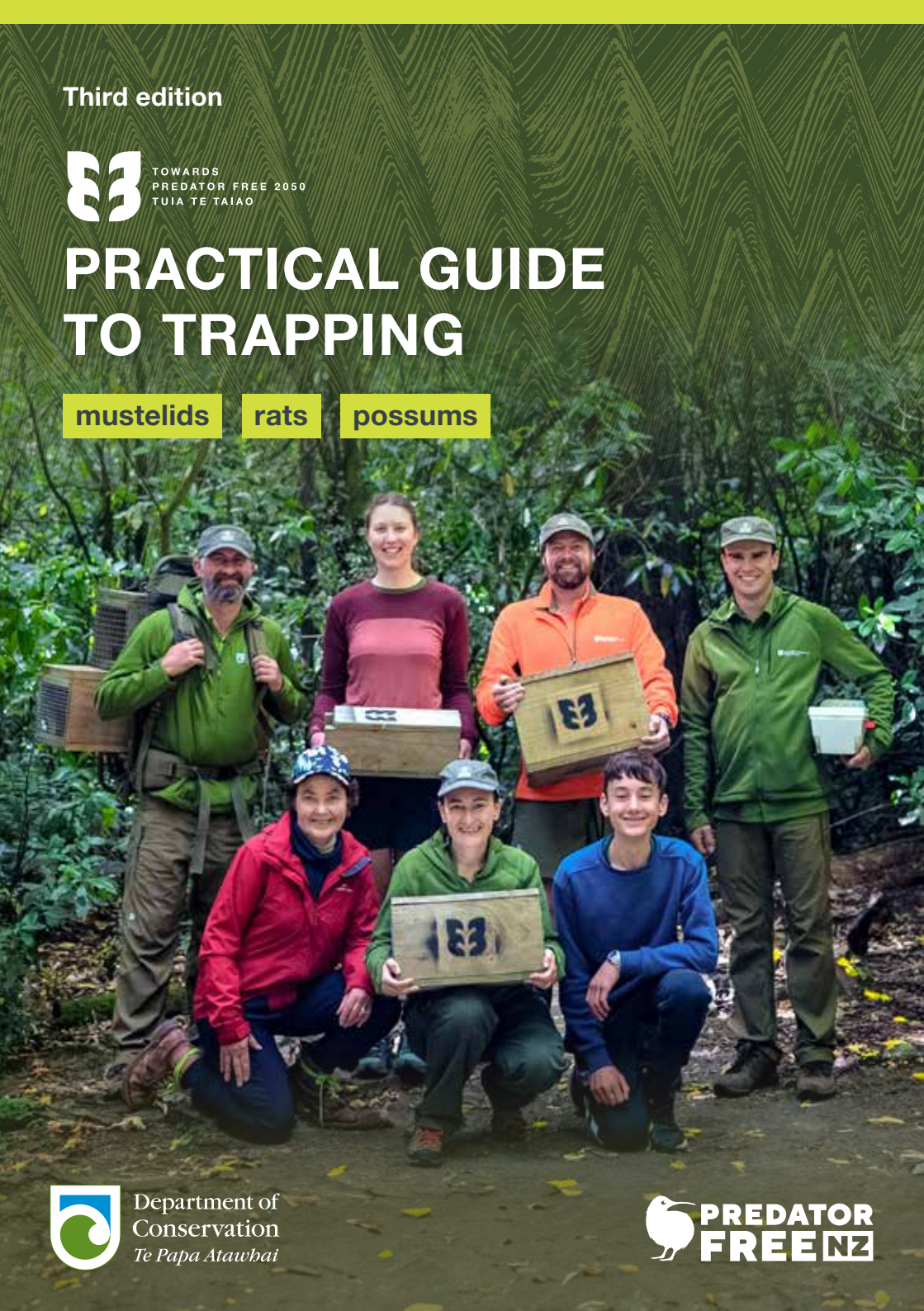
Third edition

TOWARDS
PREDATOR FREE 2050
TUIA TE TAIAO

# PRACTICAL GUIDE TO TRAPPING

**mustelids** **rats** **possums**



Department of Conservation
*Te Papa Atawhai*

PREDATOR FREE NZ

Aotearoa New Zealand's unique and ancient native species of plants and animals will be safe from extinction and flourishing once more, if our lands are free of predators.

Predator Free 2050 (PF2050) is a coordinated nationwide goal to eradicate mustelids (stoats, ferrets and weasels), rats and possums from mainland New Zealand by 2050.

Predator Free 2050 builds on the achievements of hundreds of scientists, ecologists, iwi and community conservationists and is inspiring thousands more to join the movement. It offers the unifying vision of an endgame, and an action plan to win it. That culture of care and responsibility to nurture the welfare of the land and, by extension, the people, is called kaitiakitanga.

Whakahokia mai ngā reo karanga o te ngāngara, o te mokomoko, o te pekapeka, o te manu ki te ngāhere, ara ki te wao nui a Tānemāhuta, pamu, me ngā tāone.

Return the voices of the insects, reptiles, bats and birds back to the forests, farmland, towns and cities.

Cover Photo: DOC and community trapping in Ōtautahi, Christchurch. *Photo: DOC*

Right: Miromiro / tomtit. *Photo: Shellie Evans*

# Tohu

Aotearoa has the ambitious goal to be a predator-free nation. We will rebalance our natural environment so our native species thrive alongside us.

To succeed, we must come together and support the cause however we can. The tuia te taiao tohu (symbol) reminds us why we are working towards a Predator Free 2050. It shows our support for the journey through to 2050 and connects us all to this kaupapa. It is for all Aotearoa.

Use the tohu to show your connection to the national PF2050 movement and the mahi (work) you are doing to reach the predator-free goal.

Our native species are a part of our natural whakapapa. They are our family, our equals, our ancestors. We have a binding responsibility to them – just as we do to our own whānau. When our native species flourish alongside us, our bonds will be strengthened. People young and old will feel a sense of wonder and connection.

***To succeed, we need to unite.***
***We all have a role to play.***
***People. Nature. Together we flourish.***
***Tuia te taiao.***

**www.tuiatetaiao.nz**

# 1. Foreword

The 'Predator Free 2050 Practical Guide to Trapping' was developed by the Department of Conservation (DOC) to support your valuable mahi (work) in protecting Aotearoa New Zealand's unique and highly vulnerable native taonga species.

Your predator control mahi is an extremely important contribution toward the country's vision of a flourishing natural heritage arising from a Predator Free New Zealand – thank you!

This concise guide gives you access to DOC's best-practice trapping techniques for mustelids (stoats, ferrets and weasels), rats and possums, including technical advice on a range of trapping subjects, in an easy-to-use booklet.

The guide includes all the information you will need to start your own trapping programme, no matter how big or small. You will learn to identify your target predator, how its natural behaviour is likely to affect your trapping, which traps and bait to use, and where and how to place your trap network.

The guide also covers the importance of pre- and post-predator control monitoring. It describes how to monitor outcomes (species you want to protect) and results (species you want to control or remove).

For any further information on trapping or the contents of this guide, please contact your local DOC Office or visit the Predator Free 2050 online toolkit: **www.doc.govt.nz/nature/pests-and-threats/predator-free-2050**.

# 2. Our vulnerable native taonga – wildlife

Before the arrival of humans, the only native land mammals in New Zealand were three species of bats; New Zealand was primarily a land of birds, small lizards and invertebrates. Our native species evolved without mammalian predators, making them especially vulnerable when these animals arrived.

Due to our country's unique natural history, our extinction rates are among the highest in the world. This is largely due to the impact of introduced predators, invasive species and loss of habitat.

The Aotearoa New Zealand Biodiversity Strategy identified introduced invasive species as one of the five key pressures effecting New Zealand's indigenous biodiversity. The species that are targeted in the Predator Free 2050 programme are known to be three of the most damaging invasive predators for New Zealand's native biodiversity, which is a problem that only intensifies the impacts of climate change.

These guidelines focus on trapping mustelids (stoats, weasels and ferrets), rats and possums – three of the most damaging predators of New Zealand's wildlife.

Female kea feeding its chick in Fiordland. *Photo: James Reardon* ©

# 3. Staying safe

If you're a volunteer, you must take reasonable care of your own safety and take care not to do anything that could harm another person – **www.worksafe.govt.nz**

Volunteer trappers. *Photo: New Plymouth Boys High School*

Working in the outdoors, and in different environments, presents a range of hazards and conditions that will require a comprehensive health and safety plan. Changing weather conditions, difficult terrain, and working close to coastlines and waterways will present new challenges for many volunteers. Risk assessment and risk management strategies (including training) need to be applied to all potential hazards.

In your role as a volunteer trapper you will be required to recognise these hazards and manage the risks they present.

Most community groups will have a health and safety plan in place. You should be familiar with this plan and refer to it often. A safety talk at the start of volunteer activities will ensure the correct personal protective equipment is being used, identify any new risks on the day, and inform any changes that need to be considered to reduce those risks prior to undertaking the work. For example, the risks of disease from handling carcasses and injury from traps are unique to trapping and should be addressed in your health and safety plan.

Measures taken to reduce risk of harm or injury include advising volunteers to wear gloves or use hand sanitiser, and to use safety clips when clearing traps.

For further information on your responsibilities as a volunteer, search for 'volunteer' on the WorkSafe New Zealand website: **www.worksafe.govt.nz**

For advice on outdoor health and safety, and planning a trip to remote trapping locations, visit **www.mountainsafety.org.nz**

Safety meeting. *Photo: Kaitake Ranges Conservation Trust*

# 4. Know your target predator

## Mustelids – stoat (*Mustela erminea*), ferret (*Mustela furo*) and weasel (*Mustela nivalis*)

This section deals with three of the most damaging predators. Predator Free 2050 aims to eradicate mustelids, rats and possums from New Zealand. For information on other predators, visit **www.doc.govt.nz**

Weasel (back), stoat (middle), ferret (front). *Photo: Alaine Holdom (DOC)*

Mustelids (Mustelidae) are a diverse group of small- to medium-sized carnivores. In the 1880s, three species were introduced into New Zealand to control the burgeoning rabbit population – stoat, ferret and weasel. All have a characteristically long body, short legs and sharp, pointed faces.

All three mustelid species are established in the North and South Islands, and stoats have also reached some of the nearer offshore islands unassisted. All three species are absent from Great Barrier Island (Aotea), Stewart Island/Rakiura and the Chatham Islands.

**Table 1. Mustelid fact comparisons**[1]

| | Stoat | Ferret | Weasel |
|---|---|---|---|
| **Average male weight** | 324 g | 1200 g | 126 g |
| **Average female weight** | 207 g | 600 g | 57 g |
| **Average life span** | < 1 year (max 3–8) | < 1 year (max 5–10) | < 1 year (max 2–3) |
| **Breeding season** | September to November | Usually September to October but can last longer | September to March |
| **Usual number of litters per year** | 1 | 1 (max 2) | 1–2 (max 3) |
| **Usual litter size** | 8–10 (max 20) | 4–8 (max 12) | 3–6 (max 11) |
| **Juvenile dispersal** | Most often December to January but sometimes can start in November | February to March | January to March |
| **Known dispersal distances** | Up to 65 km | Up to 45 km | None published |
| **Average home ranges (min–max)** | Males 147 ha (16–313) Females 79 ha (9–127) | Males 200 ha (80–760) Females 122 ha (45–230) | Males 1–192 ha Females < 1–29 ha (Not averages, but min–max from overseas studies) |

[1] Details in this table and elsewhere in this section on mustelids were obtained from 'Pest mustelids: monitoring and control' (National Pest Control Agencies 2018, available from **www.bionet.nz/library**) and 'The handbook of New Zealand mammals' (King, C.M. (Ed.) 2005, Oxford University Press).

# Stoats (*Mustela erminea*)

Stoat. *Photo: Tim Sjoberg (DOC)*

Stoats are ferocious predators and the number-one killer of many of New Zealand's endangered native species.

## Identification

- Stoats have long, thin bodies and sleek, pointed heads.
- They are smaller than ferrets. Male stoats grow up to 30 cm long and females up to 25 cm.
- Their ears are short and rounded.
- Their face, upper body and legs are brown while their chin and lower body are creamy-white. Some stoats may be white or pied in winter, particularly at high elevation in the South Island.
- Their tails are relatively long and have bushy, black tips.

## Habitat

- Stoats will live in any habitat where they can find prey. They can be found in rural communities where they will prey on domestic fowl, along coastal areas and beaches, in remote high country and at any altitude up to and beyond the treeline, in any kind of forest.
- Stoats are more common than ferrets and weasels in forest habitats.
- Stoats do not make their own dens but take over those of other animals. Den sites are well hidden and include holes and cavities in tree trunks and amongst roots, rabbit burrows, ditches and piles of logs.
- Stoats can tolerate extremely wet weather (eg > 6000 mm rain p.a. in Westland and Fiordland) and moderately dry conditions (eg < 500 mm rain p.a. in parts of Otago and Canterbury).

## Behaviour

- Stoats are agile climbers, semi-arboreal (can live in trees) and hunt at any time, day or night.
- Adult stoats live in separate home ranges for most of the year. These often overlap, particularly between sexes. The size, length of tenure and pattern of use of home ranges depend largely on the distribution of prey.

- Female stoats move about less during the breeding season (from September to November) and those with small young are likely to stay close to dens unless moving to new den sites.
- Breeding females and any juvenile females in dens will be impregnated by adult males. Female juveniles are usually pregnant before they become independent. Average annual litter size is 8–10 (max 20).
- Females caught between November and August inclusive are almost always (>99%) in the pre-implantation phase of pregnancy. This means they carry anywhere up to 8–10 fertilised eggs ready for implantation in the uterus.
- Stoats communicate through scent marking, which is thought to convey information on social and reproductive status and, possibly, individual identity, allowing subordinate animals to avoid conflict with larger individuals.
- Stoats are prolific breeders. Young males mature when they are 10 months old. Males search for females actively during the breeding season but do not establish even temporary bonds with them and take no part in rearing the young.
- Stoats can reach islands by swimming across water gaps of up to 1.5 km and possibly further. A stoat may be able to reach land at a greater distance than it can swim by 'rafting' on floating material (such as driftwood logs).

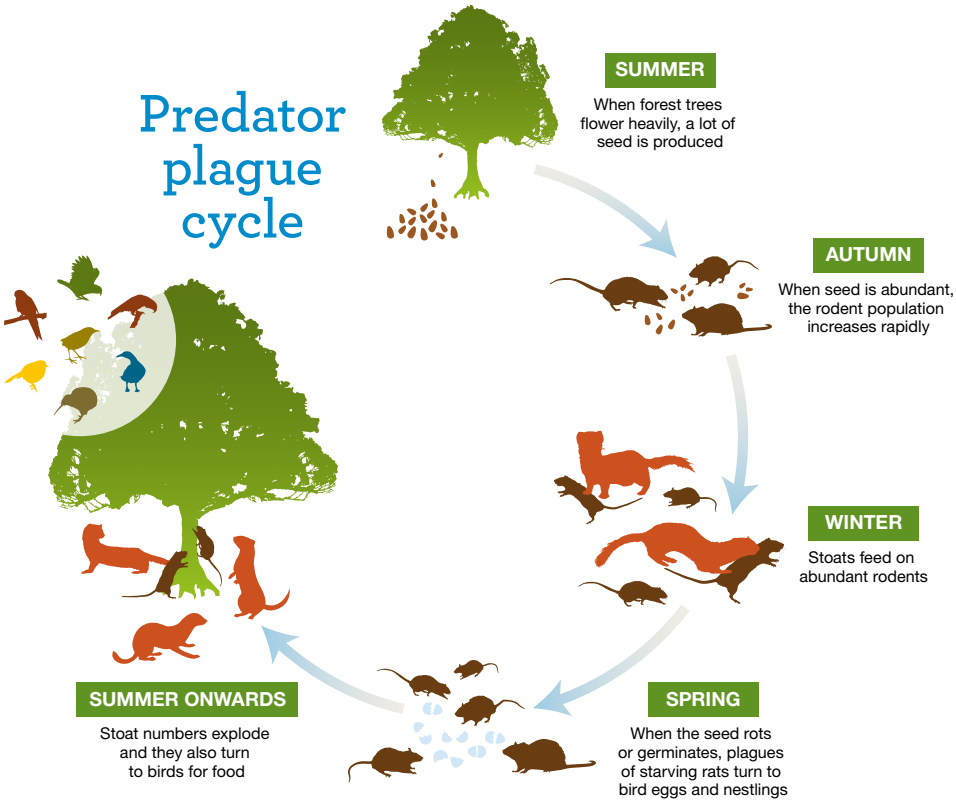
## Threat

- The serious effect of stoat predation on the survival of many of New Zealand's bird species cannot be overestimated. They are voracious and relentless hunters.
- Stoats are a serious threat to kiwi chick survival rates. In areas where they are not controlled, stoats can kill up to 95% of North Island brown kiwi chicks hatched annually before they are able to reach a stoat-proof weight of >1000 g.

Northland brown kiwi. *Photo: Tui De Roy (DOC)*

- They have a significant effect on coastal bird species such as wrybills, New Zealand dotterels and black-fronted terns. Forest birds that nest in holes in tree trunks (such as mohua, kākā and kākāriki) are particularly vulnerable to stoats, which can destroy eggs, chicks and incubating adults in one attack.
- Stoats are implicated in the extinction of a South Island subspecies of bush wren, the laughing owl and New Zealand thrush.
- Stoats, rats and mice form a complex predator-prey relationship in association with beech tree seed production. In periodic 'mast events' – when high levels of beech seed are produced – rat numbers explode. As their main prey becomes more abundant, stoat numbers also increase. Later, when the seed supplies run out and rat numbers drop, the hungry stoats turn their attention to birds, insects, bats and landsnails.

## Predator plague cycle




*Predator plague cycle diagram: DOC*

# Ferrets (*Mustela furo*)

Ferret. *Photo: Michelle Bridge (DOC)*

Although rabbits are the main diet of ferrets, this mustelid will attack, kill and eat native species.

## Identification

- Ferrets are the largest of the mustelid species in Aotearoa New Zealand. Male ferrets grow up to 44 cm long and females up to 37 cm.
- Ferrets have creamy-yellow undercoats and longer dark guard hairs which give them an overall dark appearance.
- Legs and tail appear darker than the rest of the body.
- Face is lighter in colour than the body, with a dark mask around the eyes and across the nose.

