

Pest Control Guidelines



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 (ferret, stoat, weasel) which prey on lizards, invertebrates and birds
- cats, which prey on lizards, invertebrates, birds, bird eggs and chicks
- dogs which kill kiwi, penguins and shorebirds.

Other threats include pigs, goats, escaped deer, livestock, hares, rabbits, hedgehogs, mice, wasps, Argentine and other exotic ants.

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.

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 wise, bait or trap shy animals.

Co-operative and synchronised pest control with neighbours, or as part of a Landcare Group, adds greater benefit by reducing reinvasion of a larger area and also taking longer for pest populations to rebuild. While it may currently be impossible to eradicate animal pests from New Zealand, coordinated control can reduce local populations to much less damaging levels.

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1 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 levels to which pests have to be reduced to (and for how long) to make a difference
- sustainability questions
- what monitoring needs to be done in order to determine if the pest control is working and the desired results are being achieved
- ripple effects or side effects that might occur and how to minimise these.

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.

Kauri Dieback Disease

Kauri dieback is the deadly kauri disease caused by *Phytophthora taxon Agathis* (or PTA). Nearly all kauri trees infected with 'kauri dieback disease' die, and there are several known sites in Northland.

This disease is present in the soil and it can be spread by soil on boots, equipment and machinery. Be sure to thoroughly wash your boots, removing all traces of dirt before and after every trapping round. Use warm, soapy water and then disinfect your boots with trygene spray. Note that trygene only has a shelf life of 6 months.

Trygene spray is available free from Northland Regional Council.

If you encounter sick or dying kauri trees, take a photo, GPS your location, and report this to Kane McElrea at Northland Regional Council.

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

Table 1 provides a general guide to the impacts of animal pests on Northland native wildlife.

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

Y = Yes, high impact

y = yes, but possibly low/lesser impact

Table 1: Key Animal Predators of Northland Biota

	Possum	Mustelid	Cat	Dog	Rat	H'hog	Pig
Kiwi	y	Y	Y	Y			Y
Pateke	y?	Y	Y	Y	y		Y
Bittern	Y	Y	y/Y	Y			Y
Blue penguin	y/Y	Y	Y	Y	?		Y
Kukupu	Y	Y	y/Y		Y		
Kokako	Y	Y	y/Y		Y		
Kaka	Y	Y	Y	y?	y/Y		
Kakariki		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

(Ray Pierce)

2 Controlling animal pests

2.1 Possums

Possums can devastate forests and their fauna. They alter 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.

For native wildlife the possum is 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.

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 have multiple nest sites
- have favourite trees that are visited regularly, often recognised by extensive scratchmarks in their bark and heavy browsing of leaves, and fruit.
- Are very curious and will investigate new objects in their territory. Use this to your advantage!

Their dislike of wet weather – although they can swim – makes possum control much more successful in periods of fine weather. Colder temperatures are better as well.

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
- 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

However, 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.

Poisoning

Toxins registered for possums include cyanide pastes and cyanide Feratox, cholicalciferol, 1080, brodifacoum, and pindone. Brodifacoum, cholicalciferol and pindone are the only possum poisons that do not need a Controlled Substance Licence.

Avoid prolonged use of brodifacoum (Talon and Pestoff) which is persistent in the environment and has secondary poisoning effects which can be detrimental to many species in the food chain. Use such poisons when absolutely necessary, but be aware that over time these toxins can build up in birds such as moreporks and kiwi to lethal levels.

For the maximum benefit to birdlife, possum poisoning is best concentrated just before and during the bird breeding season, which for most species runs from August to about January. Because they eat almost anything, possums are attracted by a variety of baits. But they learn quickly, so sub-lethal poisoning - often the result of low quality or degraded poison baits or not putting out enough at each site - may result in them becoming bait shy.

