necropsied. All data recording should be done at the trap site for accuracy.

4.2. Handling animals
There is a saying that ‘the only good ferret is a dead ferret’. While this may be true, ferrets are not responsible for their introduction to New Zealand and are only doing what comes naturally to them. Trapped ferrets are usually stressed, sometimes hurt and often don’t respond in a way that endears them to us. But we still have an obligation to treat them with respect. A ferret or non-target species must be killed as quickly and humanely as possible. Animals must only be captured and killed in ways that fulfil legal obligations under the Animal Welfare Act 1999. See www.biosecurity.govt.nz/regs/animal-welfare to download a guide to the Animal Welfare Act.

Methods used to kill must also preserve as best as possible those specific tissues (e.g. lymph nodes, organs) which will be subject to post-mortem. The lymph nodes associated with the jaw must be preserved in all ferrets. Many operators shoot ferrets with a .22. With live capture traps, ferrets can be run into pillowcases or sacks and then killed by a blow to the head. Ferrets can be difficult to kill, they can survive a substantial blow to the head so take care to ensure that you have actually killed your animal. Do not drown ferrets, it is inhumane, unprofessional and affects the quality of tissue for post mortem. Wear gloves when handling animals.

4.3. Disposing of carcasses
Ferret carcasses should be disposed in a closed offal pit or buried. Dead ferrets should not be left at or near trap sites, nor hung on nearby fences. Ferrets will readily cannibalise, so carcasses must be disposed of properly to prevent infection passing onto other ferrets or to other scavenger species. It is conceivable that stock could also be at risk of becoming infected if they contact dead ferrets.

It is important not to remove bodies or live animals from the blocks they have been captured in (unless required for post-mortem). There is the possibility of disease spread if animals escape or their bodies end up being scavenged on.

4.4. Presenting ferrets for autopsy
Animals must be in good condition for autopsy, especially if they are going to be submitted for histology. Cell damage can occur if bodies are not chilled immediately after death, or if they start to decompose. Animals should be bagged separately to prevent misidentification and cross-contamination. As traplines can take hours to complete, carcasses should be protected from the elements, especially heat and flies. In hot conditions, carcasses should be placed in wet sacks, chilly sacks or chilly bins. Ensure that animals are chilled individually (not packed together as the body heat can be retained). Ice packs should be carried and placed between animals. As soon as possible, bodies should be transferred to a fridge (at
approximately 5°C) and delivered to the designated post-mortem service provider within 48 hours of the animal being killed. If this is not possible, they should be frozen as soon as possible, at least within 10 hours of their death. Carcasses should be frozen for no longer than one month prior to necropsy.

If animals are required for post-mortem, then a tag with a unique number should be attached to each animal (tags are usually provided by programme managers). The unique identifier should be attached to the body in a manner that prevents its loss prior to post-mortem. Contracts usually stipulate that tags should be fitted by cutting a slit through the skin on the animal’s backbone then feeding the tag through, making sure that the tag fully closes. For private persons wanting to submit animals, the following information is important – landowner details, date of capture and trap location (if possible provide GPS coordinates or positions on topographical map). In some cases, it may be desirable for people to submit only adult animals. This saves time and money. The proportion of juveniles in a trapped sample can be high and they are much less likely to be tuberculous or to show gross signs of the disease compared to the adults. It can be difficult to distinguish adults from juveniles without experience and it has been very common for people to misjudge ferret age. Submit any animals that have open lesions or look particularly sickly.

4.5. Ageing ferrets

Juveniles reach adult size by four months of age. After four months, they can be difficult to distinguish from the adults. Size is no indicator of age; in fact it can be very deceptive. Juveniles (young of the year) are often bigger than the adults - which are typically in poorer condition due to the stress of breeding and raising young. In the summer, adults can be identified by their shorter summer coat. Ferrets will moult by winter and so adults and juveniles look the same from then on. Scars are also indicative of an adult animal, look for scars over the shoulders and haunches of males and at the back of the neck of females. Adult males often have bald tails, which is a sign of physiological stress. Bald tails can be observed until the winter moult.

A male ferret immediately after the breeding season. Note the scars, poor body condition, and most significantly the balding tail (a sure sign of an adult animal).

