

PREDATOR RESPONSE

Protecting native species

2024/25



Department of
Conservation
Te Papa Atawhai

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 native birds in New Zealand are killed each year by rats, stoats, possums and other introduced predators?

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, along with 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 New Zealand's native species to thrive with us.

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



Piawauwau / rock wren.
Photo: © James Reardon, jamesreardon.org



Kākārīki karaka / orange-fronted parakeet.
Photo: Sabine Bernert

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 New Zealand's offshore islands that have become predator-free sanctuaries. Predator Free 2050 seeks a permanent solution on the mainland, with an ambitious goal to eradicate rats, stoats and possums 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, and many conservation groups, businesses and communities 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.



Stoat with chick. Photo: David Hallet

Introduced predator facts



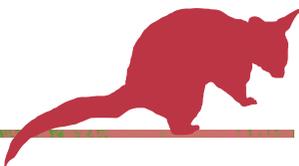
Ship rats and Norway rats:

- 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 – ship rats are particularly good climbers that can access the furthest reaches of tree branches, and Norway rats are good swimmers and large enough to kill adult burrow-nesting seabirds
- breed rapidly, making them difficult to control – the ship rat produces up to 10 offspring per adult female every 8 weeks when food is plentiful and is one of the world's most widespread and abundant mammal species.



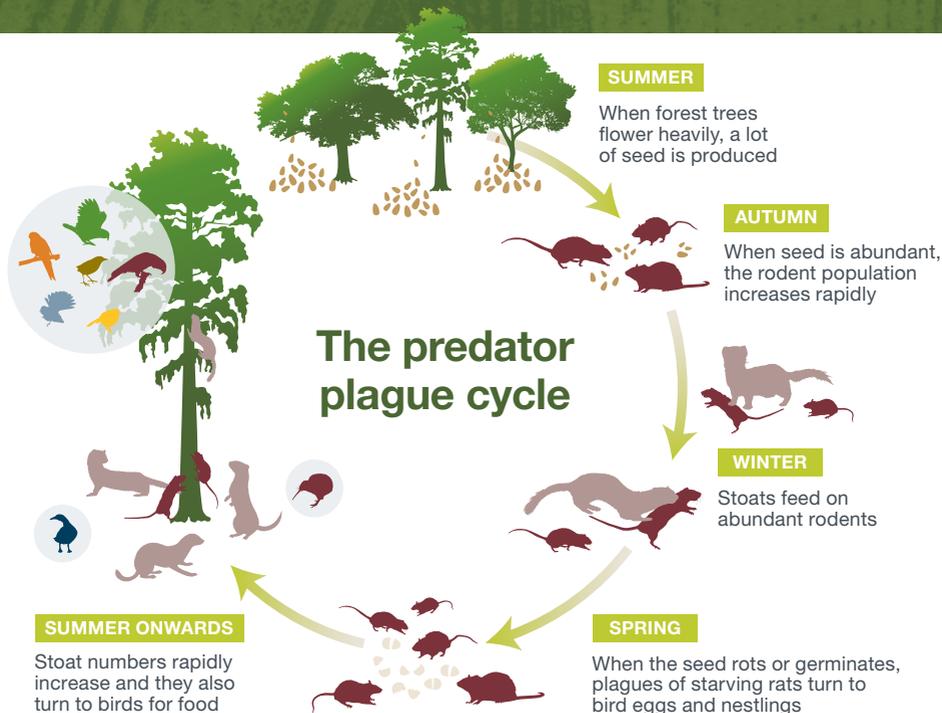
Stoats:

- 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
- 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 trees are the most common forest trees in 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 about June. During a heavy seeding event, about 50 million seeds will fall over a hectare of land – that's about 250 kg 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 an irruption in stoat numbers.

The graphic above 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 kākārīki karaka/orange-fronted parakeet.

Large-scale predator control is critical for the protection of New Zealand's native animals and forests, particularly 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. This enables vulnerable native species to grow and breed successfully. Operations may be needed more often in some situations to protect highly endangered species, especially when mast events occur more frequently.

How we control introduced predators

DOC uses a range of predator control tools to respond to different challenges across the country. 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, so aerially applied 1080 bait is used to control rats, stoats and possums in these areas. Together, these methods of controlling predators on the ground and from the air help to protect native animals and forests.

Ground control

Conventional traps, self-resetting traps and bait stations help to control predators in localised, accessible areas. 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 and drone technologies.