## Habitat

- Ferrets are not as widespread as stoats.
- It was originally thought that ferrets were limited to open country like pasture, scrubland and coastal areas, and on the fringes of forests; however, recent research has found them within some Northland forests, where their presence would add to the pressure on already threatened kiwi populations.
- Ferrets are generally absent or in low numbers in places where rainfall is high, where there are few rabbits, or deep within forested areas.

- In the 1980s, at least 17 ferret farms were established in Northland. When these closed due to a downturn in the market, many ferrets escaped or were set free, which likely contributed to the northward expansion of ferrets into some of New Zealand's remaining prime kiwi habitat.

## Behaviour

- Ferrets are mainly nocturnal. Unlike stoats and weasels, ferrets are not good climbers.
- Individual ferrets will usually exclude others of the same sex from their central home range. They use their scent glands extensively to leave territorial scent markers.
- Ferrets usually mate in September. The litter, usually of 4–8 (up to 12), is born in October or November, with young becoming independent by late January. Females can have a second litter after this if food is abundant. There is high mortality in the first year, and an average lifespan in the wild may be 4–5 years.
- Ferrets will often revisit the site of a kill.
- The main foods of ferrets are rabbits and hares. Densities of ferrets seem to be strongly correlated with density of rabbits. A sudden reduction in rabbit numbers results in hungry ferrets attacking other animals (such as threatened native species).

## Threat

- Ferrets are a significant pest of both conservation and economic importance in New Zealand. They prey on indigenous wildlife and also carry bovine tuberculosis (Tb).
- Ferrets are a serious threat to adult kiwi. They dramatically reduce kiwi life expectancy from 30+ years to only 12 years. In some North Island brown kiwi populations ferrets have caused sudden population decline by killing large numbers of the resident adult birds.
- Ferrets are known to prey on royal albatross chicks, yellow-eyed penguins and little blue penguins, weka, North Island brown kiwi and numerous freshwater wetland birds (eg ducks).
- They are considered to be one of the major causes of decline of the white-flippered penguin, and along with cats have contributed significantly to a decline in the distribution of grand and Otago skink populations.

# Weasels (*Mustela nivalis*)

Weasel with egg. *Photo: DOC*

Weasels are found in low numbers in most habitats in New Zealand. They pose a significant threat to native wildlife.

## Identification

- Weasels are the smallest and least common mustelid in New Zealand. Males grow to about 20 cm long.
- Weasels are brown on their upper bodies and white below, similar to stoats.
- Their tails are short, brown and tapering.
- To identify a weasel from a stoat, a weasel does not have a bushy black tip at the end of the tail and a stoat does.

## Habitat

- Weasels are found in low numbers in most habitat types in the North and South Islands but are not present on Stewart Island or on offshore islands.
- In New Zealand, weasels are less common than stoats and ferrets and may be displaced by stoats.
- Weasels have been observed in forests, tussock grasslands and farmland. They are more common in rough grassland than stoats, possibly because of the abundance of mice, their preferred prey, in grassland.

## Behaviour

- Weasels can be active during the day and the night.
- Their breeding season is from September through to March and a female can have up to three litters during that time. Litter sizes average 4.5 kits.
- When food is abundant, female weasels can breed in their birth year.
- While mice are their preferred food, weasels are also known to eat birds, mice, geckos, skinks and invertebrates (including wētā).

## Threat

- Weasels, being smaller, less common, more patchily distributed and present at much lower densities than the other mustelids in New Zealand, are thought to pose a less significant conservation risk. However, they are known to have adverse impacts on lizard, invertebrate and bird populations.
- In particular, weasels may damage small and localised populations of endangered species such as Whitaker's skink. On the mainland, predation pressure and loss of habitat has reduced Whitaker's skink to a single remnant population that remains under constant threat from weasels, rats and mice.
- While weasels are not able to tackle the larger bird species (eg adult takahē and kiwi) that are preyed upon by stoats and ferrets, they will tackle prey much larger than themselves, so many nesting birds are easy targets.

Three weasels on the boardwalk at Pauatahunui Inlet, Porirua. *Photo: Brent Higham*

# Rats – ship rat (*Rattus rattus*), Norway rat (*Rattus norvegicus*) and kiore (*Rattus exulans*)

Three species of rats have been introduced to New Zealand: the ship rat (sometimes referred to as black rat or roof rat), Norway rat (often called brown rat, water rat or sewer rat) and kiore (also referred to as Pacific rat, Māori rat or native rat, even though they are not native to New Zealand). It is thought that kiore arrived with the first Polynesian settlers, about 1250–1300. Ship rats and Norway rats arrived with the first Europeans and spread quickly.

## Home range

- Noway rat: 0.8–21 ha
- Ship rat: 0.3–11.4 ha
- Kiore: Data unknown

## Identification


Comparison of *Rattus*. *Photo: C. Mahoney*

The three colour morphs of ship rat found in New Zealand. *Photo: John Innes, Landcare Research*

Two ship rats preying on a thrush nest. *Photo: Ngā Manu Images ©*

**Table 2. Identification of New Zealand rats[1]**

| | **Ship rat** *Rattus rattus* | **Norway rat** *Rattus norvegicus* | **Kiore** *Rattus exulans* |
|---|---|---|---|
| **Normal adult weight** | Up to 215 g | Up to 450 g | Up to 187 g |
| **Max. body length (HBL)** | 230 mm | 275 mm | 185 mm[2] |
| **Tail length** | Much longer than HBL. Uniformly coloured. | Clearly shorter than HBL. Thick with pale underside. | Slightly shorter or longer than HBL. Thin and uniformly dark. |
| **Ears** | 19.0–26.0 mm, cover eyes when pulled forward. Fine hairs do not extend beyond edge of ear. | 14.0–22.0 mm, do not cover eyes when pulled forward. Obvious hairs extend beyond edge of ear. | 15.5–20.5 mm, cover eyes when pulled forward. Fine hairs do not extend beyond edge of ear. |
| **Adult hind foot** | 28.0–38.0 mm | 30.0–41.5 mm | 24.5–31.0 mm |
| **Colour of upper side of hind foot** | Uniform colouring over whole foot, usually dark. | Always completely pale. | Outer edge dark near ankle, rest of foot and toes pale. |
| **Fur on back** | Brown or black[3] | Brown | Brown |
| **Fur on belly** | Uniform monotone of grey, white or creamy-white | White-tipped grey giving irregular colour. | White-tipped grey giving irregular colour. |
| **Length of droppings** | 6.8–13.8 mm | 13.4–19.1 mm | 6.4–9.0 mm |
| **Number of nipples** | 10–12, usually 10 | 12 | 8 |
| **Habits** | Very agile and frequent climber; rarely burrows; nests mainly in trees and shrubs; infrequent swimmer. | Burrows extensively; climbs much less frequently than other rats; nests underground; very wary; strong swimmer. | Agile climber; digs small holes; nests on ground; or in trees; feeds on ground and in trees; infrequent swimmer. |

[1] Table is from 'Guide to the identification and collection of New Zealand rodents' **www.doc.govt.nz/documents/science-and-technical/rodent-identification.pdf**

[2] The normal maximum weight and head-body length are given for each species. However, larger kiore may be encountered.

[3] There are three colour forms or morphs (not subspecies) of *Rattus rattus*:
(a) 'rattus' – uniformly black back (sometimes has a blueish look); uniformly grey belly
(b) 'alexandrinus' – brown back with long black guard hairs; uniformly grey belly
(c) 'frugivorous' – brown back with long black guard hairs; uniformly white or creamy-white belly.

## Habitat

- Ship rats are found in most habitats and are now the most abundant and widespread rats on mainland New Zealand. They are good climbers and are therefore the rats most commonly found in forests.
- Norway rats are more typically associated with human activity and are usually found in urban areas, wet habitats and on some offshore islands.
- Kiore were once found all around New Zealand and on many offshore islands. On the mainland they are confined to parts of Fiordland, Southland and South Westland. They have some cultural significance because of their association with the migration of Polynesians throughout the Pacific and their value to Māori.

## Behaviour

- Rats have a built-in defence mechanism which makes them wary of new things in their environment. Therefore, new traps, bait stations or tracking tunnels need to be installed a minimum of 3 weeks before you need to use them.
- Rats have a high rate of population increase. Annually they can have several litters and produce 11–16 pups.
- This means control projects must either control continuously or time their efforts carefully to provide protection to native species at vulnerable times (eg for birds during their breeding season).
- Rat food preferences are often passed on socially. This means rats 'teach' others about food sources and this can include their preferences towards poison and baits.

## Threat

- Rats have a major impact in New Zealand because they are omnivores – eating birds, seeds, snails, lizards, fruit, insects, eggs, chicks, larvae and flowers. The varied diet of rats also makes them competitors with native wildlife for food sources.
- Ship rats are widespread in lowland podocarp-broadleaf forests. Because they are good climbers, they can access bird nests high in trees.
- On offshore islands, Norway rats are large enough to kill burrow-nesting adult seabirds and eat their eggs and chicks.

**TOP**
Ship rat eating a land snail.
*Photo: Ngā Manu Images ©*

**BELOW**
A ship rat attacks a fantail/pīwakawaka at its nest.
*Photo: Ngā Manu Images ©*

# Brushtail possum (*Trichosurus vulpecula*)

The brushtail possum was first introduced to New Zealand from Australia in 1837 to establish a fur trade. This release was unsuccessful and a second release 20 years later at the same Southland location was required before they were able to establish.

Brushtail possum. *Photo: Alan Cressler*

## Home range

- **Male** 0.7–3.4 ha
- **Female** 0.6–2.7 ha

## Identification

- Cat-sized marsupials with thick, bushy tails and body fur, pointed snouts, large, fox-like tapering ears and brown eyes.
- Possums in New Zealand have two main colour forms – grey and black, with many variations in appearance.
- Possums have three basic gaits – walking (along horizontal and gently-inclined surfaces), half bounds (jumping from branch to branch or up steeply inclined surfaces or through long grass) and bounds (on vertical surfaces such as tree trunks).
- Their tails are capable of grasping (prehensile) and help maintain grip until all their feet have shifted from one branch to the next.
- The size and weight of possums varies greatly across New Zealand. Adult possums are 65–95 cm long and weigh between 1.4 and 6.4 kg.
- Possums are arboreal (live in trees) and have flexible 'hands' with five independent digits used for clasping branches and holding leaves and other food when eating. Their 'feet' are similar except that the 2nd and 3rd digits are joined for most of their length and the first toe ('thumb') is enlarged and has no claw.

## Habitat

Possums are nocturnal and can live anywhere where there is shelter and a varied food supply. They are now widespread across most of New Zealand. Their preferred habitat is forest, and possum densities can be particularly high in podocarp-broadleaf forests. The margins where forest meets pasture can also support very dense populations.

Possum scavenges an egg at a kererū nest.
*Photo: Nga Manu images ©*

## Behaviour

- Possums, while mainly herbivorous (feeding on leaves but also eating buds, flowers, fruit/berries and nectar) are opportunistic omnivores, readily eating most food they come across in their environment, including eggs, chicks and invertebrates.
- They are nocturnal and usually venture out of their dens to feed just after sunset. They spend most of their time in trees and approx. 10–15% of their time on the ground.
- Possums communicate primarily by smell – scent-marking tree trunks with oil from special glands along with urine and droppings. They also make a range of sounds, including screeches, grunts, growls, hisses and chatters.
- They live in dens, preferably in tree branches or trunks, but also in ceiling cavities of buildings. Individual possums may have several dens and change dens several times per night. However, the dens are not exclusive, with more than one possum using them, but generally not at the same time.
- Juvenile females will establish territories close to their mothers, but juvenile males shift further away. Male possums prospecting new territories are often caught in traps.
- Larger, heavier possums are more dominant, and females will dominate similar-sized males
- The main breeding season is autumn but, in some locations, a second breeding season occurs in spring. Usually only one ‘joey’ is born at a time, though twins do occur occasionally. Young possums become independent at 6–9 months old.

## Threat

- Possums have a significant impact on many of New Zealand's natural ecosystems. They occur in high numbers and their predators, mostly feral cats, do not have much effect on controlling the size of the population.
- While leaves are the main part of their diet, possums will frequently eat other parts of trees or plants (including the buds, shoots, flowers and fruit), which can lead to significant adverse effects on the life cycles of targeted trees and plants. Possums often have 'favourites' (such as mistletoe, rātā, tree fuschia or kāmahi trees), leading to an even greater impact on these species. They also compete with native birds and reptiles for food sources such as nectar.
- In 1993, possums were filmed eating the eggs and chicks of kōkako and this evidence changed many people's views of the threat they posed to wildlife. They eat invertebrates, including wētā, and are significant predators of New Zealand land snails (such as *Powelliphanta* spp.). They often occupy holes in tree trunks for their dens which would otherwise be used by nesting birds such as kākāriki and saddlebacks.
- Dairy and deer farmers have the added worry of possums spreading bovine tuberculosis (Tb). The value of economic losses in primary production associated with damage from and control of possums is in the tens of millions of dollars.

Healthy rātā, Upper Copland. *Photo: Andris Apse*

Possum browse on northern rātā and rimu, Castle Rock, Coromandel, March 2000. *Photo: DOC*

# 5. Monitoring before trapping

## Monitoring needs will vary depending on your site

The following section describes DOC best-practice monitoring techniques and may not be practical for all sites. Monitoring is highly recommended for larger trap networks to inform changes over time and to assist with funding applications. For small sites and backyard trapping, monitoring is not essential, but 5-minute bird counts and homemade tracking tunnels/chew cards can be a fun activity for families.

Before you start monitoring, contact your local DOC office, council office or pest control expert for advice. Trapping is not just about how many animals you catch in traps. It is important to understand the outcomes you are trying to achieve before you commence a new trapping programme. This means monitoring what is present before you start as well as what happens after.

### Why monitor?

Monitoring assesses changes over time in ecological aspects of the area you are trapping and is essential for determining how your trapping efforts are contributing to improvements in the area's ecology.

Examples of what should be monitored include numbers of pests, numbers and species of birds present and vegetation growth at your site. Monitoring should be a key component for anyone undertaking trapping as part of an ecological restoration project.

Kererū can be a good indicator species to monitor. *Photo: Shellie Evans ©*

**You need to monitor native species to:**

- identify which native species are present and in what numbers
- define and track progress toward the desired outcomes for your project
- compare the health of your site with that of others around New Zealand
- evaluate success and know when you have reached certain targets
- build a sense of achievement.

**You need to monitor mammalian predators to:**

- determine what type of traps you will need
- determine which predators are present and in what numbers
- identify pest invasions
- modify how you work (eg increasing or decreasing trap numbers and/or checking frequency because your monitoring results are demonstrating certain trends).

# What is the difference between monitoring outcomes and monitoring results?

## Monitoring outcomes

Monitoring the native species you are trying to protect is known as monitoring outcomes. These are the outcomes you hope to achieve by delivering predator control at your site. You will start by monitoring what species you have at your site and measuring the numbers that are present before you start your predator control. This is your baseline measurement that will show if your predator control is working. An increase in native species at your site after predator control can be instrumental in ensuring successful funding applications and for promoting your group.

Now you have finished your initial monitoring and established what wildlife you need to protect at your site you can work on an outcome statement. This will help you decide which predators you need to target to achieve your desired outcomes.

Examples of outcome statements could be:
1. increased kiwi chick survival rates
2. regeneration of the forest canopy.

We know the biggest threat to kiwi chick survival is stoat predation, so for outcome statement 1 you will be setting up best-practice predator control for stoats.

If our aim in outcome statement 2 is regenerating forest canopy then you would target possums and initiate best-practice trapping for possum control.

Indicator species are species that are sensitive to predators or browsing threat and are representative of the other organisms in the ecosystem, easily observable and able to be sampled. They make a great choice for monitoring outcomes because if they are doing well then the less-sensitive species are likely to be improving in numbers as well. Examples of indicator species include kererū, tree wētā, bellbirds and tree fuchsia.

Whatever species you decide to monitor, there will be a monitoring method available. Visit **www.predatorfreenz.org/toolkits/is-your-predator-control-working**. You may need to discuss what you should be monitoring, and how, with an appropriate expert. Five-minute bird counts are a commonly used method for monitoring bird numbers. They are an easy way to find out which native birds are present and to monitor them over time.

Foliar Browse Index can be used to assess the condition of plants. This technique looks at the impacts of possums on forest health using indicator species, eg tree fuchsia. Other methods are available for lizards, invertebrates, bats, etc.

Whatever monitoring technique you select it must be applied consistently so that the data collected is accurate and the studies can be replicated over time. It is advised that you complete training in these monitoring techniques to ensure your results are accurate. For more information on appropriate courses, visit **www.doc.govt.nz** or **www.nmit.ac.nz**

## Monitoring results

Monitoring results refers to the monitoring of predator/pest numbers on your site. The monitoring methods in this guide are not designed to tell you exactly how many animals you have but looks at how abundant the species is in the area you are monitoring. It is recommended that you monitor before you start and on a regular basis ongoing. The differences you find between your monitoring periods will allow you to see if your predator control is working.

The most common methods of monitoring are tracking tunnels for stoats, weasels and rats, and chew cards or wax tags for possums (and sometimes rats).

Monitoring ferrets is difficult due to the size of tunnels. Trail cameras are an effective, yet expensive, way to monitor them. If you suspect ferrets at your site, contact your local DOC office or pest control expert for advice.

If you only want pest/predator data at critical times, you could monitor during bird breeding seasons or before and after control operations.

For ongoing studies, monitor four times per year: February, May, August and November.

For a clearer picture of fluctuations across the year, monitor once per month or every two months.

Wooden tracking tunnels being readied for deployment. *Photo: DOC*

# How to use tracking tunnels to monitor stoats and rats

## Step 1 – Planning

### Estimate the size of your trapping area

Maintaining monitoring method consistency is the most important factor in allowing your results to be compared. Even if the method you are currently using is a little different to best practice outlined below, it is important that you maintain the method you are using. This will allow you to continue to accurately track changes over time.

The number of tracking tunnel lines you will need to adequately monitor target animals is dependent on the size of the area being trapped (Table 3).