The teeth of adult animals can be worn, discoloured and often clipped or broken. Adult animals also have more developed sagittal crests, although sagittal crests are less prominent in females. The sagittal crest is a ridge of bone that runs along the top of the skull. You can feel it by running your fingers along the top of the head from front to back. The juvenile skull has obvious sutures where the bone plates have not yet fused.
Picture 1) A juvenile male ferret – note the presence of the open sutures (where the skull plates have not yet fused)
Picture 2) Female and adult male skulls – note the size difference between males and female and the prominent sagittal crest on the male

The most obvious sign of maturity is evidence of reproduction. Females with visible nipples are usually adult as the nipples are very undeveloped or invisible in juveniles. The presence of descended testes can be deceptive though, as juvenile males can show precocious development. It can take some time to learn to distinguish between juveniles and adults. It can be useful to examine a large sample of ferrets together, as it may be easier to classify age class. The proportion of juveniles in any sample should be much greater than that of adults.

Aging techniques that may be of use to programme managers (who have large samples of ferrets to process) include pulp cavity size and cementum growth rings in the canine teeth. See Ragg (1997) for more details. Pulp cavity size: dentine is the major tooth substance. When ferrets are born the teeth are hollow, but as they mature the middle of the tooth (pulp cavity) gradually fills with dentine. If you x-ray the teeth, it is easy to identify the juveniles in a sample of animals collected between November and April.

Juvenile and adult canine teeth
SECTION 5. TENDERING FOR AHB CONTRACTS

Most programme managers require contractors to submit an Operational Plan and a Risk Management Plan (which includes a Health and Safety plan) before tendering for ferret trapping projects. Contractors will be audited against these plans. Auditing of ferret contractors usually takes the form of an AHB field supervisor visiting the operational area while trapping is in progress and checking traps and Health and Safety compliance. Unlike possums, ferret operations cannot be monitored by an independent check of post trapping abundance as repopulation and reinvasion rates can be high.

Operators are required to have public limited liability insurance. AHB require a policy for not less than $5,000,000 for any one accident with appropriate extensions for fire ($500,000) and damage to property. If firearms and/or toxins are used then these should be specified in the policy.

5.1. Operational Plans
Operators should not start setting traps before they have signed permission from the landowner or farm manager. Verbal permission is not sufficient. AHB contractors must use the landowner access consent forms to obtain landowner access permission. These specify the time period over which access has been granted. The landowner must also specify any significant work-related hazards on the property as well as any conditions that may affect access or permission to conduct the control work. At the completion of the work all signage and trap markers should be removed and landowners should be given information on the numbers of animals trapped.

When tendering for specific projects, information is required on the general methodology (how the operational area will be worked), timeframe, control techniques and methodologies (traps, baits), consultative processes with landowners and other interested parties, signage details, subcontractors and employees involved in the work, supervisor details and equipment and plant details.

5.2. Risk Management Plans
A Risk Management Plan should address the following areas:
1. Environmental. How are environmental impacts going to be managed (non-target disposal, toxin management, vehicle damage or emissions, signage etc)? The aim is to leave no trace of your presence once traps have been removed. Environmental impact concerns are usually not such an issue with ferreting (compared to possuming) as toxins or trap markers are not commonly used by contractors.
2. Service quality. This deals with your ability to meet the data and reporting requirements.
3. Outcomes. This is your ability to meet the contractual requirements with details on how you would manage delays, subcontractor or employee staffing issues, adverse weather, possible landowner access issues etc. Basically anything that could jeopardise the completion of the project or have an impact on trap coverage or expected trap catch rates.
4. Health and Safety. Ferret control operators are obliged to abide by the Health and Safety in Employment (HSE) Act 1992. In the case of staff, the employer has a responsibility to provide a safe working environment and employees have responsibilities for keeping themselves and others safe. One of the main aims of Health and Safety plans are to avoid and report injury. In order to achieve this, hazards must be identified. A hazard can be an

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1 This section is intended to provide background information only and may be subject to legislative changes.
activity, process, circumstance, occurrence, situation, event, phenomenon, or substance. You are required to take ‘all practicable steps’ to eliminate or manage each hazard. The Act makes it clear that you are only required to manage hazards that you know about, or that it is reasonable to expect you to know about. A hazard register should be maintained and updated when and if new hazards become apparent. All employees and subcontractors should have access to this information and be well versed in hazard management procedure.

