

Predator Free 2050

biennial progress report



**Predator Free 2050
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June 2023**

Predator Free 2050 biennial progress report – June 2023

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Foreword

AOTEAROA NEW ZEALAND is home to thousands of special species that add colour, sound and character to our places. We know our native wildlife is vulnerable to introduced predators, including possums, rats, stoats and other mustelids. It is estimated these introduced predators kill 25 million native birds each year.

The bold goal to eradicate these predators by 2050 was described as New Zealand's moon shot by the late Sir Paul Callaghan. Seven years into our predator-free journey, we are making great progress. By June 2023, DOC's National Predator Control Programme controlled predators over 1,775,513 ha to a level where some native species can thrive.

Predators have been eliminated from some mainland areas and around two thirds of New Zealand's uninhabited offshore islands are predator free (328 of 489). Getting all islands to be predator free is proving more challenging than initially thought. Yet, every day, we are learning more about how to best tackle the challenge.

Two hugely important factors sit behind the achievements of the programme.

First, the programme involves around 30 national organisations and countless community groups and individuals across Aotearoa. On a day-to-day basis, in all weather and terrain, an incredible group of passionate and committed people, drawn from iwi, businesses and communities, are working for a common goal that brings benefits to us all. They are sharing their knowledge and finding ways to combine their expertise and know-how. I love seeing the passion and energy New Zealanders have for protecting and enhancing nature.

Second, we are continuously learning and improving how we deliver positive outcomes for nature. By testing various techniques in both urban and rural landscapes, we are getting better at scaling up and refining our methods, and moving into areas where people live. For example, Predator Free South Westland is tracking well to remove predators from 107,000 hectares by 2025. A feasibility study suggests it is technically possible to remove predators on Maukahuka/ Auckland Island, a World Heritage Site and home to more than 500 species of native plants and animals. At 46,000 hectares, the island is almost four times bigger than the largest island in New Zealand cleared of predators.

The Predator Free 2050 programme is an important part of realising Te Mana o te Taiao – The Aotearoa New Zealand Biodiversity Strategy and in meeting our Global Biodiversity Framework responsibilities.

The challenge ahead will be to harness innovation in science and new techniques. As an example, genomics research by Manaaki Whenua – Landcare Research has resulted in valuable insights into predator dispersal and behaviour that have helped refine our efforts.

Predator Free 2050 demonstrates that even individual actions make a difference for nature, and when we all play a part, the collective impact is even greater, more visible and lasting.

He waka eke noa. We are all in this together.

Nāku noa, nā



Penny Nelson
Director-General
Department of Conservation



Coromandel striped gecko. Photo: Sabine Bernert



The goal

To make Aotearoa New Zealand free from three introduced predators: rats (Norway, ship and kiore), possums, and mustelids (ferrets, stoats, weasels) by 2050.



Vision

**Whakahokia mai ngā reo karanga o te pēpeke,
o te pekapeka, o te ngārara, o te manu ki ngā
ngahere, ki ngā whenua pāmu, ki ngā tāone iti,
ki ngā tāone nui me ngā takutai.**

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



Rock wren/tuke. Photo: Sabine Bernert

Section A: Interim goals

Interim goals

THE PREDATOR FREE 2050 STRATEGY sets out seven interim goals for 2025. While devised to measure progress towards the ultimate goal, they also ensure investment and research stay focused on priorities.

The Predator Free 2050 [five-year progress report](#), published in 2021, showed considerable progress had been made against the interim goals. Progress continues to track well, with five interim goals likely to be achieved by 2025. The remaining two goals are achievable but will need more time to complete (see figure 1).

It's important to remember these goals were conceived before anyone knew precisely how Predator Free 2050 would roll out. At the time, mainland predator management fell into two categories: landscape-scale **suppression** and **eradication** within small, predator-fenced sites. To completely remove predators from large, and populated, mainland areas, new approaches were needed. This is where **elimination**¹ comes in.

We've already found that the research invested in these interim goals and the lessons and knowledge gaps they've highlighted are just as valuable as the achievement of the goal itself.

Elimination

For all of Aotearoa New Zealand to become predator free a staged approach is required. One that uses '**elimination**'¹ as a stepping stone towards eradication. Like eradication, elimination involves completely removing predators from a defined area that is protected by some type of boundary (e.g. large, fast-flowing rivers or cold, barren mountain ranges) and actively managed to prevent predator re-establishment. But while virtual and natural boundaries can minimise re-invasion, they don't completely prevent it. That's the fundamental difference from eradication: with elimination, a high level of ongoing re-invasion is expected. To manage this, surveillance is required to quickly detect these invaders so they can be removed before they can re-establish a population. This protected area then becomes predator free because the invaders are kept out over time.

Because we don't have to keep coming back to remove predator populations across the entire area, investment can be shifted, and the elimination can be scaled up into neighbouring areas in time. Elimination can also protect native species in perpetuity, helping them to thrive as they once would have, without the need for repeated large-scale suppression of predators.

For more information, see: [The meaning of Zero.](#)

