



NORTHLAND PEST CONTROL GUIDELINES ²⁰²⁰



New Zealand's wildlife is particularly vulnerable to pest animals. This is because New Zealand plants and animals evolved for millions of years in the absence of terrestrial mammals. Pest animals can be defined as all species introduced to New Zealand that have a negative impact on native plants and animals and/or production areas.

The major threats to our terrestrial plants and animals come from:

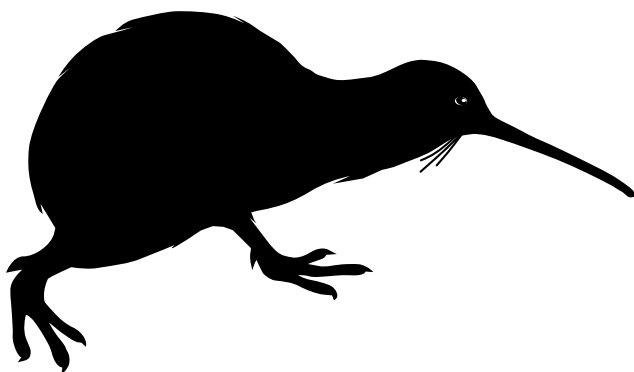
- possums, which destroy forests and birds' nests
- rats, which prey on seeds, seedlings, invertebrates, lizards, birds' eggs and chicks
- mustelids (ferrets, stoats, weasels) which prey on lizards, invertebrates and birds
- cats, which prey on lizards, invertebrates, birds, birds' eggs and chicks
- dogs which kill kiwi, pāteke, penguins and shorebirds.

Other threats include pigs, goats, deer, livestock, hares, rabbits, hedgehogs, mice, wasps, Argentine and other exotic ants, plague skinks and diseases such as Myrtle Rust and Kauri Dieback Disease.

This booklet presents basic information on common animal pests, and provides practical guidelines on how to use a range of traps, toxins and techniques for maximum success in Northland conditions.

Some pests are intelligent enough to learn from bad experiences and will quickly discover how to avoid poisons, traps and spot lights if your first attempts to kill them are not successful. Using a range of traps, baits and techniques and cycling toxins from one knockdown to the next, helps to avoid a build-up of trap-wise, bait-shy animals.

Co-operative and synchronized pest control with neighbours, or as part of a community group, adds greater benefit by reducing reinvasion rates and lowering pest populations over a wider area. This maximizes the benefits to native forests and wildlife, helping them to flower, fruit, breed and disperse successfully.



BEFORE YOU GO — KAURI DIEBACK

Phytophthora agathidicida (Pa) is the pathogen that causes dieback disease in kauri (commonly referred to as “kauri dieback”). The disease attacks and kills kauri of all ages. Pa is a soil-borne pathogen so minimising the movement of soil or plant material potentially contaminated with Pa by people, and their activities is fundamental to the management of kauri dieback. We need to ensure we are not spreading the disease when carrying out pest control operations.

Please consider that all kauri trees and stands may be infected and that you should avoid them in the first instance or be prepared to carry out hygiene when moving in and out of the root zone (3x drip line) of a kauri or stand of kauri.

To stop the spread of Kauri Dieback in Northland here’s what we need each of you need to do:

1. PLAN YOUR ACTIVITY

Use the NRC Activity Planner for each site.
<https://www.nrc.govt.nz/media/n1ljxver/kd-activity-hygiene-plan.docx>

2. HYGIENE

Before and after you finish trapping for the day and importantly between sites:

SCRUB

Thoroughly scrub/wash your boots, removing all traces of dirt, using water and scrubbing brush.



CHECK

Check to make sure all dirt has been removed. Specks of dirt not reachable by brush or wash will be captured by disinfecting. Disinfectant will not work on lumps of dirt.



SPRAY

Disinfect your boots using a mix of 70% methylated spirits and 30% water. Use stergiene or bleach as alternatives. Bleach must contain active ingredient (Sodium hypochlorite) and be 1 part bleach to 4 parts water.



Using meths means you have killed all spores and your boots will dry quicker.

Other hygiene recommendations include carrying a spare pair of clean footwear for after the job or designating a pair of boots to a particular area.

Important: Vehicles pose a higher risk of spreading dirt. Only use your quad if necessary or if you can guarantee avoiding kauri along quad bike trails. Be mindful of winter activities as its easier to spread dirt on foot or quad during this time.

If you encounter sick dead or dying trees, take a photo, a GPS location and report this to the Northland Regional Council or Department of Conservation.

NRC email: kauridieback@nrc.govt.nz

Further information on Kauri Dieback and how it spreads can be found at www.kauridieback.co.nz

CONTENTS

	Page
Planning considerations	6
<hr/>	
Possums	8
<hr/>	
Mustelids	14
Ferrets	15
Stoats	17
Weasels	20
<hr/>	
Cats	23
<hr/>	
Rats	26
<hr/>	
Other animal pests	31
Mice	31
Feral goats	32
Hedgehogs	32
Rabbits and hares	32
Uncontrolled dogs	32
Feral pigs	33
Wasps	33
Pest birds: Magpies and Mynas	34
<hr/>	
Toxins and Pesticides	35
Bait stations	37
<hr/>	
Health and Safety	38
<hr/>	
Recording results	39
Trap.NZonline trap mapping & phone app	40
<hr/>	
Product Suppliers	41
<hr/>	
References and information sources	43
<hr/>	

PLANNING CONSIDERATIONS

Before starting a pest control program it is useful to consider:

- what native plants and animals are present
- what pests are present
- the results you want to see
- the levels to which pests have to be reduced to (and for how long) to achieve those results
- the resources needed
- what monitoring needs to be done to determine if the pest control is working and the desired results are being achieved

The timing and duration of pest control also needs to be considered. For example, if the goal is the recovery of small forest birds, then rat control to low levels during the breeding season is normally adequate. However, if the recovery of seedlings, lizards and invertebrates are an objective, some level of rat control will be needed throughout the year.

Consideration should also be given to minimising side effects and ripple effects. Side-effects include direct impacts, e.g. the accumulation of toxins in the environment and the trapping of non-target species. Ripple effects are undesirable biological responses to pest control such as the increase of rats once stoats are controlled, which in turn could lead to increased predation of insects and seeds. Where possible, try to implement an integrated pest management programme targeting all serious biodiversity pests and potential problem species.

To help determine which pests you may have at your place check out this website:
www.pestdetective.org.nz

While some animal pests have now been in New Zealand for over a century, their presence continues to impact on vulnerable native species. No equilibrium with the environment has been reached. Native forests and wildlife are still declining where no management of pests is taking place.

The good news is that with the increasing number of community, iwi, hāpu and agency led conservation projects in Northland, animal pests are being controlled over an ever-increasing area, and native forests and wildlife are thriving in these areas as a direct result.

Table 1: Key Animal Predators of Northland Biota

	Possum	Mustelid	Cat	Dog	Rat	Hedgehog	Pig
Kiwi	y	Y	Y	Y			Y
Pāteke	y?	Y	Y	Y	y		Y
Bittern	Y	Y	y/Y	Y			Y
Blue penguin	y/Y	Y	Y	Y	?		Y
Kūkupa	Y	Y	y/Y		Y		
Kōkakō	Y	Y	y/Y		Y		
Kākā	Y	Y	Y	y?	y/Y		
Kākāriki		Y	y		Y		
Robin/tit	y	y/Y	y		Y		
Bellbird	y	Y	y		Y		
Rifleman		y/Y			Y		
Lizards		y/Y	y/Y		Y		
Saddleback	?	Y	Y		Y		
Stitchbird	?	Y	Y		Y		
Tuatara	Y?	Y	Y	?	Y		
Shorebirds	Y	Y	Y	Y	Y	Y	Y
Kauri/Flax							
Snail etc	Y	Y	y		Y +mice	y/Y	Y
Fernbird		Y?			Y?		
Crakes/rails		Y?			y?		
Bats	?	?			?		
Frogs	?	?			Y		Y +grazers
Germination and seedlings	Y				Y		+browsers weeds
Flowering/ fruiting	Y				y		
Threatened plants	Y/y				?		+browsers weeds

Y = Yes, high impact | y = yes, but possibly low/lesser impact

(Ray Pierce)

POSSUMS

The brushtail possum was introduced to NZ from Australia in 1837 to establish a fur trade, with a disastrous result for our native forests.

For native wildlife possums are both a food competitor and a predator. “Nest cam” video has confirmed that possums eat eggs and chicks, and autopsies have revealed that they munch through a wide range of invertebrates.

Over time, possums change the composition of the forest by heavily browsing their favoured food trees and also disrupt vital ecological processes such as flowering, fruiting, seed dispersal and germination.



Possums:

- feed at night and sleep during the day
- are good communicators and are known to make 22 different calls/sounds
- live in trees but also move across open country and graze on pasture
- often follow the same track, forming flattened paths about 20 cm wide
- have an average home range of 200m in forest and multiple nest sites
- have favourite trees that are visited regularly, often recognised by extensive scratch marks in their bark and heavy browsing of leaves, and fruit
- Their dislike of wet weather makes possum control much more successful in periods of fine weather



Possums have seasonal preferences and are opportunistic feeders. Traps or bait stations can be moved to target seasonal food supplies such as:

- pine pollen in July – August (possum poo turns yellow!)
- willow-poplar budding in October-December
- supplejack, taraire, hinau, tawa fruiting in May-August
- late summer podocarp fruit such as totara
- various orchard trees when in fruit throughout the year

PLACEMENT OF DEVICES

Possums have a home range from around 1 – 4 hectares. As a rule of thumb, aim to achieve at least 1- 2 stations (trap or bait) per hectare for possums and avoid creating any gap greater than 150m x 150m.

Targeting fresh possum sign can also be effective. Presence of run pads, extensive browse and fruit damage, scratching on territorial and play trees, faeces etc can indicate where possums are present.