Looking up Nuggety Creek. *Photo: DOC*

**Table 3. Suggested number of tracking tunnel lines to use for surveying both mustelids and rodents**

| Approximate area to be surveyed | ≤300 ha | 300–600 ha | 600–900 ha | 900–1,200 ha | 1,200–10,000 ha | >10,000 ha |
|---|---|---|---|---|---|---|
| Suggested number of tracking tunnel lines for rodents | 6–8 | 8–10 | 10–12 | 12–15 | 15–20 | 20 (or more if logistically feasible) |
| Suggested number of tracking tunnel lines for mustelids | 4–5 | 6–7 | 7–8 | 9–10 | 10–15 | 15 (or more if logistically feasible) |

* This table is reproduced from 'DOC tracking tunnel guide v2.5.2: using tracking tunnels to monitor rodents and mustelids'. **www.doc.govt.nz/Documents/Science-and-technical/inventory-monitoring/im-toolbox-animal-pests-using-tracking-tunnels-to-monitor-rodents-and-mustelids.pdf**

### Layout

- For rodents, 10 tunnels per line spaced 50 m apart and at least 200 m between tunnel lines at their closest point.
- For stoats, 5 tunnels per line spaced 100 m apart and at least 1000 m between tunnel lines at their closest point.
- You can use the same installed lines for either rodent or stoat monitoring (if lines are at least 1000 m apart for stoats) by using every 2nd tunnel when monitoring stoats on a 10-tunnel 'rodent' line.
- Don't place lines in a grid but do run each one straight in a single direction.
- Select places to install tracking tunnels that represent the range of ecological types in your trapping area. For example, if 50% of your area is beech forest, put 50% of your monitoring lines in beech forest.

### Exclude bias

When setting out tracking tunnel lines it is very important to ensure that representative environments are sampled within the areas you are interested in (eg a rodent control block). The easiest way to do this is to consider the gross environment types that make up your study site or management block and what proportion of that area they make up.

For example, if 50% of your study area is red beech forest, then 50% of your sampling effort should include that environment. The start points for each line should be determined by environment type, access, logistics (all lines need to be serviced on the same day) and the distance away from the next nearest tunnel line.

When determining the direction of tunnel line runs, avoid running lines entirely along geographic features (eg roads, ridgelines or streams) or other potential sources of bias (eg bait station lines). The best way to avoid any bias is to randomise the direction of your tunnel lines. A simple method for doing this is to roll a six-sided die (dice) and the number rolled determines the compass bearing from the start point along which the line is set out (Table 4). Run the line in the most practicable of the two bearings (either east or west) from the designated start point. If you can't decide which to choose, roll the die again. Pick the westerly bearing if the result is an odd number; pick the easterly if the result is an even number.

**Table 4. Suggested method for determining the direction (compass bearing) of each tracking tunnel line**

| Die roll | Angle of tunnel line (magnetic) |
|---|---|
| 1 | 285°W–105°E |
| 2 | 315°W–135°E |
| 3 | 345°W–165°E |
| 4 | 15°E–195°W |
| 5 | 45°E–225°W |
| 6 | 75°E–255°W |

## Frequency of running tracking lines

Use your outcome and management objectives to inform monitoring frequency, for example:

- for ongoing studies for rodents, monitor four times per year: February, May, August and November
- for ongoing studies for stoats, it is recommended as a minimum you should run surveys in November, December, January and February.

A volunteer checking a tracking tunnel.
*Photo: Michelle Bridge*

## Step 2 – How to make tracking tunnels

Each tracking tunnel consists of a wooden base with a black plastic 'corflute' cover. Corflute is the material used for real estate signs; it is cheap, light in weight and reasonably rigid. In most cases these tunnels are quite resistant to interference and damage by other animals. However, if kea, weka or possum interference is so bad that it is compromising the amount of data you are collecting from your surveys, then we suggest you use a sturdier exterior of black polypropylene plastic or timber.

### Tunnel dimensions and materials

- Wooden base: 100 mm (W) × 535 mm (L) plywood or 25 mm thick rough sawn pine (Figs 1 and 2).
- Tunnel cover: black corflute, stapled or nailed to the base, 615 mm (L) allows for 40 mm overhang each end of timber; tunnel internal clearance height should be 100 mm (Figs 1 and 2).
- Polycarbonate trays: 520 mm (L) × 95 mm (W), with each of the three partitions being 173 mm (L) (Fig. 3).
- Papers: each paper should be pre-cut to 173 mm (L) × 95 mm (W) (Fig. 3). We strongly suggest you source this pre-cut from a printer, as hand cutting can be very time consuming. The type of paper may be determined by local availability (and cost), but ensure it is sufficiently absorbent to retain the food colouring animal prints.
- Sponge: 173 mm (L) × 95 mm (W); 3–5 mm thick.
- Tracking media: use liquid red (Amaranth 123) food colouring at approximately 1:3 dilution in water. In extremely dry conditions or where you think freezing is likely to be an issue, mix the food colouring and water solution with polyethylene glycol (approximately 20%).

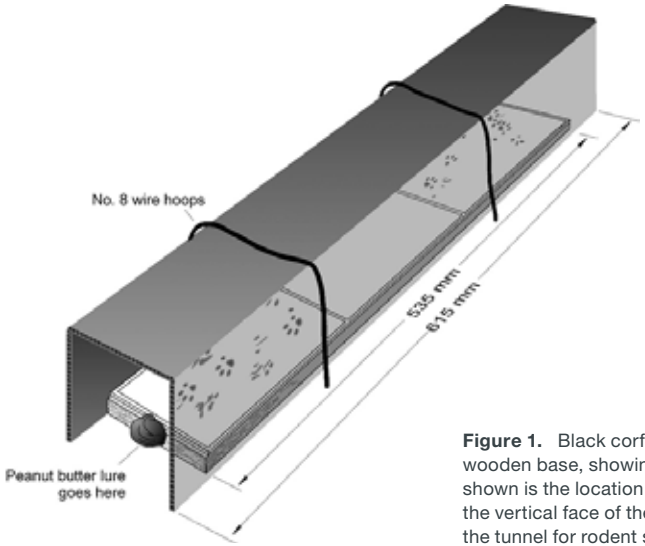



**Figure 1.** Black corflute tracking tunnel cover and wooden base, showing tunnel dimensions. Also shown is the location for smearing peanut butter on the vertical face of the wooden base at each end of the tunnel for rodent surveys.

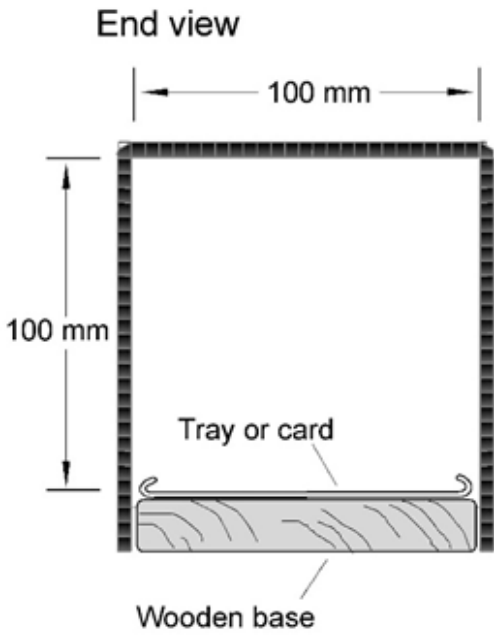



**Figure 2.** Black corflute tracking tunnel cover and wooden base – end view showing tunnel dimensions.

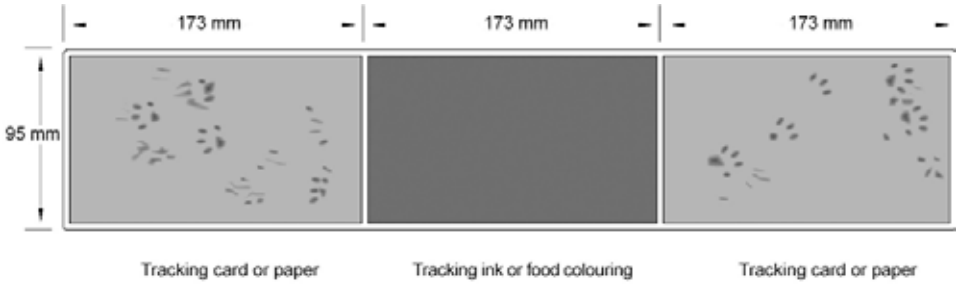



**Figure 3.** Tracking tunnel tray showing paper/card and tracking ink tray.

## Step 3 – Laying the tracking tunnels

Install unset tracking tunnels at least 3 weeks before your first survey. Resident animals should be familiar with them before you start monitoring. Leave the tracking tunnels in place between surveys.

### Equipment

- Tracking tunnels, unassembled and bundled in groups of 10, plus any necessary tools. Make your own tracking tunnels or buy them.
- Tunnel pegs – No. 8 wire loops, two per tunnel.
- Waterproof marker pen.
- Plastic markers and flagging tape, two colours (pink is a popular choice for pest line markers. Don't use orange – it's the colour used on recreational tracks).
- Hammer and nails.
- GPS preloaded with start points, map.
- Either GPS or a compass and distance-measuring tool (eg hip chain or non-stretch cord) to mark locations of lines and tunnels.
- Personal gear.

### Mark each line

- Use your GPS device or map to locate the line's start point.
- Follow the randomly-generated compass bearing for the line and measure the distance travelled.
- Place markers and/or flagging tape along the line to make it easy and safe to follow. Label them with the line's identifier.

### Setting out tunnels and lines

1. Set out the tunnels at least 3 weeks (ideally longer if you plan to survey mustelids) prior to the first survey session to ensure any resident animals are conditioned to the presence of the tunnels.
2. Leave the tunnels in place between survey sessions.
3. Mark the tunnel locations with flagging tape (or, if you have the funds, use permanent plastic triangle track markers). Since the tunnels are left in situ between surveys (in some cases for several years), their locations need to be well marked. When using flagging tape to mark tracks it is a good idea to use one colour to mark the track and another to mark the tunnel.
4. Write each tunnel number on the flagging-tape or plastic triangle at the tunnel site with a permanent marker pen.
5. Assemble the tunnels as you put them out in the field. It is a lot easier to carry the separate bases, trays and pre-cut unfolded corflute for 10 tunnels than it is to carry 10 fully assembled tunnels.
6. Site each tunnel at the most suitable spot (ie a place that look like it would provide a good 'run' for small mammals) within 2 m of the 50-m marker along the survey line.
7. If you have made your own tracking cards, place the tunnel on reasonably level ground, as this will reduce the chances of the food colouring running from the middle sponge tray and flooding the paper on the downhill side.
8. Ensure that the tunnel is held firmly in place by pegging it down with two No. 8 wire hoops. This is particularly important in areas were disturbance by possums is likely to be a problem and especially important if you plan to use the tunnels to monitor mustelids.
9. Check that access to both ends of the tunnel is unobstructed.

## Step 4 – Laying out tracking cards

You will need two days of good weather before you lay the tracking cards into tunnels. Weather affects animal activities and may affect your results. Conduct your monitoring survey over 1 (clear) night for the rodent monitoring index and over 3 nights for the mustelid monitoring index.

### Day 1: Laying out tunnels

#### Equipment list

- Pre-inked or home-made tracking cards.
- Bait: peanut butter for rodents, fresh meat or earyze for mustelids.
- Tools if monitoring any fixed-lid tunnels.
- Personal gear.

#### How to set a tracking tunnel

- Remove any scat or detritus from the tunnel.
- Write the number of the tracking tunnel and the date the card is placed in the tunnel on front of card.
- Place the fresh pre-inked tracking card in the tunnel, unfolded.
- In areas where weka are present use pins at either end to fix the paper.

For the rodent surveys, smear peanut butter generously on either end of the tracking card. Place baited cards in each of the 10 tunnels spaced 50 m apart along the survey line. Collect the cards after 1 night.

For mustelid surveys, place the meat bait in the centre of the inked central area of the card. Place cards in each of five tunnels spaced 100 m apart along the line – this could be every 2nd tunnel of the established tracking tunnel line with 10 card tunnels at 50 m intervals (as it is common to use 'rodent' tracking tunnel lines for conducting mustelid surveys). Collect the cards after 3 nights.

A tracking tunnel is baited with peanut butter. *Photo: DOC*

**Note:** For rodent surveys, DOC best practice has standardised peanut butter placement at tunnel ends rather than centre, so that possum interference is less likely to impact on sampling effort. Maintaining method consistency, even in places where possums aren't a problem, means results can be compared.

## Day 2 or 4: Processing tunnels

Processing of tunnels will occur on day 2 for rodents and day 4 for mustelids.

### Equipment list

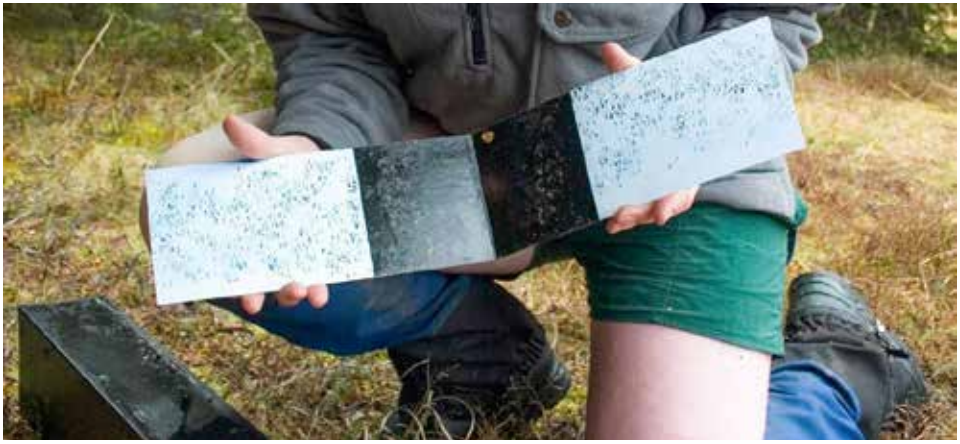
- Notebook, pencil.
- Optional: smartphone to record results.
- Tools if monitoring any fixed-lid tunnels.
- Personal gear.

### Process each tunnel in the field

1. Remove the bait.
2. Remove pre-inked tracking card and fold closed.
3. Write the tunnel number and date collected on the card.
4. Keep the cards in order as you collect them.
5. Make notes.
   - If there are no tracks, record whether the bait was taken.
   - If you've mastered footprint identification, you can do that now or back at base.
   - If there's fresh scat in the tunnel, identify it and note the species as present just as if footprints were present. Remove the scat.
   - Note anything else unusual, such as tunnel disturbance.

### Finish processing back at your base

1. Spread any damp papers out to dry.
2. Identify and double check any predator footprints.
3. Update your notes.
4. Bundle the papers, label with the survey area and date, and store for later reference.



Tracking tunnel card showing prints. *Photo: DOC*

# How to use chew cards or wax tags to monitor possums

## Step 1 – Planning

### Estimate the size of your trapping area

The number of chew cards or wax tags you will need to adequately monitor target animals is dependent on the size of the area being trapped. Set up temporary wax tag or chew card lines to monitor possum numbers. Use your results to track progress and make improvements.

Calculate the number of lines required for different trapping area sizes:

- 500 ha: 10 lines
- 500–700 ha: 11 lines
- 700–900 ha: 12 lines
- 900–1100 ha: 13 lines
- 1100–1300 ha: 14 lines
- 1300 ha or more: add 1 line per each additional 200 ha; up to 60 lines.

### Layout

- 10 devices per line.
- Run each line straight in a single direction.
- Keep devices 20 m apart on each line and at least 200 m from the nearest monitoring line at its closest point.

### Exclude bias

- For sampling to be unbiased, all potential possum habitat must have an equal chance of being sampled.
- If the start point for a line (generated by the random selection process; see p. 22) is the same as one used in previous monitoring, it is acceptable to use that start point again provided the prior monitoring was carried out more than 6 months previously.
- Overlay a numbered grid (intervals no greater than 100 m) over the map of the sampling area. Then use random northings and eastings to generate random coordinates. These are the start point locations for the lines. Mark in the lines from the random start points at zero degrees magnetic. Discard any line that falls either wholly or partly outside the sampling area, or within 200 m of any previously selected line.
- Alternatively, a GPS can be used to select random coordinates in a given area.

### Frequency of laying out chew cards or wax tags

Use your goal and management objectives to inform monitoring frequency.
For example:

- before and after possum control in order to determine how effective control has been and if it has achieved a target result
- annually to see if possum abundance is below a level required to protect valued or indicator species.

## Step 2 – Laying out chew cards or wax tags

Both chew cards and wax tags rely on bite mark identification for successful monitoring of animals. You'll need seven consecutive nights of reasonable weather, with no heavy or prolonged rain. Pre-labelling the chew cards or wax tags with both the line and device number can be easier than doing it in the field.

### Equipment

- Chew cards or wax tags grouped in bundles of 10.
- If using wax tags: luminescent strips plus lure (1 part icing sugar to 5 parts flour).
- You can make your own chew cards from 3 mm white corflute.
  - Cut corflute into 9 x 18 cm pieces so that the flutes are 9 cm long.
  - Bait with smooth peanut butter.
  - Bundle 20 chew cards together to form a temporary block.
  - Stand the block of cards so that the many flute openings along the long edge are facing up.
  - Working from one end to about 5 cm in, use a paint scraper to push a tablespoon of peanut butter about 2 cm into the flutes. Make sure to get an even spread.
  - Flip the block over and do the same at the diagonally opposite corner.
  - If your area has a high density of rats, only apply the peanut butter to one side of the card.
- Waterproof marker pen.
- Flagging tape (pink is a popular choice for pest lines. Don't use orange – it's the colour used on recreational tracks).
- Hammer and 50 mm flathead nails.
- Wooden posts if monitoring in open country.
- Compass and distance measuring tool (eg hip chain or non-stretch cord).
- Personal gear.

Wax tag with lure smear. *Photo: Possumz* ©

### Mark each line

- List of start points (compass bearing is predetermined and the same for each line, use zero degrees magnetic as a default).
- Follow the predetermined compass bearing for the line and measure the distance travelled.
- Place flagging tape along the line to make it easy and safe to follow. Label the tape with the line's identifier.

### Place and mark each chew card or wax tag

- Every 20 m, place a device and collect your measuring line.
- To place a wax tag:
  - mount wax tag and luminescent strip on the same nail 30 cm above the ground with the wax block facing the ground. If there are no trees, use a post
  - take a handful of lure and smear it up the trunk of the tree to make a 10-cm-wide blaze that finishes behind the tag.
- To place a chew card:
  - fold a card in half
  - push a nail through the top layer 10 mm from the fold and through the bottom layer 5 mm from the fold. This will keep the card open at 90°
  - hold the card in place on a tree, 30 cm above the ground with the fold at the top. If there are no trees, use a post
  - hammer the nail down into the tree at 30°.
- Label the device clearly with the line and location identifiers.
- Mark the location on your GPS device.
- Continue until you've installed 10 devices.