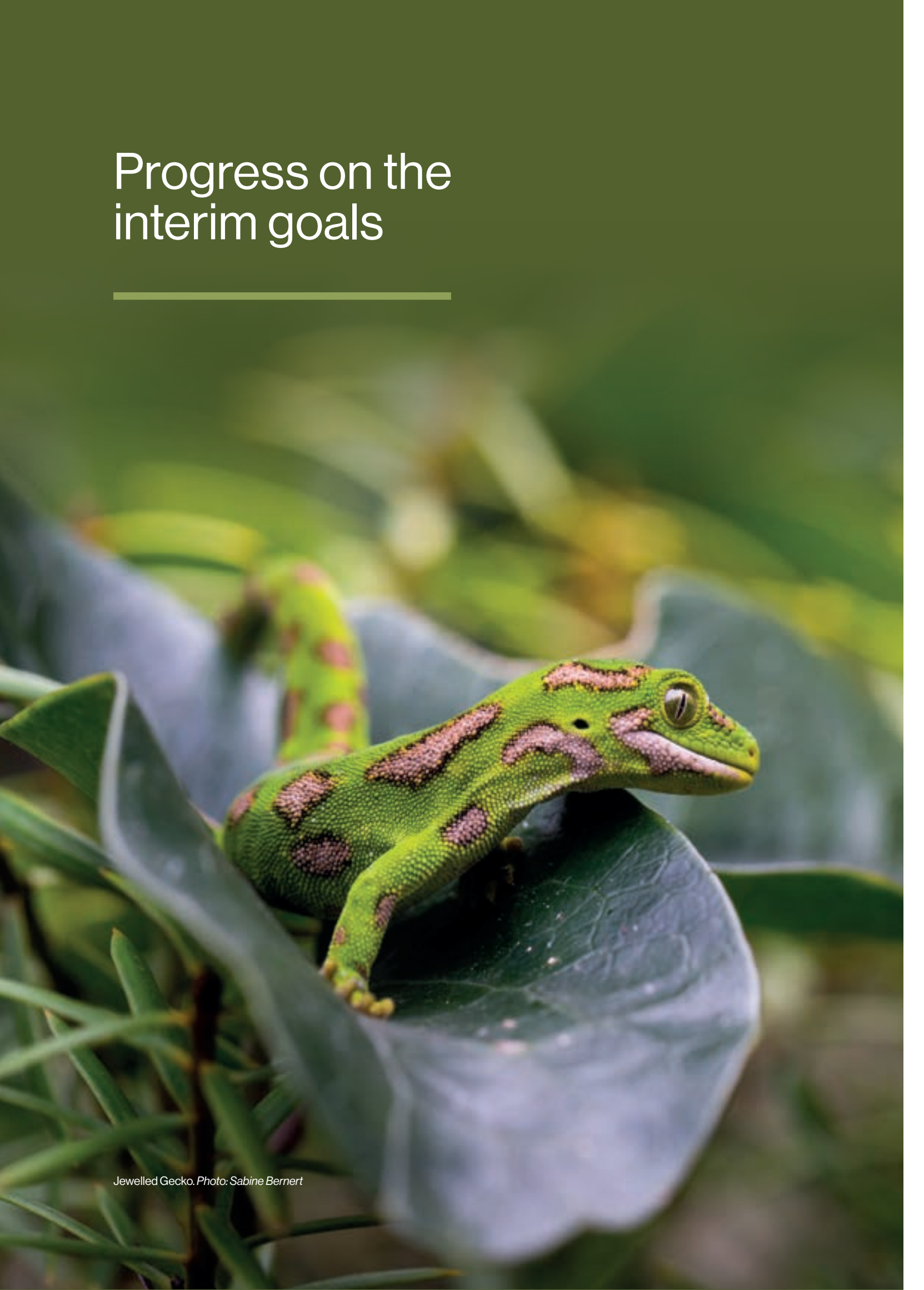
¹ The term 'elimination', or equivalent, will be officially defined and published by Predator Free 2050 in due course. It is being used in this report to recognise the 'step' in predator management before eradication on mainland sites.

		2021	2023
Goal 1	Increase suppression by 1 million hectares.	✓	✓
Goal 2	Predator eradication achieved in unfenced areas of at least 20,000 ha on mainland New Zealand and defended from re-invasion.	»	»
Goal 3	All mammalian predators are eradicated from New Zealand's uninhabited offshore islands.	✗	✗
Goal 4	A breakthrough science solution has been developed that can eradicate one mammal predator from the New Zealand mainland.	?	✗
Goal 5	Whānau, hapū and iwi lead at least five eradication projects.	»	»
Goal 6	Possums or mustelids are eradicated from a New Zealand city.	»	»
Goal 7	Effective tools and knowledge are available to achieve predator eradication on farmland.	»	»

- Key**
- ✓ achieved
 - » on track to be achieved by 2025
 - ✗ will not be achieved by 2025
 - ? insufficient data

Figure 1: Progress on the Predator Free 2050 Strategy interim goals in 2021 and 2023

Progress on the interim goals



Goal 1

By 2025, we will increase by 1 million hectares (compared with 2016) the area of New Zealand mainland where predators are suppressed, through Predator Free 2050 projects.

Current assessment



ACHIEVED

THIS INTERIM GOAL does two things.

1. It increases suppression in high-priority areas to 'buy time' for our native species until eradication is possible.
2. It provides opportunities to develop and test new tools and techniques, as well as experiment with the use of geographic boundaries. As such, it provides valuable preparation for the coming acceleration phase of Predator Free 2050.

This interim goal was achieved in 2021, with an increase of 1,083,767 hectares (ha) of suppression across the mainland.

By June 2023, this figure had increased further to 1,472,683 ha, thanks to an expansion of possum control by the Department of Conservation (DOC) (911,662 ha) and 'on-the-ground' work undertaken by Predator Free 2050 Limited landscape projects (561,021 ha)².

This total doesn't include DOC sites being treated for rats and mustelids, because variable reporting methods in 2016 make a baseline difficult to establish. Nor does it include extensive predator control by other agencies, such as OSPRI and local government, or community groups. Therefore, the total increase in area under predator suppression is considerably higher than stated here.



Kiwi. Photo: Sabine Bernert

² As at 30 June 2023, Predator Free 2050 Limited landscape projects covered 781,181 ha, with on-the-ground operational work carried out across 561,021 ha (B Butland, pers. com.).

What approach have we taken?

We have taken a two-pronged approach to meeting this goal: landscape-scale predator elimination (removing all target animals and defending the area from a high risk of re-invasion) and predator suppression (keeping their numbers down, rather than removing them altogether).

Predator elimination

Predator Free 2050 Limited has supported 18 landscape projects over 2022/23 (see figure 2). Through the company's operating model, landscape projects were established to develop the techniques to show elimination is achievable and defensible at reasonable cost. These projects were selected due to their uniqueness in biophysical, governance, leadership and operational methodology. This approach was adopted to provide useful insights into what does and doesn't work in a particular environment.

Predator suppression

While new eradication tools are being developed, DOC's National Predator Control Programme (NPCP), together with partners such as regional councils and OSPRI, is holding the line with existing tools to prevent the loss of the most vulnerable native species.³

NPCP sites are prioritised by the biodiversity values at risk, the history of predator control in the area and the type, size and condition of the forest (figure 3).