When possum density is moderate to high or they need to be controlled to very low levels for long periods (e.g. during kukupa, or kokako nesting), cyanide paste or Feratox are useful tools. Cyanide is often used for an initial 'knock-down', and then possums can be controlled to maintain low levels with trapping or other toxins, depending on preference. Define the areas and sensitive periods of the year and contract a licensed operator to lay the poison. It is most effective to collaborate with neighbours to minimise reinvasion. Generally aim for achieving possum control to below 5% Residual Trap Catch (RTC) with 10% as a threshold for initiating another knock-down. However, where particularly sensitive species (e.g. kokako, recolonising kukupa, etc) are present, the more intensive the possum (and rat) control is, the greater the chance of success.

If using bait stations, they are best spaced 50 - 100 metres apart along well-defined bush/pasture margins or along tracks through larger areas of forest.

Trapping or shooting

Trapping or night shooting using spotlight is most effective when possum numbers have been reduced to low levels by poisoning and control is aimed at minimising reinvasion or recruitment.

The most commonly used traps in Northland are the single kill Timms trap or Sentinel Trap. The resetting 'Henry' Possum trap is also available, but still being refined in field trials. Whichever trap is being used, all must be set 70cm off the ground in kiwi zones.

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 effect 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 zones, mount them on the end of a 6 x 1 piece of timber, screw this into the tree and use as a ramp.

All traps in kiwi areas need to be raised 700ml off the ground. One way to do this is to secure them to a ramp with two wooden strips allowing the trap to be slid sideways for servicing.



Hupara Landcare raised Timms trap

To attract possums to the trap, make up some 'blaze' and throw a handful of this into the trap, and a handful outside the trap. 'Blaze' can be made from mixing white flour with a good dash of spice such as cinnamon. This will help to attract animals by sight, smell and taste. This is best used during dry weather.

Tips and tricks

- Well cared for Timms traps can last for over 10 years. To prolong their life, do not set them off empty as the force of this can crack the top.
- Use a cube of polystyrene smeared with peanut or plum jam as a long life lure.
- When mounting Timms traps on trees, be sure to use a big enough tree so that rats cannot get behind the trap and set it off.
- 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.

Timms traps are available from the Northland Regional Council or www.possumtraps.net.nz

Sentinel possum traps

These have been proven in scientific trials to be one of the most efficient and effective possum kill trap in New Zealand. It is also considered to be one of the most humane possum kill traps. While slightly more difficult to set than the Timms trap, it is far cheaper. Sentinel traps are available from the Northland Regional Council or www.pestcontrolresearch.co.nz/traps.htm

Sentinel 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. Lures include peanut butter or the blue 'Smooth in a Tube' (available from PGG Wrightson). To attract possums to the trap, spread some lure on the tree under the trap.

Trapinator possum traps have been proven to be very easy to set, and great for project where volunteers assist with trapping. As they are tree mounted, they are also automatically out of harms way for kiwi and inquisitive weka.

Trapinators are simple to use with a side lever that is pushed forward to arm the trap. A bait bar inside the trap is commonly smeared with peanut butter to lure in possums. 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 kiwi zones as kiwi have been killed after being caught and injured in these traps.



Sentinel in use by Whareora Landcare



Trapinator in use by Bay Bush Action, Opua



Leg hold trap

Self resetting 'Henry' possum trap

The self-resetting 'Henry' possum trap is another tree mounted kill trap. The trap is powered by a CO2 cylinder which can 'fire' approximately 12 times. An automatic lure drips onto a bait clip to attract possums. Counters are available as attachments to measure the number of kills. While available for purchase, these traps are still being refined in field trials. Henry traps are available from www.goodnature.co.nz



'Henry' possum trap

Tips for Possum Traps:

- Good lures for possums include vegemite and jam. Avoid jam with seeds (eg, blackberry) to avoid attracting birds
- 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.
- Set possum traps near feral cat or mustelid traps to reduce labour. These predators will be attracted to any dead animals caught in the possum trap and can then also be caught in the trap nearby.
- Kiwi and weka have occasionally been caught by their beaks in Timms traps so it is necessary in kiwi areas to firmly mount them well off the ground (70 cm).
- 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.

