

Pest animal control for forests





Publisher

Te Uru Rākau – New Zealand Forest Service
Ministry for Primary Industries

PO Box 2526, Wellington 6140, New Zealand

0800 00 83 33

mpi.govt.nz/forestry

ISBN No: 978-1-997309-03-1 (online)

ISBN No: 978-1-997309-04-8 (print)

February 2026

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The importance of managing pest animals

Managing pest animals is crucial when establishing a new forest. It is also an important part of maintaining your forest's health.

Pest animals can have harmful effects on your forest, such as:

- browsing on or uprooting seedlings and young trees;
- rubbing bark from trees;
- degrading forest land by trampling and digging soil;
- preying on birds that spread seeds.

The effect of these animals can be huge depending on their population density – and the risks go beyond forest health.

If pests establish themselves on your property, they can introduce diseases such as bovine tuberculosis. The spread of pests to neighbouring properties can damage neighbourly relationships.

Pest animals pose risk at all stages of your forest's development. You need to make sure their numbers are kept low before you plant. That way, you give seedlings a better chance to establish successfully. You need to factor in ongoing animal control throughout your forest's lifespan to ensure it thrives.

If you control pest animals from the start, you can reduce the time and cost of establishing your forest. Effective pest control can mean the difference between a thriving forest or a failed one.

You need to identify pest animals on your property to ensure the best control methods. These animals can include:

- deer;
- goats;
- pigs;
- possums;
- rabbits and hares;
- wallabies.

Pest, wild or feral – what’s the difference?

In this booklet, we use “pest” as a general term for animals that damage seedlings or forests. It’s short, simple and easy to understand.

In legal contexts, though, “pest” and “wild” have defined meanings depending on the legislation they’re used in. For example:

- the terms “pest” and “unwanted organisms” are defined in the Biosecurity Act 1993;
- the term “wild animal” is defined in the Wild Animal Control Act 1977.

You might also see the word “feral” used to describe animals, such as feral pigs and feral goats. Feral animals are those that come from domesticated species but escaped to the wild. They’re not reliant on humans for food, shelter or care and are self-sustaining.



Risks from pest animals

The highest risk is that pest animals will eat your seedlings. But these animals cause many harmful effects if left unchecked.

Biodiversity

Possums and pigs eat native birds and insects. These and other animals also compete with our native fauna for food and habitat.

Pest animals often favour more palatable plant species. This reduces plant diversity and alters the forest structure.

Forest regeneration and succession

Pest animals stunt the natural regeneration of forests. They trample, uproot and eat seeds and seedlings growing on the forest floor.

Wallabies and goats destroy all vegetation within reach. Possums strip trees of leaves, buds, flowers and fruit. By attacking these parts of the tree, they disrupt the growth and lifecycle of forests.



The left side of this image shows the damage wallabies cause to native understorey. The fence in the middle stops wallabies eating the understorey on the right. Image courtesy of Biosecurity New Zealand.



Rabbits undermine soil by digging warrens, making the land more prone to erosion.

Erosion and water quality

Pest animals disturb soil. For example, pigs plough up soil searching for food and rabbits undermine it digging warrens. This results in more erodible land and sedimentation in waterways.

Timber returns

If you're planting trees to harvest, pest animals can reduce your timber returns by:

- eating seedlings and thereby increasing the cost to establish your forest;
- slowing tree growth and delaying the harvest date;
- damaging bark and leaving trees vulnerable to disease;
- deforming or killing young trees, thereby reducing harvest volume, log grade and product out-turn.

The Emissions Trading Scheme (ETS)

Pest animals can affect whether your trees qualify as forest land in the ETS. As part of the requirements to join the ETS, your land must have (or be expected to reach) more than 30 percent tree crown cover per hectare – and the trees must be able to grow at least 5 metres tall. Pests can prevent or delay this by eating or damaging seedlings and young trees.