There are a wide variety of hazards in the agricultural environment. The main hazards that are specific to ferreting are:

**Disease transmission**
It is possible to catch TB from a tuberculous ferret, although the risk is considered low. If a ferret has open draining lesions then millions of bacteria may be shed from the body. Take particular care when handling an animal with open wounds and wear disposable gloves. It is always handy to keep a pair of thick rawhide gloves in your kit for protection when handling animals. TB bacteria can become airborne if there are lesions in the respiratory tract and transmission could potentially occur if you inhaled the breath of a tuberculous ferret. Respiratory infection in ferrets is relatively uncommon though and so the risk is small. Most of the threat can be minimised if you follow basic hygiene practices. Hand sanitizer is a must for your kit. Wash hands before eating and disinfect equipment that has come into contact with suspect animals. Prevent dogs from killing ferrets or coming into bodily contact, as there may be a risk of them catching TB.

**Quad and motorbike use**
Ferreting relies heavily on the use of quads (ATVs) and motorbikes. These vehicles can be very hazardous in inexperienced hands. They are responsible for more deaths in the farming situation in New Zealand than any other machinery. Most serious accidents occur when quads overturn. Poor maintenance of ATVs has been identified as a contributing factor in a number of serious accidents and fatalities. Poor tyre condition and incorrect tyre pressures, faulty or inadequate braking (including parking brake mechanisms), excessive wheel and steering play, damaged towbars and faulty suspensions have been identified as being common safety-related mechanical faults on ATVs in New Zealand.

**Working alone in isolated places**
All contractors should have someone who knows their daily intentions and are able to sound the alarm if the contractor is late returning from work. This contact person should know the area where the contractor is working and have basic information on who to contact in the first instance if they have any concerns. All contractors should have filled out an Emergency Plan Form so that there is quick access to contact information and procedure. All contractors
should carry cell-phones and first aid kits. An emergency locator beacon would be necessary for persons working in isolated places or in particularly dangerous country. Ferreeters should be well versed in basic first aid and bushcraft skills.

Other hazards that may also be relevant are firearms, toxins, weather extremes, getting lost, difficult and dangerous country, unseen debris or obstructions, unsafe farm tracks, bridges, culverts, sealed and gravel roads, other industry (like mining or quarries), irrigation, stock, verbal or physical assault from other people, and exposure to criminal activity. The tenderer must consider how risks to the public, landowners and their personnel and families, the contractor and employees will be managed and minimised.

All serious harm accidents to any persons are to be notified to OSH as soon as possible, with the Notification of Circumstances of Accident or Serious Harm form to be sent within 7 days. Help and information can be obtained through two services of the Department of Labour: The Occupational Safety and Health Service (OSH) – for general and technical questions on your health and safety practices, and the Employment Relations Service (ERS) – for employers who are managing the health and safety of staff. Both services can be contacted by phoning 0800 209020 or www.osh.dol.govt.nz
SECTION 6. INFORMATION AND PRODUCTS

6.1 Suppliers of equipment

Animal Control Products
408 Heads Rd, Private Bag 3018, Wanganui 4501
Phone: 06-344-5302
Fax: 06-344-2260
Email: info@pestoff.co.nz
Website: www.pestoff.co.nz

Basically Bush Ltd
P.O. Box 430, Opotiki.
Phone: 07-315-7765
Website: www.basicallybush.co.nz

CMI Springs
P.O. Box 3963, Auckland
Phone: 09-579-4089
Fax: 09-579-2595
Email: rossm@cmisprings.co.nz

Connovation Ltd
36B Sir William Drive, P.O. Box 58613, East Tamaki, Auckland
Phone: 09-273-4333,
Fax: 09-273-4334
Email: info@connovation.co.nz
Website: www.connovation.co.nz

Good Traders Ltd,
2 Brackenfield Place, Parklands, Christchurch.
Phone: 03-383-6286 or 027-2742493
Fax: 03-383-6288
Email: goodtradersnz@gmail.com

Haines Pallet Co. Ltd
111 Hutt Park Rd, Seaview
Phone: 04-568-6898
Fax: 04-568-6480
Email: haines.pallets@paradise.net.nz

KBL Rotational Moulders
P.O. Box 827, Palmerston North
Phone: 06-358-6477
Fax: 06-355-4825
Email: sales@kbl.co.nz
Website: www.kbl.co.nz
M.S. Woodcraft Ltd
128 Marine Parade, Mt Maunganui.
Phone: 07-575-5920
Fax: 07-574-8910
Email: mswoodcraft@xtra.co.nz
Website: http://mswoodcraft.tripod.com

Novel Ways Ltd
436 Morrinsville Road (SH26), Newstead, RD4, Hamilton 3284
Phone: 07-856-6270 or 0800-003-003
Fax: 07-856-6439
Email: enquiry@novel.co.nz
Website: www.novel.co.nz