LURES

- Good lures for possums include fresh fruit, citrus peel, peanut butter, blue ‘Smooth’ paste, and licorice.
- Possums love sugar! Sprinkle some sugar on the fruit and place a piece both in the Timms Trap, and also leave a piece outside the trap to attract the possum.
- Leave freshly killed possums next to the trap, as this will attract further possums and predators.
- When using spices on fruit or in ‘blaze’ consider that cinnamon is considered to be the scent that travels farthest in the forest. Other spices proven to work include aniseed and curry.

TRAPS

All possum traps must be raised 700mm off the ground in kiwi areas.

Timms traps are best baited with a piece of fruit, eg. apple sprinkled with cinnamon, lemon or orange peel, etc. If using citrus fruit, be sure to remove any fruit flesh, and only use the actual peel so that the bait pins in traps do not corrode from the acids in the fruit. Use medium sized pieces of fruit (eg 1/8th of an apple) to encourage possums to reach into the trap with their mouths instead of hands. Do not be tempted to use large pieces of fruit, as this can affect the trigger mechanism and make it harder for the possum to set the trap off. The sensitivity of Timms traps can be altered by bending the bar backwards or forwards.

If using Timms traps in kiwi areas, mount them on the end of a 6 x 1 piece of timber, screw this into the tree and use as a ramp. Two wooden strips allowing the trap to be slid sideways makes it easier to service the trap.

Follow this link to learn how to set a Timms Trap effectively. <https://www.youtube.com/watch?v=o4zPSVQ9ScA>



Mounted sliding Timms Trap (Hupara Landcare)

Sentinel possum traps are tree mounted and have a grooved bait clip. The grooves in the bait clip are designed to allow rats to feed from the lure while leaving enough to still attract possums. While more difficult to set than the Timms trap, it is far cheaper. Lures include peanut butter or the blue 'Smooth in a Tube' (available from PGG Wrightson). To attract possums to the trap, spread some lure or blaze on the tree under the trap.

Follow this link to learn how to install and set a Sentinel possum trap. <https://www.youtube.com/watch?v=ITyLn3NA6SU>

Trapinator possum traps are easy to set, with a side lever that is pushed forward to arm the trap. They are great for projects where volunteers assist with trapping.

The bait bar inside the trap is commonly smeared with peanut butter to lure in possums. As they are tree mounted, they are also automatically out of harm's way for kiwi and inquisitive weka.

Detailed setting instructions can be found at www.cmisprings.com/trapinator_instruction.html

Leg hold and cage traps

Live capture traps such as leg holds, and cage traps can be effective for those who don't mind dispatching live animals and are able to check the trap within 12 hours of sunrise every day as legally required.

Victor #1's are the most preferred and legally compliant leg hold trap. Remember that all leg hold traps need to be raised 700mm in kiwi zones as kiwi have died after being caught and injured in these traps. Permission is needed from dwellings within 150m of any leg hold set.

Steve Allan "SA2" Trap

Designed and produced by Northlander, Steve Allan, the SA2 is an easy to set kill trap, that is NAWAC approved for possums and feral cats.

They are mounted either directly on accessible tree branches or on fence palings screwed into trees to act as ramps at 45 degree angles.



Sentinel possum trap (Whareora Landcare)



Trapinator (Bay Bush Action)



Kiwi caught in ground set leg hold trap (DOC)

Setting and Baiting the SA2 Possum and Feral Cat Trap

This trap has passed the NAWAC testing regime as a raised set trap only.

Find a suitable position to fix the trap down to. Keep trap away from areas likely to have domestic cats. Be aware of non target animals eg stock, dogs, native birds (Weka, Penguin etc) Keep away from children. Fix trap approx, 700mm up from the ground (where kiwi are present) and on an angle up to 45 degrees. Natural sets such as tree logs stumps etc are fine. A ramp up to the fixed trap will help greatly. Screw trap into position, an 8mm socket on the end of a battery drill works well.

To bait the trap for possums:

Smear a generous amount of peanut butter or blue Smooth paste on to the wooden base inside the trap. A long life lure can be attached to the screw at the back of the trap. Apply 'blaze' to the ramp leading up to the trap.

Setting the trap:

Standing in front of the secured trap have the front piece of the trigger pointing at you. **IMPORTANT**, ensure correct hand orientation with a flat palm with fingers pointing to the rear of the trap (as shown in photo) pull and push down the handle. A reasonable amount of force is required.

While holding down the handle rotate the front trigger bit into the second half of the trigger with the washer. The trap should nicely fit together in the set position. Please be aware of the moving parts inside of the trap, hence why fingers not to be put anywhere near the inside of trap.

DO NOT PUT HANDS FINGERS INSIDE ONCE IT HAS BEEN SET!

ALWAYS RELEASE the trap (before baiting) by slowly holding down handle with the flat of your palm, fingers pointing towards rear of trap and disengaging the trigger arm out the washer trigger piece, the handle will with **TENSION** on it come back to the upright position.

Contact **STEVE ALLAN** 027 6534386 for further advice



The **NZ Autotrap AT220 Possum and Rat Trap** is a self-resetting, self re-baiting spring trap which, once triggered, is reset automatically by a gear drive reset mechanism using a small electric motor. The motor is powered by a rechargeable battery pack.

The trap can last for 100 cycles and 12 months before needing a lure refill and battery change. A daylight deactivation/night time reactivation feature reduces potential unwanted bycatch and improves safety (less chance of children around at night). Data is logged and can be accessed by computer; a mobile app is to follow shortly.

The AT220 has been approved by NAWAC for both possums and ship rats – the only trap to do so.

The AT220 trap is new to the market, with only limited data presently available on how the traps perform in the field. They are currently being field trialed in Northland conditions by Bay Bush Action and Kiwi Coast.

To order or find out more about these traps contact NZ Autotraps. <https://nzautotraps.com>



NZAT220 in action (Tutukaka Landcare)

The **Goodnature A12 possum trap** is powered by a CO₂ cylinder which can ‘fire’ approximately 12 times. It works by firing a piston when a possum bites down on a lured block inside the trap.

The trap is designed with an automatic lure dripper, but in practice often needs to be refreshed manually. Counters are available as attachments to measure the number of kills.

Note that **kiwi have been injured by some Goodnature Traps**. Ensure all Goodnature Traps are raised 1m off the ground in kiwi areas.

Available from: www.goodnature.co.nz



Goodnature A12 possum trap (Goodnature)

Night shooting

Night shooting with spotlights can sometimes be effective in more open terrain, around the margins of small forest blocks and in isolated trees. Regular night shooting is a useful gauge on the number of possums in an area, but is seldom a long term control options as possums quickly become light-shy.



TOXINS

Toxins registered for possums include cyanide pastes and cyanide capsules (Feratox), cholecalciferol (Feracol), 1080, brodifacoum, and pindone. Brodifacoum, cholecalciferol and pindone are the only possum poisons that do not need a Controlled Substance Licence. Avoid prolonged use of brodifacoum (sold as Talon and Pestoff) as it is persistent in the environment and if used continuously can build up to lethal levels in kiwi, moreporks and hawks

MONITORING RESULTS

To gauge the success of your possum control operation, use wax blocks or 'chew' tags and record the number trapped via Trap.NZ.

Annual observations of possum browse or photo points of trees favoured by possums such as kohekohe, mahoe, puriri, rata, pohutukawa and tree fuchsia will help to determine if your native forest is recovering.

Regular **Five Minute** Bird Counts can help to monitor native bird population trends over time. Information on how to set up Five Minute Bird Counts can be found at: <https://www.doc.govt.nz/our-work/five-minute-bird-counts/the-5mbc-method/>

POSSUM CONTROL TIPS AND TRICKS

- Possums respond well to visual lures – white and blue are good colours to draw possums in from a distance.
- Attract possums to your trap/bait station with “blaze” - throw a handful of this into the trap, and a handful outside the trap. ‘Blaze’ can be made from mixing white flour and icing sugar with a good dash of spice such as cinnamon or aniseed. This will help to attract animals by sight, smell and taste - best used during dry weather.
- Their sense of smell is only good over a few metres, but possums are great at following scent trails left by other possums – the best time to catch the next possum is the night after the last one was caught.
- Well cared for traps can last for over 10 years. To prolong their life, do not dry-fire (set them off empty) as the force of this can damage them.
- Use galvanized nails when mounting traps on trees – they last a lot longer
- Use Sentinel bait clips (which can be bought separately) in Timms traps and hook them above the S bend. Smear with ‘Smooth’ or peanut butter to create a long life lure.
- Possums are very curious and will investigate new objects in their territory. Use this to your advantage. If your trap has stopped catching, change its shape by placing a rock or branch on top, or move it a few meters. This may cause a curious possum to investigate this ‘new’ object.
- When one technique stops working - change to something new. Cycling between different toxins in different years, using a range of traps and baits, and adding in an occasional night shoot will increase your success. This will also help to remove the cunning or shy animals (usually the older breeders) that have learnt to avoid a certain trap, toxin or technique.

MUSTELIDS

Mustelids include weasels, stoats and ferrets.

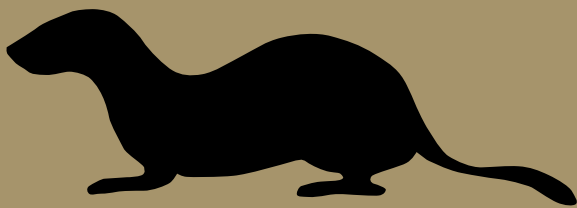
Ferrets are large (up to 1.5kg) mustelids, usually with a dark facial mask and creamy coloured body with dark guard hairs giving an overall darker appearance from a distance.

Stoats and weasels are cinnamon coloured with a white underbelly, with stoats being larger and with a black tipped tail. Ferrets are strictly nocturnal, but stoats and weasels often also hunt during the day.