- 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 spike. These lures will last a lot longer than fresh fruit.
- Possums are attracted to new objects in their territory. If a trap has not been catching, change it's shape by putting a branch or rock over it, moving it a few meters, using a different bait/attractant etc.
- Possums prefer to travel along fallen logs than over ground. Take advantage of this by placing traps firmly on logs.

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.

When one technique stops working it is worth changing 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.

Monitoring

To gauge the success of your possum control operation, use wax blocks or 'chew' tags and record the number trapped or shot. Annual observations of possum browse or photopoints 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 birdcounts can help to monitor bird populations over time (See www.formak.co.nz for more information on monitoring methods).

2.2 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. (DOC, 2011). 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) every day. They cannot store fat on their bodies.



Animal on right is a weasel, other two animals are stoats – note the bushy black tail of the stoats. Photo: Todd Hamilton, Whangarei Heads Landcare Forum

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.

Poisons

The 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. Currently, in order to use this toxin it is a legal requirement that all land owners within 3km of bait stations must be notified.

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.

Traps

Traps for catching mustelids include the Fenn, DOC 200 and DOC 250. Mark VI Fenns will successfully trap all three species of mustelids. However, DOC 200's are designed specifically to catch weasels and stoats, with the larger DOC 250 needed to trap a ferret.

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.

Trap layout and site selection

Trap configuration and spacing varies with the species being protected. Trapping densities typically have been 1 trap to 10 ha for mustelids, but this can vary according to the terrain. For example traps could be spaced at a lower density (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.

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.

Trap Setting

Mustelid 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

Special tips for using mustelid traps:

- 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.
- 'Hazing' of trap is important to direct animal over treadle.
- Record captures and bait etc

Fenn traps

- Ensure that the treadle plate is level and moves freely
- There is value in having a variation in trap type – ie alternating Fenn’s and DOC 200s
- Fenn Mk 4 are easier to set – but won’t catch or kill large mustelids
- Where funding allows – double traps are preferable to singles (stoats prefer tunnels they can access at both ends).
- Often a rat in one trap will lure a stoat into the other.

DOC 200 trap in a wooden tunnel

- The entrance hole should be no larger than 60mm otherwise ferrets can enter the tunnel and pull out of the trap using their large facial muscles
- Tilt your tunnel so that salty liquid from the bait runs out of the tunnel and not around the trap in order to avoid corrosion
- Check DOC 200’s are working with a bundle of rags/old socks. Using a soft bundle, rather just 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.

DOC 250 trap

The DOC 250 trap is a third bigger than a DOC 200. It is specifically designed kill trap for ferrets. Note that ferrets have large facial muscles and are able to pull themselves out of a DOC 200 so DOC 250 should be used where these may be present. While there appear to be relatively low numbers of ferrets in Northland compared to the South Island, ferrets kill adult kiwi and can quickly eradicate a local population.

Bait type and frequency of checking

Refinements in preferred baits are ongoing. Useful baits include fresh rabbit, salted rabbit, freeze-dried rabbit, freeze-dried rat, pilchards and eggs.

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 (For the full report see www.doc.govt.nz/upload/documents/science-and-technical/drds262.pdf)



Fenn trap



Double DOC 200 trap. Photo: Whareora Landcare

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. Some pest control operations use fresh or salted rabbit over summer, and eggs over winter.

The frequency of trap checking varies both seasonally and depending upon which native wildlife is being targeted for protection. Many Landcare groups check mustelid traps and replace baits fortnightly in summer and monthly in winter.

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Photo: Wade Doak

Preparing Salted Rabbit Bait For Mustelid Trapping

Developed by Steve Allen and Terry Johnson

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 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 25 rabbits will make approximately 20 litres of bait.
- Thaw rabbits (if you leave them partially frozen there is less splatter).
- Use a meat cleaver and chopping block to chop off the head and feet.
- Skin rabbit by simply pulling off the skin.
- Gut rabbit.
- Split carcass in half with cleaver then chop into bait sized pieces (c40-50mm square) – about 25 per full sized rabbit.
- 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. 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.
- Cover, and leave in a cool place for 12 hours.
- 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.
- Mix again then drain off the liquid completely for approximately 1 hour.
- 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.
- Put the bait on a spike above the ground

WARNING: Rabbits can carry the disease leptospirosis in their urine. Always wear gloves when handling dead rabbits.

between your traps to help it last and to aid scent dispersal. The bait 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.