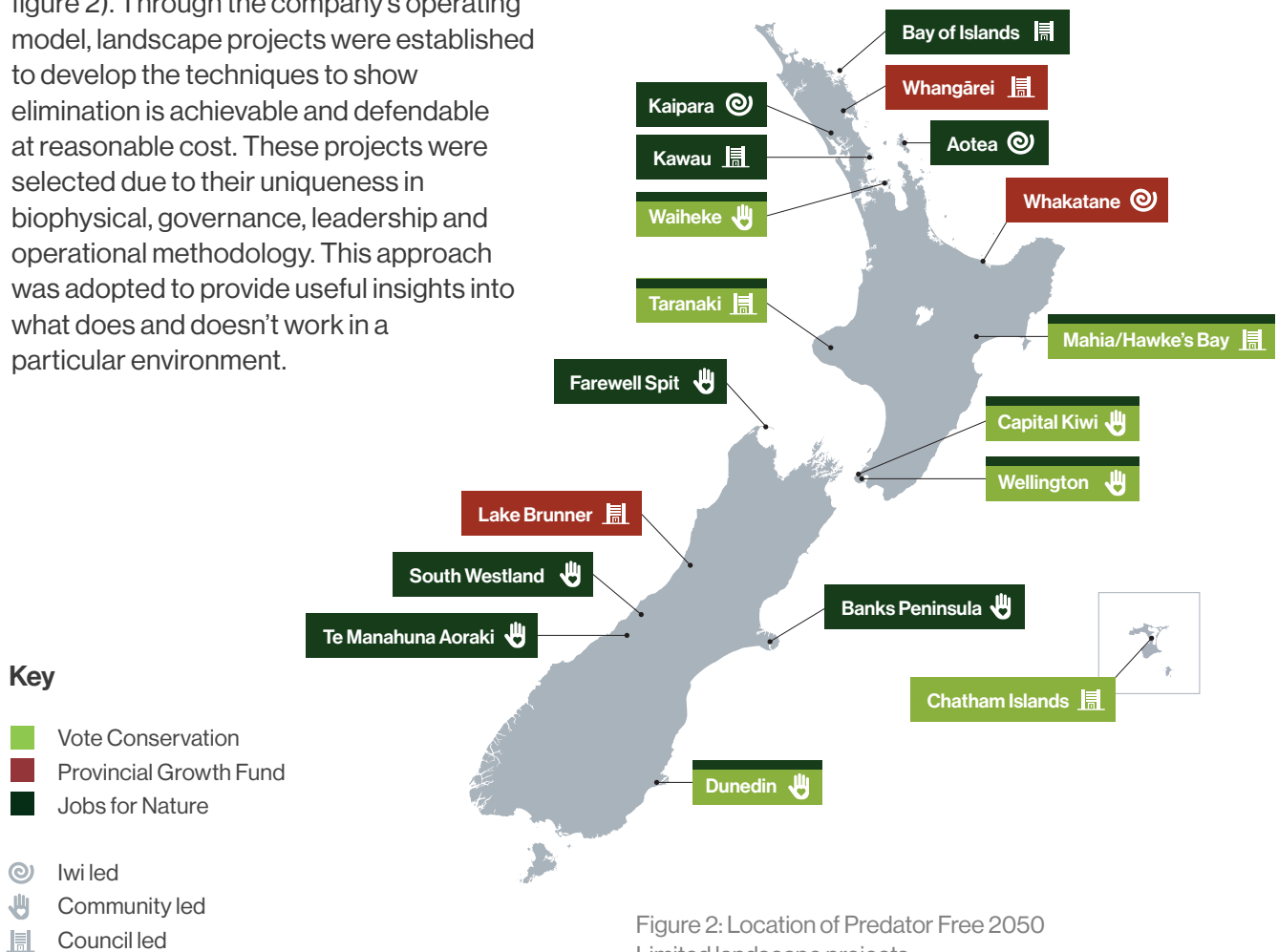


Figure 2: Location of Predator Free 2050 Limited landscape projects

³ See the [National Predator Control Programme Annual Report 2022](#), for further information.

What have we learnt?

Suppression versus eradication: Each of these involves different models and mindsets, with their own planning and funding considerations. We can't simply increase suppression to achieve eradication. Suppression has a vital role to play in maintaining and protecting threatened species populations while PF2050 develops new tools and approaches for landscape scale management.

Monitoring of native species needs to happen too: Although removing predators is a key objective for PF2050, we measure success by the recovery of native species. We are developing an outcome monitoring framework (as part of Te Mana o te Taiao – The Aotearoa New Zealand Biodiversity Strategy) to track the recovery of native species.

Where to next?

Now that we've met this interim goal, we need to maintain this level of biosecurity protection. We need to consider whether this is enough protection to maintain our native species populations, or if more investment is required. PF2050 will maintain its focus on testing and refining eradication methods and new technology at significant sites.



Figure 3: National Predator Control Programme: sites under control over the next four years, 2023–27



DOC's National Predator Control Programme

THE NPCP WORKS TO halt the loss of the most vulnerable native species and increase their populations at priority sites on public conservation land. A range of tools are used to control predators including aerially applied 1080 pellets, bait stations and traps. The timing and frequency of predator control operations are tailored to best protect the native species concerned and this takes into account mast events⁴ (figure 4). For example, operations to protect Fiordland tokoeka/kiwi from stoats follow a 3-year cycle. Rat and stoat control to protect orange-fronted kākāriki/parakeet combines annual ground control with 1- or 2-yearly aerial 1080 applications.

As of June 2023, there was 1,775,513 hectares (ha) of public conservation land with ongoing control of mustelids, rats and possums under the NPCP. This will increase slightly over the next 4 years to 1,800,000 ha (see figure 3).

In 2022, most NPCP operations achieved a post-operation rat monitoring result of 0% (figure 5). Although these results are encouraging, predator control needs to be sustained and success is ultimately achieved when the numbers of the protected species themselves increase.

Vulnerable native species are being monitored at key sites with and without predator control across the country. For example, DOC has monitored pīwauwau/rock wren populations at 22 sites across the South Island for the past 3 years.⁵ Results show that pīwauwau numbers are increasing at 12 sites where predators are regularly suppressed using 1080 and traps but are gradually declining at sites with no control. Kahurangi National Park is an important sanctuary for pīwauwau because it is home to the only surviving populations north of Lewis Pass. Widespread predator control in 2019 protected Kahurangi pīwauwau from the worst of the surge in predators caused by a beech forest 'mega-mast' that year, and their numbers have rebounded since.

In 2023, Kahurangi is again a priority site for predator control, to keep pīwauwau and other native wildlife safe.

⁴ A 'mast' is a season of heavy flowering and seeding of beech or rimu forest, or tussock grasslands, occurring roughly every 2–6 years. This increase in food leads to predator population explosions, which has a devastating impact on native species, if left unchecked.

⁵ See [Predator Response: Protecting Native Species 2023](#), for further information.