Table 2 shows the defining features of the different mustelids found in Northland.

All mustelids are good swimmers and can prey on animals up to 3 times their own body weight.

Mustelids can breed rapidly in response to the availability of food. Rats, rabbits and mice are staples but, birds, bird eggs, lizards and invertebrates are also targeted.



Mustelids are now some of the top predators in New Zealand ecosystems. They are flexible and opportunistic in their diet. A change in the abundance of their normal prey can cause a rapid shift to alternative food resources. This has implications for pest control operations, in that removing a key food such as rats or rabbits may cause mustelids to prey more greatly on native birds for example.

Mustelids have fast metabolisms and need to eat 1/3 of their body weight (about 100g for stoats) every day. They cannot store fat on their bodies.

In general mustelids are difficult to trap, and only trapping to a high standard will bring about increased survival rates of birds. Keep a watchful eye out for them and their tracks and droppings. Input from an experienced mustelid trapper can be very helpful when setting up your programme.



Animal on right is a weasel, other two animals are stoats – note the bushy black tail of the stoats (Backyard Kiwi)

Table 2: The difference between ferrets, stoats, and weasels

	Colour	Average Length	Average weight	Comments
Ferret	Generally creamy with black tips	52cm	M 1200 g F 600 g	Size of a small cat, active at night; take mainly rabbits and rodents but can kill kiwi up to 2.5 kg in weight.
Stoat	Brown back, pale belly	37cm	M 325 g F 205 g	Bushy tail with black tip; active day and night; take mainly rodents, but also most kiwi chicks are killed by stoats. Peak dispersal of young is December-March.
Weasel	Deep brown to light tan	22cm	M 125 g F 60 g	Short tail – no black tip; active day and night; prey on small animals only.

FERRETS

The ferret is the largest mustelid in New Zealand. They were introduced to New Zealand from Europe in the 1880s, along with stoats and weasels, to control rabbits that were breeding out of control. By 1900, ferrets were well established in the wild and contributed to the decline of native birds like the kiwi, weka and whio/blue duck, and the extinction of kakapo on the mainland.

In the 1980s, at least 17 ferret farms were established in Northland. When these closed down due to a downturn in the fur market, many ferrets escaped or were set free, contributing to the expansion of ferrets northwards into some of New Zealand's remaining prime kiwi habitat. The decline of kiwi in Northland has been greatest in the south, which is the area where ferrets are most prevalent.

Rabbits and hares are key food sources for ferrets, with densities of ferrets strongly correlated with populations of these pests. Rodents, possums and ground-dwelling or nesting birds are also frequently taken. Lizards, eels, frogs, insects, eggs, hedgehogs and carrion are minor prey items. Ferrets will often revisit the site of a kill, and once keyed into a particular prey – such as kiwi – can quickly devastate the local population in a very short time.

They are mainly nocturnal, with a home range that is variable according to food supply, from 3-70 ha. A ferret will usually exclude others of the same sex from its central home range. Scent glands are used extensively to leave territorial scent markers.

Mating of ferrets usually occurs in September. The litter, usually of 4-8 (up to 12), is born in October or November, with young independent by late January. Females can have a second litter after this if food is abundant.



TRAP PLACEMENT

Place traps along a natural runways so that approaching animals must either pass over the trap or turn back. Suitable sites are along fences, hedges or the banks of a stream, in bush among tree roots, beside fallen logs or in dry culverts. Keep trapbox entranceways free of leaves and weeds.

LURES

Fresh whole hen eggs, fresh rabbit.

DOC 250s are often too insensitive to catch stoats so be careful not to make stoats lure shy by using lures such as salted rabbit in DOC 250s. Eggs or fresh meat are more appropriate.

TRAPS

The **DOC 250** trap, is a powerful kill trap designed specifically by the Department of Conservation to target ferrets. It is a third bigger than the DOC 200 stoat trap. Note that ferrets have strong necks and shoulders and are able to pull themselves out of a DOC 200.

The trap needs to be placed in a trap box to ensure that birds, children or pets cannot access to it. The box also orients the ferret in the right direction to be caught in the trap, disguises the trap, and protects it from the weather.

Instructions are available for building your own DOC 250 trap box can be found at: <https://www.doc.govt.nz/globalassets/documents/conservation/threats-and-impacts/animal-pests/doc250-predator-trap.pdf>



DOC 250 trap

Live Capture Cage Trap

For difficult to catch ferrets, try using a live capture cage trap lured with fresh rabbit changed daily. Note that all live capture traps must by law be checked within 12 hours of sunrise. Have a plan on how the animal will be dispatched prior to setting the trap.

Mark 6 Fenn Traps are a ‘scissor’ type trap that was developed by game keepers in England. They can catch ferrets, stoats, weasels and rats.

- Use in double sets under black plastic tunnels (available from Philproof).
- “Haze” the trap by putting pins or sticks vertically in the ground beside it to force the mustelid to stand on the trap treadle plate to access the lure.
- Ensure that the treadle plate is level and moves freely. This can be tested by picking up the trap and gently squeezing it to release the pressure and the treadle plate should drop freely. If it doesn’t clean and adjust the trigger mechanism (move from side to side), lubricate with a drop of Innox or graphite dust and re-test.
- Ensure the Fenn trap is sitting firmly on the dirt or wooden floor – it should not rock when a mustelid stands on it
- Place the lure on a pin between the traps
- Clear the tunnel trap box of any spider webs and keep it tidy.
- If using a Philproof plastic cover, ensure it is securely pinned down.

There is value in having a variation in trap type– ie alternating Fenn’s and DOC 250s - or if it is top ferret location use both (two separately located boxes/tunnels) to increase your catch rate.



Mark 6 Fenn Trap

STOATS

As stoats kill 95% of kiwi chicks before they reach their first birthday, sustained, high quality stoat control is essential if Northland kiwi populations are to increase and thrive.

Key stoat facts:

- Stoats kill several times a day.
- In colder climates where they originate, they stash their prey in the snow and come back to it later. This does not work in Northland's temperate climate - so they just keep killing...
- The calling card of a stoat is a bite to the back of the neck.
- Male stoats impregnate all juvenile females before they leave the den.
- Stoats are good climbers and swimmers.
- Young stoats disperse many kilometres from their birth site, beginning in early summer.

PLACEMENT

Trap configuration and spacing varies with the species being protected. Trapping densities typically have been 1 trap to 10 ha for stoat control in Northland kiwi zones, but this can vary according to the terrain. Traps may be placed at lower densities (1/15 -1/20 ha) in areas with large areas of grassland, or at higher densities in areas with continuous forest or a mosaic habitat where there are many contours that mustelids could be active along.

Select sites where predators are likely to hunt, i.e.:

- stream edges
- bushland edge
- fencelines
- animal runs
- crossings over water courses
- fallen trees
- along tracks/roads.

The best sites are where there are converging features like a stream crossing a track at the edge of bush. A change in features is also a good site – eg pasture:bush interface. Select sites that are beneath a tree canopy cover where possible. Mustelids are likely to be less concerned about overhead predators under trees and therefore more likely to enter a trap.

Keep trapbox entranceways free of leaves and weeds.



LURES

Fresh whole hen eggs, salted rabbit, fresh rabbit.

Stoat bait trials have been carried out by the Department of Conservation in Northland. During one of these trials fresh rabbit, replaced every 3-4 days, was compared to salted rabbit replaced fortnightly. Fresh rabbit captured only slightly more stoats.

In a separate trial, fresh hens eggs were compared with salted rabbit and both baits were replaced fortnightly. In this trial, salted rabbit was found to be significantly more attractive than eggs.

As a result of these trials, it is common practice in Northland to lure stoat traps with salted rabbit from September – April, and whole fresh hens' eggs from May – August.

Salted rabbit lasts longer than fresh rabbit (2 – 3 weeks compared to 2 – 3 days), but is not palatable and must never be discarded at the trap site. Always bury well or remove old salted rabbit to prevent stoats becoming bait-shy.



Hau Tafataha-'O-Iotofale'ia Livai from Okaihau College sets a DOC 200 (Enviroschools, NRC)

TRAPS

A trap is only useful if it is well serviced, has oiled working parts, wire-brushed, filed, etc. Traps need to be regularly tested to ensure that they will be set off by a mustelid. Pathways for mustelids need to be kept open, e.g. in pastoral landscape, to ensure the trap-site is found, and the trap preferably hazed to orientate the animal. Good oils to use are Innox and WD40. WD40 is not as sticky as CRC and has a slight fish odour, which may be attractive to mustelids.

Stoat traps are used in single or double sets in a tunnel-like cover or box. The cover has three functions:

- 1) To orientate the animal so that it enters the trap correctly
- 2) To disguise and protect the trap
- 3) To keep out non-target animals

Mark 6 Fenn traps

See Ferret trap section page 16.

Maintenance and Preparation of Newly Purchased Traps

There is currently no simple solution to prolonging the life of traps.

- If not fully stainless steel, each trap should be dipped in Innox oil (available from boating or fishing shops) before being set in the field.
- At each check the trap should be checked to ensure the treadle plate drops freely. Apply a few drops of engine oil around the dog hinge, and/or tweak the treadle from side to side to free it.
- Bring traps in every 1-2 years and clean. Water blast them and use a wire brush to remove any scale rust. Once dry, dip them into engine oil or a mix of 4ltrs penetrol to 8ltrs of vegetable oil. (Penetrol is available from paint shops). Graphite powder works well too.



Todd Hamilton, Backyard Kiwi, with stoat in Mark 6 Fenn Trap lured with salted rabbit

The **DOC 200** is a NAWAC approved humane kill trap for stoats, rats and hedgehogs.

The traps can be set singly or in “double sets”. As stoats are behaviorally primed to run through tunnels and burrows, a double set while costing more, will catch more stoats over time.