Pests can affect the New Zealand units (NZUs) that your registered forest earns by reducing carbon sequestration. For example, if pests kill trees and reduce crown cover in a registered forest, you may need to pay (surrender) NZUs. For ETS participants with more than 100 hectares of forest who use the Field Measurement Approach, pests could reduce the number and size of your trees. This will affect the measurements used to calculate your carbon yields.

Pest animals may also make it harder to reestablish trees after harvest. If trees don't regrow, the land may be deemed deforested, and you'll need to surrender NZUs. This applies to both pre-1990 and post-1989 forest land.

Identifying pest animals on your property

To control pest animals, first figure out which species are on your property.

Deer

There are seven species of deer in New Zealand. Deer were imported and released here from 1851. You can find populations of wild deer throughout the country.

Browsing	Browsing signs up to shoulder height – 1 to 1.5 metres but can be up to 2 metres. Look for cleanly snapped stems.
Prints	Small to large 2-toed cloven hoofprints. The main hoofprint is about 6 to 7 centimetres long. Dewclaw marks are sometimes visible behind the main hoofprint. The top image opposite shows a red deer hoofprint, including dewclaw marks.
Scat	Oval cylindrical pellets; usually in piles; dark brown and firm. The bottom image opposite shows red deer scat. Image courtesy of Biosecurity New Zealand.
Notes	Deer trample seedlings and understorey. They damage mature trees by rubbing their antlers on the bark. They do this during velvet stripping (late summer) and rut (autumn). Deer follow well-used game trails.

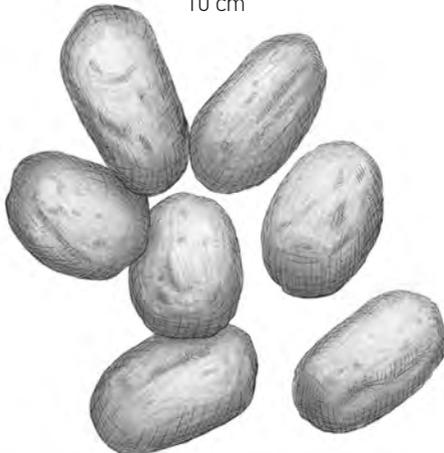


A red deer stag. Deer can damage mature trees by rubbing their antlers on the bark.

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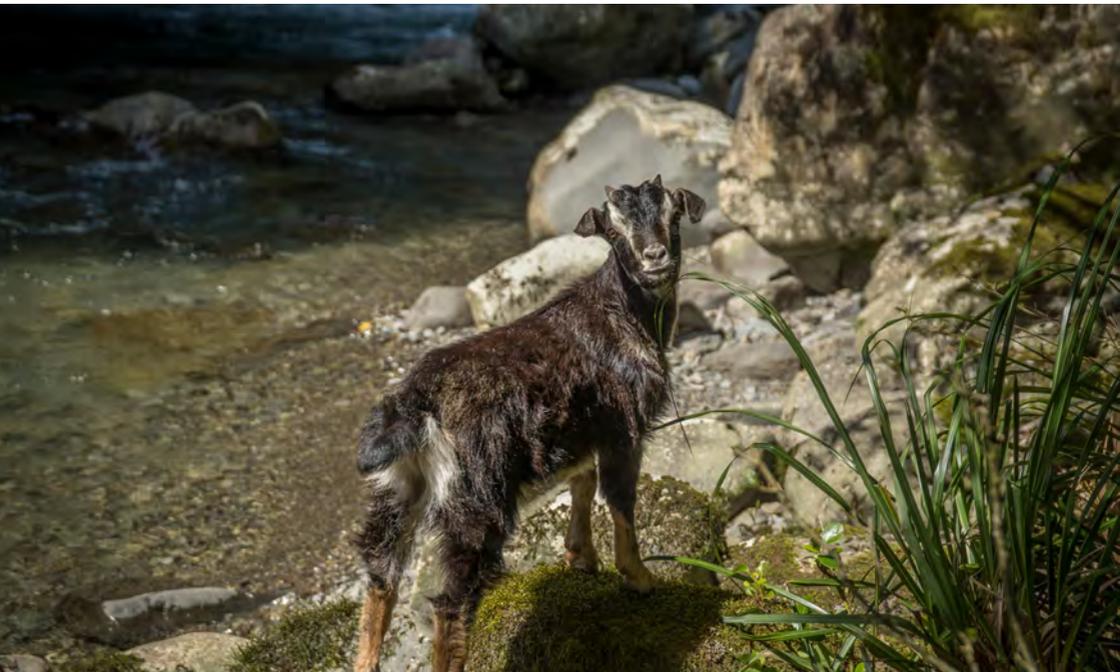