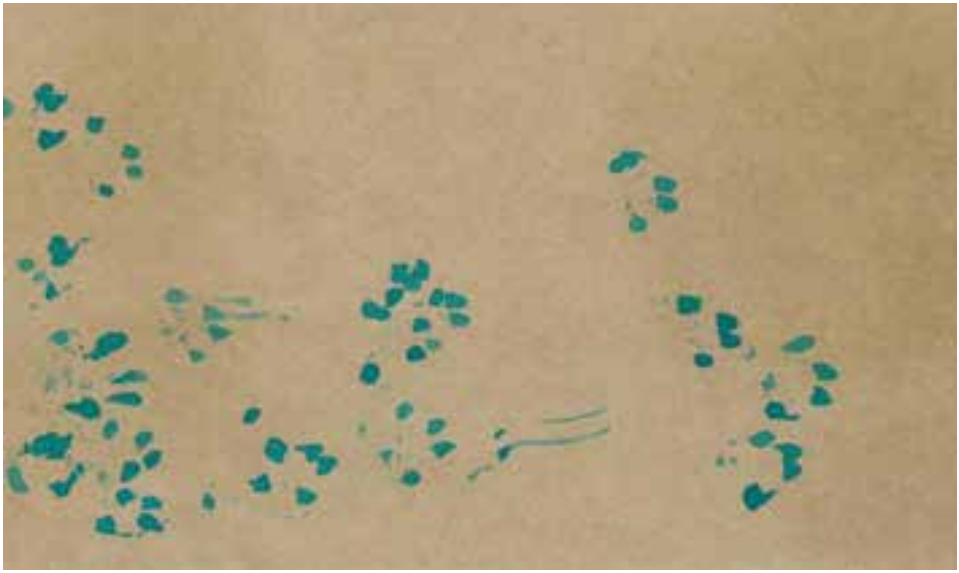
## Step 3 – Collecting chew cards or wax tags

- After seven nights, collect the devices and process them.
- Collect the flagging tape – you will set different lines next time.
- Collect the devices, making sure they're labelled correctly.
- Process and record the results:
  - (P) Definite possum bite marks
  - (NT) Non-target but identifiable bite marks. Record the species too
  - (U) Unknown bite marks
  - leave the record blank if there are no bite marks
  - (L) Lost or destroyed device.
- Store the devices for at least 2 years.
- For further information on planning and conducting possum population monitoring, refer to 'Possum population monitoring using the trap catch, waxtag and chew card methods', available at **www.bionet.nz/library/npca-publications**

Chew card with bait applied. *Photo: Traps.co.nz* ©

A nibbled chew card. *Photo: Kiwi Coast Project* ©

## Interpret the data for tracking tunnels, chew cards and wax tags



Stoat footprints on a tracking card. *Photo: DOC*

To calculate and monitor the abundance of pests over time, you can:

- use apps or online data management agencies to generate indices, maps and summary tables to export and share. You can also use these apps in the field
- use scientific formulae to generate indices yourself: **www.bionet.nz**
- interpret footprint tracking tunnels:
  - guide to reading footprint tracking tunnels: **www.doc.govt.nz/how-to-monitor-using-tracking-tunnels/**
  - DOC tracking tunnel guide
- interpret bite marks:
  - for wax tags: **www.traps.co.nz**
  - for chew cards: **www.landcareresearch.co.nz**
- write a data report to share. Include the following information:
  - name and location of trapping area
  - size of the trapping site
  - control methods and start and finish dates
  - device type
  - number of lines
  - number of nights devices were deployed
  - weather information
  - names of participants (optional – get permission)
  - maps with data overlays (optional).

# 6. Select the right trap

Several factors will influence your selection of traps for your networks:

- target predator
- efficacy of trap
- humane killing
- non-target species
- capacity of volunteers
- ease of use (especially trap setting)
- type of terrain
- budget constraints.

Trapping at North Head, Auckland. *Photo: DOC*

## NAWAC (National Animal Welfare Advisory Committee)

The following information relates to the welfare performance of traps used in New Zealand for capturing and/or killing small to medium-sized mammals. The tests relate to the welfare performance of the traps, NOT to their capture efficiency, safety, costs, or target specificity.

In New Zealand, trap use is regulated by the Animal Welfare Act 1999. This Act permits any trap to be used for trapping any species, but it also enables the Minister of Agriculture to recommend to the Governor-General traps that should be prohibited because they cause unacceptable pain and suffering. To enable the welfare performance of traps to be assessed in a standardised way, the National Animal Welfare Advisory Committee (NAWAC) has developed a trap-testing guideline. The NAWAC kill trap test requires 10/10 test animals are to be rendered irreversibly unconscious within 3 minutes to meet the guideline for acceptable performance (Table 5).

**Table 5. List of traps that have been tested to meet National Animal Welfare Advisory Committee (NAWAC) Guidelines** Last updated 21 November 2023

**KEY**

✓ Passed NAWAC 09 guideline test specification for acceptable killing effectiveness or effective restraint
Cells are empty if the trap is not suitable or advocated or marketed in NZ for the pest species.

| TRAP | Possum | Ship rat | Norway rat | Stoat | Ferret | Weasel | Hedgehog | Feral cat |
|---|---|---|---|---|---|---|---|---|
| DOC 150 | | | ✓ | ✓ | | | ✓ | |
| DOC 200 | | ✓ | ✓ | ✓ | | | ✓ | |
| DOC 250 | | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| BT 200 | | ✓ | | ✓ | | | | |
| BT 250 | | | | | ✓ | | | |
| PodiTRAP | | | | | ✓ | | | |
| Rewild F-Bomb | | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| Goodnature A24 | | ✓ | | ✓ | | | | |
| Envirotools D-Rat 'Lumberjack'[1] | | ✓ | | | | | | |
| Envirotools Supervisor MAX | | ✓ | | | | | | |
| Victor Professional PCR mod | | ✓ | ✓ | ✓ | | | | |
| Victor professional | | ✓ | | | | | | |
| T-Rex/Tomcat[2] | | ✓ | | | | | | |
| Timms | | | | | | | | ✓ |
| Flipping Timmy | ✓ | | | | | | | |
| Sentinel | ✓ | | | | | | | |
| Warrior | ✓ | | | | | | | |
| Trapinator | ✓ | | | | | | | |
| Goodnature A12 (discontinued) | ✓ | | | | | | | |
| SA Coni (discontinued) | | | | | | | | ✓ |
| Twizel kill trap (discontinued) | | | | | | | | ✓ |
| Belisle Super X 220 | | | | | | | | ✓ |
| SA2 Kat trap | ✓ | | | | | | | ✓ |
| NZ AutoTraps 'AT220' | ✓ | ✓ | | | | | | |
| Victor No.1 double coil spring unpadded | ✓ | | | | | | | |
| No.1 double coil spring unpadded with chain-spring and swivel modifications[3] | ✓ | | | | | | | |

1. Testing was undertaken using the standard Envirotools D-Rat trap (includes shroud/ yellow cover) in a wooden box.
2. Includes the T-Rex trap with the EVO tunnel.
3. Details on modifications and pass grade can be found in the testing report available here: **www.nzfurcouncil.org.nz/wp-content/uploads/2020/05/Final-Report-Possum-leg-hold-trap-modifications.pdf**

**General notes**

- Traps are only the killing device, so for the trapping operation to achieve the stated purpose and manage risks depends on effective operational planning. The effective use of traps within this operational planning context can be supported by following industry best-practice material.
- The relative suitability of a trap for an operation is also influenced by criteria not captured here. These may include: capture efficiency, cost of use, user friendliness, non-target animal safety.
- Traps listed include the 'trap system' which includes the trap and how it is set (that is, additional equipment such as trap covers, and whether the trap is set above ground and how/if it is baited).
- The NAWAC guideline (09: Assessing the welfare performance of restraining and kill traps) standardises the testing of welfare performance of restraining traps and kill traps. The tests are designed to give 90% confidence that traps which pass the test will perform below the upper threshold (5 min for class B kill traps) 70% of the time and below the lower threshold (3 min for class B kill traps) 80% of the time.
- The NAWAC guideline provides robust standardised information on welfare performance but pass/fail trap results on their own are not an unequivocal determinant of whether the trap should or shouldn't be used.
- Copies of traps that have passed the guideline's criteria may be available from alternative manufacturers and distributors. While these traps may have dimensions that are the same, and clamping force and impact momentum values that are similar, to those of the original trap, for the purposes of this table they cannot be confirmed as having the same welfare performance as the original trap. The NAWAC trap testing guideline does not provide guidance for mechanical testing of copied trap designs to confirm whether they would meet the trap testing criteria. There are also no validated ranges of mechanical measures within which a trap copy would be considered as sufficiently equivalent to the original trap.
- For further information on NAWAC testing, visit **www.landcareresearch.co.nz**

# Humane trapping

The traps in this section have been tested to meet National Animal Welfare Advisory Committee (NAWAC) Guidelines. Before selecting a trap, refer to Table 5 for humane testing status.

## Choosing a trap type

When choosing the right trap, consideration needs to be given to a number of factors including what you plan to trap, the kinds of non-target species you might encounter, the habitat it is going into and the ability of the trapper to service them. If you have weka or kea in your area, you are best to contact your local DOC office to find out what trap types would be suitable and what adaptations might be necessary.

Another thing to consider is whether there are other non-target predators in your control area. You might be targeting rats, but also have mustelids. In this case it would be prudent to invest in a trap that will also be humane to mustelids. If in doubt, contact your local DOC office.

DOC 200 double-set trap.
*Photo: Erana Stevens-Tulip*

DOC 200 kea- and weka-proof trap.
*Photo: DOC*

## DOC-series – 150, 200, 250 traps

Durable, long service life, proven effectiveness. Must be used inside a covered tunnel box. If targeting stoats, DOC double set traps have been shown in comparison field trials to have considerably higher catch rates than single sets. If you have inquisitive non-target species (such as weka or kea) present, ensure your tunnel is built to non-target species DOC best-practice design.

It is recommended that the side or extended entrance tunnel designs are used in areas where domestic cats may be present. For kea/weka DOC-series tunnel designs contact your local DOC Office.
To order reinforced hardware components, visit **www.fielden.co.nz/products/doc-trap-tunnel-kits**.

Trapinator mustelid tunnel.
*Photo: Trapinator.com*

## Trapinator mustelid tunnel

This DOC-series trap box design by Trapinator is designed to be strong, lightweight and easy to service in the field and houses either the DOC150 or DOC200 mechanisms.

The lids are stackable, which acts as a space saver when transporting to site and the plastic housing makes them more resistant to decay. DOC accepts this trap boxing as a best practice design.

## BT200 & BT250

National Springs BT200 predator traps have passed NAWAC testing for ship rats and stoats and the BT250 has passed NAWAC testing for ferrets. They come in both zinc plated and full stainless options with good solid weld points. The full stainless option will better resist corrosion and would be advisable in coastal areas. It is recommended that the extended DOC 200 tunnel design is used in areas where domestic cats are present.

**Note**: To adhere to NAWAC testing guidelines the trap must be installed within a covered tunnel. The BT200 is 2 mm larger than the DOC 200 version, so take extra care of distance between trap and tunnel walls when installing into a DOC-series wooden tunnel design.

The Rewild F-Bomb. *Photo: rewild.nz*

## Rewild F-Bomb

The Rewild F-Bomb is powerful, lightweight and easy to use. It is a single set and is designed around an integrated tunnel-and-trap mechanism. It has a capture flag, so you can quickly ascertain if a trap has been triggered. It is a completely integrated design requiring no additional tools or enclosures for safety or operation, particularly for a trap of this power. The trap has recently passed the NAWAC guidelines for stoats, ferrets, rats and hedgehogs.

Goodnature A24 trap. *Photo: Goodnature*

Chirp App. *Photo: Goodnature*

## Goodnature A24 stoat and rat trap

An automatic resetting trap that triggers 24 times before the gas canister (which powers the trap) needs to be changed, providing constant control with reduced maintenance. Comes with long-life, non-toxic lure and is easy to use. For areas where kea are present, a Goodnature Blocker attachment is recommended. Where weka are present, install the A24 at 1.3 m above the ground. If kiwi are present, place the trap vertically and with the tree-mount base 12 cm above the ground.

The Chirp model communicates trap data via Bluetooth to the Chirp App, providing information about your trapping efforts. Chirp is available as a simple retrofit to existing A24s. For large trapping projects the Chirp Dashboard provides a project-wide view.

The podiTrap Treadle Trigger model. *Photo: poditrap.co.nz*

## podiTrap

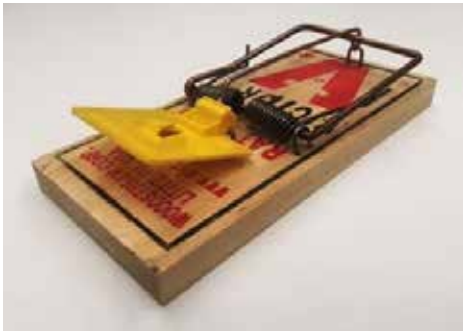
The podiTrap Treadle Trigger model (yellow handle) has passed NAWAC humane testing guidelines for ferrets, and is easy to set, safe and convenient.

The trap can be easily set from the outside without tools. The handle is used for setting and works as a 'flag': a raised handle indicates it is set, a lowered handle that it needs resetting – no need to check every trap. The trap is also designed so users cannot open the trap once set. Its stackable plastic housing makes it light and portable.

Victor Professional trap in tunnel. *Photo: DOC*

## Victor Professional

The Victor Professional is a cost-effective, single-kill snapback rat trap. It has passed NAWAC testing for ship rats and is suitable for trapping in native forest where ship rats are most prevalent. To meet NAWAC testing guidelines the Victor Professional must be used inside a wooden, corflute or plastic pipe tunnel system.



Victor Professional trap. *Photo: traps.co.nz*

The tunnel guides the animal to ensure humane killing and shelters the trap limiting the risk of by-kill and interaction from non-target species. The Victor Professional may not be consistently effective for the larger Norway rat. DOC-series traps are recommended where Norway rats are present.


Victor Professional PCR model with tunnel.
*Photo: traps.co.nz*

## Victor Professional PCR model

The white plastic hood on the Victor Professional PCR model was designed in New Zealand and has passed NAWAC testing guidelines for the humane killing of stoats, and ship and Norway rats. To meet NAWAC testing guidelines, the Victor Professional PCR model must be used inside a wooden, corflute or plastic pipe tunnel system. The tunnel guides the animal to ensure humane killing and shelters the trap, limiting the risk of by-kill and interaction from non-target species.

D-Rat trap Lumberjack model. *Photo: Envirotools*

## Envirotools D-Rat

The D-Rat trap is designed to be effective, versatile, and easy to use. Operation is simple and safe. The D-Rat trap is part of the Lumberjack combination that meets NAWAC's humane trap-testing guidelines for ship rats.

The trap is designed and manufactured in New Zealand specifically for New Zealand conditions. It is made from stainless steel and UV-resistant polymers and has a 5-year manufacturer's warranty.

Supervisor MAX Model. *Photo: Envirotools*

## Envirotools Supervisor MAX

Based on the D-Rat trap, the Supervisor MAX is a lightweight and compact multi-rodent tunnel trap suitable for living spaces, commercial kitchens, sheds, compost heaps, etc. The Supervisor Max meets NAWAC testing guidelines for ship rats.

It is safer for pets and children with its automatic safety lock that prevents access inside the trap while it is set. The trap is hard-wearing and is guaranteed by the manufacturer for 5 years.

T-Rex. *Photo: Key Industries*

## T-Rex

A cost-effective, reusable single-kill rat trap, that effectively incorporates a combination of trap velocity and trigger sensitivity.

To meet NAWAC testing guidelines the T-Rex must be placed inside a NAWAC-tested tunnel system. The tunnel guides the animal to ensure a humane kill and limits the risk to non-target species.

T-Rex wooden tunnel design. *Photo: DOC*

All snapback rat traps should be fixed in place inside the tunnel so the trap is orientated towards the target for an effective and humane kill. To avoid capture of non-target species, in standard tunnels the trap should be placed 130 mm from the tunnel entrance (265 mm if weka are present). Refer to pages 50 and 51 for best-practice rat trap wooden and corflute tunnel designs.

## NZ AutoTrap AT220

A spring-powered trap that is reset by a small electric motor with a rechargeable battery. It resets and rebaits itself automatically, ensuring bait is always fresh. Their Android app can be used to access the internal kill counter and other trap data for monitoring purposes. This trap has passed NAWAC testing guidelines for possums and ship rats.

AT220. *Photo: NZ AutoTraps Ltd*

Trapinator. *Photo: Trapinator.com*

## Trapinator

All-in-one spring-set mechanism in a weather resistant plastic box and has passed NAWAC testing guidelines for possums. It is screwed onto trees or posts, 1 m above the ground (or no lower than 1.3 m if weka are present).

This trap is low maintenance and is designed to be easy to set, making it accessible to both professionals and individuals without extensive trapping experience. Instructions on setting this trap can be found on their website.

Flipping Timmy model. *Photo: Envirotools*

## Envirotools Flipping Timmy

The new Flipping Timmy possum trap is based on the Timms trap. It is mounted vertically (removing the need to bend over) which ensures a clean catch area. The Flipping Timmy meets NAWAC's humane trap-testing guidelines.

The trap is designed for a long life with stainless steel components and UV-resistant polymers. It is guaranteed by the manufacturer for 5 years.

Sentinel. *Photo: landcareresearch.co.nz*

## Sentinel

The Sentinel is a lightweight possum trap set suitable for use in remote areas of native forest where the portable design allows more traps to be packed in. Has a white corflute cover for visibility and to orientate the possum to the trap. Each set includes trap, tree attachment, bait clip and corflute cover.



## Warrior

The Warrior is lightweight (850 g) easy-to-carry possum trap. It has a 1.6 mm-thick annealed spring steel body. With a strong, rigid structure, it is designed to be fixed to a tree with screws, 1 m above the ground.

Above left: Warrior set on tree.
*Photo: landcareresearch.co.nz*

Below right: Warrior unset.
*Photo: National Springs and Wire Products NZ Ltd*

SA2 Kat trap. *Photo: Steve Allan*

## SA2 Kat trap

Durable and robust, the SA2 Kat trap is an effective single-kill possum trap. The trap has passed NAWAC testing for possum and feral cats as a raised trap only.

It is recommended the trap is placed 750 mm above the ground on an angle (up to 45 degrees), but if weka are present this height and angle will need to be increased to 1.3 m and 55 degrees respectively.