Ensure the entrance hole to the wooden box is no larger than 60mm otherwise ferrets can enter the tunnel and pull out of the trap using their strong necks and shoulders. Bigger entrances also increase the risk of non-target species, such as kiwi, accessing the trap mechanism with fatal results.

DOC 200 setting instructions and trap box templates can be found at: <https://www.doc.govt.nz/documents/conservation/threats-and-impacts/animal-pests/doc200-predator-trap.pdf>



Stoat in double DOC 200 (Whareora Landcare)

TOXINS

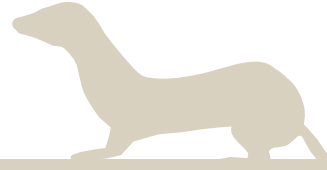
Even with highly skilled trappers any trapping network's effectiveness reduces over time. Studies by the Department of Conservation in the Whangarei Kiwi Sanctuary <https://kiwicoast.org.nz/wp-content/uploads/2018/09/Secondary-poisoning-for-untrappable-stoats-Whangarei-Kiwi-Sanctuary.pdf> have shown that after 3-5 years using traps alone is ineffective for kiwi recovery. This is because of untrappable or trap/lure shy stoats not being caught and increasing in their numbers and impact.

The only direct poison registered for stoats is called PAPP (Para-aminopropiophenone). A Controlled Substances Licence is required to use this toxin. The toxin is prepared in a paste and recommended to be used in balls of fresh rabbit mince placed in tunnels. Difficulty in efficiently carrying out this method effectively over a stoat control network has led to little use of this toxin in Northland to date.

Fortunately, stoats are highly sensitive to secondary poisoning, this is where another pest (rat or possum) is poisoned and the stoat feeds on that animal. A carefully controlled pulse of the appropriate toxin in bait stations is highly effective in removing untrappable stoats from the area. Not all the area needs toxin pulsing as stoats travel widely and targeting appropriate blocks of land in an area can prove highly effective.

1080 and brodifacoum are the two toxins that can be used for this secondary poisoning. As with any toxin care is needed to avoid stock and other non-target species. A Controlled Substance License (CSL) is needed to handle and use 1080.

Contact Kiwi Coast or the NRC Biosecurity Team to find out when the next CSL course is being run and if support is available to obtain this for your project.



“Managers of conservation or game bird programmes that rely solely on long-term trapping to control stoats or other cautious and intelligent predators should be aware that the probability of an animal entering a trap or bait station is highly variable (King et al. 2003, 2009).”

Some animals are naturally wary of traps or other artificial structures or have learned to actively avoid them (i.e. they find but do not enter traps or bait stations), perhaps because of a near-miss or seeing/hearing another animal being caught, or are wary of objects with human scent on them.

We recommend that managers of all long-term trapping programmes consider using a periodic pulse of a completely different pest control method that does not rely on the same behaviour of the target species to reach a kill trap ...

[Our research found that] ... survival of kiwi chicks improved because some or all resident stoats were secondarily poisoned after toxic baits were made available to rats and possums for a very short period.”

Robertson et al., 2016

WEASELS

Weasels are the smallest and least common mustelid in New Zealand. Males grow to about 20 cm long.

To distinguish a weasel from a stoat, a weasel does not have a bushy black tip at the end of the tail and a stoat does.

Weasels are often predated by stoats. A sign of good stoat control in Northland is when your stoat catch goes down and your weasel catch increases.

Weasels are active day and night. While mice are their preferred food, they also prey upon birds, geckos, skinks and invertebrates – including wētā.

Weasels are generally considered to be less of a conservation threat than the other mustelids. However, like all mustelids they will tackle prey much larger than themselves and pose a particular risk to nesting birds (Predator Free 2050, 2019)

LURES & TRAPS

In Northland, weasels are generally a by-catch rather than a specific target of pest control operations. Weasels can be caught in rat traps, Fenn traps and DOC 200's using the same placement, lures and traps as those described for stoats.

MONITORING MUSTELIDS

There is currently no scientifically accepted method for monitoring mustelid populations in Northland. Tracking tunnels have proven to be ineffective, with animals avoiding the tunnels.

Monitoring can include sightings of live animals and annual trap catch data, including geographic locations of captures.

After successfully trapping a ferret, stoat or weasel, measure and record it's gender and length from snout to vent (nose to bum). Feel for a crest on top of its head – an older animal will have developed a bony crest.



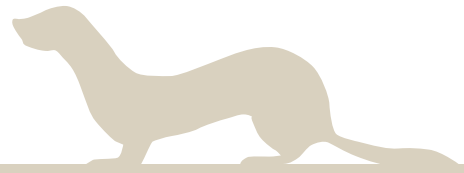
Weasel caught in Victor Rat Trap (Prescott Rd Trappers)



Measure a stoat from nose to vent (stick to stick), not nose to end of tail (Riverlands Landcare Group)

Outcome monitoring (monitoring the population of the native species you are working to protect) is the most effective way of determining the success of your mustelid control.

Taking part in the Annual Northland Kiwi Call Count Survey https://kiwicoast.org.nz/wp-content/uploads/2020/05/Kiwi-Call-Count-Survey_Instructions-for-Listeners_Revised-May-2020.pdf or doing regular Five Minute Bird Counts will generate abundance data to help track native species recovery over time.



MUSTELID CONTROL TIPS AND TRICKS

- Double traps are preferable to singles - stoats prefer tunnels they can access at both ends, and often a rat in one trap will lure a stoat into the other.
- The frequency of trap checking varies both seasonally and depending upon which native wildlife is being targeted for protection. Many Northland projects check mustelid traps and replace baits fortnightly in summer and monthly in winter.
- A useful strategy is to pulse with fresh baits and change bait types, particularly if it is suspected that there are trap-wise or bait-shy animals present.
- Check DOC 200's are working with a bundle of rags/old socks. Using a soft bundle, rather than setting empty traps off prolongs their life.
- DOC 200s should be triggered at 80g. Check this by weighing your soft bundle of rags/ socks.
- Wear gloves when handling trapped animals (many target species carry leptospirosis and other diseases).
- Take every trap check seriously.
- Keep to a strict routine of what is done to minimise mistakes like leaving safety catches on or obstructions to traps closing.
- Clean out tunnels – keep free of cobwebs/ obstructions etc – make it look like the tunnel is being used by animals.
- Use your boot to clear a path from the tunnel entrance back about half a metre – to look like an animal track.
- Free and oil the treadle.
- Don't put bait under plate
- Single sets - keep fine setting and place bait not too close to blocked off end with mesh.
- There is value in having a variation in trap type – ie alternating Fenn's and DOC 200s.
- At the trap site dig the ground over and keep the access open by providing a run, e.g. log over grass to trap site, or weed/spray around the site.
- It may take a few months to catch a mustelid. Don't be disillusioned by this, and ensure your traps are primed to catch at all times. If a trap is in a good place (as per details above) – only consider moving it if it hasn't caught for 2 years.
- If a trap catches regularly, consider adding another trap nearby.
- A top entrance can be added to a DOC 200 box by cutting a 50mm X 50mm section out of the corner of the lid at each end above the side entrance holes. Some stoats will use this entrance rather than the standard side one.
- Stoat bedding is occasionally available from research projects and has shown to be a useful lure change.
- Bags of salted rabbit lure can sometimes be purchased from Northland pest control contractors – contact Kiwi Coast or Northland Regional Council.

PREPARING SALTED RABBIT LURE FOR MUSTELID TRAPPING

It is important not to over or under treat the rabbit meat. Best results are achieved when rabbit pieces are salted just well enough for them to last for a two -three week period. Over-salting appears to reduce the attractiveness of rabbit baits and under salting will result in rotten baits during the last week.

Salted rabbit has not been trialed for periods in excess of two weeks. It is likely that its performance relative to other baits may decline if replaced less frequently than this.

Shot rabbits can be frozen whole until you have enough to salt. About 12 rabbits will make approximately 10 litres of lure.

1. Thaw rabbits (if you leave them partially frozen there is less splatter).
2. Use a meat cleaver and chopping block to chop off the head and feet.
3. Skin rabbit by simply pulling off the skin.
4. Gut rabbit.
5. Keep the rabbit meat as clean and fresh as possible.
6. Split carcass in half with cleaver then chop into bait sized pieces (c40-50mm square) – about 25 per full sized rabbit.
7. Layer the pieces in a 20 litre bucket or fish bin with layers of MEDIUM COARSE (grade 24) non- iodised Summit AGsalt. Grade 24 is a medium coarse salt which has been found to work well.
8. The salt / rabbit ratio should be between 20 - 25% of the weight of the rabbit. Generally 22% has been found to work well so for 10kg of rabbit, you should use 2.2kg of AGsalt.
9. Cover, and leave in a cool place for 12 hours.
10. After 12 hours, check a piece for firmness and that the meat is not “raw” in the middle. If it is still pink and raw and no salt remains visible, mix in a further 500 grams of salt and leave for a further 12 hours.

11. Mix again then drain off the liquid completely for approximately 1 hour.
12. Bag the pieces in plastic bags and freeze. The pieces of bait should remain firm and only just free flow. Baits will tend to stick together more after a month. The baits are now ready to use as you need them, and excess bait remaining after a day’s trapping can be re-frozen.

Tips for using Salted Rabbit

- Put the lure on a spike between your traps to help it last and to aid scent dispersal.
- The lure should appear relatively unchanged for two weeks depending on the weather and the shade on your trap site. If baits look “frosted” too much salt has been used. If they degrade rapidly, too little salt has been used.
- Lure needs to be attractive at all times. Rotten bait won’t catch.
- In fenn sets, keeping the lure off the ground on wires will delay it going rotten.
- With hanging lures (eg in a wooden tunnel) watch bait doesn’t interfere with trap when it is sprung.
- Orientate traps to the prevailing wind to maximise air flow through the tunnel to spread the scent as much as possible.
- Placement of lure under the trap is not recommended, as the predator may not cross the trap cleanly which will result in miss catches.
- Alternate lures occasionally, e.g. during period of low/nil captures can use eggs to attract the occasional bait shy animal.
- Some trappers recommend leaving fur on rabbit lures as this may attract a mustelid intending to line their den with the fur.