Other points to note:

- Bait needs to be attractive at all times. Rotten bait won’t catch.
- Keeping baits off the ground on wires will delay it going rotten
- With hanging baits (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 bait under the trap is not recommended, as the predator may not cross the trap cleanly which will result in miss catches. Bait also degrades faster on the ground.
- Alternate baits occasionally, e.g. during period of low/nil captures can use eggs to attract the occasional bait shy animal.
- Salted bait is not palatable so it is important to remove old salted baits completely (carry out or bury) so target animals do not get the chance to taste it and be deterred.
- Some trappers recommend leaving fur on rabbit lures as this may attract a mustelid intending to line their den with the fur
- Rabbit bait pastes and blocks are available from Connovation if you don’t have a supply of rabbit

Frequency of trap checking

- Varies seasonally, and depending on what you are trying to protect
- Fortnightly trap checks from October to April, and monthly checks from May - September appears to be sufficient for kiwi protection.
- Where trapping is to protect pataka more frequent trap checks may be necessary.
- Beware of autumn stoats which will be strong and intelligent and account for a lot of birds at this time of year especially pataka and late kiwi chicks.
- If there are high capture rates of rats, consideration could be given to more frequent checks primarily to remove rats from traps, especially in single-set regimes.

Maintenance and Preparation of Newly Purchased Traps

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

- If not anodised, 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)

Stoat facts

- Stoats kill 95% of kiwi chicks.
- 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 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.

Monitoring/Recording Data

Monitoring can include sightings of live animals and annual trap catch data, including geographic locations of captures. After successfully trapping a stoat, measure and record it's 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.

Taking part in the annual kiwi census or doing regular birdcounts will also help to determine if bird populations are recovering (See www.formak.co.nz or more information on monitoring methods).



Photo: Riverlands Landcare Group

2.3 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.

Traps should be 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. Fresh bait is essential as it is easy to create trap-wise cats if unpalatable bait is tasted and then the cat escapes. Cat biscuits in peanut butter is commonly used.

Control methods for cats include:

- Steve Allan Feral Cat Trap – a new easy to set kill trap getting great results
- SA trap – formerly the conibear trap elevated 70 cm on narrow ramp, e.g. fence post stay, sloping ponga trunk, and baited with minced rabbit (not salted). These are effective in controlling cat numbers, but take a reasonable amount of strength and skill to set.
- Victor traps, also elevated and baited with minced rabbit meat, but unlike SA traps require daily checks.
- Timms traps – the opening needs to be widened slightly to accommodate the largest cat head. In kiwi areas these also need elevating; bait with fish.
- Cage traps – treadle spring is better than hook spring, but both work. Bait with fish or rabbit. Must be checked within 12 hours of sunrise by law.
- Shooting

Poisons

The only poison registered for feral cats 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 'submarine' stations. Currently, in order to use this toxin it is a legal requirement that all land owners within 3km of bait stations must be notified.

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

- Locate traps at forest/pasture margins, along tracks and on sunlit logs
- Fresh meat is required – never use salted or preserved bait in traps in which the animal must actually fire the trap by coming into contact with the bait (eg SA Cat trap).
- Minced rabbit best for Conibears/SA Cat Traps
- A mixture of cat biscuits and peanut butter or fat is a good longer lasting alternative (although this will increase the possum and rat bycatch/interference.)
- Salted bait (e.g. pilchards) is good for legholds and treadle operated cage traps but alternating with rabbit is recommended Canned fish is OK for conibears
- 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.

Steve Allan Feral Cat Trap

Steve Allan Feral Cat Traps are an easy to set kill trap that have been getting great results. They are mounted either directly on accessible tree branches or on fence palings screwed into trees to act as ramps at 45 degree angles. Baits that can be used include:

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

The wooden platform under the trap soaks up oils and scents from these baits so that the trap remains attractive to cats, even if rats have removed the bait.