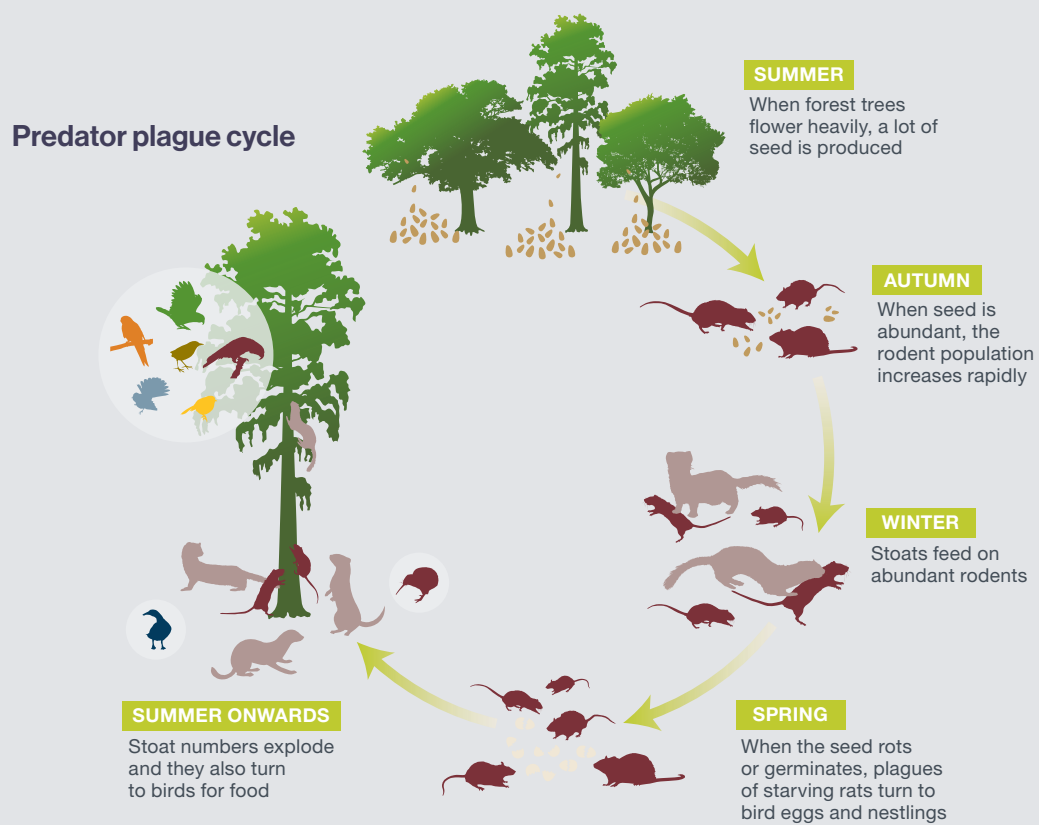


Figure 4: Mast event and predator plague cycle

Pre- and post-operation rat monitoring results for 2022 NPCP operations

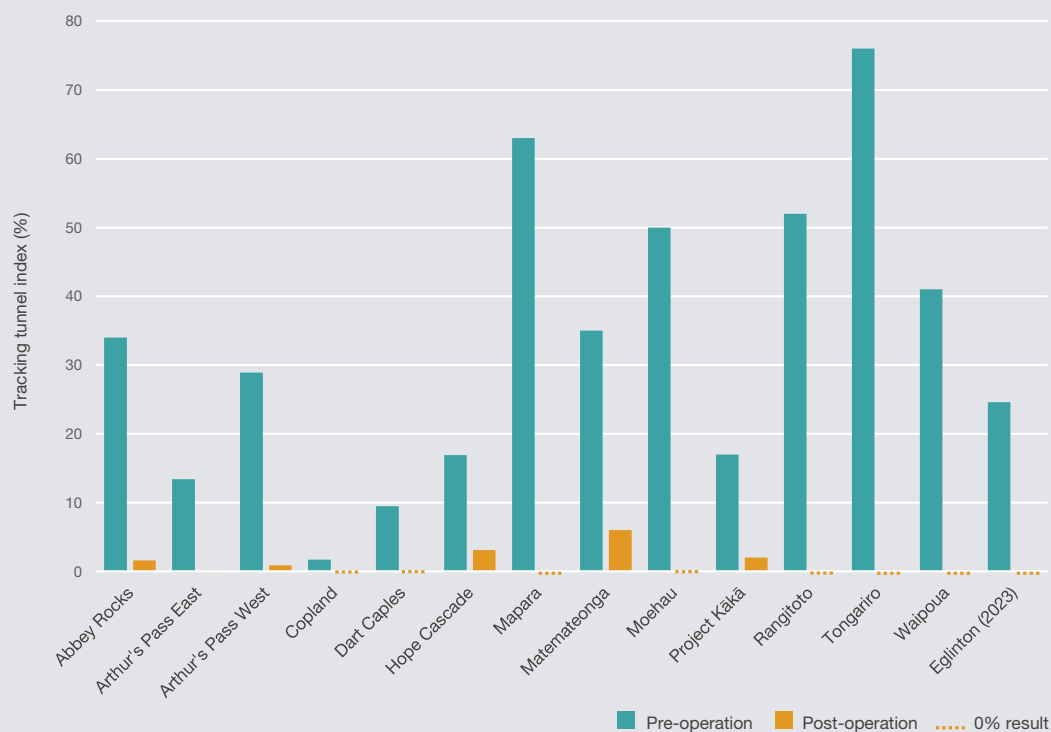


Figure 5: Rat monitoring results for each 2022 National Predator Control Programme operation

Goal 2

By 2025, we will have demonstrated that predator eradication can be achieved in areas of mainland New Zealand of at least 20,000 hectares and that these areas can be defended from re-invasion without the use of fences.

Current assessment



ON TRACK

THIS INTERIM GOAL seeks to completely remove predators from mainland sites larger than 20,000 ha and protect these sites against re-invasion.

This interim goal was 'on track for achievement' in 2021, with Predator Free South Westland having successfully eliminated possums and stoats, and reduced rats to low numbers, across 12,000 ha in the Perth Valley. Whakatipu Māhia was also on track to complete possum eradication on the Māhia Peninsula (14,500 ha) by 2022.

In June 2023, Predator Free South Westland had eliminated predators from around 43,500 ha across two distinct sites, in the Whataroa–Perth catchment and South Ōkārito rowi/kiwi sanctuary, with re-invasion being managed around the boundaries of each site. The project aims to have eliminated predators across nearly 107,000 ha by 2025. How this project successfully prevents the re-establishment of a breeding population of predators (particularly stoats and rats) will be essential to achieving this interim goal.⁶

Other smaller projects (each less than 20,000 ha) have achieved elimination of one or more of the target predator species. Some areas have been free of resident predators for over 3 years. Predator Free Wellington is defending 1,200 ha of mustelid (weasel and stoat) and Norway rat elimination. Predator Free Hawke's Bay (Whakatipu Māhia) is defending 5,500 ha of possum elimination. Towards Predator Free Taranaki – Taranaki Taku Tūranga is defending 2,000 ha and Predator Free Whangārei is defending 1,882 ha of possum freedom.

What approach have we taken?

Landscape projects involve finding out whether natural and artificial features can be effective barriers to re-invasion.

Led by Zero Invasive Predators (ZIP), both Predator Free South Westland and Te Manahuna Aoraki Project are using the high mountains and waterways of the Southern Alps, coupled with innovative technology, to protect large areas against re-invasion by predators.

The Towards Predator-Free Taranaki – Taranaki Taku Tūranga project is eradicating possums from a 9,500 ha area of bush and farmland, and 2,300 ha of the Kaitake Range, using rivers as natural barriers, along with a 'virtual barrier' of remote reporting traps.

⁶ The evidence of elimination in Predator Free South Westland will go through a peer-review process to confirm this goal has been achieved by 2025.