**Possum kill traps are not recommended in areas where domestic cats are present, and must be raised out of reach of any kiwi and weka. Possum kill traps can present a risk to kea. This should be discussed with DOC staff when considering if and how to use possum kill traps in kea habitats.**

## Donating and purchasing traps for community groups

If you are looking to donate a trap to a community group, Forest and Bird's platform Give a Trap® (**www.giveatrap.org.nz**) allows users to find a group from a national list that needs support.

There is an option to select a trap for a particular group, or you can donate funds towards trapping and/or advocacy. To purchase traps, bait or lure, a list of trap suppliers can be found on page 77.

# Live capture trapping

Live capture cage or box type traps are sometimes used in places where there is a risk of non-target animals accessing kill traps. This system allows non target animals to be released, usually without unreasonable harm to them.

Live capture traps also include leghold traps that restrain the trapped animal by clamping on the lower leg. Leghold traps can cause considerable injury and distress to animals (target and non-target). Determining if leghold traps are suitable for use and then managing their safe use requires a good understanding of both the regulatory (legal) and practical requirements. An order of council under the Animal Welfare Act (Animal Welfare Leg-hold traps Order 2007) prohibits the use of some types of leghold trap and places restrictions/requirements on the use of leghold traps to manage the risks to companion animals. It is critical that the requirements of this order are met. For further information on leghold traps, visit **www.mpi.govt.nz/animals/animal-welfare/traps-devices-animal-welfare-pest-management**.

There are specific legal requirements that must be adhered to when conducting any live capture trapping.

## Legal requirements

Legal requirements have been set in place for live capture trapping to ensure that an animal does not suffer unreasonably.

These rules ensure that traps are not left set without being checked regularly and any animal caught can be either released or dealt to in a timely manner.

Setting live capture traps means you are bound by legal requirements as set out in **Section 36**** of the the Animal Welfare Act 1999, which states that a person must "manually inspect that trap, or cause a competent person to manually inspect that trap, within 12 hours after sunrise on each day the trap remains set, beginning on the day immediately after the day on which the trap is set".*

There are significant penalties and legal ramifications if these rules are not followed correctly.

Victor No.1 double coil spring unpadded, used in live capture possum trapping. *Photo: Tim Sjoberg*

* There are separate requirements for people setting live capture traps using a remote reporting system. For more information, read the obligations in the Animal Welfare Act (**www.mpi.govt.nz/animals/animal-welfare/traps-devices-animal-welfare-pest-management**).

** **www.legislation.govt.nz/act/public/1999/0142/latest/whole.html#DLM50445**

## Humane methods of killing live trapped animals

The objective is to ensure live trapped pest animals are killed as humanely as possible, that methods are safe and practical for the trapper, and non-target captures are dealt with appropriately. The most appropriate method of dispatch will be dependent on several factors including:

- the physiology/biology and typical behaviour of the species when live trapped;
- the type of trap you are using and the access it provides to the animal;
- the environment of the trapping area (eg peri-urban or rural), which will determine if firearm methods are allowable.

Methods of euthanasia that are often used for killing live trapped animals include shooting or blunt force trauma. However, it is the trapper's responsibility to ensure they are meeting all of their obligations under the Animal Welfare Act 1999.

Before committing to live capture trapping, people should familiarise themselves with their obligations regarding animal welfare and responsible euthanasia practices.

For more information on your obligations and methods of dispatch, please refer to the Animal Welface Act 1999 (**www.legislation.govt.nz/act/public/1999/0142/latest/whole.html**). and the additional information about traps* and possum control** on the Bionet website.

A Havahart possum cage trap used in live capture trapping. *Photo: Tim Sjoberg*

* **www.bionet.nz/assets/Uploads/A4.1-Leghold-Traps-2020-minor-revision.pdf**

** **www.bionet.nz/assets/Uploads/A3-Landowners-Possum-Comtrol-Guide-2021.pdf**

# 7. Select the right bait or lure

Stoat with chick. *Photo: David Hallett*

## Mustelids – stoats, weasels and ferrets

Some lures are most effective in trapping mustelids:

- salted rabbit (Erayz)
- fresh rabbit meat and eggs
- Goodnature stoat lure
- PoaUku long life clay lure
- Mustelid & Rat Lure from Traps.co.nz
- Connovation Eggsellent Lure or Best Foods Mayonnaise

Helpful methods include alternating eggs with salted and fresh rabbit.

Ship rat eating snail.
*Photo: Ngā Manu Images ©*

## Rodents – ship, Norway and kiore rats

Rats often pass their food preferences between them, and 'teach' others about a food source. Effective lures include:

- peanut butter
- Connovation Ferafeed peanut butter mixed with rolled oats
- Goodnature rat lure
- PoaUku long life clay lure
- Mustelid and Rat Lure from Traps.co.nz
- chocolate.

Possum scavenges at abandoned wood-pigeon nest.
*Photo: Ngā Manu Images ©*

## Possums

Although possums are attracted by food smells, their sense of smell is not particularly good. Visually striking lures like white icing are a great attractant. Effective lures include:

- Apple
- PoaUku long life clay lure
- icing sugar, flour and cinnamon
- peanut butter
- Connovation 'Smooth in a Tube'
- 'Possum Dough' by Traps.co.nz
- Goodnature possum lure.

# 8. DOC best-practice trapping

## Examples of site-specific factors

Before laying your trap network it is important to consider site-specific factors.

### Permission

Before you commence trapping at your site, check that you have permission. What procedures do you need to follow? Are you trapping on iwi land, or private, public conservation or council land? There may be regulations to follow or permissions required that affect your predator-control plan.

If you are applying for permission to trap on public conservation land, DOC permission will prescribe standards to ensure acceptable traps are used in a way that manages risks to non-target animals and the public at the site.

### Risks to non-target species (native and domestic)

It is important to consider non-target species at your site. To reduce the likelihood of trapping valued non-target species refer to Section 6 of this guide.

For further information on non-target species at your site, consult with your local DOC office.

### Time of year

- Is there an abundance of naturally occurring feed? Consider the effect on bait uptake or reschedule your operation.
- Does your target pest species behave differently with the seasons? Consider operating when it is easiest to target.

### Density of target pests

- Are rat densities high? Consider self-resetting traps or consider whether toxins may be a more successful option to explore.

### Public accessibility of the site

- Does your plan pose a risk to the public's health and safety? Plan to limit any risks.
- Is there a risk of people interfering with installed traps?

### Skill level of the people involved

- Ensure volunteers receive the appropriate training to deliver effective, humane and safe trapping in line with best practice.

### Potential for re-invasion from the surrounding area

- Is your site small or skinny, or surrounded by pest-dense areas? Take steps to protect borders.

### Plant diseases

What plant diseases are present at your site? You need to know this to avoid spreading disease from your site to other sites. Your health and safety plan should include the recommended management guidelines for trapping in sites where plant diseases are present. Two diseases in our native forest are kauri dieback and myrtle rust.

### Kauri disease

DOC is responsible for protecting kauri on public conservation land and other land it manages, including many of New Zealand's most significant kauri forests. In 2022, a National Pest Management Plan introduced 10 rules to help protect kauri from the pathogen that causes kauri dieback disease. The pathogen can be spread by just a pinhead of soil, you can't always tell if a tree is infected. There is no cure. The pathogen that causes the disease can survive as an encapsulated spore for years in or on the soil without any kauri nearby. Therefore, your footwear and other gear (regardless of how long it has been in storage) are cleaned and disinfected before you go near kauri, cleaned again before you leave an area with kauri or bag for cleaning at home. To meet these rules and protect kauri you must follow the guidelines for trapping in kauri forests, visit **www.kauriprotection.co.nz/resources/forest-visitor-guides/trapping**.

While kauri disease is currently restricted to the upper North Island (Northland, Auckland region to Bay of Plenty), we should take all precautions to prevent its spread inside and outside of this border.

### Myrtle rust

The myrtle rust fungal disease attacks plants in the myrtle family (including pōhutukawa, mānuka, ramarama, rōhutu and rātā). It has been found across the North Island and upper areas of the South Island.

If you suspect myrtle rust at your site:

- don't touch it or collect samples as this might spread the disease

if you can, take a photo of the rust and the host plant and report it on: **www.inaturalist.org/projects/myrtle-rust-reporter**

Myrtle rust has yellow, powdery spores that are easily spread on your gear (clothing, boots, equipment, bags, etc). If you get yellow spores on you, put all affected gear in bags and wash your gear with soap and water as soon as possible.

For more information, visit **www.myrtlerust.org.nz**

Kauri dieback wash station. *Photo: Kat Lane*


Myrtle rust infection on rōhutu leaf. *Photo: Roanne Sutherland*

## Rat trap networks

Plan to set your rat traps in a grid pattern using the following spacings.

Spacing between lines: no greater than 100 m.

Spacing between traps on each line: 50 m (25 m along perimeter lines). In high-density rat areas the internal spacing of traps should be 25 m apart.

Grids: laid out on grids by compass bearing or, in rough terrain, placed on ridges and spurs. Spacing should be established as precisely as possible using compass and hip chain. Record all trap station locations on a GPS.

## Stoat trap networks

Plan to set your stoat traps along the natural lie of the land, such as habitat perimeters, ridges, altitude contours, waterways (both sides if larger than a stream) and track and road edges.

Spacing between lines: for broad-scale control, no further than 800 m – 1 km apart.

Spacing between traps on each line: for broad-scale control, traps are placed up to 200 m apart. For intensive trapping operations, traps are spaced 100 m apart. Trap spacing should be established as precisely as possible using compass and hip chain.

## Possum trap networks

Plan to set your possum traps where you see obvious possum sign at the base of trees and posts, and on pad runs (tracks made by possums).

Spacing between lines: 100 m or less.

Spacing between traps on each line: 20–40 m initially, or up to 100 m at low possum densities or if using self-resetting traps.

In difficult terrain: set lines down ridges and spurs, and along contours to achieve the necessary spacing.

Volunteer trapper.
*Photo: New Plymouth Boys High School*

## How to combine trap lines

You can combine trap lines for the different predators present at your site and this will mean you can make efficient use of your track infrastructure and servicing time in the field.

Lay rat trap networks first at the recommended distance apart (100 m or less between lines and 50 m / 25 m between traps). Then lay stoat traps on the rat lines that most closely coincide with the recommended distance for stoat traps (no further than 800 m apart), at the recommended spacings (100–200 m). This could result in stoat traps along every eighth rat line. If possums are present, lay possum traps on each 100 m spaced trap line. Lay possum traps on each line: 20–40 m apart initially, or up to 100 m at low possum densities or if using self-resetting traps.

## Marking trap locations

Plot trap locations on a map or with software. Plot your line locations before you head out and consider practicality of access when picking a line's starting point. Mark your locations on a paper map or in a portable GPS device, if possible.

### Mark each line

1. Find each trapping line's start point by preloading your GPS device with waypoints or using a map.
2. Follow the compass bearing for the line and measure the distance travelled.
3. Place markers and/or flagging tape along each line to make it easy and safe to follow. Label them with the line's identifier.
4. At the relevant distance, place a device and collect your measuring line.

Volunteer trappers. *Photo: Kaitake Ranges Conservation Trust*

## Place and mark each device

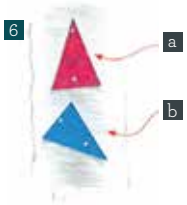
1. Follow the set-up instructions for your chosen trap.
2. Label the device clearly using a durable blue plastic triangle or Allflex tag attached to the trap lid of a wooden or corflute tunnel design. If using a tree-mounted trap, nail tag to the tree on which the trap is placed. Clearly write the name of the trap line and the trap number, eg Line A trap 6 = A6.
3. Never use an orange marker to identify a trap line as this colour is used to identify DOC walking tracks. Best-practice is to use a fluoro-pink plastic triangle to identify a trap line, and a blue plastic triangle to identify the location of each trap on the line.
4. Mark the location of the trapping device on your paper map or GPS device.
5. Continue until you've installed the relevant number of devices. Refer to pages 49–50.

Volunteer trapper. *Photo: DOC*

# How to establish a trap line

## Step 1

- ☐ Use pink triangle markers to mark trap lines, place at eye level and mark with trap line reference (eg 'Z line').
- ☐ The start and finish of each trap line should have two pink triangle markers placed on both sides of tree so they can be seen in either direction. Add the trap line reference and the words start and finish at either end of line; eg 'Start of Z line'.
- ☐ Triangle markers should be as close as practicable to the trap line.
- ☐ All trap line markers should be kept vertical unless trap line deviates around a major obstacle.
- ☐ 2 x 75 mm flathead nails with 25 mm driven into the tree and at least 25 mm protuding.
- ☐ All markers pulled out to be flush with the nail heads (this reduces risk of eye injury).
- ☐ You may need to place a pink trap line marker on either side of the tree so it can be viewed from either direction.




a Pink triangle markers for trap line.

b Blue triangle markers for trap location. If the trap is placed directly on the trap line, keep the blue marker vertical. But if the trap needs to be positioned away from the trap line, angle the blue marker to point to trap location.

## Step 2

- ☐ When clearing trap line, do not cut vegetation of stem diameter at ground level >30 mm.

## Step 3

- ☐ Place trap no more than 1 m from the trap line, or as close as possible.

## Step 4

- ☐ Trap boxes must be securely bedded (flat and stable) so that no movement is detected.
- ☐ Test by leaning your weight on trap to see if it is firm and level; it should not rock up or down.
- ☐ Lid must be securely shut with screw or locked with a wire hinge.
- ☐ Ground around each end of tunnel should be clear for at least 400 mm.

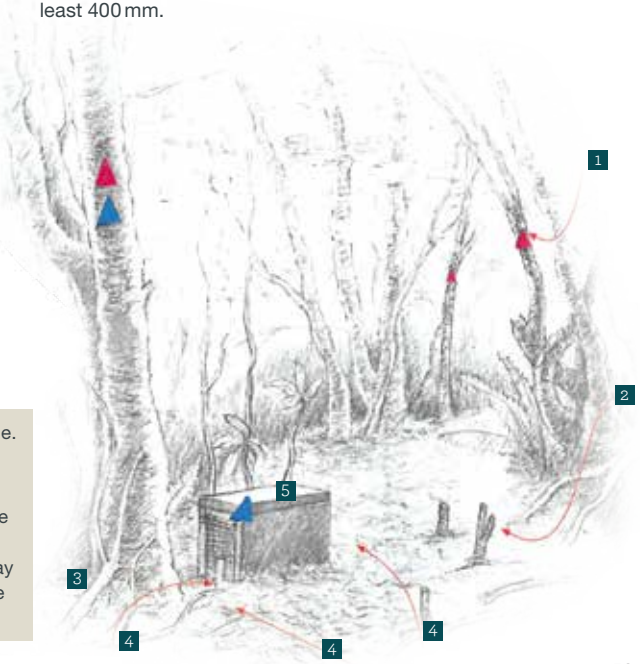
## Step 5

- ☐ To identify trap, write number with permanent marker on a blue tag and attach by staple to lid of trap.

## Step 6

- ☐ Location of the trap on the line should be identified with a blue triangle marker.
- ☐ Blue triangle trap markers must be seen from either direction so a trap is not missed. The number of the trap should be written on the blue marker attached to a tree (eg 'Z18').

**WARNING**: Do not use orange markers – these are used by DOC for walking tracks and can result in public becoming lost on an off-trail trap line.

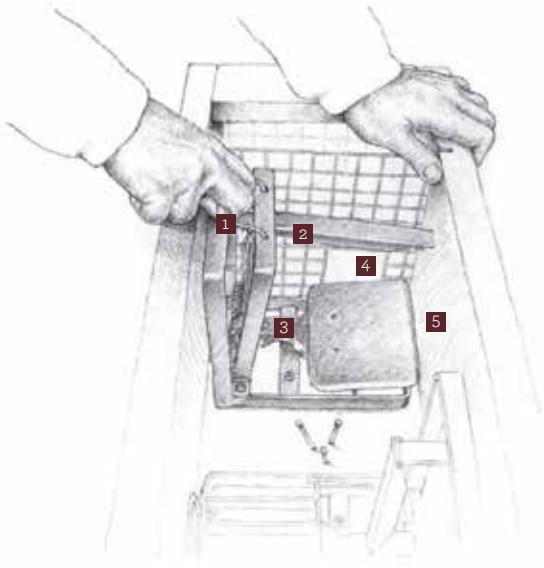



Drawing: Phill Waddington

# How to set DOC-series traps

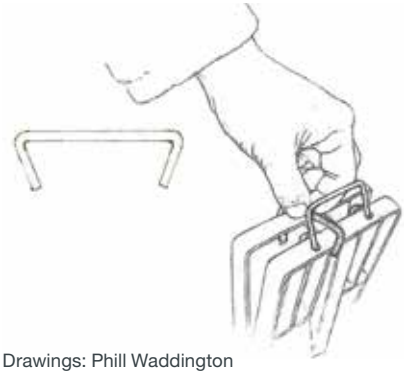
**The DOC150 has passed NAWAC (National Animal Welfare Advisory Committee) guidelines as a humane kill trap for stoats and Norway rats. DOC200 has passed for stoats, Norway rats and ship rats. DOC250 has passed for stoats, ship rats, Norway rats and ferrets. All DOC series traps have passed for hedgehogs.**

- ☐ Place bait (egg or meat) on wood or nail pedestal.
- ☐ SLOWLY release pressure, allowing the bottom of the trigger arm to gently ride up treadle and catch on the sear.
- ☐ Apply safety clip when testing and cleaning the trap. Don't forget to remove safety clip before closing lid.
- ☐ Shut the lid securely with a screw or wire hinge.




**Key**

1. Setting loop
2. Trigger arm
3. Sear
4. Treadle and hole in baffle must be aligned
5. 5 mm gap



Drawings: Phill Waddington

**Safety Clip Application**

**WARNING:** Place the safety clip in the center of the wire setting loop. This prevents the safety clip from sliding off the end of the kill bar.