Conventional trap



Bait station



Self-resetting 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 New Zealand's native plants, including pūhā.

1080 has been extensively researched and proven to effectively protect native wildlife in 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.



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, and nor does it damage the health-giving properties of plants. 1080 is far less toxic to birds than mammals, but a small number of native birds are susceptible (eg kea, weka and takahē). The baits are designed to deter birds and attract mammalian predators, and technologies and methodologies are being continually improved 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 and accurately to best target predators. On average, each predator control operation removes 95–100% of rodents and 90–100% of possums and stoats. Operations need to be repeated as their numbers recover over time.

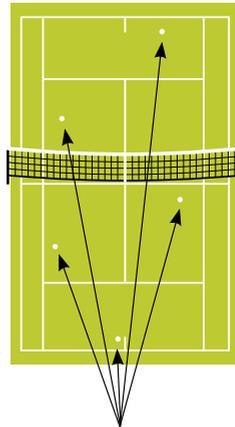


Kiwi nesting success:



5% without
predator control

Up to 60% with
predator control



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

Restoring the mauri of native ecosystems

An ecosystem is like a spider web – with all its strands intact, it's strong and resilient, but with every strand that is broken, it 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 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 the concepts within te ao Māori 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.



Kōkako on the rise at Rotoehu

Kōkako numbers are rapidly increasing at Rotoehu Forest between Rotorua, Whakatāne and Te Puke. A survey in 2023 has revealed huge growth in the local population of this ancient wattlebird thanks to ongoing efforts to control introduced predators using bait stations and aerially applied 1080 bait.

Rotoehu Forest is now home to New Zealand's second largest mainland kōkako population, with 289 breeding pairs counted in a survey in 2023 – an 84% increase on the 157 pairs counted in 2019.

Kōkako are a taonga for the local iwi, Ngāti Mākinō, and hold a special place in the stories, traditional knowledge and cultural practices of the area. Preserving kōkako is deeply rooted in the cultural and spiritual connection the iwi has with the environment.

Ngāti Mākinō Iwi Authority is working alongside DOC to help protect kōkako and other native species in Rotoehu Forest, and is developing the skills of its people to take on specialised roles.

The biggest threat to kōkako and many other native species is being killed by introduced predators, including rats, stoats and possums.

By regularly controlling these threats with a range of tools, native birds, insects,

frogs, reptiles and plants have a much greater chance of survival. This helps to preserve the diversity that ecosystems need to thrive.

DOC is using aerially applied 1080 bait in combination with a ground control programme that is being led by the local community to protect native species in the area. These include karearea/ New Zealand falcon, rifleman/ titipounamu, kererū, korimako/bellbird, pōpokatea/whitehead, toutouwai/ North Island robin, tūi, ruru/morepork and pekapeka/bats.

The Rotoehu Ecological Trust has been managing bait stations in the forest since 2013 and says that the survey result is testament to the hard work of community volunteers and advocates who have strived to protect the forest for decades.

There are more than 2000 kōkako breeding pairs in total throughout New Zealand, and the population is continuing to increase in areas with sustained predator control, including trapping and aerially applied 1080.

The largest mainland population is in Pureora Forest (more than 600 pairs), followed by Rotoehu Forest (289 pairs) and the Hunua Ranges (over 250 pairs). Te Hauturu-o-Toi/Little Barrier Island also hosts a large population of more than 400 pairs.

