

The challenge to protect native wildlife

We all want Aotearoa New Zealand's precious native wildlife to be safe and to thrive alongside us. But did you know that an estimated 25 million of our native birds are killed each year by rats, stoats, possums and other introduced predators?

Aotearoa New Zealand's native plants and animals existed and evolved for over 80 million years without mammalian predators, so they were defenceless and extremely vulnerable when people introduced these mammals. Combined with other factors, such as habitat loss, introduced predators have contributed to more than 50 native bird species becoming extinct, as well as several plants, frogs, reptiles and bats.

Without predator control, many more native animal populations will become extinct in less than two human generations, and forest health will continue to decline. So we face a choice: leave pests unchecked and accept that native forests will become silent and bare, or control these predators and help Aotearoa New Zealand's native species to thrive alongside us.

For decades, the Department of Conservation Te Papa Atawhai (DOC) has worked with others to reduce the threat of introduced predators at important conservation sites through the use of traps and toxins. As a result, many populations of native birds, bats, frogs, reptiles, insects and plants are now stable or recovering. We need to continue this critical work because predators can quickly repopulate areas and overwhelm native species.

In areas where rats, stoats and possums are permanently eradicated, nature heals, allowing native wildlife to return and recover. We're seeing this in many of Aotearoa New Zealand's offshore islands that have become predator-free sanctuaries. The Predator Free 2050 programme has the ambitious goal of eradicating rats, possums and stoats (plus ferrets and weasels) on the mainland by 2050. We don't yet have the tools and technology to completely eradicate predators, so a number of organisations are investing in research to develop these.

In the meantime, our National Predator Control Programme is holding the line for threatened native species by regularly controlling predators across large forest areas and closely monitoring the outcomes. Currently, the programme covers about 1.8 million hectares or nearly 20% of public conservation land. DOC is working alongside iwi, hapū, local government, businesses, communities and many conservation groups that are helping to protect and restore native wildlife and forests. The tools we use have been proven to help native wildlife to survive and recover.







Introduced predator facts

Ship rats and Norway rats:

- were transported here on whaling ships and with early European settlers
- eat native birds and their chicks and eggs, as well as insects, plants and seeds
- climb and jump to reach native birds in treetops and branches
- swim long stretches of open ocean to invade new areas
- breed rapidly, making them difficult to control the ship rat can produce up to 10 offspring per adult female every 8 weeks.



- were introduced in the late 1800s in a misguided attempt to control the introduced rabbit population
- need the equivalent food intake of 12.5 pīwakawaka/ fantail chicks per individual every day just to stay alive
- breed very rapidly and early female stoats can have up to 12 kits at a time and can become pregnant when they are only 2 to 3 weeks old and still in their den
- hunt day and night, and can move quickly and travel long distances on land and across water
- climb trees to eat nesting birds and eggs
- kill more native animals than they need for food and hide their carcasses in dens.

Possums:

- were introduced in 1837 by early European settlers hoping to establish a fur industry
- strip the forest canopy and can cause forest collapse by eating the new shoots, flowers and fruits of native trees
- compete with native birds and reptiles for food sources
- kill nesting birds, chicks and eggs
- carry and spread the infectious disease bovine tuberculosis (TB).



Beech tree masting produces a bounty of food

Beech trees are the most common forest trees in Aotearoa New Zealand and are particularly dominant in the South Island. They produce seeds every 2–6 years, and when many beech trees in a region produce large numbers of seeds at the same time, it's known as a mast event. This is triggered by a significant difference in temperatures between summers.

Beech trees flower in the spring, and the ripe seeds fall to the ground from March until around June. During a heavy seeding event, about 50 million seeds will fall over a hectare of land – that's about 250 kilograms of seeds per hectare. This provides a bounty of food for native birds and insects, but it also feeds rodents, whose populations grow rapidly, in turn fuelling a surge in stoat numbers.

Surging predator populations threaten native species

The graphic on the next page shows the devastating flow-on effect for native animals if predators are left uncontrolled. Previous mast events have led to local extinctions of populations of threatened species such as mohua/yellowhead and kākāriki karaka/orange-fronted parakeet. The beech mast in 2000 resulted in a rat plague, which wiped out a devastating 85% of the southern population of wild kākāriki karaka/orange-fronted parakeet.