# Rat trap wooden tunnel design

**These Department of Conservation 'current agreed best practice' tunnel designs must be used with the models of snapback rat traps listed below to pass the (National Animal Welfare Advisory Committee) standards as humane kill traps for rats: Victor Professional, Victor Professional PCR model, T-Rex, and 'D-Rat trap – the works model with shroud'. Setting instructions must be followed to meet the NAWAC standards. These tunnels are designed to exclude non-target species, guide target species and provide public safety.**

**Outlined below is the wooden tunnel system using a Victor Professional rat trap.**

It is important to ensure the trap remains at the correct distance inside the tunnel entrance to reduce accessibility to non-targets. If using a wooden-based Victor trap this can be done by stapling the trap base to a rigid PVC or coreflute strip that sits on the floor of the tunnel. Alternatively it could be achieved by inserting tacks/screws/pins to protrude from the floor at the correct distance (130 mm standard, 265 mm in weka habitat) back from the tunnel entrance to prevent the trap from moving forward.

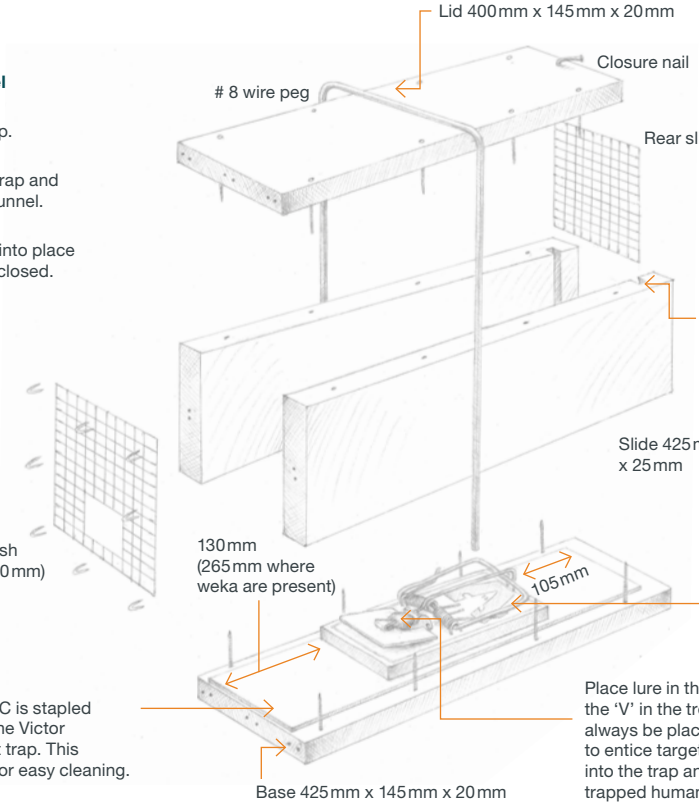
**In areas where weka are present, tunnels should be 550 mm long. In areas where kea are present please contact your local DOC office.**

**Wooden tunnel**

**Step one**
Bait and set trap.

**Step two**
Carefully slide trap and PVC floor into tunnel.

**Step three**
Slide rear door into place and swivel nail closed.



# Rat trap corflute tunnel design

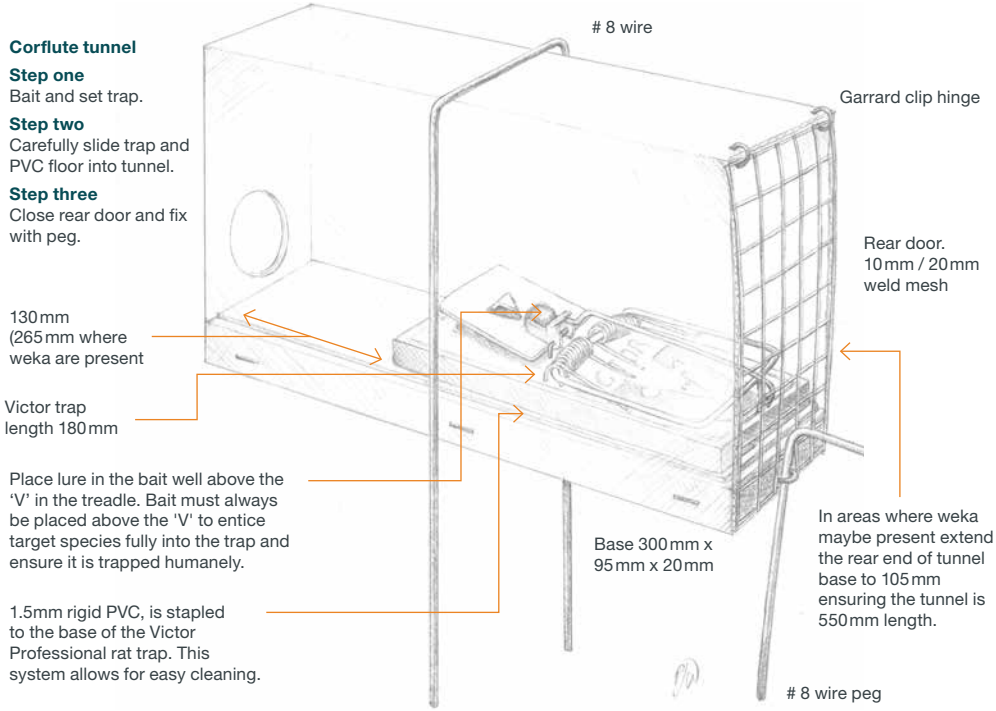
**These Department of Conservation 'current agreed best practice' tunnel designs must be used with the models of snapback rat traps listed below to pass the (National Animal Welfare Advisory Committee) standards as humane kill traps for rats: Victor Professional, Victor Professional PCR model, T-Rex, and 'D-Rat trap – the works model with shroud'. Setting instructions must be followed to meet the NAWAC standards.**

**These tunnels are designed to exclude non-target species, guide target species and provide public safety.**

**Outlined below is the corflute tunnel system using a Victor Professional rat trap.**

It is important to ensure the trap remains at the correct distance inside the tunnel entrance to reduce accessibility to non-targets. If using a wooden-based Victor trap this can be done by stapling the trap base to a rigid PVC or coreflute strip that sits on the floor of the tunnel. Alternatively it could be achieved by inserting tacks/screws/pins to protrude from the floor at the correct distance (130 mm standard, 265 mm in weka habitat) back from the tunnel entrance to prevent the trap from moving forward.

**In areas where weka are present, tunnels should be 550 mm long. In areas where kea are present please contact your local DOC office.**



# DOC150 single set tunnel design

**These Department of Conservation 'current agreed best practice' tunnel designs must be used with DOC150 traps.**

**These tunnels are designed to exclude non-target species, guide target species and provide public safety.**

**In areas where Kea are present please contact your local DOC office for modifications to DOC-series tunnel designs.**

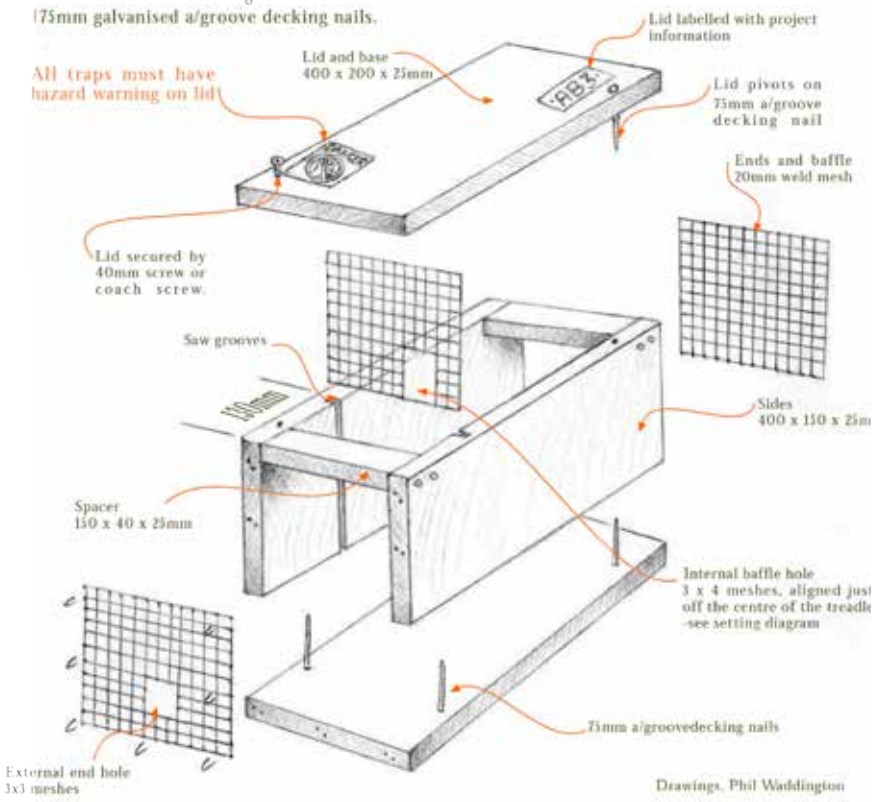
It is important that an internal width and height of at least 150 mm is achieved to allow for some timber warping and shrinking, and ensure sufficient clearance for the trap to function. With rough-sawn timber this may require that tolerance around dimensional variation is limited, and during construction that the internal width (150 mm) is used as the reference point. This could result in the walls overhanging the floor by a small amount.

## Single set tunnel design.

In areas where weka are present, the tunnel length is 525mm, the distance from end mesh to the internal mesh increases from 130mm to 265mm.

Materials

- All timber H4 treated radiata or similar.
- Ends and baffles 20mm galvanised weld mesh.
- 75mm galvanised a/groove decking nails.



# DOC150 double set tunnel design

**These Department of Conservation 'current agreed best practice' tunnel designs must be used with DOC150 traps.**

**These tunnels are designed to exclude non-target species, guide target species and provide public safety.**

**In areas where kea are present please contact your local DOC office for modifications to DOC-series tunnel designs.**

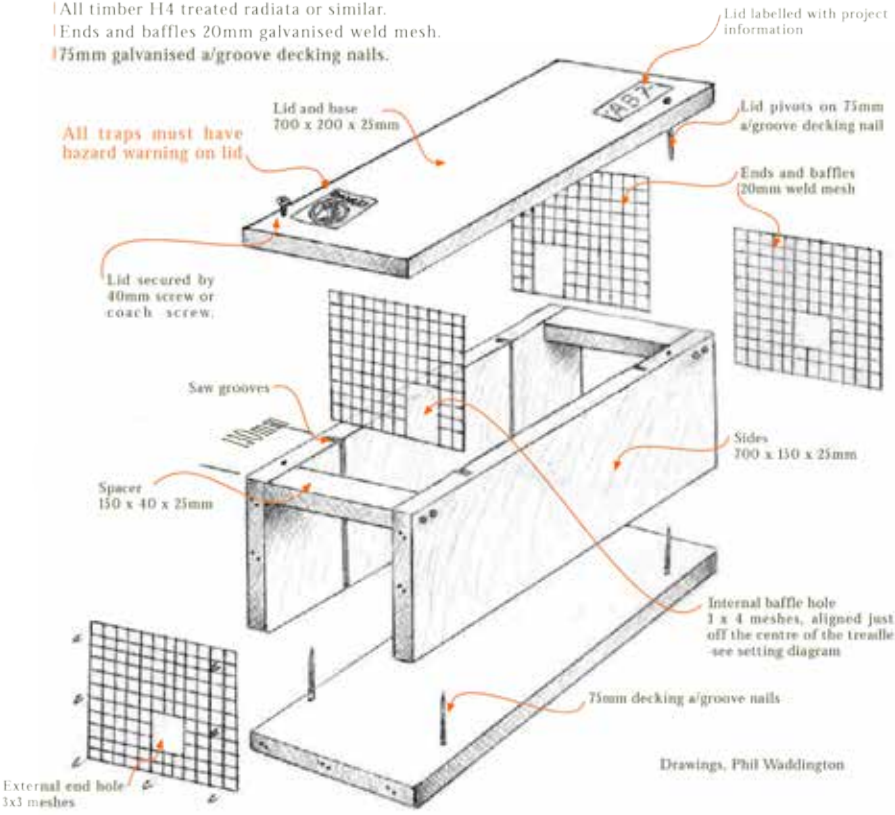
It is important that an internal width and height of at least 150 mm is achieved to allow for some timber warping and shrinking, and ensure sufficient clearance for the trap to function. With rough-sawn timber this may require that tolerance around dimensional variation is limited, and during construction that the internal width (150 mm) is used as the reference point. This could result in the walls overhanging the floor by a small amount.

Fix traps with a 135mm space between, this prevents double/ sympathetic spring off.

In areas where weka are present, the tunnel length is 950mm, the distance from the end mesh to the internal mesh increases from 130mm to 265mm.

Materials

- All timber H4 treated radiata or similar.
- Ends and baffles 20mm galvanised weld mesh.
- 75mm galvanised a/groove decking nails.



# DOC200 single set tunnel design

**These Department of Conservation 'current agreed best practice' tunnel designs must be used with DOC200 traps.**

**These tunnels are designed to exclude non-target species, guide target species and provide public safety.**

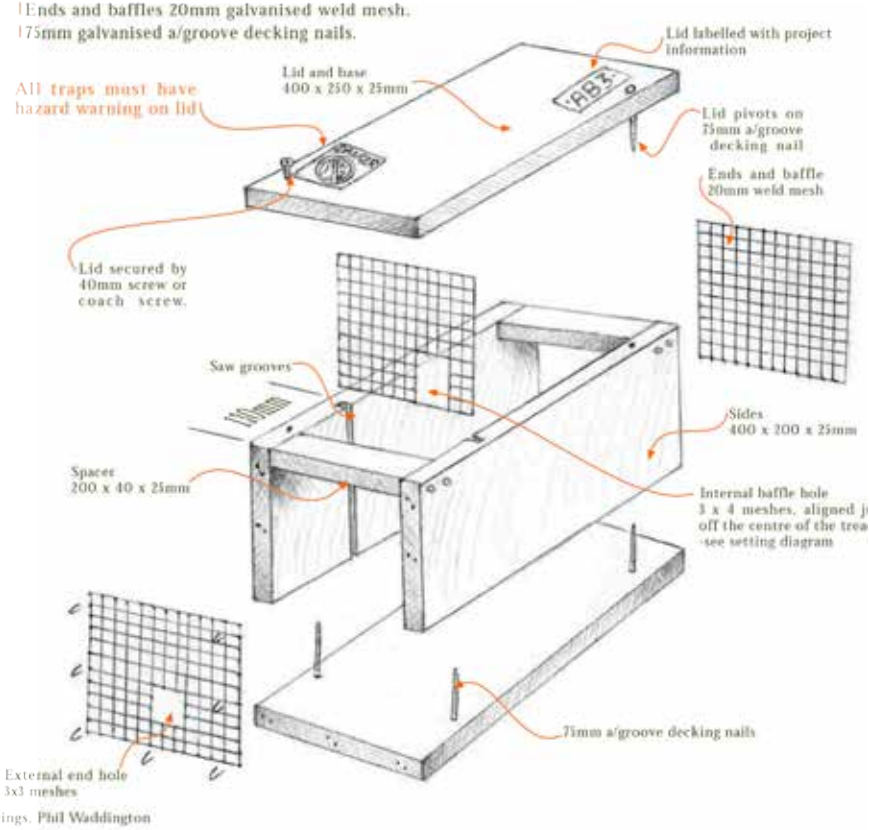
**In areas where kea are present please contact your local DOC office for modifications to DOC-series tunnel designs.**

It is important that an internal width and height of at least 200 mm is achieved to allow for some timber warping and shrinking, and ensure sufficient clearance for the trap to function. With rough-sawn timber this may require that tolerance around dimensional variation is limited, and during construction that the internal width (200 mm) is used as the reference point. This could result in the walls overhanging the floor by a small amount.

In areas where weka are present, the tunnel length is 525mm, the distance from the end mesh to the internal mesh increases from 130mm to 265mm.

Materials

- All timber H4 treated radiata or similar.
- Ends and baffles 20mm galvanised weld mesh.
- 75mm galvanised a/groove decking nails.




Drawings, Phil Waddington

# DOC200 double set tunnel design

**These Department of Conservation 'current agreed best practice' tunnel designs must be used with DOC200 traps.**

**These tunnels are designed to exclude non-target species, guide target species and provide public safety.**

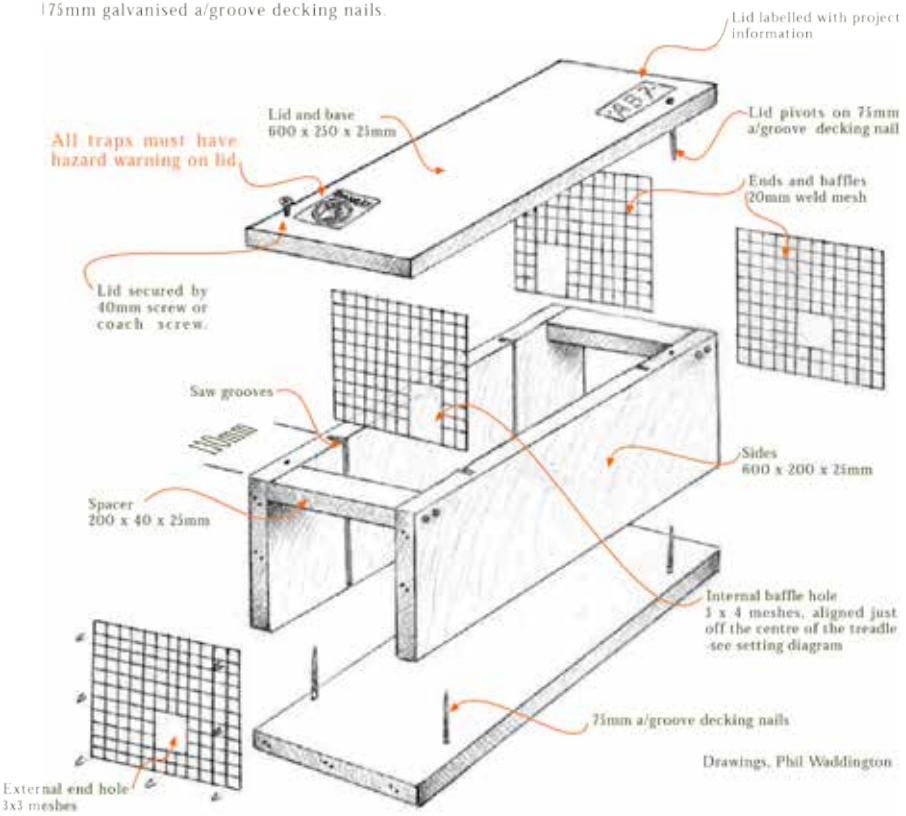
**In areas where kea are present please contact your local DOC office for modifications to DOC-series tunnel designs.**

It is important that an internal width and height of at least 200 mm is achieved to allow for some timber warping and shrinking, and ensure sufficient clearance for the trap to function. With rough-sawn timber this may require that tolerance around dimensional variation is limited, and during construction that the internal width (200 mm) is used as the reference point. This could result in the walls overhanging the floor by a small amount.