Monitoring native species and introduced predators



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

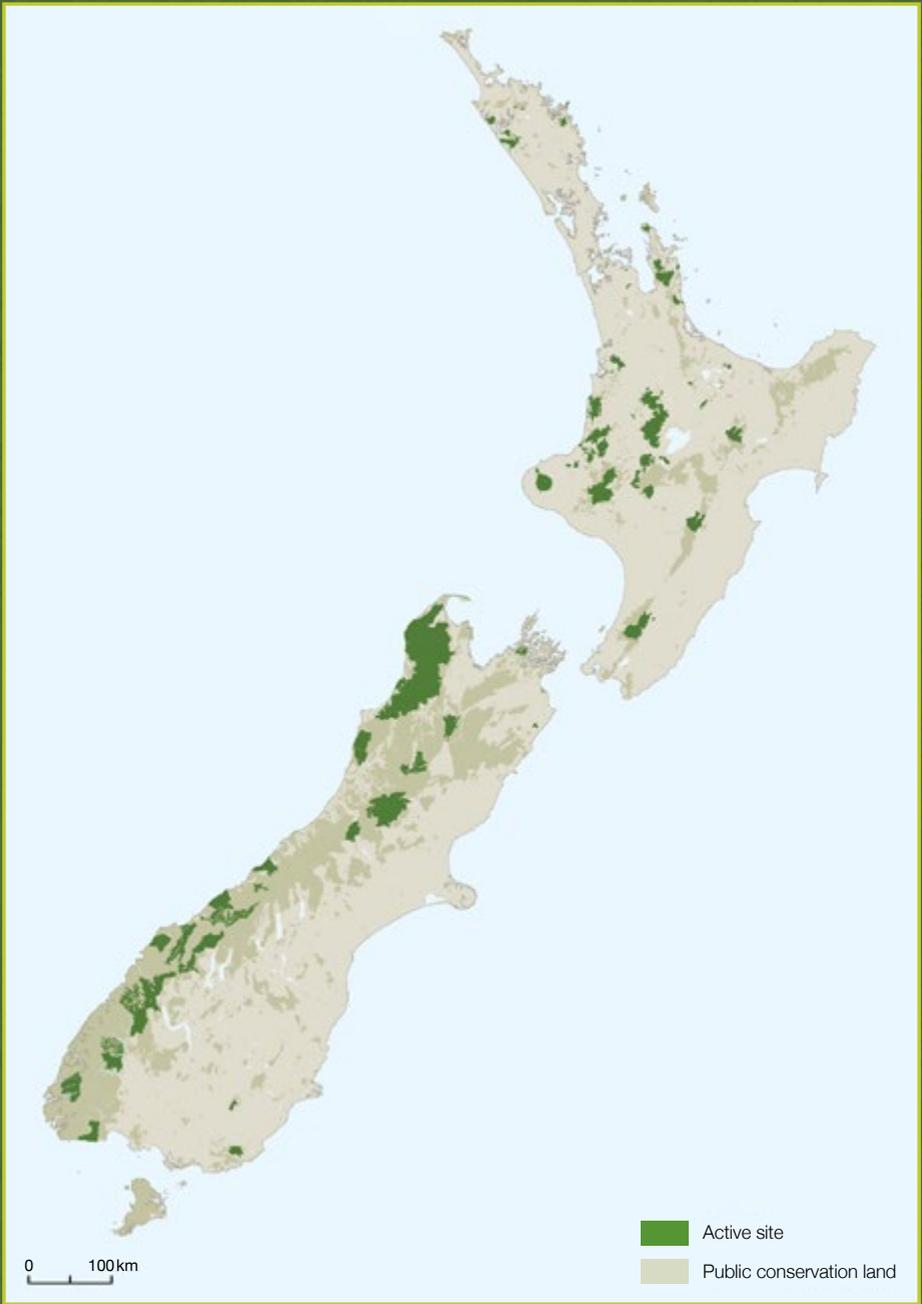
We use cameras, acoustic recorders, tracking tunnels, chew tags and human observation methods. Monitoring results inform where and when predators need to be controlled to get the best outcomes for native wildlife, how effective the operation was at reducing predator numbers, and how native species responded.

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 with no predator control, native species, including more common birds, are declining at greater rates and, in some cases, becoming 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.

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 need our help

Pekapeka/ long-tailed bat

Photo: Colin O'Donnell

Status: Threatened – Nationally Critical

Distribution: Throughout the North and South Islands, Stewart Island/Rakiura, Te Hauturu-o-Toi/Little Barrier Island, Great Barrier Island/Aotea, and Kapiti Island

Did you know that these bats can fly at 60km/hr and their colonies can have a home range of more than 100km² (10,000ha)?

In the Eglinton valley, the population of long-tailed bats has steadily increased over more than a decade because of sustained predator control.

Mohua/yellowhead

Photo: Leon Berard, leonberardphotography.co.nz

Status: At risk – Declining

Distribution: Small, isolated populations in the South Island and on predator-free offshore islands

Did you know that mohua are more vulnerable to introduced predators than many other forest birds because they nest and roost in holes in trees?

This makes the adults, as well as their eggs and chicks, susceptible to being eaten by stoats and rats. Learn more about the work we are doing to try to improve their fortunes in the story on the next page.