These traps are also good at catching possums, and even the odd rat. Nearby cats will feed upon these carcasses, which are then acting as a prefeed attracting the cat back to the site.

Tips and Tricks

- To prolong the life of your trap, do not set it off empty. Traps can be unset by placing your hand on top of the trap, releasing the side trigger, and gently easing the trap open



Steve Allan Feral Cat Trap. Photo: Whareora Landcare

SA 'ConiBear' Traps

These are very effective traps when set correctly – but near enough is not good enough. If not set correctly they won't catch or worse, will produce trap shy animals! The trap must be set at least 700mm off the ground. Spraying the trap with black enamel paint can improve the catch rate.

Ramp

- Angle of the ramp should not exceed 35 degrees.
- Ramp should not be more than 100 mm wide (wider ramp gives more room for rats and target species to go around the side of the ramp and remove the bait without being caught.) Fence battens make good ramps.
- Make sure it is wide enough for a large cat to get up

Mounting plate

- Secure the trap plate firmly to the tree using screws.
- Choose a straight tree that will let the trap sit as close to the trunk as possible.
- Nail the chain higher up than the trap so that caught animals will hang down.
- The holding plate for the trap should be hard against the top of the ramp – not above it. Push the trap firmly into the plate so it sits at the back and doesn't wobble.
- Ensure the lip of the plate faces upwards slightly – just press down and pull up on the two bottom lips on the plates to realign them.

Trap set

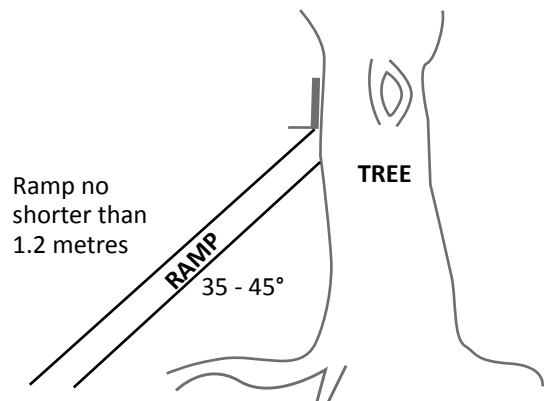
- Have the trigger wires splayed so they section the trap into thirds.
- The trigger pins should be level with or slightly forward of the front of the trap. The spring should be on a 45 degree angle down once set.
- Oil the trigger system (drop of engine oil) at each check – especially if a possum or rat has been caught in the trap.
- Sometimes need to use a chainsaw file in the groove if they become too sensitive - but don't over file! Don't file the back of the washer as it is critical to making the trap go off.

- If the trap will not set try setting the trap with the dog set outside the washer. If the dog is the problem then the trap will keep going off set this way. If the washer is the problem then the trap will stay set.

Bait placement

- The bait should be placed on the plate and going up the tree above the plate. Bait can also be spread on the ramp as a lure. The bait must be behind the trigger mechanism.

Typical trap set for an SA 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.

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!).

2.4 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. Both species are rapid breeders, with ship rats being able to breed at 2-4 months of age and have 3 litters per year, each with about 5 young. They can live for 1-2 years. Ship rats are usually the most common rat species in Northland forests.

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 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, scrublands, 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.

How to tell wthe 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 (~ 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.

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 will be taking most of your bait.

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 kukupa 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 skinks, rats should be controlled year round.



Ship Rat

Norway Rat

Table 3: Some examples of rat control objectives and requirements

Objective for rat control	Requirements for control	Other comments
Kukupa 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.

Bait station and trap layout

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! 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
- Two streams meet.

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.

Rat Poison – Ratabate

Ratabate uses the first generation anticoagulant diphacinone. Diphacinone breaks down quickly in the food chain and is far less persistent than brodifacoum. First generation anticoagulants are a multiple feed toxin. Rats must feed on the poison for at least five days and bait stations must not be allowed to become empty during this period to ensure rats ingest sufficient poison to kill them. Overseas, rodents have become resistant to first generation anticoagulants after poor baiting strategies.