In areas where weka are present, the tunnel length is 950mm, the distance from the end mesh to the internal mesh increases from 130mm to 265mm.

Materials

- All timber H4 treated radiata or similar.
- Ends and baffles 20mm galvanised weld mesh.
- 75mm galvanised a/groove decking nails.



# DOC250 single set tunnel design

**These Department of Conservation 'current agreed best practice' tunnel designs must be used with DOC250 traps.**

**These tunnels are designed to exclude non-target species, guide target species and provide public safety.**

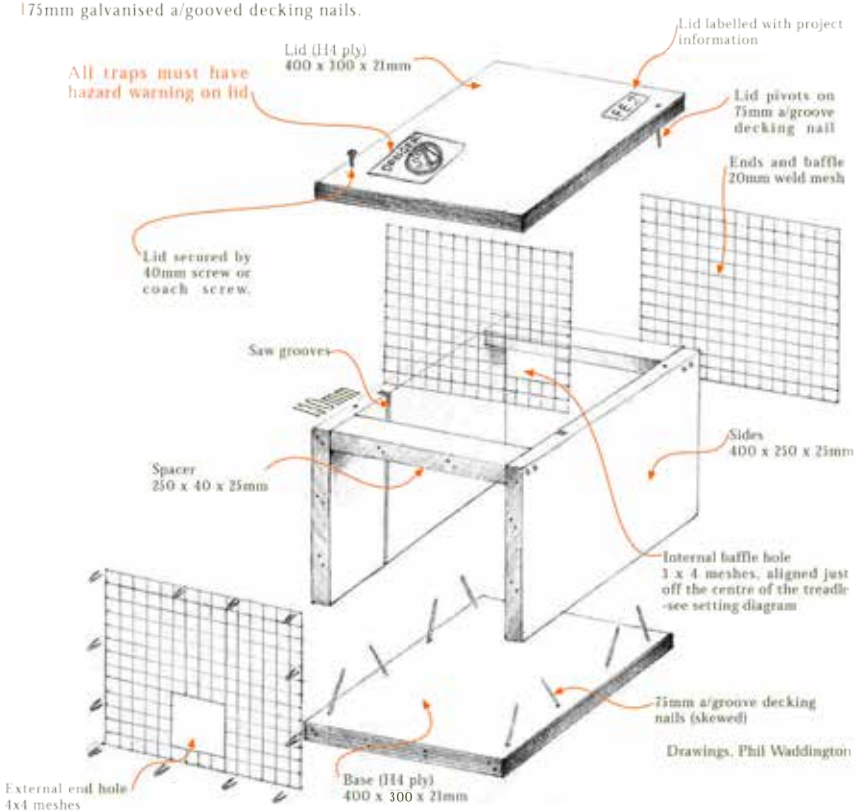
**In areas where kea are present please contact your local DOC office for modifications to DOC-series tunnel designs.**

It is important that an internal width and height of at least 250 mm is achieved to allow for some timber warping and shrinking, and ensure sufficient clearance for the trap to function. With rough-sawn timber this may require that tolerance around dimensional variation is limited, and during construction that the internal width (250 mm) is used as the reference point. This could result in the walls overhanging the floor by a small amount.

In areas where weka are present, the tunnel length is 535mm, the distance from the end mesh to the internal mesh increases from 130mm to 265mm.

Materials

- All timber H4 treated radiata or similar.
- Ends and baffles 20mm galvanised weld mesh.
- 75mm galvanised a/gooved decking nails.



# How to place a DOC-series trap in tunnel

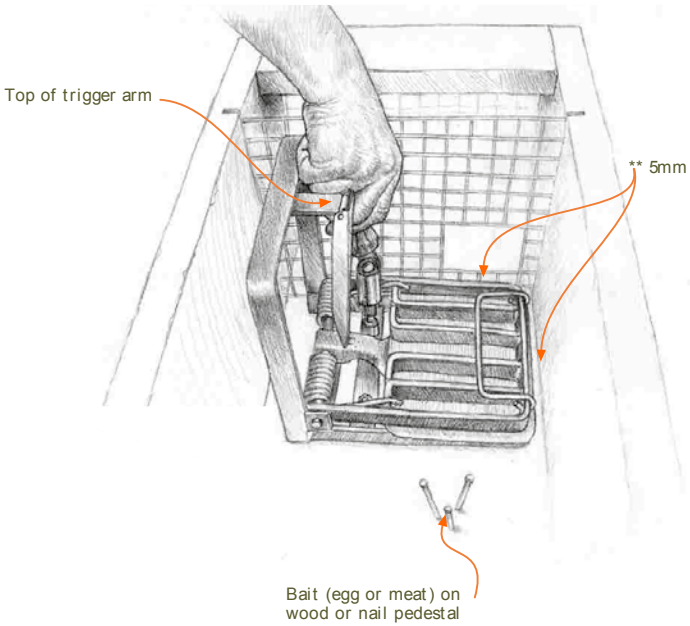
**The Department of Conservation 'current agreed best practice' trap placement must be used with all models of DOC-series traps 150, 200, 250.**

**Placement of trap in the tunnel is designed to exclude non-target species, guide target species and provide public safety.**

**Attach trap to base of wooden tunnel using galvanized bolts or stainless steel screws.**

**Traps should be fixed with the treadle (base plate) of trap 5mm (approx.) from the side of the box and internal wire baffle**.**

It is important that an internal width and height of at least 200mm is achieved to allow for some timber warping and shrinking, and ensure sufficient clearance for the trap to function. With rough-sawn timber this may require that tolerance around dimensional variation is limited, and during construction that the internal width (200mm) is used as the reference point. This could result in the walls overhanging the floor by a small amount.



# 9. Every trap counts

In the previous section of the guide we described best-practice trap networks, based on 30 years of experience in the deployment of landscape scale-trapping across the complex and varied terrain of public conservation land. Often these recommended best-practice trap networks are not appropriate to be deployed in a residential backyard or small block of land. This section will help you plan the layout of traps on less-complex sites.

## Planning small-scale trap networks and placement of backyard traps

- There are some factors that are relevant to all trap networks regardless of size or complexity of the site.
  - Target predator behaviour, home range and habitat as described in the section 'Know your target predator' (pages 4–18).
  - Difficult terrain may be a factor that will influence the location of your traps. For example, best-practice trap networks (page 49) describes the layout of stoat traps along the natural lie of the land such as habitat perimeters, ridges, altitude contours, waterways, and track and road edges.
- While difficult terrain is less likely to be a problem for most small sites, there are other limitations you will need to consider when placing your traps.
  - Trap proximity to dwellings and property boundaries.
  - Placing your trap where you can see rodent tracks or run lines; fence lines are a great place for a single trap on a small site.
  - If your trap is a tree mounted, its placement will be restricted to the location of suitable trees.
  - Compost is an easy source of food for rodents, so we recommend you remove the temptation. Use a rodent-proof compost bin so rodents are more likely to be attracted to your bait.
  - If there is a risk that the trap may be stolen or interfered with, it is best not to place it close to the street.
- The smaller your site the higher the reinvasion rates, therefore your trap network will need to be more intensive than described in best practice. If you have the funding and time to clear traps, then place them as close as 10 m apart on boundaries.
- If you are surrounded by vacant land, paddocks, bush or residential sections that are not trapped then your catch rate may initially be higher; take this into account when using single-kill traps, as they will require more frequent clearing, rebaiting and setting.

- Rodents are the most common predators in residential backyards. Multi-kill automated traps are a great choice for sites with high reinvasion rates; they are less labour intensive and will keep on working without you having to regularly clear or reset them.
- If your traps are near your dwelling and easily accessible, then trap checking won't take as much time, so check them as often as you like, weekly or even daily.
- With a small number of traps, it is important they remain set to trap your target predator. The fewer traps you have, the less likely your target predator will be to encounter a trap. Therefore, increase the frequency of checking and rebaiting your traps.
- In urban settings, consider the risk that traps could present to domestic animals and children. This may require placing traps in less-accessible locations and/or using tunnels that prevent access to the trap. Some rat trap models have only limited injury potential, so may be a safer choice for trapping in residential areas.
- Encourage your neighbours. If every backyard has a predator trap, control is more effective and working together will reduce reinvasion rates and the number of predators in your neighbourhood.
- Don't underestimate the impact that a single trap or small-scale trap network can have on predator control. One household trap can lead to a street of traps, then a neighbourhood of traps which may one day become a city of traps. It may all start with you. Remember, every trap counts.

For further advice on small-scale networks or backyard trapping, contact your local council: **www.localcouncils.govt.nz** or Predator Free NZ Trust: **www.predatorfreenz.org**

To connect with community groups, share knowledge and see what is happening in your area, add your community group's details to the Predator Free NZ Trust's interactive online map: **www.predatorfreenz.org/about-us/national-map**


Backyard trapping with Goodnature A24.
*Photo: Goodnature*

# 10. Recording trap catch

Accurate recording is critical. Here are some simple rules for data collection.

1. Record accurate information at each trap. Your data may be used over and over by many people to improve the way we do things, so making accurate records is very important.
2. Record written data clearly.
3. Check all your data a second time before you leave the field. It is easier to check missed data in the field than at home.
4. Look after the data, make back-up copies as soon as practicable and take care to store originals where they cannot be lost or damaged.

There are numerous providers who have developed online data capture tools in New Zealand for managing and analysing your trap data, including interactive maps and graphs.

To compare the features of the various options for online data collection refer to 'Mapping and monitoring tools' at the Predator Free NZ Trust website: **www.predatorfreenz.org/toolkits/is-your-predator-control-working/mapping-monitoring-tools**

The trap.nz app on a mobile phone.
*Photo: trap.nz*

## Data management tools

### trap.nz

Developed with the support of WWF and Groundtruth Limited it is one of the largest trapping data capture and management tools. The Department of Conservation uses the trap.nz app and web application for recording data on public conservation land and encourages communities working on public conservation land to do the same.

There are a number of benefits to trap.nz, including that it has Android and IOS applications, and it collects both trapping and monitoring data in the one app. It can generate reports easily and has significant uptake across Aotearoa. For more information, go to their website **www.trap.nz**.

#### Other data management options

**EcoTrack** – co-developed by Agile Cloud and Pest Free Kaipatiki: **www.ecotrack.nz**

**CatchIT** – developed by Auckland University: **www.stat.auckland.ac.nz/~fewster/CatchIT/**

# 11. Instructions for DOC-series trap maintenance

DOC ranger checking trap. *Photo: DOC*

## DOC-series trap design

DOC-series traps are ergonomically designed for ease of usability. They are highly effective single-kill predator traps, NAWAC tested to humanely kill target predators (refer to NAWAC table page 35).

DOC traps require regular maintenance to ensure continued efficacy and humane predator control over long periods of use in the field.

It is recommended that trigger weight testing and calibration of DOC-series traps be completed annually. Visual inspections should be completed during every trap check, during which all carcass remains, leaf litter and debris should be removed. Keeping the trap mechanism clean will ensure continued effective performance. Deterioration or any other issues that may prevent the trap from working correctly should be noted and traps replaced as required.

If a trap continually has no catches, then there may well be an issue with its trigger weight, trap mechanism or location. Check the trap's calibration using weight testing and/or move the trap to a new location.

Testing the trigger weight as described on pages 69–72 requires two small weights, one 50 g the other 100 g. When testing the trap with the weights the trap should not be set off by the 50 g weight. When tested using the 100 g weight, the trap should be set off. This means the trigger mechanism is calibrated correctly to the minimum weight of the target predator.

In double-set trap designs with two traps side-by-side in one wooden tunnel, when one catches a predator it may set the other one off. This is known as 'sympathetic set-off'. The first trap is triggered by a catch and the other is found set off and empty. This can indicate that one or both traps require weight testing and calibration or that the trap is not level or the ground too soft.

To prevent continued sympathetic set-off, it is recommended that double set traps are securely fixed to the ground. This will require short rods of rebar (reinforcing steel; about 50 cm) be hammered into the ground and nailed to either side of the outside of the wooden tunnel to keep it steady.

## How to clean, weight test and calibrate a DOC-series trap

**WARNING:** Always use a safety clip when maintaining DOC-series traps and wear gloves when handling traps and dead animals. Carry hand sanitiser and wash your hands properly on completion of trapping and before eating or drinking.

Video instructions on trap maintenance can be found in DOC Skillables **www.youtube.com/user/DOCskillable**.

Before calibrating a trap for the first time we recommend you familiarise yourself with a well-calibrated DOC-series trap. Review the components and working mechanisms, focus on how the treadle plate and trigger arm interact, move and function when set and unset. Note the height of the sear, and how the trigger sits against it when set.

Adjusting the traps to the right weight takes practice and a trial and error approach. Ensuring traps are not too sensitive is especially important for double-set tunnel designs. The force of one trap activating can trigger the other if poorly adjusted.

## Equipment

Check you have all the equipment you need before you head into the field. The following equipment is recommended for weight testing, calibration, and trap and track maintenance. It's a good idea to mark your equipment with fluoro flagging tape so you don't lose it in the field.

1. Notebook
2. Permanent marker
3. Safety clip
4. Safety clip for no clearance between wall
5. Gloves
6. 50 g and 100 g weights
7. File
8. Square head driver as tapping tool
9. Pincer
10. 8 mm socket driver
11. Scraper
12. Pruning saw
13. Hammer

## Cleaning

Before weight testing, complete a visual inspection of trap and tunnel. It is important to clean the trap of all carcass remains, bait, soil and leaf litter before you begin weight testing. Figure 4 shows a trap with fur accumulated on the sear. This may prevent the trap from activating when tested at the correct trigger weight.

Focus on the working areas of the trap mechanism where debris can collect and interfere with the correct function of the trap. Using a small wire brush, clean the trap mechanism as follows.

**Step 1**
Put the safety clip on.

**Step 2**
Clean the tip of the trigger arm and the small sear (Fig. 5). The tiny sear is the small protruding metal nub that the trigger tip catches against when the trap is set. It is located on the arm of the trap treadle (plate).

**Step 3**
Clean the hinge at the top of the trigger arm, it should swing smoothly and freely when the trap is not set (Fig. 6).

**Figure 4.** Fur accumulation.

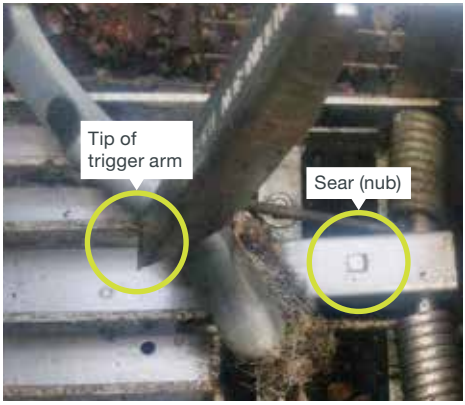



**Figure 5.** Tip of trigger and sear.


**Figure 6**. Aerial view of hinge connecting trigger arm to trigger hanger.

## Weight testing

The reason for weight testing is to ensure that set traps trigger correctly at 100 g. This weight prevents smaller non-target species, particularly mice, from setting off the trap. This ensures traps remain set and ready to catch their target species.

**Correct weights for testing**
DOC150 and 200 traps will hold when tested at 50 g and will trigger at 100 g. DOC250 traps will hold at 50 g and trigger at 120 g max.

1. Before weight testing, ensure trap is set correctly and the safety clip is on.
2. **You want the trap to hold at 50 g**. For the first weight test use the 50 g weight. Place it gently and slowly on the location shown on the treadle plates in Fig. 7. The trap should not be triggered by the 50 g weight. If the trap does trigger, it will require calibration.
3. **You want the trap to trigger at 100 g**. For the second test use the 100 g weight. Placing it gently and slowly in the same location as described above. The trap should trigger. If it does not trigger, it will require calibration.
4. Accurate placement of the test weight on the treadle (plate) varies between DOC-series models. For correct position of weight, refer to Figure 8 for testing DOC150 traps and Figure 9 for testing DOC200 traps.

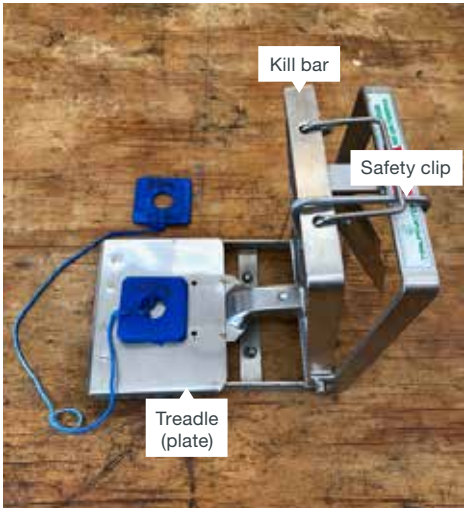



**Figure 7.**

**For DOC150**

Align washer with flat plate

**Figure 8.**

**For DOC200**

Old model | Current model

Align washer with welding marker

**Figure 9.**

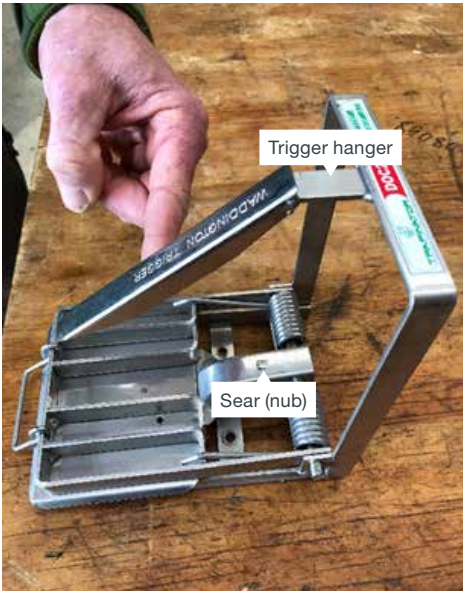



**Figure 10.**

If your trap fails to pass the weight test and before you consider calibrating, take a second look at how clean your trap is. Calibrating can take a lot of time and often a good clean is enough to ensure the trap weight tests correctly; check to see if you have missed anything in your first round of cleaning and try weight testing again. You may not need to adjust any of the trap mechanisms.

## Calibration techniques

### Step 1 – Visually inspect relevant parts of the trap mechanism

There are two parts of the trap mechanism that can be adjusted for correct weight calibration (Fig. 10).