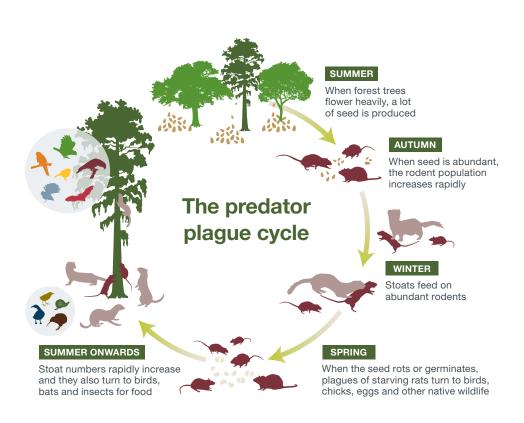
Predator control operations are critical during mast events

Large-scale predator control is critical for the protection of Aotearoa New Zealand's native animals and forests, especially in response to mast events. In many areas, we need to control rodents every 2–3 years to prevent them from reaching dangerously high levels and to enable vulnerable native species to grow and breed successfully.

More frequent operations may be needed during mast events to protect threatened native species. During a mast, we often run predator control operations in two rounds – before and after mast seeding, when predators have less food available and will eat toxic bait. Our monitoring has shown exceptionally good results from this timing, with rats consistently reduced to undetectable or very low levels.







Mohua/yellowhead on Anchor Island. Photo: Leon Everett, leonberardphotography.co.nz

How we control introduced predators

DOC uses a range of predator control tools to protect native species. Trapping and other ground-based methods may be used in accessible areas. However, ground control is not always safe or effective in large and remote forests with rugged terrain. In those cases, we use aerially applied 1080 bait to control rats, stoats and possums in these areas, protecting native animals and forests.



Ground control

Traps and bait stations are effective at controlling predators in smaller and more accessible areas. However, large numbers of predators can overwhelm trapping networks. New technologies to control predators are being developed as part of the Predator Free 2050 programme, with examples including new and improved traps, toxins, lures, smart monitoring devices and drone technologies.



Bait station



Conventional trap

Aerially applied 1080 bait

1080 is the common name for a bait pellet we use to control rats, stoats and possums. Its active ingredient, fluoroacetate, is naturally found in several plants around the world and serves as a defence against mammals. It is also found at lower concentrations in some of Aotearoa New Zealand's native plants, including pūhā.

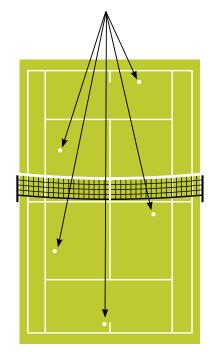
1080 has been extensively researched and proven to effectively protect native wildlife in Aotearoa New Zealand. The breeding success and population sizes of many native species increase significantly in areas where 1080 is regularly used to control predators. 1080 application also supports forest health by reducing the impact of possums on native trees.



Restoring the mauri of native ecosystems

1080 is biodegradable, which means it breaks down quickly in the environment. Studies have shown that it doesn't leave harmful residues in water, soil or plants, nor does it damage the health-giving properties of plants. 1080 is far less toxic to birds than to mammals, but some native birds are susceptible (such as kea, weka and takahē). The baits are designed to deter birds and attract mammalian predators. For example, baits are dyed green to look like unripe fruit, they include cinnamon to deter birds, and they are large and firm so they're challenging for birds to eat with their beaks. We're continually working to improve technologies and methodologies to further reduce the risk to native birds.

1080 is carefully managed and strictly regulated to ensure that it is used safely and effectively. During predator control operations, helicopters accurately distribute bait pellets containing 1080 over large, remote and rugged areas where it isn't possible to use traps. Technology enables us to place baits very precisely to best target predators. On average, each predator control operation removes 98–100% of rodents and 90–100% of possums and stoats. Operations need to be repeated, as predator numbers rebound over time.



Typically, four to six 1080 bait pellets are dropped in an area the size of a tennis court



To find out more about 1080 and how it is used, visit doc.govt.nz/1080

An ecosystem is like a spider web – with all its strands intact, it's strong and resilient, but with every strand that is broken, the web becomes weaker and its integrity is diminished. In te ao Māori (the Māori world view), this is the concept of mauri – that every living thing has an essence.

To help restore the mauri of native ecosystems, DOC is consulting and partnering with iwi and hapū throughout Aotearoa New Zealand. This aligns with the principles of Te Tiriti o Waitangi/ the Treaty of Waitangi, which DOC has a responsibility and commitment to uphold.

We acknowledge te ao Māori concepts that describe the inseparable bond between people and the environment. Wairuatanga and kaitiakitanga recognise that if the environment is ailing, people are also weakened. Taonga species need to be preserved for the benefit of future generations. Our challenge and commitment is to work with iwi and hapū to honour these principles and concepts through Predator Free 2050 and our National Predator Control Programme.