Predator Free 2050 Limited is supporting landscape projects to eradicate predators on peninsulas. Peninsulas and spits are surrounded on three sides by ocean making them easier to defend against predators.

- > Predator Free Whangārei has begun eradication work around Whangārei Heads Peninsula.
- > Whakatipu Māhia is on track to complete possum elimination on the Māhia Peninsula (14,500 ha) by the end of 2023, despite the devastating impact of Cyclone Gabrielle.
- > Pest Free Onetahua has completed a feasibility study for Farewell Spit, in Mohua/ Golden Bay, and operational planning has begun.
- > Eradication of possums on Te Pataka o Rakaihautū/Banks Peninsula is under way, with the initial aim of removing possums from over 20,000 ha by 2024.
- > Pēwhairangi Whānui/Predator Free Bay of Islands is working to remove possums, rats and stoats from over 29,000 ha on three peninsulas.
- > Pest Free Kaipara has just completed its feasibility investigation and plans to eradicate possums from 10,000 ha on its priority peninsula.
- > Predator Free Dunedin is down to known individual possums in sectors one to three of the Otago Peninsula and is using a combination of tools, including possum detection dogs and drones with thermal imaging, to detect and remove the last animals. The group is on track to complete possum eradication across the whole Otago Peninsula (9,784 ha) by the end of 2024.

What have we learnt?

Natural and artificial boundaries can slow, but not completely prevent, re-invasion: Big rivers are a foil to possums, and high alpine areas are a barrier to rats. However, some level of incursion on mainland sites is inevitable.

Re-invasion must be detected early: Before any invaders have time to re-establish within the protected area. As such, networks of smart cameras and tightly targeted traps and bait stations are the first line of defence.

Elimination enables predator-free areas to be increased over time: As predators are removed, project boundaries can be pushed further out, either to the next natural barrier or to a neighbouring project. By linking projects in this way, predator-free areas can be expanded over time.

Where to next?

Predator Free South Westland aims to eliminate predators from around 107,000 ha by 2025 (see case study below).

ZIP is also developing and implementing similar approaches to eliminate predators and other small mammalian pests from South Island East Coast dryland ecosystems in Te Manahuna Aoraki Project.





Predator Free South Westland

PREDATOR FREE SOUTH WESTLAND is an ambitious 5-year project (2020 to 2025) to eliminate possums, rats and stoats from forest, townships and rural land encompassing some 107,000 ha, an area more than half the size of Rakiura/Stewart Island. The project area includes forested and alpine areas, rural land, and the townships of Franz Josef, Ōkārito and Whataroa. It is bounded by Kā Tiritiri o te Moana/the Southern Alps, fast-flowing rivers, and Te Tai-o-Rēhua/the Tasman Sea, which provide natural barriers against predator re-invasion.

The project is being carried out in stages (figure 6). In forest and remote areas, elimination begins with an aerial 1080 operation, while ground-based methods are used where people live.

The project is tracking well. As of 30 June 2023, ZIP had eliminated predators from almost 43,500 ha of the project area and is defending these areas against re-invasion.

ZIP has recently begun work to eliminate predators from a further 30,000 ha in Burster Range and surrounds. This will reduce invasion around the boundaries and effectively connect the predator-free areas from the mountains to the sea. Intensive surveillance detects predator survivors and re-invaders.

Trail cameras and remote reporting thermal cameras with on-board artificial intelligence automatically alert rangers to an incursion, so they can quickly respond with predator dogs, traps and bait stations, or highly localised aerial 'spot treatments'.

Predator Free South Westland is proving that landscape-scale predator elimination on the mainland is possible.





ZIP back country camera, Predator Free South Westland.
 Photo: Nathan McNally



Blue duck/whio. Photo: Naomi Aporo



Figure 6: Predator Free South Westland project area

Goal 3

By 2025, we will have eradicated all mammalian predators from New Zealand's uninhabited offshore islands.

Current assessment



WILL NOT BE
ACHIEVED BY 2025

NEW ZEALAND HAS led the world in island eradications (particularly of rats). Until now, most island eradications in New Zealand's waters have been small, and all have been uninhabited, but that focus is about to change. Eradications on islands are helped greatly by the natural barrier to re-invasion provided by the ocean. For this reason, islands offer an opportunity to eradicate all mammalian predators (not just those in the Predator Free 2050 goal) more quickly than on the mainland.

In 2021, DOC established an eradication team to deliver island eradications more efficiently. An assessment undertaken by the newly formed National Eradication Team (NET) in 2021 found that "we're not on track to achieve this interim goal by 2025, due to the size of the remaining uninhabited offshore islands and the time it will take to achieve eradication"⁷.

This interim goal seeks to learn more about how to eradicate multiple predator species from bigger, more challenging islands and how to stop them re-invading.

What approach have we taken?

DOC is the lead agency for island eradications on public conservation land. In 2022, NET prepared a report that outlined a high-level strategy to achieve this interim goal.⁸ The report endorsed a best practice for scoping and assessing the feasibility of island eradications.

Five principles of island eradication must be met to achieve eradication success:⁹

1. All target individual predators can be put at risk by the eradication technique(s).
2. Predators can be removed at a rate exceeding their rate of increase at all densities.
3. The probability of the predator re-establishing is manageable to near zero (sustainability).
4. The project is socially acceptable to the community involved.
5. The benefits outweigh the costs.

⁷ See [Predator Free 2050 5-year progress report](#) for more information.

⁸ Department of Conservation. 2021: Offshore Islands: Pest Eradication and Defence. A decision-making framework and assessment for pest eradication and defence of New Zealand's uninhabited offshore islands. Unpublished report.

⁹ Horn, S.R.; Sagar, R.L.; Frank, V.K.; Cox, F.S.; Jacques, P.M.; Ware, J.; Hanley-Nickolls, R.; Leask, E.P.; MacDonald, N.L.; Kirby-Crowe, M.S.; Le Lievre, M.E.; Broome, K.G. 2022: The next frontier: Assessing the feasibility of eradicating mammalian pests from Auckland Island. *New Zealand Journal of Ecology* 46(3): 3500.

What have we learnt?

No eradications can occur on islands near the mainland until we find a solution to re-invasion:

We don't yet have the tools or techniques to effectively defend all islands from (re)invasion or to quickly detect and remove invaders when they do get in. The closer an island is to the mainland, the more challenging defending it will be. Elimination techniques, such as ongoing surveillance and rapid response, which are being developed and refined on large mainland sites, may have a role here.

This is a bigger challenge than we thought:

Even though we have decades of knowledge and experience from more than 100 island eradications, the NET report makes it clear this goal will be harder to achieve than we believed. Of New Zealand's uninhabited offshore islands, 328 are predator free and 161 still have predators present. We need innovative methods to achieve this interim goal.