Leptospirosis warning – wear overalls, gloves and face visor.

CATS

All cats, whether feral or domestic, kill the same groups of native wildlife, including insects, eels, koura (native crayfish), fish, lizards, birds (including kiwi chicks) as well as rabbits and rodents.

Cats are active hunters during the day and night, and can cover long distances quickly.

Feral cats breed well in Northland forests. They tend to be in higher densities in areas adjacent to forests but they also thrive deep within native forests.

Cats are often present in far greater numbers than is obvious as they are extremely alert and quick to hide. Keep a watch out for their droppings which are used to mark territories.

They have large overlapping home ranges with males known to roam up to 20 km, although females with kittens seldom move more than 500 m from their den. Feral cats are easiest to catch in mid-winter when food sources are low.



TRAP PLACEMENT

Locate traps at forest/pasture margins, along tracks and on sunlit logs at densities of about 1 to 15ha in fringe areas, and 1 to 20ha in the core forest areas. Roads and tracks and sites where there are other traps are the best places to locate these traps.

Meaningful population control in areas where cats are abundant (see below) requires an extensive trap layout: set traps 100-200 metres apart along linear landscape features (fence lines, forest edges, waterways, roads and tracks), in isolated patches of cover and other preferred microhabitat, and in areas with high prey abundance or where non-natural food is available (e.g. rubbish dumps).

There should be at least one trap station within a cat's home range. They have large (45.8-2083 ha), often over-lapping, home ranges. Densities of feral cats, where measured, range from 0.19 cats/km to 1.18 cats/ha. The highest densities are in areas with the most prey e.g. seabird islands, farmland and/or high rabbit population areas.

LURES

Where possible, baits should consist of local food sources used by cats. Successful lures include:

- Peanut butter and cat biscuits
- Fat and cat biscuits
- Oily sardines
- Fresh minced meat
- Cat food from cans or in rolls

Fresh bait is essential as it is easy to create trap-wise cats if unpalatable bait is tasted and then the cat escapes.

Cats are flexible and opportunist in their diet. The most effective baits may differ with location and with the natural diet of cats in that location.

TRAPS

SA2 Possum and Feral Cat trap. See setting instructions on page 11.

To Bait the SA2Trap for feral cats:

Smear a generous amount of peanut butter on the wooden base inside the trap before setting the trap.

Then a small sprinkle of cat biscuits placed on and pushed into the peanut butter. The oils in the butter keep the biscuits fresher for longer.

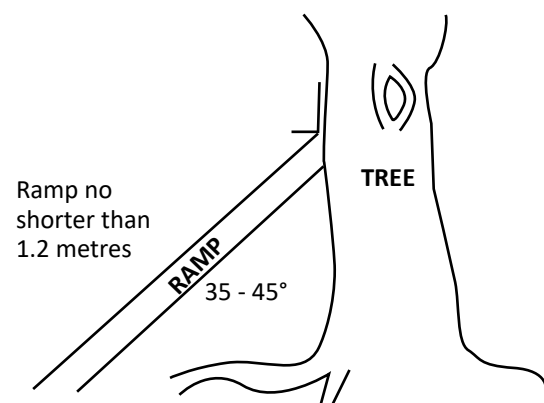
A small piece of rabbit or possum can also be placed on the screw at the back of the trap (optional).

Additional baits can be used such as commercially made catfood, eg jellymeat. This is applied in a generous amount by smearing from front to back of trap.

Minced Rabbit and Possum can also be used.

Cats love fat so chicken fat, mutton fat etc are good baits and soak into the wooden base.

Typical trap set for an SA2 Feral Cat Trap



LIVE CAPTURE CAGE TRAP

It is wise to use live capture cage traps near domestic cats and near houses. That way if you catch a pet cat by mistake, it is not harmed and can be returned to the owner.

By law, all live capture traps must be checked within 12 hours of sunrise. Have a plan for how the animal will be dispatched prior to setting the trap.

Live capture cage traps will catch possums and cats. Back the cage up to buildings or large trees so that animals cannot access the bait.

Once the animal is caught, there are only two legal means of disposal:

1. Take the animal to the vet. In some areas you can take it to the SCPA first who then take it to the vet, and you get a reduced rate.
2. Dispatch the animal with a firearm (Be careful not to destroy the trap too!).



Feral cat in live capture cage trap (Whareora Landcare)

OTHER TRAPS

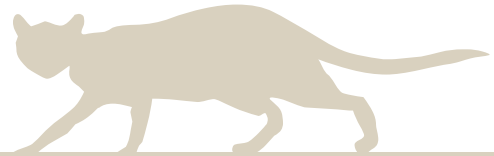
- Timms traps are NAWAC approved for feral cats. Elevate to 700mm in kiwi areas. Bait with fresh meat or fish lures.
- Shooting - gun license required.

TOXINS

PAPP (Para-aminopropiophenone) is a toxin registered specifically for feral cats. A Controlled Substances License is required to use this toxin. The toxin is prepared in a paste and recommended to be used in balls of fresh rabbit mince placed in 'submarine' stations.

Guidelines on how to use this toxin for feral cat control can be found at: <https://www.bionet.nz/assets/Uploads/PredaSTOP-for-feral-cats-guidelines-28052018.pdf>

Some secondary kill of cats can occur following targeting of large rodent and possum populations with 1080 or brodifacoum.



TIPS ON USING CAT TRAPS AND BAITS

- Alternate baits and keep them fresh
- Cage traps – cages need to be stable; also block off rear end of cage to stop pawing, Treadle operated traps are best.
- Timms traps – fish heads are good.
- Remove old baits from the trap site, but it is OK to use fresh bait as enticement
- Connovation have developed long-life fish and meat flavoured lures for Timms traps
- Put extra effort into feral cat control in winter when conditions make them more vulnerable.

RATS

There are two main species of rat on the New Zealand mainland - the ship rat or black rat which is able to climb trees and the Norway rat, usually found near water. Ship rats are usually the most common rat species in Northland forests. Both species are rapid breeders.

The ship or black rat comes in several colours (despite its name) and in comparison to the Norway rat it is a poorer swimmer, but more agile and a better climber, tending even to flee upwards. It is usually black to light brown in colour with a lighter underside.

A typical ship rat will be 15 to 20 cm long with a further 20 cm of tail. It is nocturnal and omnivorous, with a preference for grains. In a suitable environment it will breed throughout the year, with a female producing three to six litters of up to ten young. Ship rats live for about 2-3 years. Social groups of up to sixty can be formed.

In New Zealand, ship rats have an unusual distribution and importance, in that they are utterly pervasive through native forests, scrub, and urban parklands. Ship rats are the most frequent predator of small forest birds, seeds, invertebrates, and perhaps lizards in New Zealand forests, and are key ecosystem changers.

All rats eat a wide range of foods, are quick to find bait stations and communicate their location to other rats. They are capable of detecting some poisons, especially cyanide and cholecalciferol if not used appropriately.

A dominant rat will protect a large food supply such as a station of baits and stockpile the baits in or on the ground, which means only a few rats may be taking most of your bait.



How to tell the difference:

Ship rat

1. Variable coat colour with slate grey or white belly.
2. Very long tail - in adult this is longer than the head and body length combined.
3. Very long thin ears - when you pull the ears forward they will generally cover the eyes of the rat.
4. Female usually has 10 nipples

Norway rat

1. Coarse shaggy coat, greyish brown flanks, and grey belly.
2. Thick tail usually shorter than head and body length
3. Small ears that can't be pulled forward over the eyes
4. Female usually has 12 nipples.
5. Large, robust rat.

The type of rat present has implications for pest control projects. For example having more ship rats around has implications for most tree-nesting birds including kukupa and small birds. Norway rats on the other hand are large and ground- dwelling, with potential impacts on ground- nesting species. In addition to their impacts on birds, rats also have impacts on invertebrates and lizards and can also limit seedling germination, by eating fruit, seeds and young plants. Rats have a relatively small home range (about 1 ha for ship rats), and this combined with their rapid breeding means that reinvasion of rats in a controlled area is generally very rapid.

Timing of rat control operations

Timing is critical and depends on what is being protected. For species protection, timing is dependant on when the species being protected is most vulnerable. For example to protect native birds such as kükupa or tomtits during the breeding season, rat numbers must be low while the birds are on the nest until the chicks fledge. This is usually from early spring to late summer,

but the timing will differ between different species and different localities. To protect invertebrates and lizards, rats should be controlled year round.



Table 3: Some examples of rat control objectives and requirements

Objective for rat control	Requirements for control	Other comments
Kükupa and other small bird recovery	Intensive rat control from late winter/ end summer. Traps or toxin should be available to rats continuously over this period.	Key areas should generally be identified. Begin control at onset of kukupa display flights and ensure possums also controlled to low levels. Need to monitor toxin take and condition of baits frequently.
Increased seedling germination	Year round control	Target late-summer-autumn when many native berries and seeds are ripe.
Native snail, weta and lizard recovery	Year round rat control required.	Major implications to costs and methods chosen.

PLACEMENT

Ideally, 'traplines' should about be 100m apart. Along traplines, traps or bait stations should be 50m apart. (Perimeter traps or bait stations, 25m apart). This will create a network of traps or bait stations. It is important to consider the ease of checking and maintaining the equipment. Use existing tracks where possible.

When setting up bait stations or traps, look for evidence of rats being present ie. fresh droppings, rub marks, gnawing, or feeding activity. Pick trap sites that are naturally attractive to your target, such as near good food sources. Rats often nibble on seeds and fruits of native trees including nikau, karaka, taraire and kohekohe. Look out for fallen berries with the outer layer chewed away on the forest floor.