It takes about 5 -8 days for the rats to die. 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 must be collected and removed from operational area. This reduces the chance of rats being exposed to poor quality or old bait and the time toxin is in the environment.

Only fresh bait should be used. Bait that has previously been in the field must not be reused. This ensures high bait palatability, which has a direct influence on success. Old baits are likely to have mould growth and be less palatable.

Ratabate is attractive to possums but does not kill them. Possum control should be continued to keep possum numbers low while using Ratabate.

Bait stations

Bait stations can be made of Draincoil or PVC pipe. These bait stations:

- allow rats easy access but limits access by non-targets, eg possums or kiwi
- protect bait from the elements,
- limit bait spillage,
- don't get blocked easily,
- are easy to fill (and transport when establishing the network),and
- are long lasting.

To prevent non-target animals such as possums or native birds accessing the bait, use at least 500mm long lengths of draincoil. Secure the draincoil to the ground at each end, using wire pins. This will help to prevent animals such as pigs or possums

removing the bait station, as well as present an obstacle to long billed birds such as kiwi (or inquisitive weka!).

How to use draincoil bait stations and Ratabate

- 1) New stations should be set up prior to toxin being placed to allow the stations to 'weather' and 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
- 2) 'Prefeed' the bait stations with a teaspoonful of peanut butter halfway up the drain coil so that rats get to know that the bait stations contain food and get used to feeding from them.
- 3) Initial knockdown: Put gloves on. Place 70-80g of Ratabate paste in the center of each bait station. Check and refill as often as possible for the first five days. THIS IS CRUCIAL!
- 4) Leave bait stations for 10 days, then refill bait stations. Check after 2-3 days. If not much bait has been taken leave for a month. If most of the bait is gone, rebait and keep filled for the next 5 days, then leave for 10 days. Repeat this step as often as necessary till the bait is no longer being eaten by rats in large amounts. Additional bait stations may need to be used if bait take does not reduce.
- 5) Maintenance: Check, remove old bait and refill bait stations every 6 weeks until beginning of February.
- 6) Operation completed: Remove all old bait – leave bait station coil in place if still in good condition.

Limitations

- The method is labour intensive and relatively expensive in the first year because of initial setup of lines and bait stations
- Labour costs increase in difficult terrain.
- Rat populations bounce back within months once control is stopped
- Mouse numbers may increase after rat control.
- There is a small risk to native birds if they feed from the bait stations or if baits are spilt

Trapping

In areas with high rat numbers trapping may be time consuming and expensive, so a toxin may have to be used first to reduce rat numbers. Trapping can then be used to keep rat numbers low. Commonly used rat traps include the Snap-E and Victor.

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

- i) orientate the animal relative to the trap,
- ii) disguise and protect the trap, and
- iii) 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 dryer, 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.



Phillip Smith from Waimate North Landcare resets a SnapE rat trap.

Rat trapping tips:

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

Baits and Lures

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

Baits or lures may need to be alternated over the duration of control programme in order to attract rats with different preferences!

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.
- Pig and possum interference with covers can be a problem.
- Mouse numbers may increase after rat control.



Victor Rat Trap

Monitoring

To gauge the success of your rat control, use 'tracking tunnels' before and after the control program. Record the number trapped 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 birdcounts can help to monitor bird populations over time (See www.formak.co.nz or more information on monitoring methods).

2.5 Mice

The impacts of mice on native plants and animals are poorly known, but they appear to be able to have serious impacts on small invertebrates, e.g. weevils, as well as some lizards and plant germination rates. 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.

2.6 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 traps, Timms and cage traps (baited for cats) and Victor traps and 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.

2.7 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.



Hedgehog.

2.8 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.

2.9 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 exposed to 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.

2.10 Rabbits and hares

Rabbits and hares have the potential to impact on sensitive plants such as orchids and dune plants, and can potentially 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)
- Shooting, particularly spotlighting shooting, but this needs to be sustained
- Carefully planned release of the calici virus, which may provide temporary benefit.

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.

2.11 Wasps

There are two 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.