Dactylanthus

Photo: Terry C Greene

Status: Threatened – Nationally Vulnerable

Distribution: From Northland to Wairarapa, with the largest populations in East Cape and the Central Plateau; there is also a small population on Te Hauturu-o-Toi/Little Barrier Island

Did you know that 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. Possum browsing is the greatest long-term threat to dactylanthus, and controlling possums and protecting the plants with cages or enclosures has proved effective in allowing the plants to flower and produce seeds.

Beech mistletoes

Photo: Herb Christophers

Status: At Risk – Declining

Distribution: Three species are found mainly in beech forests – red mistletoe (*Peraxilla tetrapetala*), scarlet mistletoe (*P. colensoi*) and yellow mistletoe (*Alepis flavida*)

Did you know that possums have eaten mistletoe to local extinction in many forests?

However, with sustained possum control, mistletoe can slowly recover, as we are seeing in the Maruia River valley to the east of Reefton and Waitutu Forest in Southland.

Pepeketua / Archey's frog



Photo: Amy Blair

Status: At Risk – Declining

Distribution: Coromandel Peninsula and forests in the King Country

Did you know that Archey's frogs are like modern-day dinosaurs?

Almost unchanged from their 150-million-year-old, fossilised relatives, these little battlers have ancient features that aren't found in any other frog species in the world, but they're in desperate need of protection. Thankfully, Archey's frog populations are now stable or increasing at monitoring sites where 1080, bait stations and self-resetting traps are being successfully used to control rodents.

Kākā



Photo: DOC

Status: North Island kākā: At Risk – Recovering;

South Island kākā: Threatened – Nationally Vulnerable

Distribution: Large forested areas in the North and South Islands

Did you know that when they're nesting, female kākā and their chicks are prime targets for possums and stoats because they stay in tree cavities for long periods?

Over time, this leads to a male-skewed and declining population. However, surveys in the Eglinton valley in Fiordland have shown that the kākā population there is thriving, with good numbers of female and juvenile birds as a result of long-term predator control.

Fiordland tokoeka



Photo: Nathaniel Hutchinson-Wong

Status: Northern Fiordland tokoeka: Threatened – Nationally Vulnerable; southern Fiordland tokoeka: Nationally Endangered

Distribution: Northern Fiordland tokoeka: from Milford Sound/Piopiotahi to Wilmot Pass; southern Fiordland tokoeka: from Wilmot Pass to the Princess Mountains

Did you know that numbers of Fiordland tokoeka are increasing in a remote part of Fiordland thanks to successful aerial predator control operations?

Prior to the use of 1080, chick survival in the Shy Lake area was 0%, overwhelmingly due to stoat predation. However, numbers are now increasing by around 2% per year. This means that not only are chicks surviving long enough to replace the adults, but enough chicks are making it to adulthood to officially grow the population.

For more information about the conservation status of native species, visit doc.govt.nz/conservation-status

Our goal to reverse the decline of mohua

The only time most people will have seen the mohua/yellowhead is on New Zealand's \$100 note. Over the years, this small native forest bird has been decimated by introduced predators and has completely disappeared from most of its former haunts – but there is still hope of a revival.

Mohua have been monitored for decades at important South Island sites. The populations appear to be stable on eight predator-free offshore islands and are recovering at two sites on the mainland – the Landsborough and Hurunui South Branch valleys – due to sustained predator control.

These small songbirds have strong local song dialects, many of which have been lost. However, the translocation of these birds to other sites for protection has led

to their dialects becoming mixed, so they are now singing new tunes that we hope will be increasingly heard over the years to come.

While mohua have recovered in some places, they are declining elsewhere despite predator control efforts. Important populations in The Catlins and the Blue Mountains in Southland are in gradual decline, and the previously large populations in the Dart and Caples valleys in Otago and the Eglinton valley in Fiordland have suffered significant declines in recent years.

The reasons why predator control is less effective at some sites are complex, and we don't yet have all the answers.

Climate change is likely to be increasing predation pressure on mohua by



creating conditions that favour rats, with increased winter temperatures and more frequent forest masts or seeding.

Mast events increase the risk for mohua because rat numbers can skyrocket as seeds fall en masse, especially in red beech forests, which produce the biggest seeds. The risk of predation then increases when the seeds run out and the rats switch to eating native wildlife. Stoat numbers also increase after beech masts as they feed on rodents and then switch to native birds.

The only available method for controlling predators in large forests during these events is the aerial application of 1080 bait. However, this hasn't been effective enough in some places to stabilise and increase mohua populations.