Large island eradications are nevertheless technically feasible:

A 3-year feasibility study found that eradicating pigs, cats and mice from Auckland Island⁹ is possible (see case study – Maukahuka, pest free Auckland Island). At 46,000 ha, Auckland Island is nearly four times bigger than the largest island yet cleared in New Zealand (11,300 ha Motu Ihupuku/ Campbell Island).

Southern Royal Albatrosses.
Photo: Rachael Sagar





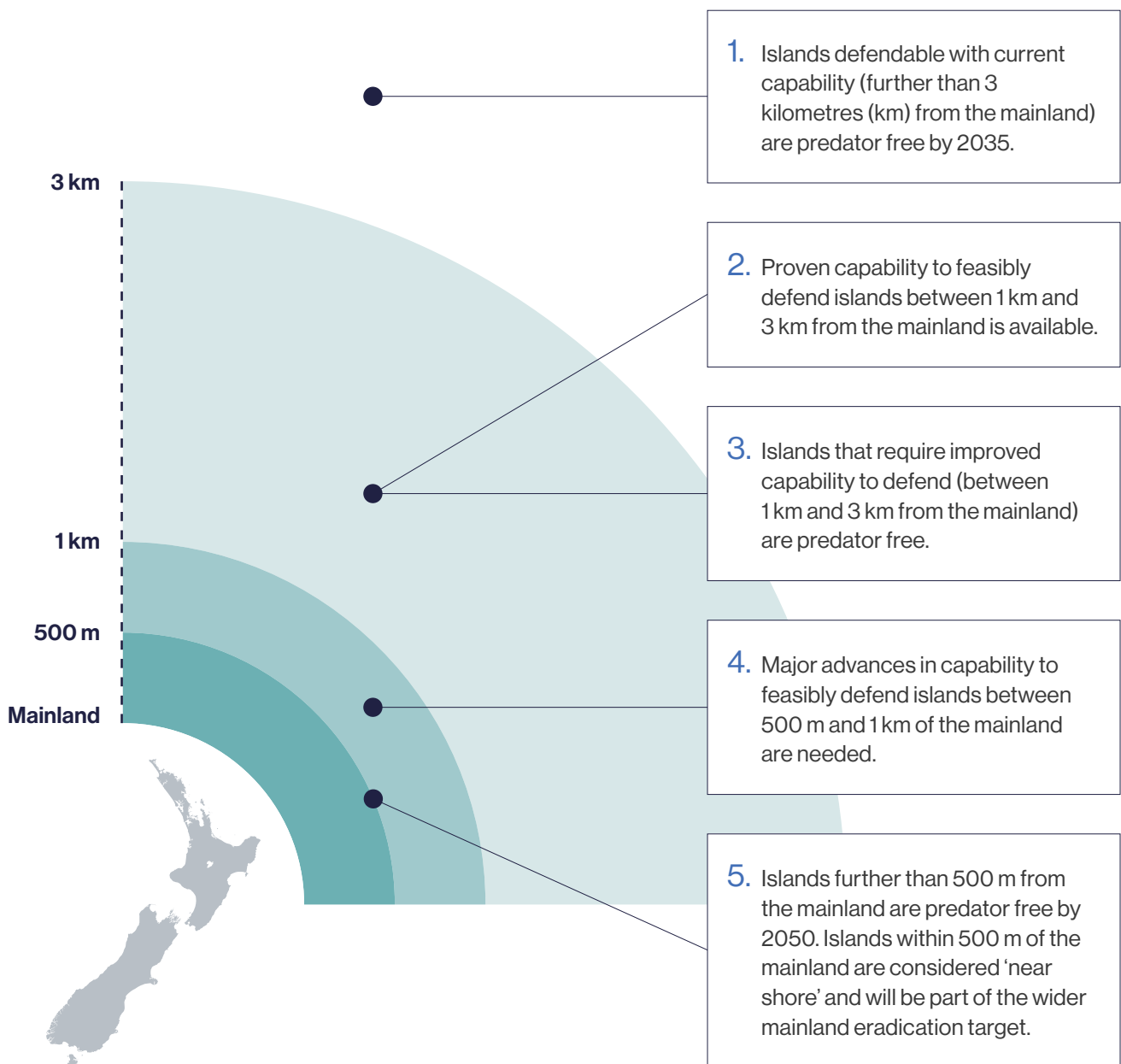
Southern Royal Albatross on its nest, Auckland Island. *Photo: DOC*



Auckland Island Snipe. *Photo: Rachael Sagar*

Where to next?

The NET report defined a sequence of five milestones to make all remaining uninhabited islands predator free by 2050.



Not to scale



Maukahuka, pest free Auckland Island

AUCKLAND ISLAND IS the fifth-largest island in New Zealand, a World Heritage Site and home to more than 500 species of native plants and animals (figure 7). More than 100 of them are endemic to the island, that is, they are found nowhere else on the planet. However, introduced pests (feral pigs, feral cats, and mice) have wreaked havoc on the island's native biodiversity. Thirty-two bird species alone have been lost.

Auckland Island stands out as one of the few large uninhabited islands where pests can be feasibly eradicated, and kept from re-invading, using tools and methodology we already have. Lessons from the operation will help us with still-more challenging predator-free projects, such as on large, inhabited islands and on the mainland. The project is now well understood, but it is still short of funding.

The project is co-led by DOC and Ngāi Tahu and supported by several stakeholders, including tourism concessionaires. It will first require a network of huts and tracks. Once in place, pigs, mice and feral cats will be eradicated in separate stages, each timed for optimal weather conditions. The island's isolation and visitor restrictions greatly reduce the risk of pests reinvading the island. The entire operation could take up to 8 years to complete and was estimated in 2022 to cost \$78 million.

Maukahuka is a priority project because of its special biodiversity values, its international recognition and protection status, and the severity of pest impacts there.

Eradicating pests from Maukahuka is the final step in over 30 years of investment, research, restoration, and innovation in restoring the subantarctic world heritage area. The legacy of the project will be enduring, with no ongoing cost or intervention needed to maintain its pest-free status.