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Goats

Goats were introduced to New Zealand as early as the 1770s. You can find wild goats on both main islands and some offshore islands. They live in grasslands, scrublands and forests from the coast to upland areas.

Browsing	Browsing signs up to about 1.2 metres, but can be up to 2 metres. Look for ragged tear marks on plants and branches stripped of leaves.
Prints	Small to medium cloven prints; about 5 to 6 centimetres long; slightly in-curved tips. The top image opposite shows a goat hoofprint.
Scat	Oval cylindrical pellets; usually medium-sized but can vary. Scat image opposite courtesy of Biosecurity New Zealand.
Notes	Wild goats trample seedlings and understorey. Goats bleat loudly. Billy goats have a strong scent. Goat scat can look like deer scat, but the browsing signs are different.



A wild goat in a riverbed. Goats eat all types of vegetation and trample understorey.

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Pigs

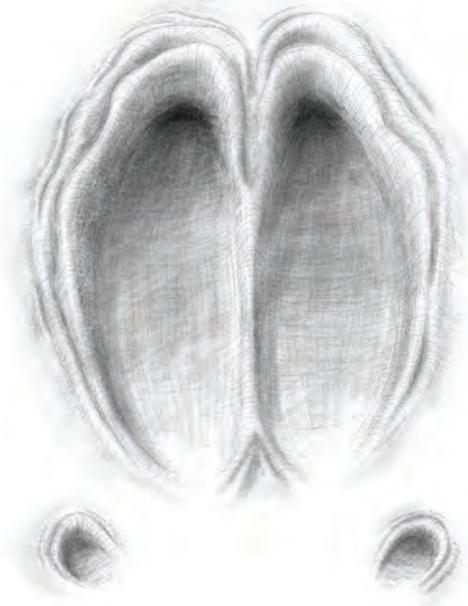
It is thought that pigs were introduced by James Cook on his first voyage to New Zealand in 1769. Wild pigs are present on both main islands and the Great Barrier and Chatham Islands.

Browsing	Browsing signs are at a low height. Look for broken stems, roots dug up for tubers and chewed grass.
Prints	Wide, rounder prints with dewclaw marks; 6 to 9 centimetres long. The top image opposite shows a pig hoofprint.
Scat	Large, cylindrical scat with blunt ends; 5 to 8 centimetres long; scattered or in piles; soft. The bottom image opposite shows pig scat.
Notes	Wild pigs are active at night. They make loud grunts. Look for churned-up muddy depressions where pigs wallow.



A wild pig using its snout to search for food in the understory.

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Possums

Brushtail possums were introduced to New Zealand between 1837 and 1898 to establish a fur trade. They're now common throughout the country.

Browsing	Browsing signs include chewed or skeletonised leaves, stripped bark (in horizontal rows), and damage to the forest canopy.
Prints	Small prints with thumb-like large toe; 4 to 5 centimetres long. The top image opposite shows a possum's foreprint (top) and hindprint (bottom).
Scat	Small, firm cylindrical pellets about 1 to 2 centimetres; sometimes clumped together; often under trees. Scat image opposite courtesy of Biosecurity New Zealand.
Notes	Possums are nocturnal. They can leave possum "runs" (tracks) in grassy areas. It's not easy to identify possums by their prints – other signs are more obvious.



A brushtail possum at night. Possums strip trees of leaves, buds, flowers and fruit.