Tokoeka kiwi recover in Fiordland thanks to predator control

The kiwi, Aotearoa New Zealand's beloved national icon, relies on ongoing predator control. The biggest threat to kiwi chicks is stoats. In areas without predator control, kiwi are declining by 2% every year. Our monitoring shows that predator control operations can help turn the tide for one of Aotearoa New Zealand's rarest kiwi species, the Fiordland tokoeka/southern brown kiwi.

An 8-year monitoring programme has shown aerial 1080 predator control reversing the fortunes for Fiordland tokoeka, moving the population from decline to growth.

DOC has been monitoring the population of Fiordland tokoeka at Shy Lake on the remote Wet Jacket Peninsula in Fiordland since 2017. Stoats killed most chicks that year (none survived past 62 days old), and the population was declining by more than 2% per year.

Two aerial 1080 predator control operations in 2020 and 2023, respectively, knocked back stoats. All radio-tagged adult tokoeka also survived exposure to 1080 in their environment. Over the two summers after the 2020 operation, 21% of the kiwi chicks survived their first year of life.

In the 2023/24 season, chick survival spiked to over 60%, not only reversing the population decline but showing growth of about 3% per year.

Through this research we have learnt and verified how to stop the extinction of Fiordland tokoeka. We have now committed the resources to protecting this unique kiwi species into the future, confident that aerial 1080 makes a huge difference for their population recovery.

Other bird species in the area have also benefitted from aerial 1080 predator control, with increases in species like kakaruai/South Island robin and kākāriki/yellow-crowned parakeet, and sightings of kākā, pīwauwau/rock wren and kea.

We're confident that the application of aerial 1080 every 3 years is enough to grow the Fiordland tokoeka kiwi population. However, if chick survival rates remain high, the population could continue to grow even with less frequent operations.

The nearby Seaforth-Grebe area (59,000 hectares) was included in the National Predator Control Programme for the first time in autumn 2024, which will extend the area where we're working to protect Fiordland tokoeka.

Fiordland tokoeka nesting success:



5% without predator control



Up to 60% with predator control



DOC Ranger Monty Williams preparing harness change equipment before attaching a transmitter to a tokoeka.



monitored tokoeka chicks to survive during the programme now fully grown. Photo: Monty Williams





Camping at Shy Lake. Photo: Chris Dodd



DOC Ranger Monty Williams tracking tokoeka in the snow

Monitoring native species and introduced predators

DOC is monitoring threatened native species and introduced predators at important conservation sites across the country.

We use cameras, sound recorders, radio tracking, tracking tunnels, chew tags, satellite monitoring and human observation methods. Monitoring results inform where and when predators need to be controlled to get the best outcomes for native wildlife, how effective the operation was at reducing predator numbers, and how native species responded.

Some populations of native species are continuing to decline due to intense pressure from predators, but others are now stable or recovering through combined efforts with hapū, iwi, other environmental agencies and many community groups.

In areas without predator control, native species, including more common birds, are declining at greater rates. In some cases, they have become locally extinct. Overall, the use of 1080 to control predators benefits many types of native animals and plants, as well as entire forest ecosystems.

This map shows the places our National Predator Control Programme is protecting, covering about 1.8 million hectares or nearly 20% of public conservation land. Some of the most threatened native birds that live at these sites include kiwi, kōkako, kea, kākā, mohua/yellowhead, whio/blue duck, kākāriki karaka/orange-fronted parakeet, pīwauwau/rock wren, pepeketua/frogs and pekapeka/bats.



Acoustic recorder set up to capture bird and bat audio. Photo: DOC



Camera set up on a tree. Photo: DOC

For more information about our National Predator Control Programme, visit doc.govt.nz/predator-control-programme



Key sites being protected by the National Predator Control Programme

Native species we work to protect



Status: Threatened - Nationally Critical

What makes them special: Pekapeka/bats are Aotearoa New Zealand's only native land mammals. The long-tailed bat is the smallest, being about the length of a thumb or even smaller. These unique bats are believed to produce only one offspring per year and will carry their pups around while flying.

Why they need predator control: Bats are vulnerable to predation but can recover when we act. In the Eglinton valley, the population of long-tailed bats has steadily increased over more than a decade thanks to sustained predator control.



Status: At risk – Declining

What makes them special: This beautiful bird features on our \$100 note and used to be one of the most abundant forest birds. Now, only about 30 populations remain.