Rats prefer areas with water and good food sources. Northland forests, with the large number of different types of fruiting native trees and numerous stream systems are ideal for rats.



Setting a SnapE Rat Trap (Waimate Nth Landcare)

Consider placing extra rat traps or bait stations where:

- There is a particularly heavily fruiting tree that attracts rats, ie lots of rat gnawed berries nearby;
- You have observed nesting or breeding behaviour in a species you are trying to protect;
- There is a tree favoured by native birds, ie a taraire tree in which you often see kukupa; and/or
- At a confluence where two streams intersect.

Be sure to position traps and bait stations so that they are not easily accessible by children or stock. Bait stations and traps should not be placed in water.

There should be at least one trap or bait station within each rat's home range. Home ranges are generally reported by length. Ship rats have an average range length of 100-200m during the breeding season. Non-breeding ship rats have larger home ranges. Norway rat home ranges are between 218-916m in length. At high rat densities, trap or bait station spacing may have to be reduced further to maximise control.

If you have a large quantity of traps or bait stations, it can help to number each one. This can help to reduce the risk of missing one during checking and allows capture data to be related to each site.

LURES

To attract rats into your traps use highly palatable lures such as chunky peanut butter, peanut butter mixed with rolled oats, blue 'Smooth' paste and white chocolate. These lures have been proven to be very attractive to rats, last well, are easy to use and cheap.

TRAPS

In areas with high rat numbers trapping may be time consuming, expensive and ineffective in actually reducing the rat population despite plenty of rats being caught in traps. A toxin may have to be used first to reduce rat numbers. Trapping can then be used to keep rat numbers low.

Kill traps must be set in a tunnel or under a cover. The tunnel has three functions:

1. orientate the animal relative to the trap
2. disguise and protect the trap, and
3. keep out non-target species, such as kiwi.

Tunnels or covers should:

- Be at least 500mm long to prevent non-target animals accessing the trap
- Have an entry hole of no more than 45mm x 45mm to exclude non target animals
- Allow easy access for checking traps
- Be able to be secured to the ground with wire to prevent traps being disturbed and removed by pigs and possums
- Fully enclose the trap and be stable, so the trap cannot be dragged out of the cover
- Keep the traps off the surface of the ground to keep the trap drier, and extend the life of the trap.

Initially traps should be checked every 1-2 days. Once catch rate drops (after about 5-10 checks), traps only need to be checked once every 2-3 weeks. When rat numbers increase, the frequency at which traps are checked will also need to increase.

Commonly used rat traps in Northland include:

The **Victor Professional** has passed NAWAC testing for ship rats and is suitable for trapping in native forest where ship rats are most prevalent.

Wooden trap boxes to house these rat traps are commonly made by Men's Shed's in Kerikeri, Waipu and Whangarei.



Victor Professional Rat Trap

The **Goodnature A24 Rat Trap** is also available. Powered by a CO2 cylinder which can 'fire' approximately 24 times. It works by firing a piston when a rat triggers the trap. An automatic lure dispenser is designed to drip lure for 6 months.

Note that kiwi have been injured by some Goodnature Traps. <https://kiwicoast.org.nz/kiwi-interaction-with-goodnature-a24-trap/> Ensure all Goodnature Traps are raised 1m off the ground in kiwi areas.

Available from: www.goodnature.co.nz



Goodnature A24 Rat Trap

The **T-Rex** Is a NAWAC approved snap trap that uses a combination of trap velocity and trigger sensitivity. Its removable bait cup allows the trap to be fully serviced without being set.



T-Rex Rat Trap

The **Snap E Rat Trap** has a large treadle plate that the rat triggers when investigating the central lure holder.



SnapE Rat Trap (Whareora Landcare)

TOXINS

Toxins for rat control include pindone, diphacinone, brodifacoum, cholecalciferol and 1080. One of the most commonly used toxins for rat control by Northland community-led projects is diphacinone.

Diphacinone

As a first generation anticoagulant, diphacinone is a multiple feed toxin, meaning that rats must feed on the poison for at least five days. Bait stations must not be allowed to become empty during this period to ensure rats ingest sufficient poison to get a lethal dose. Otherwise, they will simply digest it and may learn to associate feeling unwell with the toxin. Overseas, rodents have become resistant to first generation anticoagulants after poor baiting strategies.

It takes about 5 -8 days for the rats to succumb to the toxin. Assuming rat numbers are high during the initial control; bait consumption will be high and gradually reduce as rat numbers decline. At the end of the operation uneaten bait should be collected and removed from operational area, rather than left to degrade and go mouldy. This reduces the chance of rats being exposed to poor quality or old bait and the time toxin is in the environment.

Diphacinone is attractive to possums and some birds (eg waxeyes) but does not kill them. Diphacinone should be presented in possum proof bait stations or used in standard bait stations in low possum density areas. Otherwise it is just expensive possum food!

Diphacinone breaks down quickly in the food chain and is far less persistent than brodifacoum. Secondary poisoning effects are low-non-existent.

Limitations

- Constant re-invasion and rapid breeding means effective long-term control must be ongoing. Rat numbers are likely to return to pre-control densities within weeks or months after control stops.
- Mouse numbers may increase after rat control.

Always wear gloves when handling rats and rat traps as their urine carries the disease leptospirosis.

MONITORING

To gauge the success of your rat control:

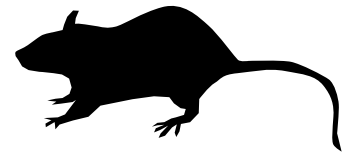
- use 'tracking tunnels', wax tags or chew cards before and after the control program.
- Record the number trapped and/or the amount of bait taken.
- Observations of rat browse on native fruits such as kohekohe, karaka, taraire and tawa will help to determine if your native forest is recovering.
- Regular Five Minute Bird Counts can help to monitor native bird population trends over time. Information on how to set up Five Minute Bird Counts can be found at: <https://www.doc.govt.nz/our-work/five-minute-bird-counts/the-5mbc-method/>

Rat trapping tips:

- Rats are neo-phobic – they avoid new things in their environment for approximately 10 days. Ensure rat control or monitoring equipment is well in place prior to operations.
- Traps need to be cleared regularly – a trap with a dead rat in it is not available to catch others.
- Regular maintenance of traps is essential, including checking for worn pivots, weakened springs and broken trigger mechanisms.
- Victor snapback traps require periodic re-treating with preserving agent.
- When checking Victor snapback traps the trapper should carry spare traps, treadles and pegs. Treadles may be lost when the traps are sprung.
- Traps should be cleaned regularly with a wire brush – remove fur and remains of dead animals.
- Rats are nervous creatures. Ensure rat tunnels have good clearance above the trap.
- There should be a 200mm gap between the end of the rat tunnel and the trap treadle to avoid catching kiwi.

OTHER ANIMAL PESTS

MICE



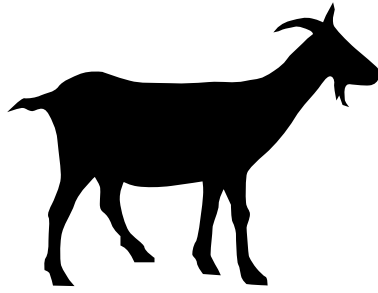
The impacts of mice on native plants and animals are poorly known, but are likely to impact on insects, seeds, fruits and seedlings.

Where there is effective predator and rat control, one potential ripple effect is for mice to increase in numbers, so consideration of impacts, monitoring and management are needed. Control methods for mice are, however, not perfected and any attempts to control mice should be carefully designed and monitored.

Potential control methods include:

- Anticoagulant poisoning, on grids of e.g. 25 x 25 m, although this might provide only temporary control because mice have a high LD50 to some anticoagulants and they may also develop aversions to toxin use.
- Trapping using covered mouse traps baited with e.g. peanut butter on grids of e.g. 25 m x 25 m. This may need to be supplemented with poisoning, e.g. when reinvading numbers build up in late summer-autumn.

Trapping can be used as a monitoring tool. If trapping is also the main control method an alternative trapline should be used to monitor mice.



FERAL GOATS

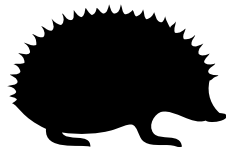
Goats can have devastating impacts on local biota, particularly regenerating forest understorey. Over time they can change the composition of native forests by their selective browsing of preferred plants. For example, larger leaved Coprosma's are a favourite food of goats, and are rarely found in forest patches regularly browsed by goats.

Methods for controlling or eradicating goats include:

- Pre-feeding with e.g. calf pellets in a secluded area where animals are finally shot or poisoned, the latter by licensed operator.
- Sustained shooting, particularly if it can be coordinated amongst local landowners, can be very effective in eradicating small herds.
- Rounding up herds by using farm dogs and sending to freezing works (the ultimate in cost-recovery).

Monitoring should include browse on palatable plants such as Coprosma.

HEDGEHOGS

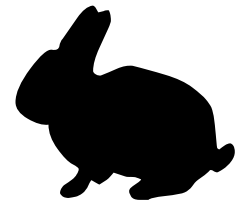


Hedgehogs eat large numbers of invertebrates from many habitats, including forest remnants, and they prey on the eggs of dotterels and other ground-nesting birds.

There is no specific control method for hedgehogs, but many are trapped in Fenn's, Timms, Victor and cage traps (baited for cats). They are also susceptible to brodifacoum in cereal baits.

Fenn traps can be split in half to remove hedgehogs. Wear gloves to avoid **leptospirosis** and other diseases.

Effective control of hedgehogs requires high density trapping, such as Fenn traps at 25m spacing.



RABBITS AND HARES

Rabbits and hares have the potential to impact on sensitive plants such as orchids and dune plants, and can rapidly increase during dry seasons, particularly if mammalian predators are being controlled.

Control methods include:

- Poisoning rabbits with pindone placed in bait stations or furrows (there is no known toxin for hares).
- Particularly spotlighting shooting, but this needs to be sustained.