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Rabbits

Rabbits were released in New Zealand in the 1800s to create a fur and meat trade. They're now widespread, and especially numerous in dryland and semi-arid areas in the South Island.

Browsing	Diet mostly consists of short grasses but will eat seedlings in winter when grass is scarce.
Prints	Hindprints side-by-side and overreaching the foreprints. The foreprints are placed one in front of the other. The hindprints of adult rabbits are 6 to 9 centimetres. The top image opposite shows a rabbit's smaller foreprint (left) and larger hindprint (right).
Scat	Small, dark brown or black round balls; 1 centimetre in diameter or less; clustered. Scat image opposite courtesy of Biosecurity New Zealand.
Notes	Rabbits are social and live in burrows below ground. They range up to about 3 hectares. Rabbits are nocturnal and their eyes shine red orange in torchlight at night.



Rabbits mostly eat grass, but will browse tree seedlings in winter when grass is scarce.

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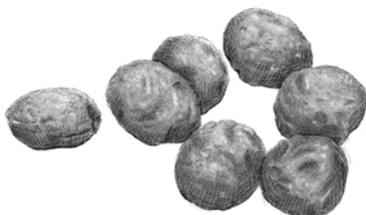
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Hares

Hares were released in New Zealand from 1851 for sport and food. They're now found in most pastoral and grassland areas.

Browsing	Hares eat grasses, tussocks and rougher vegetation, and will browse seedlings. Look for seedlings cleanly snipped at 45 degree angles.
Prints	Like rabbit prints, with the hindprints side-by-side and overreaching the foreprints. The foreprints are placed one in front of the other. The hindprints of adult hares are 10 to 15 centimetres long. The image opposite shows a hare's smaller foreprint (left) and larger hindprint (right).
Scat	Light brown and fibrous flattened round balls; up to 1 to 1.5 centimetres in diameter; scattered. Scat image below courtesy of Biosecurity New Zealand.
Notes	Hares are larger than rabbits with a black tip on the top of their ears. They're solitary and have a home range of up to 50 hectares. Like rabbits, they're nocturnal.



Hares are larger than rabbits and have distinctive black tips on their ears.

10 cm



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Wallabies

Five species of wallabies were introduced to New Zealand in the late 1800s. Three are now significant pests. These are:

- dama and parma wallabies found mostly around Rotorua Lakes in the North Island;
- Bennett's wallaby found mostly around South Canterbury in the South Island.

Browsing	Browsing signs at a low height (about 0.5 metres to 1 metre). Look for ragged tear marks on plants and damage to seedlings.
Prints	Parallel pairs of prints from hopping; distinctive Y shaped footprints; sometimes handprints or tail drag visible. Wallabies leave narrow, bare trails. The top image opposite shows pawprints from a Bennett's wallaby. The following page (page 20) features pawprints from a dama wallaby. Images courtesy of Biosecurity New Zealand.
Scat	Small, oval to cylindrical scat in loosely grouped piles; dry and hard; brown to dark brown. Dama and parma wallaby scat is 2 centimetres long and Bennett's wallaby scat is 2.5 to 3 centimetres long. The bottom image opposite shows scat from a Bennett's wallaby. The following page (page 20) features scat from a dama wallaby. Images courtesy of Biosecurity New Zealand.
Notes	Wallabies are nocturnal and may be seen at last light and at first light. It's easy to mistake other animals as wallabies, including possums, hares and feral cats. Wallabies are shy and elusive. Possums will dominate bait stations before wallabies can feed.