Why they need predator control: Mohua are more vulnerable to introduced predators than many other forest birds because they nest and roost in holes in trees. Stoats and rats eat adults, eggs and chicks.



Status: Threatened - Nationally Vulnerable

What makes them special: The Māori name for dactylanthus is 'pua o te reinga', meaning 'flower of the underworld'. This name alludes to the way the flowers from this leafless parasite emerge from below the ground.

Why they need predator control: Possum browsing is the greatest long-term threat to dactylanthus. Controlling possums and protecting the plants with cages or enclosures helps plants to flower and produce seeds.



Status: At Risk – Recovering for North Island, Threatened – Nationally Vulnerable for South Island

What makes them special: Flocks of boisterous kākā gather in the early morning and late evening to socialise – their raucous antics led Māori to refer to the birds' 'chattering and gossiping'.

Why they need predator control: Female kākā are more vulnerable to predation, especially when they're confined to nest cavities during the breeding season. Studying the ratio of kākā males to females can help us understand the health of a population and its predation pressures. This year, kākā monitoring in Pureora Forest (an ongoing predator control site) revealed a 1:1 sex ratio – the most balanced we've ever recorded.



Status: At Risk - Declining

What makes them special: This frog is a modern-day dinosaur – the species is almost unchanged from its 150-million-year-old fossilised relatives. Archey's frog eggs hatch almost fully formed frogs rather than tadpoles, and the father carries his offspring around on his back.

Why they need predator control: These walnut-sized frogs are especially vulnerable to predation from rodents. Pigs, stoats, hedgehogs, possums, cats and introduced frogs also prey on them. 1080 operations in Whareorino to control rats have led to an increase in these unique frogs.



Status: Threatened - Nationally Vulnerable

What makes them special: This white-water rafting waterfowl species is one of only a few in the world that lives year round on fast-flowing waters. This unique duck is rarer than most kiwi species, with only about 3.000 individuals left.

Why they need predator control: Stoats are the greatest danger to whio and their nests. In a study of whio living in an area without predator control, more than half the deaths were from introduced predators, about 90% of which were stoats.



Status: At Risk - Declining

What makes them special: Found only in Aotearoa New Zealand, this unique shrub has spectacular bright red flowers that bloom in the summertime. It is a semi-parasitic plant, which means it gets energy from the sun but also relies on host trees or shrubs for water and nutrients.

Why they need predator control: Possums have eaten mistletoe to local extinction in many forests. With sustained possum control, mistletoe can slowly recover, as we are seeing in the Maruia valley and the Waitutu Forest.

For more information about how predator control helps native species populations recover, read our most recent National Predator Control Programme annual report doc.govt.nz/
predator-control-programme



Future looking brighter for pīwauwau/rock wren

A monitoring programme to study the effects of predator control on pīwauwau/rock wrens now has over 5 years of scientific research revealing which techniques work best.

Alpine rock wrens live year round in the Southern Alps/Kā Tiritiri o te Moana and Kahurangi National Park.

No bigger than a tauhou/silvereye, the rock wren hops and flits rather than flying, and nests on the ground, making it easy prey for introduced predators like rats and stoats. It is threatened with extinction.

Since 2019, DOC researchers have surveyed this wee bird at 25 sites from Fiordland to Kahurangi each summer. Predators are controlled at 19 of these sites, while 6 are left unmanaged.

Results to date have shown that rock wren numbers are mostly increasing where predators are being controlled through aerial 1080 and trapping, but gradually declining at unmanaged sites. On average, areas with predator control have twice as many rock wrens as areas without.

With 5 years of monitoring data, we can now see which predator control methods benefit rock wrens most.

We're seeing the best results when aerial 1080 is used in the alpine area above the treeline where rock wrens live year round and not just in the surrounding forest. Stoats can be common in alpine areas, and rats are increasingly seen in this environment too, possibly due to temperatures becoming warmer.

More recently, monitoring has shown that rock wren numbers are growing in Westland podocarp and hardwood forest areas in the 'beech gap', where predators have been controlled since 2022. These forests tend to have fewer predators than beech forests and don't need as frequent predator control.

Results also confirm the need to control predators whenever the beech forest seeds, as predator numbers soar in response to more food.

For more information about the results we are achieving for native species, visit doc.govt.nz/1080results









Front cover: Kākā chicks in Waitutu Forest at approximately 60 days old, just prior to fledging. *Photo: Terry Greene*Back cover: Native mistletoe. *Photo: DOC*

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