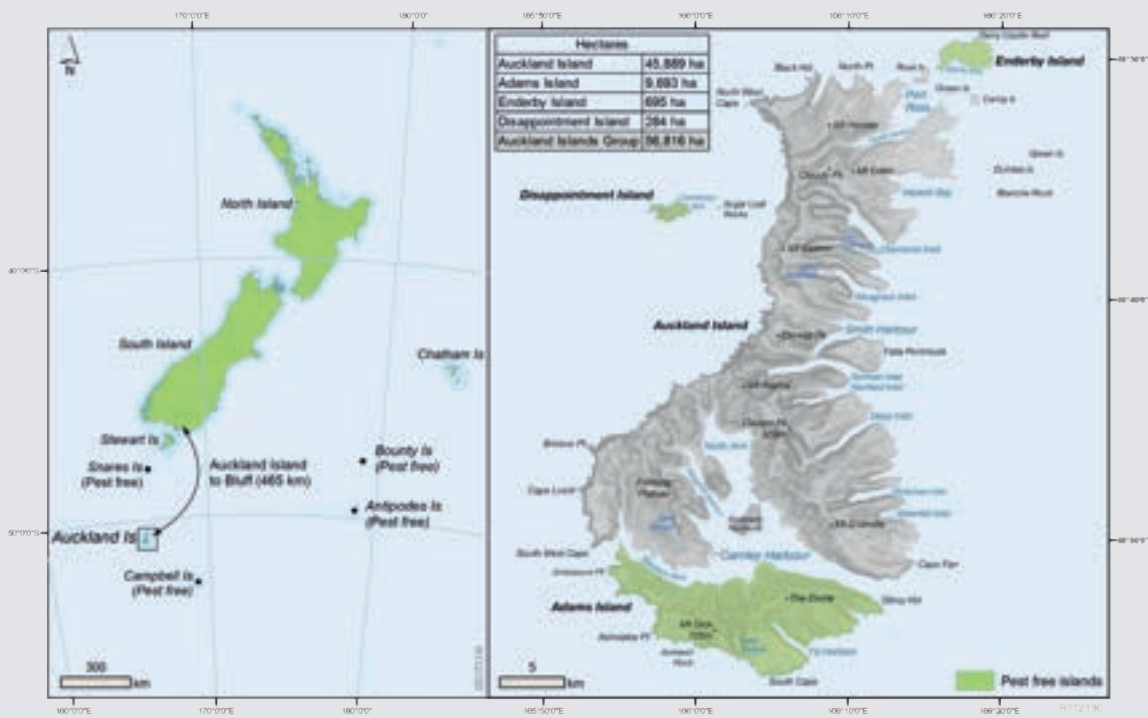


Figure 7: Location of Auckland Island (DOC)



Pig damage on Auckland Island. *Photo: DOC*



Goal 4

By 2025, we will have developed a breakthrough science solution that would be capable of eradicating at least one small mammal predator from the New Zealand mainland.

Current assessment



WILL NOT BE
ACHIEVED BY 2025

WE DON'T CURRENTLY HAVE the tools or technology to achieve complete eradication of any of the target predators from the mainland. When this goal was set, it was thought that a breakthrough science solution would be required.

This interim goal was assessed as having 'insufficient data' in 2021. We now know it is unlikely that any one tool or technique will be a 'silver bullet' for eradication of any one species. Success is likely to require various approaches involving both the innovative use of current tools and new technology gained from research.

Although this interim goal won't be achieved by 2025, good progress has been made.

What approach have we taken?

Genetic research

A genome is the complete set of genes a creature carries, and we've now 'mapped' the genomes of all the Predator Free 2050 target species, except for weasels. In the past 2 years, Genomics Aotearoa has mapped the full genome of kiore/Pacific rat, and the University of Otago has mapped the full genome of the brushtail possum.

This means we can assign or locate any specific gene to a particular region of a chromosome, a little like assembling a jigsaw puzzle. Genomes provide a wealth of information we can use to identify 'Achilles heels', particular traits of predator species, that can be targeted in the development of new eradication tools.

Understanding animal behaviour

Genomes can also tell us much about a species' behaviour, and Manaaki Whenua – Landcare Research is looking into the behaviour that makes some individuals resistant to current control methods. Understanding this 'shyness' will help us develop new tools to overcome it.

Semiochemicals are substances, such as pheromones, that transmit information, mainly by scent, between animals. These scents often causes animals to change their behaviour, which makes the Manaaki Whenua work especially valuable. Manaaki Whenua has derived a novel scent lure from ferrets, which is highly attractive to stoats. In recent field trials, adding the lure to trap baits has doubled stoat capture rates. Iwi partners in Taranaki have recently begun a trial with the lure.

Research shows that female stoats are shyer and more cautious than males, which makes them much harder to trap. This wariness could be a fundamental issue, influencing control efforts country wide.



Stoat. Photo: Ngā Manu

A problem with trap shyness is that cautious individuals survive to breed. This means we're inadvertently helping that trait to spread, because nearly 50% of an individual's personality is inherited from its parents. By regularly switching to different kinds of traps and deploying a range of sensory-based lures, we can help overcome the challenge of trap-shy predators.

In collaboration with the University of Canterbury, Manaaki Whenua has demonstrated 'social learning' in possums, whereby possums learnt to solve a puzzle device by observing a demonstrator possum in an adjacent pen. Social learning by predators could impede eradication.

Innovation in large landscapes

ZIP is working on innovations that are helping to make landscape-scale predator elimination a reality. They include:

- > aerial 1080 techniques that reliably remove 99.9% of possums, rats and stoats
- > risk mitigation to improve resilience of kea populations during aerial operations
- > adopting emerging communications systems, such as LoRa (provides for long-range communications), and satellite communications, which enable remote monitoring of traps, detection devices and aerial toxin operations
- > an artificial intelligence-based detection camera paired with remote reporting technology for timely identification of predators with significantly reduced labour
- > a mobile truck-based loading platform for drone bait sowing to target sensitive areas (eg road edges and farm boundaries) with a high degree of precision and efficiency.

What have we learnt?

It will take more than one science solution: it will take innovative use of current tools, as well as new technology gained from research, to eradicate any one species from New Zealand.

Where to next?

Manaaki Whenua – Landcare Research and the Cacophony Project are co-developing Bluetooth-linked smart devices that can deploy appropriate sensory lures based on the type of animal approaching the device. They are also refining a new high-interaction trap to meet animal ethics standards.

The Eradication Science project being conducted by Manaaki Whenua will test a range of visual, sound and scent cues on wary individuals in captivity, to see if they help overcome their natural caution.

ZIP applies tools and methodologies tailored to the challenges and constraints of a given site.

Over the next 2 years, it will focus on:

- > using new technology, such as eDNA sampling, to reduce the infrastructure and cost associated with maintaining long-term detection networks
- > improved high-precision aerial baiting techniques for sensitive operational boundaries
- > low-cost reliable remote communications systems with the ability to transmit high volumes of data loads from trap and detection networks.



Manaaki Whenua – Landcare Research

MANAAKI WHENUA provides science and strategic advice to the Predator Free 2050 programme, helping us understand, for instance, the behaviour of animals that avoid control operations, and how genomics offer clues to the movement of predators across the landscape. Manaaki Whenua is also developing species-specific toxins that exploit unique physiological and metabolic traits of predators.