Control methods for wasps have not yet been perfected on a large scale and even efficient destruction of colonies may not greatly reduce local wasp densities. However, control methods that can provide some relief include:

- Night-time application of carbaryl powder in ground or tree hole nests of *Vespula* wasps (refer NRC Animal Pests Fact Sheet).
- Night time spraying of paper wasp nests with insecticide.
- In all cases operators need to wear sting-proof clothing.

2.12 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.

Traps:

'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.

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' single-capture, split-perch Magpie/Myna trap. Photo: Adrian Gilbert



'Pee Gee' continuous-flow Indian Myna trap. Photo: Adrian Gilbert

3 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 Licence and if signage and approval is needed when planning any pesticide operations.

Using Ground based toxins:

Ground based toxins are commonly delivered via permanent baitstations 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. Bait stations can pose a threat to native birds where birds learn to feed from stations, or when bait is spilled.

Not all ground based toxins require bait stations. However, ground based toxins risk animals receiving sub-lethal doses and becoming bait-shy. It is therefore necessary to vary the toxin used every few years. Having a bait station network gives more flexibility over which toxin can be used in any given year.

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.

The table below 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
Cholecalciferol	Feracol Kiwi Care Gel	Possum Rat	No	No	Occurs naturally as Vitamin D ₃
Coumatralyl		Rat Mouse	?	No	First generation anti-coagulant
Cyanide	Sodium cyanide Potassium cyanide	Possum	No	Yes	
Diphacinone	Ratabate	Ferret Rat Mouse	No	No	Rats need multiple feeds to receive a lethal dose. Possums are relatively resistant and can eat large quantities, reducing bait availability to rats.
PAPP	Para-aminopropiophenone	Feral cat Stoat	-	Yes	
Pindone		Possum Rabbit Rat	Low	No	Rats need multiple feeds to receive a lethal dose. are relatively resistant and can eat large quantities, reducing bait availability to rats.
Sodium nitrite		Possum Pig	?	?	Still in registration process

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

First generation anticoagulants include Diphacinone (Ratabait and Ditrac), cholecalciferol (Feracol and Kiwicare gel). Pindone and Warfarin products are best utilised and alternated each year.

Second generation anticoagulants include brodifacoum (Talon/Pestoff), coumatralyl (Racumin), bromadiolone (Rentokil rid rat). It is not recommended to use these toxins on an ongoing basis due to their accumulative nature and persistence in the environment. Scientific research has shown that brodifacoum in particular bioaccumulates in native wildlife such as kiwi and morepork.

4 Health and Safety

- Tell someone where you are going and when you expect to return!
- 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 disposable gloves for all handling of traps and dead animals.
- Use water-proof bandaids over cuts and wash your hands before eating or smoking (note the latter is also a hazard!).
- Alcohol based anti-bacterial wipes in sachets are a good way to sterilize your hands before eating in the field.
- Follow instructions on labels.

5 Recording results

Results recorded from pest control programmes can provide a useful source of information on predator populations, maintain the enthusiasm of Landcare group members not actively involved in trapping and be crucial for obtaining and maintaining funding. Standard recording sheets are available from the NZ Landcare Trust, or see the examples below.

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!

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. The amount of bait or

toxin taken by pests from bait stations in regular pulsing operations can be used to give a broad index of relative population levels. For example, declining levels of bait take suggest falling pest population levels.

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.

The location of bait stations and traps should be marked on a topographical map of the area, and ideally recorded using a GPS. As well as helping to ensure the correct density of traps and bait stations this is also essential information for health and safety reasons.