We are trialling a change in the timing of aerial 1080 treatments in the hope that this will make them more effective by removing rats prior to forest seeding rather than while seed is on the ground. This is then followed by a second operation if rat numbers increase to threatening levels after the seed runs out.

Bait stations and traps are also being used effectively at some sites, including in the Landsborough and Hurunui South Branch valleys.

The decline of mohua is a concern and illustrates the biodiversity crisis that is happening in New Zealand. It's critical that we continue to use the tools we have available while also investigating how we can improve their effectiveness for mohua.



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

Working together to protect whio

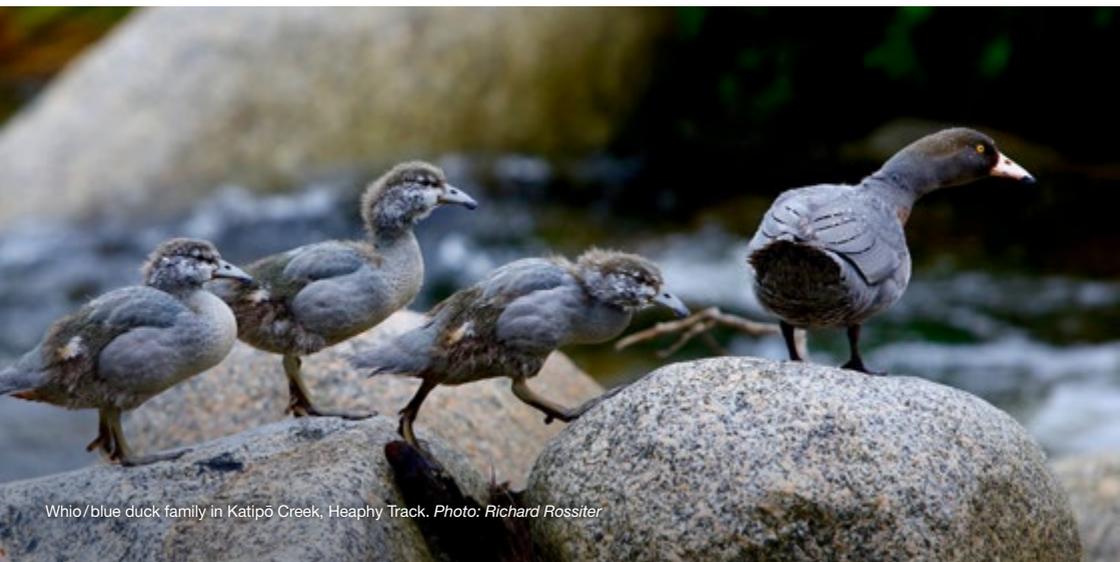
The whio/blue duck population in Kahurangi National Park has grown significantly over the past 23 years through sustained predator control and other management efforts by DOC and its partners.

A survey in Kahurangi from 2020 to 2023 found that there had been a 340% increase in whio numbers since the first count was made in 1998–2000. DOC staff walked more than 700km of waterways and counted 846 adult whio, including 335 breeding pairs, which is a significant increase from the 191 adults, including 58 pairs, that were counted in the 1998–2000 survey across the same area.

The aerial application of 1080 bait over large areas of Kahurangi has increased the protection of whio and other vulnerable species from rats, stoats and possums, particularly during mast events.

There are also two ‘security sites’ that have been well protected since the early 2000s through a combination of 1080 and stoat traps to boost the breeding success of whio.

DOC has received instrumental support from Genesis through the Whio Forever programme, the Isaac Conservation and Wildlife Trust in raising whio ducklings to translocate back to the security sites, and contractors and volunteers in helping to maintain traps. The community groups



involved include the Friends of Flora, the Friends of Cobb and the Mokihinui-Lyell Backcountry Trust.

Although overall numbers have risen, setbacks for whio have been noticed in some places, reflecting the challenges these ducks face in the wild and how critical it is to effectively control predators.

The repeated flooding of rivers appears to have led to fewer breeding attempts at some sites, with very few ducklings or juveniles being produced. This shows the likely impact that climate change is having on whio.

The mega-mast event of 2019, which was the biggest in 40 years, also affected

whio. The abundance of beech seed for food saw numbers of rats and mice soar, along with stoats and feral cats as they fed on the rodents.

Aerial 1080 predator control was carried out over a large part of Kahurangi, but it wasn't possible to cover all of it. And as the beech seed ran out and rodent numbers dropped off in 2021, hungry stoats and feral cats turned to native birds such as whio and kea for their prey.