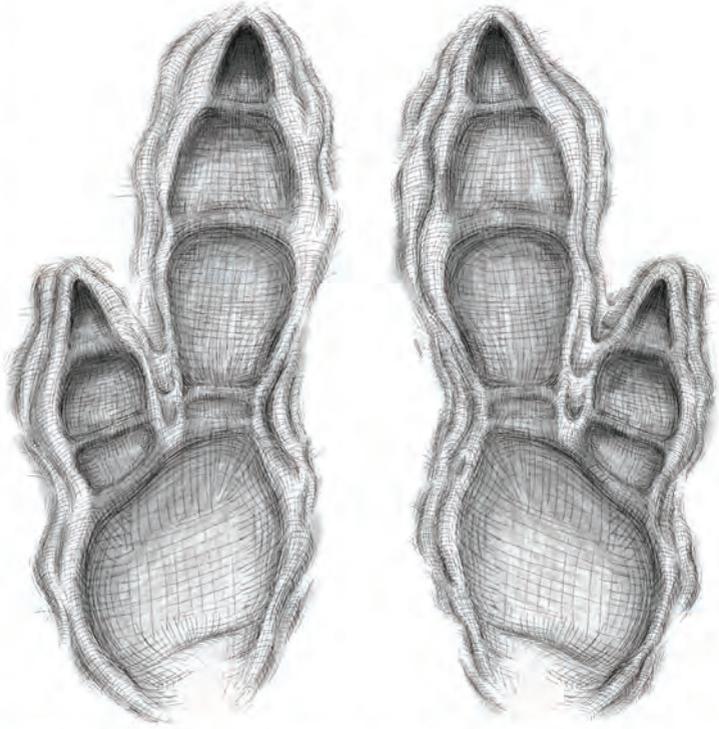
Bennett's wallaby.

Tipu Mātoro National Wallaby Eradication Programme

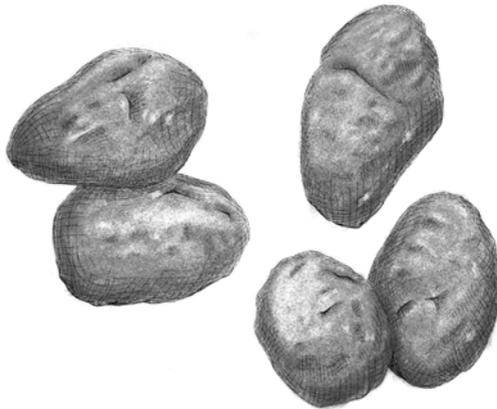
Wallabies are mobile, breed easily and have no predators in New Zealand. Left to themselves, wallabies could occupy one-third of the country over the next 50 years. The Tipu Mātoro National Wallaby Eradication Programme was established to protect farms, forests and the country from pest wallabies. The programme's first aim is to contain wallabies to their current locations. The long-term goal is a wallaby-free New Zealand.

You can help by reporting wallaby sightings at reportwallabies.nz

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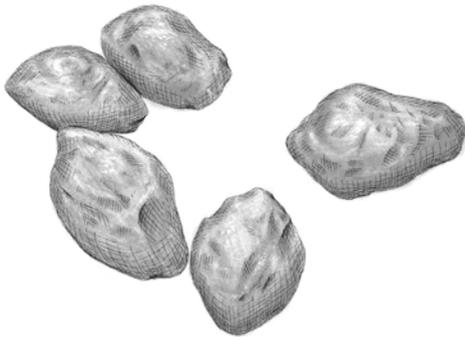
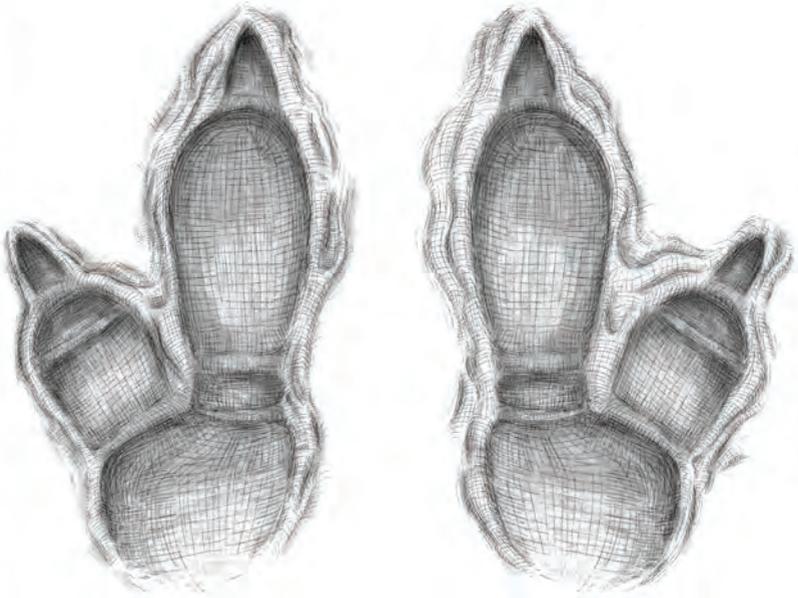