Baitstation Record Sheet (Use a new form at the beginning of each month)

Operator: _____

Location: _____

Form No. _____

Date	Property	Line	Bt stn no.	Poison used	Amount applied	Amount removed	Notes

6 Product Suppliers

The Biosecurity team at the Northland Regional Council also 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: Suppliers contact details

Supplier	Toxin (active ingredient)	Traps	Other	Contact details
Adrian Gilbert		PG Myna Trap		PO Box 7174, Tikipunga, Whangarei 0144 Phone: 09 434 3110 Mobile: 021 566 747 Email: adriangilbert@xtra.co.nz
Animal Control Products	Pest Off Rodent Blocks (Brodifacoum) Decal Possum Bait (Cholicalciferol) Pest Off Brodifacoum Possum Bait Cyanide Possum Paste			Private Bag 3018, Wanganui Phone: 06 344 5302, Web: www.pestoff.co.nz, Email: info@pestoff.co.nz
CMI Springs		Trapinator DOC 200 trap DOC 250 trap		Phone: 09 5794089 Web: www.cmisprings.com
Connovation	Feratox (Cyanide) Feracol (Cholicalciferol) Ratabate (Diphancinone)	DOC 200 Live Capture Cage Trap SnapE Rat Trap Victor Leg Hold Magpie Trip Trap	Bait stations, repellents, monitoring equipment, Chew cards, Wax Blocks, Erayz rabbit paste/blocks, Smooth in a Tube/Ferafeed paste. Poison notices	PO Box 58613, Botany, Manukau 2163 Phone: 09 273 4333 Web: www.connovation.co.nz Email: info@connovation.co.nz
Geosystems			Flagging (coloured) marking tape, survey equipment	PO Box 33-970, Takapuna, Auckland 1332 Phone: 09 915 6760 Web: www.geosystems.co.nz Email: sales@geosystems.co.nz
Grantley Imports		SnapE Rat Traps Victor Rat Traps Mice Traps	Replacement parts for Victor Rat trap, Corflute Rat Trap Tunnels	Carol Johnson PO Box 18161, Glen Innes, Auckland 1072 Phone: 09 5270308 Mobile: 021 622 149 Web: www.grantleyimports.com

Table 5: Suppliers contact details continued

Supplier	Toxin (active ingredient)	Traps	Other	Contact details
Haines Pallet Co Ltd		DOC 200 DOC 250	Trap boxes	Greg Haines Phone: 04 568 6898 Email: haines.pallets@xtra.co.nz
M. S. Woodcraft		Victor Leg Hold Live catch animal cages Conibear		128 Marine Parade, Mt. Maunganui Phone: 07 575 5920 Web: www.victortraps.co.nz Email: mswoodcraft@xtra.co.nz
Pest Control Research Ltd		Sentinel DOC 200 DOC 250 Leg Hold		PO Box 7223, Christchurch 8035 Phone: 03 372 1580 Email: info@pcr.co.nz Web: www.pestcontrolresearch.com
Pest Management Services	Pest Off (Brodifacoum) Pindone for Rats and Possums	DOC 200 DOC 250 Fenn Leg Hold Timms Sentinel Live Capture Cage Traps Trapinator	Repellents, bait stations, trap boxes and tunnel covers	P O Box 121, Waikanae, Kapiti. Phone: 0800 111 466 Web: www.nopests.co.nz Email: sales@keyindustries.co.nz
Philproof	Contrac (Bromadiolone) Ditrac (Diphacinone) Pest Off (Brodifacoum)	Timms Fenns Victor Leg Hold Victor Rat Trap	Bait stations, trap covers, monitoring equipment	Brooke Keith P.O. Box 4385, Hamilton, 3247. Ph/Fax: 07 859 2943 Mobile: 021 270 5896 Web: www.philproof.co.nz Email: philproof.feeders@clear.net.nz
Trapper Cyanide	Cyanide	Leg Hold Live Capture Cage Trap	Bait stations, flavoured oils	303 Laidmore Rd, Amberly, Christchurch Phone: 03 314 9940 Web: www.traps.co.nz Email: sales@traps.co.nz

Pest Control Guidelines, Northland 2015.

Produced by NZ Landcare Trust, PO Box 4305,
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www.landcare.org.nz.

References and information sources

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

- Biodiversity Technical Guidelines
- Kiwis for Kiwi Trust
- Landcare Trust Trapper Training Workshops from 2005 – 2014
- Northland Regional Council Biosecurity team
- Pateke Survival Guide, DOC 2011.
- Restoring the Balance: Northland Biodiversity Self-Help Kit

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