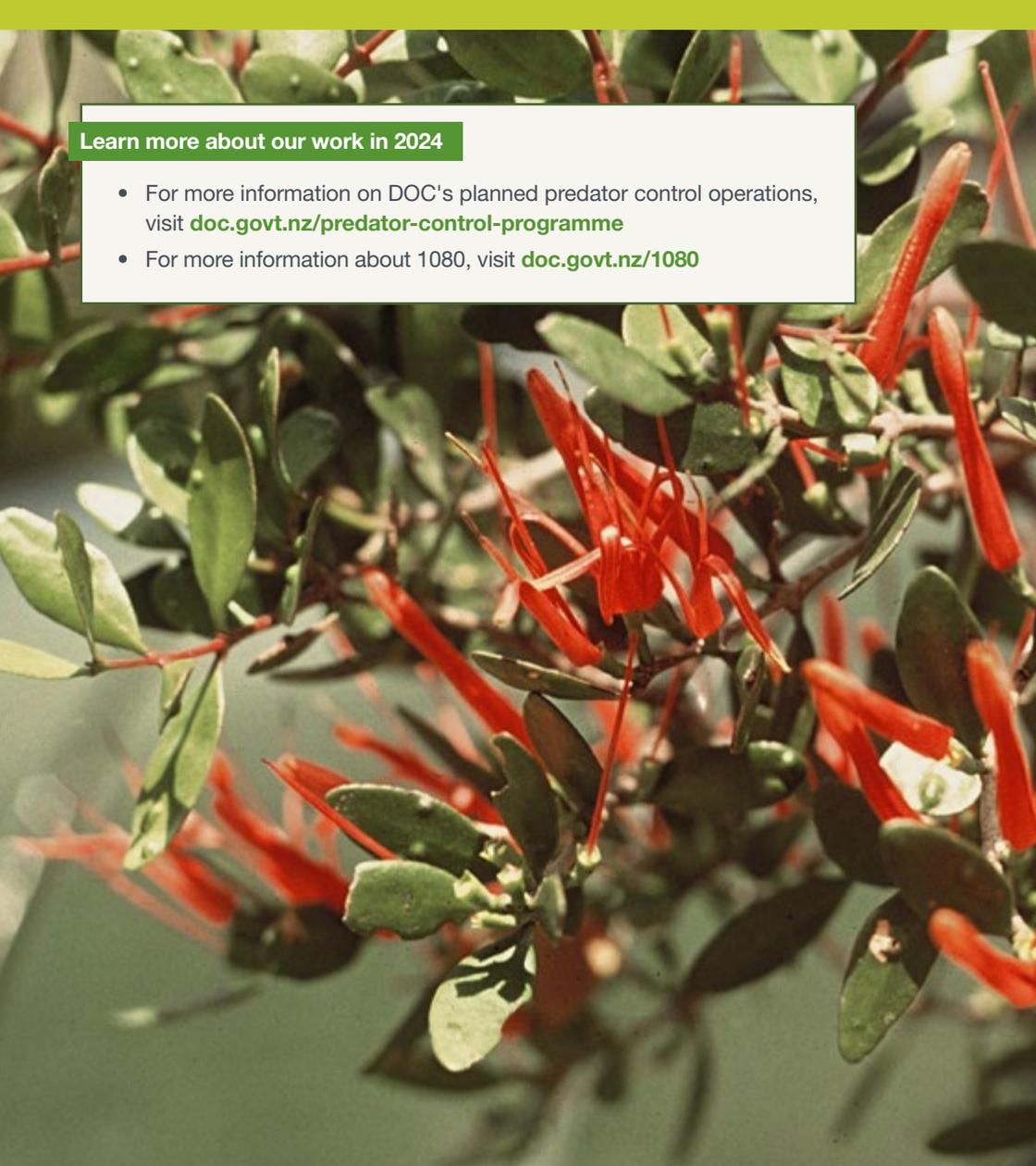
Another, more moderate, mast event occurred in 2023 and a large-scale predator control programme is being delivered in response to provide greater protection for native wildlife.





Fiordland tokoeka. Photo: Nathaniel Hutchinson-Wong





Learn more about our work in 2024

- For more information on DOC's planned predator control operations, visit doc.govt.nz/predator-control-programme
- For more information about 1080, visit doc.govt.nz/1080

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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o Aotearoa**
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