Pest Control Research
Unit 5/25 Opawa Road, PO Box 7223, Christchurch 8240
Phone: 03-372-1580 or 021-115-1884
Fax: 03-372-1581
Email: info@pcr.co.nz
Website: www.pestcontrolresearch.com

Pest-Tech Ltd
P.O. Box 40, Leeston
Phone: 03-324-3163
Fax: 03-324-3163
Website: pest-tech@slingshot.co.nz

Possum Traps NZ
31a Ratima Place, Awatapu, Whakatane
Phone: 07-308-4861 or 0800-863-504
Email: traps@possumtraps.co.nz
Website: www.possumtraps.co.nz

Progressive Plastics
P.O. Box 1379, Dunedin
Phone: 03-477-6999
Email: panstey@es.co.nz

Trappers Cyanide Ltd
303 Laidmore Road, RD2, Amberley
Phone: 03-314-9940
Fax: 03-314-9970
Email: mike@traps.co.nz
Website: www.traps.co.nz

Stock and station agents and some hardware stores sell various types of traps, covers and other pest control products.
6.2 Who to approach for further information and advice

Many of the companies listed above provide information on their web sites about how to use their products effectively. Traps are usually supplied with instructions on how to use them.

Animal Health Board  
www.ahb.org.nz  
P.O. Box 3412, Wellington  
TB info line 0800 482 4636

The Landcare Research website (www.landcareresearch.co.nz/research/wildlifeecol/ferrets) has a section devoted to ferrets and they also produce a 6-monthly newsletter detailing research on vertebrate pest species called “Kararehe Kino/Vertebrate Pest Research Newsletter”.

Other relevant websites:

- MAF  
www.maf.govt.nz
- NAWAC  
- Department of Conservation  
www.doc.govt.nz
- ERMA  
www.ermanz.govt.nz
- NZ Food Safety Authority  
www.nzfsa.govt.nz/acvm/subject/vert-pest-control

Most Regional Councils have pages on their websites with information about mustelids and their control.

6.3 References to relevant information

The best single source of research and scientific information on ferrets in New Zealand is:  

Objective 2 of this report provides a summary of every Animal Health Board contract report (until 2002) on ferrets and other published and unpublished research papers and reports on ferrets in easy-to-read format. Full reference details are provided so that people can source the original material. Contact Penny Fairbrother, AHB (04-472-2858) for a copy of this report, quoting Objective 2, Project R-80554.

The next most comprehensive source of information is:


The 2nd edition of the ‘The Handbook of New Zealand Mammals’ is available in bookstores.

A useful booklet has been produced by the Yellow-eyed Penguin Trust focusing on control of weasels, stoats and ferrets. The emphasis is more on the conservation impacts of mustelids.  

03-479-0011, yept@clear.net.nz or P.O. Box 5409, Dunedin.
There have been two workshops specifically on ferrets:


Go to www.ahb.org.nz/resources/Research to download workshop proceedings.


Write to the Royal Society, P.O. Box 598, Wellington or obtainable from a university library.

National Possum Control Agencies has a number of publications that can be downloaded from their website www.npca.org.nz that are relevant to ferret control, including:

- **Code A4.1.** Leghold Traps - A guideline for capturing possums, ferrets and feral cats using leghold traps.
- **Code A4.1.** Kill Traps - A guideline to trap possums, ferrets, stoats and feral cats using kill traps.
- **Code A4.4.** Possum and Ferret Traps: A report to inform and advise users of trapping products.
- **Code A8.** Pest Mustelids - Monitoring and Control.

The following are all papers published in scientific journals or student theses. To obtain these references go to your nearest university library.


The following are contract reports to the Animal Health Board.


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Photo credits
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Photos on pages 4, 5, 6, 7, 10, 12, 15, 18, 20 (wire cage trap), 27 and 33 belong to Justine Ragg.

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The polecat photo on page 5 belongs to Johnny Birks (UK).

Photos of traps on pages 20 and 21 belong to the respective manufactures: Mike Holden (Holden live capture and Holden kill traps), Ray Henderson (Set and Forget), Andy Kinley (K-trap), Trappers Cyanide (Tunnel trap), Department of Conservation (Masher trap), NZtrap (Hammer trap), and Kelvin Leathem (Possum Master). Peter Lo took photos of the Timms and KBL traps.

The graphic on page 8 belongs to the Animal Health Board.