Control needs to be sustained and monitored with options to provide complementary control methods if required. Monitoring can include transect counts (replicated), scoring rabbit sign (extent and density of droppings and dung heaps) and measuring levels of fresh browse on sensitive plants.

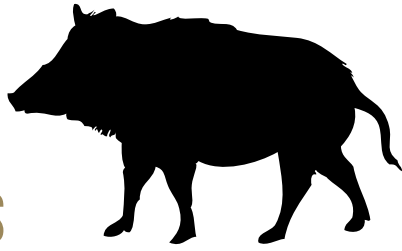
UNCONTROLLED DOGS

All dogs, whether they are family pets, hunting, working or wild, retain an inherent drive to track, chase, hunt, grab and kill other animals. Dog control is an important part of biodiversity enhancement and protection projects.

Some of the wildlife currently at risk of being killed or having nests disturbed by dogs are:

- Kiwi, and other ground dwelling birds, in bush, scrub, long grasses.
- Shorebirds nesting or feeding on beaches or dune areas.
- Seabirds, especially penguins, nesting along the Northland coast.
- Wetland birds, like the bittern, nesting or living in swamps and long vegetation.

New Zealand Dog Control legislation covers the need for people to control their dogs so they do not attack or harm threatened wildlife.



FERAL PIGS

Pigs have a serious impact on forest understorey and some threatened species. Kauri snails are particularly sought after by pigs and kiwi have been recorded as prey.

Control methods are generally uncoordinated but potential methods include:

- Hunting using trained dogs that are regularly receive kiwi aversion training if relevant to the area.
- Pre-baiting pigs into an area in which they can subsequently be shot or poisoned. However, pigs are very taste-sensitive and control advice should be sought from Councils and DOC.
- Pre-baiting koru-shaped steel-netting traps.

Monitoring should include determining extent of recent characteristic grubbing.



Feral pig caught on trail cam (Whareora Landcare)

WASPS

There are three main types of introduced wasps in Northland – paper wasps (narrow bodied) and the plumper Common and German wasps.

They are a problem because they have no natural predators in Northland, our winters are mild and there is plenty of food. They are voracious eaters of honeydew, which is an important food for native birds, bats, insects and lizards. Wasps also prey on insects and have been observed killing newly-hatched birds.

Wasps will strongly defend their nests if humans or animals get too close. Paper wasps build umbrella-shaped nests which hang by a single stalk from the branches of trees or eaves of houses. German and common wasps most often live in underground nests with one or more entrance holes, although their nests may also be found in trees.

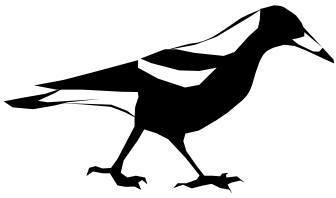
Successfully controlling wasps over large areas is now much more likely with the registration of the insecticide Fipronel as a wasp toxin under the trade name of Vespex, Vespex is designed to target both the common wasp and german wasp, but not the paper wasp.

Vespex needs to be used by Approved Handlers and used when the wasps seek protein foods as part of their natural life cycles.

For more information ring the NRC Biosecurity team or check out: www.merchento.com/vespex_faq.html

Other was control methods include:

- Night-time application of insecticide powder in ground or tree hold nests of Vespula wasps.
- Night time spraying of paper wasp nests with insecticide.
- In all cases operators need to wear sting-proof clothing.



PEST BIRDS: MAGPIES AND MYNAS

Indian mynas and Australian magpies are both aggressive birds known to raid the nests of native birds, destroy eggs and tip out fledglings. This

is a result of competition for territory and food. Mynas are also known to predate on native skinks, geckos and insects such as weta.

Australian magpies and Indian mynas are highly intelligent birds. Shooting is not a long term effective method as the birds quickly become 'gun shy'.

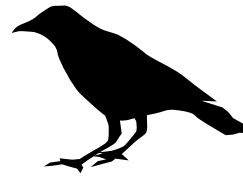
Toxin: Alpha-chloralose – a humane poison that produces a hypnotic effect by interfering with the bird's body temperature control mechanism - can work well but only when you get good frosts. It does not work well in Northland's warm climate. Alpha-chloralose does not discriminate and non-target birds may take the bait and die as well.

Larsen Magpie Trap

'Larsen' single-capture, split-perch trap: The trap consists of two compartments, one holding the 'decoy' bird, one armed with a sprung-loaded mesh panel held open by two pieces of dowelling. When a bird drops into the trap to land on the perch, the dowelling gives way and the trap door springs closed. A limitation however is that after catching the bird, it must be removed and the trap reset.



'Larsen' single-capture, split-perch Magpie/Myna trap (Adrian Gilbert)



Pee Gee Myna Trap

The 'Pee Gee' trap consists of a 'trapping' compartment and a 'holding' compartment. A minimum of two 'decoy' Mynas are kept in the holding compartment to call in further birds. There are two 'tunnel' entrances into the 'trapping' compartment and one 'chute' entrance from the 'trapping' compartment into the 'holding' compartment. Attracted by the food in the trap, the bird enters the 'trapping' compartment through one of the one-way 'tunnels', feeds for a while and then looks for a way to escape. The only exit from the 'trapping' compartment is up the 'chute' into the 'holding' compartment which can hold at least ten mynas. An advantage of the 'Pee Gee' trap is that it can trap multiple birds.

Traps are usually supplied with a myna to put in the 'holding' compartment to get you started.

Larsen and Pee Gee traps are available from Adrian Gilbert adriangilbert@xtra.co.nz with all profits going to conservation charities.



'Pee Gee' continuous-flow Indian Myna trap (Adrian Gilbert)

TOXINS & PESTICIDES

All toxins, or pesticides, used for animal pest control differ in the way they effect animals and the environment in which they are used. It is important to understand the toxin you are using, whether any secondary poisoning can be expected, and how it may persist in the environment.

Animal pests can become 'bait shy' if toxin operations are not carried out well, or if the same toxin is used persistently. Some toxins are also known to effect native species if used inappropriately.

Always take the time to read labels, know the active ingredient, and any health and safety requirements. Check if you need a Controlled Substances License and if signage and approval is needed when planning any pesticide operations.

USING GROUND BASED TOXINS

Ground based toxins are commonly delivered via permanent bait stations or temporary biodegradable bags stapled to trees. To be most effective the operation needs to be completed over a large area in a short period of time to prevent reinvasion from uncontrolled areas.

Uneaten bait, including bait bags, need to be retrieved to prevent old degraded toxin causing bait shyness.

Tracks and bait stations need to be established and maintained to make the deployment of bait efficient. A bait station network of one station per hectare, is the minimum required to control possums and rats, although a tighter bait station network of 2 bait stations per hectare is ideally used for rats.

Vertebrate toxins are sometimes referred to as either first generation or second generation anticoagulants.

First generation anticoagulants include Diphacinone (Ratabait and Ditrac), cholicalciferol (Feracol and Kiwicare gel), Pindone and Warfarin.

Second generation anticoagulants include brodifacoum (Talon/Pestoff), coumatetralyl (Racumin), bromadiolone (Rentokil rid rat). It is not recommended to use these toxins on an ongoing basis as they accumulate and persist in the environment. Scientific research has shown that brodifacoum in particular bioaccumulates in native wildlife such as kiwi and morepork with potentially lethal effects.

Table 4 summarises some of the commonly used pesticides in Northland.

Table 4: Summary of some commonly used pesticides in Northland

Pesticide	Also known as:	Target Pest	Secondary Poisoning?	CSL required?	Other comments
1080	Sodium monofluoroacetate	Feral cat Possum Rat	Yes	Yes	
Brodifacoum	Pest Off Talon	Possum Mouse Rat	Yes	No	Second generation anti-coagulant Known to build up in kiwi and moreporks
Cholecalciferol	Feracol Kiwi Care Gel	Possum Rat	No	No	Occurs naturally as Vitamin D3
Coumateralyl		Rat Mouse	?	No	First generation anti-coagulant
Cyanide	Sodium cyanide Potassium cyanide Feratox	Possum	No	Yes	
Diphacinone	Ratabate Ditrac	Rat Mouse	No	No	Rats need multiple feeds to receive a lethal dose. Different formulation available for rabbits.
PAPP	Para-aminopropio-phenone	Feral cat Stoat	-	Yes	
Pindone		Possum Rabbit Rat	Low	No	Rats need multiple feeds to receive a lethal dose. Possum are relatively resistant and can eat large quantities, reducing bait availability to rats.

BAIT STATIONS

Bait stations protect bait from the elements to keep toxins fresh and appealing to target pests. They can also be designed to limit non-target animals from accessing the bait, 'lock' bait away from children and pets, and reduce bait spillage on to the ground.

A range of commercial bait stations are available – some are multi-purpose and can take a range of different toxins, while others have been specifically designed for targeted delivery of a particular pesticide.

You can also make your own bait stations for rats from Draincoil or PVC pipe.

If targeting rats, new bait stations should be set up prior to toxin being placed to allow rodents to become accustomed to their presence. Rats are 'neo-phobic' and will avoid new objects in their territory for about 2 weeks.

Any bait left in bait stations after an operation should be removed, rather than left to decay.

Commonly used bait stations in Northland include:

Enviromate Automated Bait Station

A new product currently being trialed. It is an all in one lure and/or toxin dispensing pest control tool that is automated and programmable. It can be used alone or in conjunction with traps. The Enviromate has 7 internal compartments on a rotating tray that can be loaded with lure and/or toxin.

For more information on Enviromates contact www.enviromate.co.nz

Pied Piper Bait Station

Ground set bait station which excludes possums from accessing bait. A 500gm capacity top container is sectioned off from a run-through feeding tunnel by a grid, meaning rats are comfortable to stay and feed but cannot remove and stash bait. Designed for pindone but can take other toxins.