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Controlling pest animals

Effective pest control requires ongoing work and neighbourly co-operation.

To manage pest animals, you need to:

- identify what animals are on your property;
- consider which forms of management will work best;
- consider your forest's stage of establishment;
- collaborate with your neighbours and catchment groups.

You need to take a long-term view to animal management. The initial phase is the most expensive – this is where you reduce a dense population of browsers. However, keep in mind that ongoing maintenance, such as trapping and baiting, is necessary. Casual hunting alone isn't enough to control pest animals.

Talk to your neighbours about what they're doing to control browsers. Working with your neighbours can lower costs and make your efforts more effective.

Without a joint effort, you will find it hard to control pest animals on your property. Even if you manage to reduce pests, they'll spread from neighbouring properties and re-establish themselves.

You can use the tools listed on the following pages to control pest animals. You'll need to use more than one tool to keep browsers at bay.



Hares in open grassland. Hares are usually solitary, but can form small groups when browsing.

Helicopter shooting

Using a helicopter for shooting can control larger browsers like deer, goats and wallabies when they're in big groups, for example 20 to 30 animals.

Forest phase: Early phase. Helicopter shooting is effective on open ground when seedlings are growing. It's less effective in later forest phases unless there are breaks in the forest canopy.

Pros:

- Quickly reduces pest numbers.
- Can cover entire catchment areas.
- Effective way to monitor and muster pest animals.
- Non-toxic.
- Can recover meat to offset costs.

Cons:

- Expensive.
- Not effective over closed-forest canopies.
- Less effective for browsers at lower densities.



Using helicopter shooting

Using firearms from a helicopter is specialised work. You'll need to hire a company with experienced pilots and shooters. Before choosing a company, ask about their health and safety practices. What steps will they take to keep you and your neighbours safe?

Ground shooting

Using hunters for ground shooting works for all browsers. It's most effective if browsers are at low densities, and the hunters use thermal sights.

Forest phase: Closed-canopy phase. Ground shooting is most useful in mature forests. It's less effective in early forest phases as there's no cover for hunters. In open areas, drones can help track browsers without spooking them.

Pros:

- Works well for pest animals at low densities.
- Effective in forests with closed canopies.
- Can use drones to track browsers in open areas.
- Non-toxic.
- Can recover meat to offset costs.

Cons:

- Labour intensive.
- Limited reach in dense bush.
- Hard to detect nocturnal species without specialist equipment.
- Can scare wallabies and other browsers into new areas.

Using firearms

The use of firearms to control pest animals has risks. To minimise these risks, follow the Firearms Safety Code. You can find the code and other safety advice, including the seven rules of firearm safety, at: firearmssafetyauthority.govt.nz

You must comply with the relevant laws, including the Arms Act 1993, Arms Regulations 1992 and Wild Animal Control Act 1977. Obligations include:

- holding a firearms licence if using a firearm unsupervised;
- getting permission of the owner or occupier of the land before hunting;
- remaining alcohol and drug-free while in charge of a firearm.



Trapping

Trapping is effective at controlling pigs and possums, especially at high densities. There are different types of traps, including live capture traps, kill traps and snares.

Trapping takes effort and expertise. Traps need to “become part of the environment” before animals interact with them. Animals can become trap shy if they have a near miss with a trap.