1. The sear (nub)
2. The trigger hanger

Calibration may require the adjustment of one or both parts of the trap mechanism. Visually inspecting both parts first will help you to determine which part or parts need to be adjusted.

### Step 2 – Check the trap and tunnel

Begin by checking all trap parts are in good order (no rust or debris present, for example) and that the trigger arm and hinge are moving freely (Fig. 10). Check the spring function of the trap treadle (the base plate which the predator steps onto). It should lift and move freely. If it does not, then clean it. If it still fails to move freely then a full trap replacement may be needed.

## Step 3 – Adjusting the sear (nub)

- The sear should be 1 mm high so that the tip of the trigger catches against it when the trap is set (Fig. 11). With constant use, the sear can wear and become too low to catch the tip of the trigger. The trigger then swings back behind the kill bar.
- Your trap sear is not sensitive enough if it won't allow the trap to be triggered when tested with a 100 g weight. To correct this, the sear needs to be lowered.
- You do not need to remove the trap from the tunnel to lower the sear. With the trap unset, use the tip of a square head screwdriver and a hammer to gently tap the sear down slightly (see Figs. 12 and 13).
- Lowering the sear by 0.5 mm increases sensitivity by approximately 20 g. Be careful! If you hit the sear too strongly you will lower it too much and you will then have to remove the trap completely, turn it upside down and tap it on its underside to raise it again.
- Your trap sear is too sensitive if the trap sets off when tested with a 50 g weight. You will need to adjust the sear higher to reduce trap sensitivity. To do this you will need to remove the trap from the wooden tunnel, turn it upside down (so you have access to the base of the sear under the trap) and, using the tip of your screwdriver, give the sear a very gentle tap to raise it slightly. It does not take much force to raise or lower the sear.

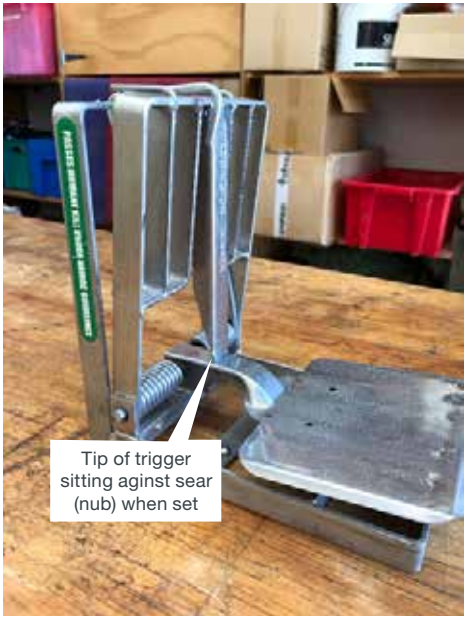



**Figure 11.**


**Figure 12.**


**Figure 13.**


**Figure 14.**

## Step 4 – Adjusting the trigger hanger

The kill bar should fit snugly against the top end of the trigger arm when set. First check that the kill trigger moves freely. In the parallel position, the top end of the trigger arm overlaps the trigger hanger without catching (Fig. 14). The kill bar should pull smoothly up over the top of trigger hanger and rest against the top of trigger arm when set. If the kill bar is dragging or won't go over the top of trigger arm when setting, then use the hammer claw to gently bend the trigger hanger down (Fig. 15). If the kill bar is too loose and keeps slipping forward because it doesn't fit against the trigger hinge to set, then the trigger hanger will need to be bent up slightly.


**Figure 15.**

## Step 6 – Concluding trap maintenance

1. Perform steps 2–5 weight testing between steps until you reach the correct range of trigger weight (the trap should hold at 50 g and trigger at 100 g).
2. Set your trap and don't forget to retrieve the safety clip.
3. It is important to make notes describing the work completed on each trap. Keep a logbook of the dates the trap was tested, how and why the trap failed weight testing and what parts of the trap were adjusted. Record whether the trap passed or failed weight testing so that it can be replaced if required.
4. Check the area around the tunnel ends to make sure they are clear of grass, vegetation and leaf litter, creating a clear run to the trap entrance way (Figs. 16 and 17).
5. Finally, check to make sure you don't leave equipment behind!

For further information on DOC-series trap maintenance we recommend you watch the 'DOC Skillable' series of videos available on **www.youtube.com/user/DOCskillable**

For full instructions on testing all other traps, visit the suppliers' websites.

**Figure 16.**

**Figure 17.**

# 12. NZQA training

## NMIT/Te Pūkenga Predator Trapping Methods Course

## Level 3 micro-credential

If you are interested in further training, DOC has partnered with NMIT/Te Pūkenga to deliver the Predator Trapping Methods course. The course utilises the 'Predator Free 2050 Practical Guide to Trapping' as a resource and will discuss in further detail the techniques and best-practice information in this guide.

To enrol in this course or for further information, visit **www.nmit.ac.nz/study/short-courses/prt301-predator-trapping-methods**

This course provides knowledge and skills to manage effective pest-control programmes.

There are two ways to achieve the NZQA micro-credential: by learning fully online, or by blended delivery including a 2-day face-to-face workshop.

Designed for communities that wish to become more active in predator control in their local conservation areas, this course aims to provide an overview of New Zealand predators, focusing on rats, stoats, and possums.

You will learn why these predators are pests, their impacts, and the control methods to use. The focus will be on developing an effective predator-control plan for your area and the importance of monitoring, allowing you to work out the right methods to match the outcomes you need.

You will also gain the practical experience you need to trap successfully.

On completion you will be able to:

- discuss and evaluate a range of trap based control methods
- create and refine a predator control plan
- develop Health & Safety procedures for trap based predator control
- interpret and use field instructions for trap based predator control
- undertake predator control and document trap-catch results

Photo Predator Trapping Methods Workshop, Invercargill 2021. *Photo: DOC*

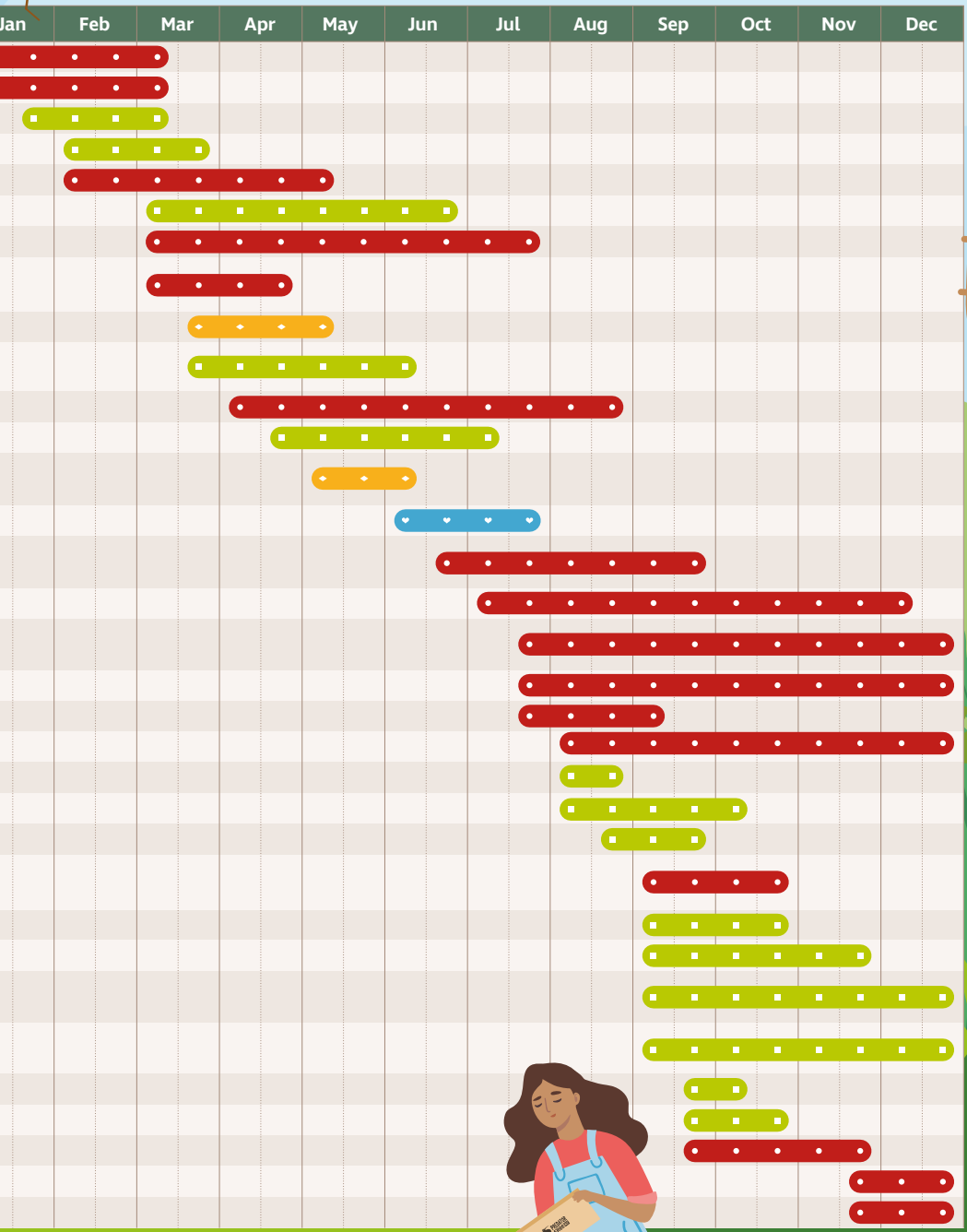
# Predator Control Calendar

| Event |
|---|
| Mustelid (ferret, stoat, weasel) juveniles have left the den, and populations peak. Consider increased trap servicing. |
| Hot temps and increased microbe/insect activity. Good time to move to mutton fat as bait in DOC200 traps. |
| Whio juveniles start to fledge. Adults begin to moult, leaving them particularly vulnerable. Increase stoat trap servicing. |
| Second clutch kiwi chicks emerge from the nest. Increase stoat control. |
| Wasp numbers start to increase, caution is required. Deploy Vespex® bait stations. |
| Beech mast starts to hit the ground. |
| Rodent populations have started to increase exponentially. Good time to pulse bait. |
| Major possum mating period for the year. Juveniles are dispersing. Opportunity to exploit promiscuity (use possum 'night clubs'). Pulse bait in bait stations. Rebait and set kill traps. |
| Annual deer roar, lots of hunters in the bush — caution required. |
| Domestic pip-fruit (apples, pears) and nuts are coming on stream. Possums are active in orchards, place traps or bait stations on popular trees. |
| Cooler weather starts to bring rodents inside houses and buildings. Set up traps and bait stations inside in anticipation. |
| Podocarp mast ripe, adding to rodent population growth. |
| Duck shooting on many wetlands and aquatic environments (lakes, rivers, streams, estuaries). Consider using duck carcasses as bait for cat & mustelid control as they will be occurring in the natural environment. |
| Best time to take a holiday from predator free mahi. |
| Possums are active in winter green crops. Target crops for possum control (night shooting) or trapping on possum runs heading into crops. |
| Cat breeding season begins, kittens in dens. Dumping of domestic kittens common at this time of year. |
| Time to start ramping up rodent control (pulse baiting) for spring. Rodents hungry as beech mast/podocarp fruit disappears. Rodents need to be reduced under 2–5% Tracking Index by 1 October, depending on outcomes sought. |
| Undertake possum control together with rodent control. For example, pulse bait in bait stations, rebait and set kill traps. |
| Intensive rabbit shooting will reduce the survival of spring juveniles', limiting mustelid and cat population increases. |
| Start increasing mustelid/stoat trap servicing to protect spring bird breeding. |
| Now is a good time to clean & recalibrate your DOC200 traps. They should activate at about 80g plate trigger weight. |
| Weather cool, low microbe and insect activity. Best time to use fresh meat baits in DOC200s. |
| Possums are eating pine catkins. Target big old pines for possum control, night shooting in open terrain or trapping in the bush. |
| Second possum mate period, opportunity to exploit promiscuity (possum night-clubs); pulse bait in bait stations; rebait and set kill traps. |
| First-clutch kiwi chicks emerge from the nest. Active stoat trapping is essential. |
| Whio hens start nesting. Lost nests will see second clutching well into November. |
| Forest bird nesting ramps up for the next 4–5 months. Rodent indices should be at an annual low (2%). Intensive predator control is required. |
| Eggs common in the landscape, best time to use fresh egg baits in traps. Blow eggs at trap entrance. Ensure the egg shell is horizontal on the nails. Dirty hen or duck eggs covered in poop are best. |
| Willow/Larch bud break. Great night shooting opportunities for possum control in open terrain. |
| Kowhai flowering. Good time to target possums on kowhai trees. |
| Female stoats start breeding. Kittens in the den, lots of prey predated. Consider increased trap servicing. |
| Mustelid (ferret, stoat, weasel) juveniles start leaving the nest — populations begin to peak. Consider increased trap servicing. |
| Hot temps & increased microbe/insect activity. Good time to move back to mutton fat as bait in DOC200 traps. |

* Possum 'night clubs' can be created at sites that might attract possums from distance i.e. on the edge of clearings, ridgelines, etc. Prefeeding over a week to 10 days attracts increasing of possums for food and social interaction. The increased possum traffic can then be targeted with multiple traps at the site or toxin bait stations (Feratox®/Double-Tap®/Feracol®).

** 'Pulse' baiting = feeding a set amount (300–500g for possums) of bait (eg. Feracol®/Double-Tap®) once per month, to avoid over-feeding and to reduce bait shyness from over exposure to damp/mouldy bait. Remove all uneaten bait when refilling. Dispose of unused bait as per label instructions.

PREDATOR FREE NZ




numbers

- Environmental cues
- Pest cues
- Social/human cues
- Take a well-earned break!

# 14. Suppliers of traps, baits, lures and monitoring equipment

| | |
|---|---|
| **Predator Free NZ Trust** | https://shop.predatorfreenz.org |
| **Goodnature Traps** | www.goodnature.co.nz |
| **Haines Pallets** | www.hainespallets.co.nz/predator-traps |
| **CMI Limited** | www.cmisprings.com |
| **National Traps** | www.nztraps.co.nz |
| **Pest Control Solutions** | www.pestcontrolsolutions.co.nz |
| **Connovation** | www.connovation.co.nz |
| **Kiwicare** | www.traps.co.nz |
| **NZ Auto Traps** | www.nzautotraps.com |
| **Key Industries** | www.keyindustries.co.nz |
| **Farmlands** | www.farmlands.co.nz |
| **Mitre 10** | www.mitre10.co.nz |
| **PGG Wrightson** | www.pggwrightson.co.nz |
| **Designed-2-Kill** | www.designed2kill.info |
| **Envirotools** | www.envirotools.co.nz |
| **Dead Rat Ltd – Grantley Imports Ltd** | www.deadrat.co.nz |
| **Poditrap** | www.poditrap.co.nz |
| **Fielden Metalwork** | www.fielden.co.nz/products/doc-trap-tunnel-kits |
| **Rewild** | www.rewild.nz |
| **Trapinator** | www.trapinator.com |
| **Good Wood** | www.goodwood.nz |
| **MENZSHED NZ** | www.menzshed.org.nz |

# 15. Online resources

| | |
|---|---|
| **Department of Conservation** | www.doc.govt.nz/predator-free-2050 |
| **National PF2050 programme website** | https://www.tuiatetaiao.nz/ |
| **Predator Free New Zealand Trust** | www.predatorfreenz.org |
| **Predator Free 2050 Ltd** | www.pf2050.co.nz |
| **Forest and Bird** | www.forestandbird.org.nz |
| **NZ Local Government** | www.lgnz.co.nz |
| **Ministry of Primary Industries (MPI)** | www.mpi.govt.nz |
| **Ministry for the Environment (MfE)** | www.mfe.govt.nz |
| **Landcare Research** | www.landcareresearch.co.nz |
| **NAWAC ( National Animal Welfare Advisory Committee)** | www.mpi.govt.nz |
| **Bionet NZ** | www.bionet.nz |
| **QEII National Trust** | www.qeiinationaltrust.org.nz |
| **NEXT Foundation** | www.nextfoundation.org.nz |
| **New Zealand's Biological Heritage – National Science Challenge** | www.biologicalheritage.nz |
| **ZIP (Zero Invasive Predators)** | www.zip.org.nz |
| **Pest Detective** | www.pestdetective.org.nz |
| **Goodnature** | www.goodnature.co.nz |
| **Trap.NZ** | www.trap.nz |
| **iNaturalistNZ** | www.inaturalist.nz/guides/1298 |
| **NZ Tracker** | www.nztracker.org |

# STOAT & RAT TRAP CHECK LIST

## Follow this check list to help get the best out of your trapping.

Always wear gloves when handlings traps or catches, for hygiene and to prevent disease.

- [ ] Open the trap with the lid resting across the box, not 'hanging'.
- [ ] Remove any catches from the trap. If the trap is empty, use a sock or soft item to set the trap off.
- [ ] Clean the trap, mechanism and box and clear the entranceway of grass.
- [ ] Record the trap catch and status on your data capture app or notebook.
- [ ] While the trap is unset, ensure that the box is level, stable and doesn't wiggle.
- [ ] Carry out any minor maintenance required (applying new nails or screws, securing mesh ends).
- [ ] Make sure entranceways are smooth and free of sharp edges or sprags.
- [ ] Change the lure in the trap, such as peanut butter, erayze or mutton fat.
- [ ] Reset the trap. If using a double-set, ensure a safety clip is used while setting the second trap.
- [ ] Scuff the ground at trap entrances, and blaze flour lure in scuff and on trees near the trap.
- [ ] Step back and look at the trap. Is there anything that could be better? Ensure you have all your gear before moving on to the next trap.

Remember that regular maintenance of traps is important; calibrate them at the right weight and make sure they're operating well.

For more information, go to
**predatorfreenz.org**

Thanks to Cam Speedy from Wildlife Management Associates Ltd.

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# Kōkiri whakamua i te Whakakore Konihi i Aotearoa

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**Disclaimer**
This guide reflects agreed best practice and the latest technical information at the date of publication. As it will need to be updated regularly, please check the DOC website to ensure you are using the latest version.

## DOC thanks you for your contribution towards a Predator Free New Zealand.

If you would like further information about the content in this guide please contact your local DOC office or Regional Predator Free Ranger.

**www.doc.govt.nz**

Learning to trap in wetland habitat. *Photo: DOC*

Te Kāwanatanga o Aotearoa
New Zealand Government