Enviromate



Pied Piper Bait Station (NRC)

Mini-Philproof Bait Station

A tree-mounted multi-toxin bait station providing easy access to possums and rats. Can take 800g of bait. Also available as large Philproof bait stations, which can hold 1.5kg of bait.

Tamper-proof Rat Bait Station

Ground set bait station, with see-through lid for bait inspection and internal spikes to prevent rats from removing bait blocks.



Mini-Philproof



Tamper-proof rat bait station

HEALTH AND SAFETY

It is important that you keep yourself and your co-pest controllers safe when checking traps, preparing lures and using toxins.

- Tell someone where you are going and when you expect to return – carry communications and text them when you depart and arrive back home/at base.
- Consider texting in from a ridge half way through your trapping day to let a contact know how you're going.
- If regularly trapping in remote areas, consider carrying a Personal Locator Beacon.
- Diseases such as leptospirosis and campylobacter are carried by animal pests - wear gloves.
- Alcohol based anti-bacterial wipes in sachets are a good way to sterilize your hands before eating in the field.
- Follow instructions on labels

Always wear gloves when handling dead animals to avoid contracting diseases such as leptospirosis.



Andrew Mentor checks a DOC 200 stoat trap (Kiwi Coast)

RECORDING RESULTS



These figures show pests trapped by Kiwi Coast groups and projects over the past 7 years.

For annual figures, go to <http://www.kiwicoast.org.nz/kiwi-protection/>

kiwicoast.org.nz

**KIWI
COAST**

Results recorded from pest control programmes can provide a useful source of information on pest populations, maintain the enthusiasm of group members not actively involved in trapping and be crucial for obtaining and maintaining funding.

Each time traps are checked, the results should be recorded. A monthly summary of trapping records can then be compiled for the main pest species from the trapping data sheets. Annual totals can also be calculated. This will give you a good idea of pest numbers, how they fluctuate during the year and if your pest control methods are working.

Look for seasonal or locational trends in the data, and use this information to refine trapping programmes. For example you may choose to check traps more frequently during times of the year when you know pest numbers are at their peak.

Traps and bait stations should also be mapped using a GPS / Smartphone. As well as helping to ensure the correct density of traps and bait stations, this is also essential information for health and safety reasons.

Similarly, records should be kept of any toxins used, the number of bait stations, how much bait is taken by pests and how much is removed at the end of the operation.

Each year in January, Kiwi Coast compiles all the trap catch data for Northland to generate a collective regional tally. To submit your results fill in this form: <https://kiwicoast.org.nz/annual-pest-control-results/>

TRAP.NZ ONLINE TRAP MAPPING SYSTEM AND PHONE APP



There are a number of online trap mapping systems and phone apps aimed at helping projects to record pest control data and map traps easily and efficiently. The days of recording your trap catches with pen and paper are numbered!

The most commonly used system in Northland is Trap.NZ www.trap.nz

Trap.NZ can be used to capture your results and trap information at your computer desktop or via an app in the field.

The program records and analyses data, generates reports, graphs, heat maps and allows coordinators to check the status of traps (ie when they were last checked, or which ones are catching best) across the project.

Trap.NZ can also be used to record bait, monitoring and biodiversity outcome data



PRODUCT SUPPLIERS

The Biosecurity team at the Northland Regional Council supply a wide range of pest control products at wholesale prices and may be able to assist with funding. Many animal pest control products are also available from some farm and rural supply retail centres.

Table 5: Product Supplier List

Supplier	Toxin (Active ingredient)	Traps	Other	Contact details
Adrian Gilbert		Larsen Magpie Trap PG Myna Trap		P: 09 434 3110 M: 021 566 747 E: adriangilbert@xtra.co.nz
Connovation	Cyanara (Cyanide) D-Block (Diphacinone) Double Tap (Cholicalciferol + diphacinone mix) Feratox (Cyanide) Feracol (Cholicalciferol) PredaStop (PAPP) Ratabate (Diphacinone)	DOC 200 DOC 250 Live Capture Cage Trap SnapE Rat Trap Timms	Wide range of pest control products, including: Bait stations, lures, monitoring equipment, chew cards, wax tags, Smooth Paste, poison notices, DOC 200 + 250 setting tools, flagging tape, track markers	M: 09 273 4333 W: www.connovation.co.nz E: sales@connovation.co.nz
Dead Rat Ltd		SnapE Rat Traps Victor Rat Traps Mice Traps	Replacement parts for Victor Rat trap, Corflute Rat Trap Tunnels	M: 021 622 149 W: www.deadrat.co.nz E: carol@grantleyimports.co.nz
Haines Pallet Co Ltd		DOC 200 DOC 250	Trap boxes, replacement baffles for DOC 200 boxes	P: 04 568 6898 E: info@hainespallets.co.nz

Supplier	Toxin (Active ingredient)	Traps	Other	Contact details
Key Industries	Contracon (Bromadiolone) Ditracon (Diphacinone) Pest Off (Brodifacoum) Pindone for Rats and Possums Pindone for Rabbits	DOC 200 DOC 250 Fenn Leg Hold Live Capture Cage Traps Sentinel SnapE Rat Trap Timms Trapinator T-Rex Rat Trap Victor Rat Trap	Wide range of pest control products, incl: Repellents, Bait Stations (incl. Pied Piper), trap boxes, chew cards, tracking tunnels + cards, flagging tape, track markers, Timms trap replacement parts	P: 0800 539 463 M: 0272569440 W: www.keyindustries.co.nz E: karen@keyindustries.co.nz
Kiwi Coast		SA2 Possum and Feral Cat Trap	DOC 200 double trap boxes DOC 250 wooden trap box	W: www.kiwicoast.org.nz E: ngaire@kiwicoast.org.nz
M. S. Woodcraft		Mark 6 Fenn Traps Live catch animal cages Victor Leg Hold		P: 27 437 1084 W: www.victortraps.co.nz E: trapsvictor@gmail.com
Northland Regional Council	Ditracon (Diphacinone) Pindone for rabbits	DOC 200 SnapE Rat Trap Timms Trapinator T-Rex Rat Trap	Wide range of pest control products available at wholesale prices, incl: Trap boxes, bait stations, monitoring equipment.	P: 0800 002 004 E: info@nrc.govt.nz
Pest Off	1080 (Sodium fluoroacetate) Pest Off (Brodifacoum)		Bait stations, Pre-feed	P: 06 344 5302, W: www.pestoff.co.nz, E: info@pestoff.co.nz
Philproof	Contracon (Bromadiolone) Ditracon (Diphacinone) Pest Off (Brodifacoum)	Fenns Timms T-Rex Rat Trap Victor Leg Hold Victor Rat Trap	Philproof and Tamperproof bait stations, fenn trap covers, monitoring tunnels.	P: 07 859 2943, M: 021 270 5896 W: www.philproof.co.nz E: philproof@gmail.com
Traps.Co.NZ	Contracon (Bromadiolone) Cyanide Pest Off (Brodifacoum)	Leg Hold Live Capture Cage Trap Sentinel Timms Trapinator Victor Rat Trap	Wide range of pest control products, incl: Bait stations, flavoured oils and lure pastes, wax tags, chew cards, tracking tunnels + cards.	P: 03 372 1580 W: www.traps.co.nz E: info@pcr.co.nz

REFERENCES AND INFORMATION SOURCES

Thanks to all the Northland professional trappers, projects, groups and pest control operators who have shared their considerable knowledge and expertise and made this document possible.

This document was produced by compiling information from the following sources:

- Kiwi Coast trappers
- Community, iwi and hapu-led projects across Northland
- Northland Regional Council Biosecurity Team and **Pest Control Hub** (<https://www.nrc.govt.nz/environment/weed-and-pest-control/pest-control-hub/>)
- SA2 and SA3 Traps Ltd
- Goodwood Aotearoa
- Department of Conservation
- Kiwis for Kiwi Trust
- Landcare Trust and Kiwi Coast Trapper Training Workshops from 2005 – 2020
- Pateke Survival Guide, DOC 2011.

WHERE TO GET HELP AND ADVICE

Kiwi Coast helps with:

- starting community groups
- getting projects up and running
- technical advice
- training and support
- providing customized hands-on trapping and pest control workshops
- monitoring

To link in your group or project to Kiwi Coast, or for more information contact ngaire@kiwicoast.org.nz

Northland Regional Council sells most of the products mentioned at wholesale rates and can also provide assistance with

- funding
- mapping
- project plans
- technical advice and support.

For more information contact: info@nrc.govt.nz

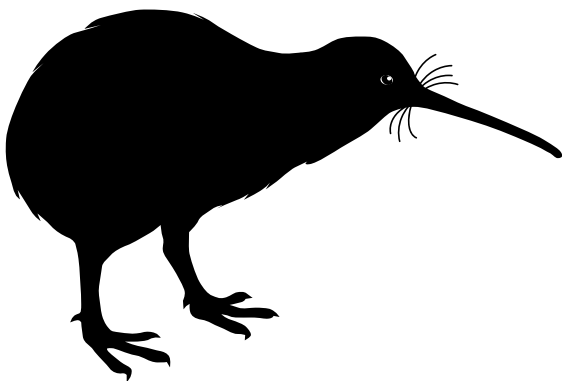
REFERENCES

King, C.M., 2005, *The Handbook of NZ Mammals*. Oxford University Press, Melbourne

HA Robertson, E Craig, C Gardiner & PJ Graham (2016): *Short pulse of 1080 improves the survival of brown kiwi chicks in an area subjected to long-term stoat trapping*, New Zealand Journal of Zoology, DOI: 10.1080/03014223.2016.1185018

Predator Free 2050, 2019. *A Practical Guide to Trapping*.

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This document can be downloaded from the Kiwi Coast website: <https://kiwicoast.org.nz/wp-content/uploads/2020/10/Northland-Pest-Control-Guidelines-2020.pdf>

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