Forest phase: All phases. Trapping can control browsers while seedlings are growing. It’s also a good option for ongoing animal maintenance.

Pros:

- Effective method for controlling pigs and possums, and sometimes deer.
- Non-toxic.
- Effective at all forest stages.
- Range of traps available: pig traps and tree-mounted and leg-hold traps for possums.

Cons:

- Labour intensive as traps need to be set, checked, emptied and reset.
- Can lead to trap-shy animals if not done properly.

Using traps

When trapping, take all practical steps to ensure the activity is humane. Choose traps based on target species, humaneness and effectiveness. For more information about traps, see:

mpi.govt.nz/traps-and-devices-used-to-manage-pests

Bionet also publishes information on the welfare performance of traps, including a table of traps for specific pests. For more information, see:

bionet.nz/rules/performance-traps

You must comply with the relevant laws, including the Animal Welfare Act 1999. Depending on your circumstance, obligations include:

- checking live-capture traps within 12 hours of sunrise each day they remain set, or within 24 hours of a capture when using remote monitoring technology to inspect a trap;
- removing live animals from the trap and caring for them or humanely killing them;
- ensuring the traps you use are legal (some leg-hold traps, and all glueboard traps, are illegal);
- getting the permission of the occupier to use leg-hold traps within 150 metres of a dwelling;
- avoiding the use of leg-hold traps where there is a probable risk of catching a pet.

Toxins

Toxins are an effective way to manage possums, rabbits, hares and wallabies in higher densities. But they can also kill non-target species. Always seek professional advice before using toxins. You need to carefully read and follow label directions and consider placement (for example, in bait stations, away from waterways).

Forest phase: All phases. Toxins are effective from early establishment of seedlings through to maintenance in mature forests. Toxins work best in seasons when other food is scarce.

Pros:

- Easy to scale from small to large areas of forest.
- Works well at all forest stages.
- Cost effective if target pests are in high densities.
- Range of baits and toxins available.

Cons:

- Toxins can result in "by-kill" of non-target animals.
- Baiting operations need dry weather of up to seven days to be effective.
- May need to pre-feed pests so they're not bait shy.
- Not safe to recover meat after a bait drop.
- Toxins can bio-accumulate in water bodies.

Using baits and toxins

Consult a pest control expert before using baits or toxins – or hire them to carry out the operation for you.

Vertebrate toxic agents (VTAs) are trade name products used to control pests like possums, rabbits and hares. Examples include 1080, brodifacoum, and pindone. You need a licence to use most VTAs.

Multiple pieces of legislation may apply if you're using toxins, including the:

- Agricultural Compounds and Veterinary Medicines Act 1997;
- Hazardous Substances and New Organisms Act 1996;
- Health and Safety at Work Act 2015.

For more information, see:

mpi.govt.nz/vertebrate-toxic-agents-making-selling-using



Biodegradable 1080 bait pellets.

Health and safety when controlling pest animals

All pest control methods – whether shooting, trapping or using baits – carry risk. You need to factor in health and safety when planning a pest control operation.

Make sure everyone involved in your operation is across the health and safety plan. Discuss the risks as a group and decide how you'll mitigate them. Below is a list of points to consider.

Essential parts of the plan

- Identify the pests you're targeting.
- Choose your control methods and list the risks for each method.
- Define the area where you'll carry out pest control and note any environmental risks (for example, dense bush or steep hillside).
- Consider the time of day and season when you'll carry out pest control and note the associated risks (for example, dark or wintry conditions).

Permissions and notification

- Get permission from the landowner to carry out pest control.
- Give neighbours and affected parties reasonable advance notice of the operation.
- Choose the best way to notify people (for example, signs, emails, phone calls and reminders).
- Let neighbours and affected parties know when you've finished the operation.

Tools and equipment

- Follow best practice guidelines and regulations for your specific control method.
- Use the right equipment for your control method – and keep it well-maintained.
- Identify the personal protective gear you'll need (like gloves, masks, earmuffs and safety glasses).
- Consider what emergency equipment you'll need (like a first aid kit or personal locator beacon for remote areas).
- Keep emergency equipment well-maintained and easy to access.

Environmental impacts

- List how you'll reduce the environmental impact of your control method (for example, placing baits away from waterways).
- Plan how to protect non-target species such as livestock, pets and native species.
- Consider how you'll safely dispose of animal carcasses.

Working with others

- Share your health and safety plan with everyone involved in the pest control operation.
- Keep a risk register and update it as needed.
- Make sure those involved in the operation know who to contact in an emergency and where the first aid kit is kept.

For more information, see Predator Free New Zealand's health and safety toolkit at predatorfreenz.org



A hunter looking for game.

Other ways to protect your seedlings and forest

In addition to reducing pest animal populations, there are several methods you can use to help safeguard your seedlings and forest.

Choose low-palatability species

Some plants are less appealing to browsers. Consider species like harakeke, mānuka, and kānuka. If food is scarce, browsers might still nibble these plants.

Fencing

If you have livestock, fence off your planting area while your trees are growing. You can also upgrade your fencing to deter pest animals:

- deer fencing is 1.8 metres to 2 metres tall with number 8 wire mesh;
- rabbit fencing is 1 metre tall with fine mesh netting;
- pig fencing uses double hot-wires – electrified wires at the top and bottom of the fence;
- wallaby fencing differs according to the target wallaby species and includes a mesh ground skirt (seek specific advice from your local or regional council).

All these fencing types need regular maintenance and are more expensive than standard batten-and-wire fencing.

Manual releasing

If you weed using your hands, you can leave some greenery around your seedlings. This can make seedlings less visible to browsers than if you spot-spray the area. Manual releasing is labour intensive.

Plant guards

You can use guards to protect against hares and rabbits. Guards work well alongside weed matting, which suppresses weeds around the plant's stem.

Deterrent sprays

You can use species-specific and general-use sprays to deter browsers. These are temporary solutions that need to be reapplied regularly. There are no deterrent sprays that are effective for wallabies yet.

Increasing the impact of pest control operations

To effectively control pest animals, you need to coordinate your effort with others.

Deer, hares, pigs and wallabies are highly mobile. For example, deer can travel up to 10 kilometres in a night to find a food source. Use these questions as a starting point for catchment-wide animal control.

Voluntary co-operation

Who in your community could you team up with to manage pest animals? Think about:

- neighbours;
- catchment groups;
- iwi;
- local or regional council;
- local hunting clubs and associations, such as the New Zealand Deerstalkers Association;
- specific pest management programmes, such as Tipu Mātoro National Wallaby Eradication Programme.

Co-ordinated approach

Within your group, how can you coordinate your approach to controlling pest animals?

Think about:

- where and how you'll meet (for example, in person or online);
- how often you'll meet to review progress and adjust your plan;
- your shared goals like protecting seedlings;
- the best time of year to act;
- health and safety best practice.

Animal species and methods

What animal species are you dealing with? What's the best method to control them?

Think about:

- what stage your forest is at (for example, early phase or closed canopy phase);
- the terrain you're working with;
- ongoing animal management as well as the initial knock-back of browsers;
- whether it's worth hiring a professional for advice.

Cost-share arrangements

How will your group arrange to share the costs of controlling pest animals?

Is there any funding available? Consider options like:

- an equal charge per person;
- contributions based on property size;
- possibility of recovering meat.

Notes





Find out more

Canopy website

For more information on forests, visit:

canopy.govt.nz

Or scan the QR code using your phone's camera.



Forestry advisory service

Te Uru Rākau – New Zealand Forest Service offers forest advice and information to landowners and tangata whenua. It's free and impartial.

For more information about the forestry advisory service, visit:

mpi.govt.nz/forestry-advisory-service

Or scan the QR code using your phone's camera.



Was this booklet useful?

We value your feedback. Let us know your thoughts on this booklet – and what other information you'd like to see.

Email: canopy@mpi.govt.nz



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