‘Precision pest control’ Ministry of Business, Innovation and Employment Endeavour programme

An issue with current toxins is that, despite careful mitigation, they can sometimes harm non-target species. This can be prevented with new, highly specific toxins that only act on the predator in question. Thanks to recent genome mapping, Manaaki Whenua is identifying potential molecular targets in stoats, ship rats and possums that could help this quest.¹⁰



Stoat ear (sample) collected for DNA testing. *Photo: Manaaki Whenua – Landcare Research*

Predator landscape genomics

In a separate study, Manaaki Whenua undertook genetic analysis of more than 550 tissue samples, which has offered valuable insights into the dispersal of stoats, weasels and ferrets across Taranaki Mounga and the surrounding ring plain.¹¹

- > Dispersing mustelids are not impeded by geographical features in this landscape.
- > Female stoats can roam up to 7 km, so this should be regarded as a minimum buffer for trap networks.
- > Genetic evidence suggests most new predator populations spring from surviving residents rather than re-invaders, so finding the residents is a priority.
- > The study found most weasels caught were male (2.4 males to every female). It recommended research into a weasel-specific trap that is capable of trapping lighter-weight females.

¹⁰ Manaaki Whenua – Landcare Research. May 2022: [Pūtaiao: Manaaki Whenua Science Summary](#). Issue 10.

¹¹ See [Assessing mustelid dispersal and the Predator Free Taranaki trapping programme using population genomics](#) for further information.



Clockwise from top left: Rats eating blackbird eggs; possum and rat at fantail nest; possum. *Photos: Nga Manu*

Goal 5

By 2025, whānau, hapū and iwi will have identified sites of importance for predator eradication and at least five eradication projects led by whānau, hapū and iwi will be under way across the country.

Current assessment



ON TRACK

WHĀNAU, HAPŪ, IWI AND IMI (Moriori term for tribe) are pivotal to achieving a predator-free Aotearoa New Zealand in their roles as landowners, managers and decision-makers. Predator management projects rely heavily on their collaboration and delivery. Integrating mātauranga Māori and Western science will benefit both people and nature.

What approach have we taken?

The focus of this goal is to see Māori leading, rather than supporting, Predator Free 2050 projects.

In 2021, one iwi-led predator eradication project was under way: Korehāhā Whakahau, led by Ngāti Awa, which aims to eradicate possums from 4,700 ha of Ngāti Awa's rohe (including Whakatāne, Ōhope and Ōhiwa) by 2025 without using toxins. The project is reviving kaitiakitanga while providing career opportunities, among many other social benefits.

By 2023, three more iwi-led projects were under way: Pest-Free Kaipara by Te Uri o Hau; Tū Mai Taonga (Aotea/Great Barrier Island) by Ngāti Rehua Ngātiwai ki Aotea Trust, and Predator Free Rakiura, which is co-led by Te Rūnanga o Ngāi Tahu and the community.

What have we learnt?

Projects create opportunities for Māori: Iwi-led projects provide employment along with the opportunity for building iwi capability in taiao management. They inspire the next generation of kaitiaki, who are gaining research expertise aligned with tikanga. Iwi leadership often brings mātauranga to the work, re-establishing collective connection, understanding and responsibilities.

Lessons shared from iwi-led projects are inspiring and motivating others.

Role of mātauranga Māori: Indigenous knowledge is helping the development and use of new pest eradication technologies. A series of wānanga, conducted by Manaaki Whenua – Landcare Research, is building capacity and supporting the co-development of a mātauranga-based pest control and eradication framework. Investment by Predator Free 2050 in mātauranga, alongside iwi-led projects, is enabling not only new and innovative approaches but is allowing kaitiakitanga to be practised in a deeper and holistic way.

Where to next?

Predator Free Maukahuka/Auckland Island is co-led by Ngāi Tahu and is ready to implement, with the appropriate funding.



Auckland Island Teal. Photo: Rachael Sagar



Rakiura. Photo: Jason Blair

Goal 6

By 2025, we will have eradicated possums or mustelids from at least one New Zealand city.

Current assessment



ON TRACK

URBAN PREDATOR-FREE PROJECTS are showing eradication is possible in urban areas. They yield valuable knowledge about what works and what doesn't in urban areas, and they boost social acceptance and support, which is critical to achieving a predator-free New Zealand.

Predator Free Wellington was leading the charge on this goal in 2021 and remains on track to eliminate possums from urban Wellington by 2025.

What approach have we taken?

Peninsulas are good places to start urban eradications. By offering early wins, they generate support and momentum. Many cities have begun by aiming for possum-free peninsulas as a step towards complete predator eradication. Rats pose a much bigger challenge, but the Miramar Peninsula is now almost rid of all three predators. Wellington City Council removed possums in 2006, and now Predator Free Wellington has eliminated Norway rats and mustelids. Rangers are currently focused on removing the last few ship rats.

Predator Free Dunedin aims to eradicate possums, rats and stoats from the city's urban and rural landscapes by 2050. The possum operation is split into three areas; the most advanced is Otago Peninsula, where possum eradication is projected for 2024.

What have we learnt?

Social outcomes are important too: Predator Free Wellington emphasises social outcomes, such as health and wellbeing, environmental justice, and greater appreciation of indigenous biodiversity. The community will continue to see benefits as the project expands their predator free work into new areas. Lessons from Wellington can help boost community engagement nationally.

Cities are the most challenging environment for rat eradication: In the absence of strong boundaries to re-invasion, experience has confirmed that rats will be difficult to eradicate from towns and cities. We are continuing to develop and refine socially acceptable tools and techniques to completely remove rats from these environments and reduce re-invasion to manageable levels. While it is not economically feasible to eradicate rats from large-scale urban areas using current methods, Predator Free Wellington's work on Miramar Peninsula is beginning to show that urban rat elimination is achievable.

Where to next?

As urban projects continue to establish and roll out new phases, their experiences will inform best practice and areas for further research, particularly regarding the social engagement approach needed for urban landscapes.



Otago Peninsula. *Photo: Craig McKenzie*



Predator Free Wellington

PREDATOR FREE WELLINGTON LTD is a charitable company supported by Wellington City Council, Greater Wellington Regional Council, NEXT Foundation and Predator Free 2050 Limited. The aim is to remove every last rat, possum, stoat and weasel from the Wellington area.

“Our project is about system change, demonstrating that, in the face of widespread global environmental degradation, a dedicated collective of people can change the tide.”¹²

Predator Free Wellington is being conducted in stages. Phase One, Miramar Peninsula, achieved mustelid (stoats and weasels) elimination in July 2020, and Norway rat elimination in January 2022. In the absence of these predators, Miramar Peninsula has seen a 51% increase in native birds since 2017, piwakawaka/fantail numbers are up 550%, and a 275% increase has occurred in riroriro/grey warbler.¹³

In Phase Two, the first operational goal is to install over 15,000 traps and bait stations from Kilbirnie to Ōwhiro Bay and the central business district. Phase Two will be more complex, because it includes municipal infrastructure, such as Wellington Hospital and Wellington Zoo, and encompasses 1,300 ha of high-density housing, home to 60,000 people. Over 9,590 individual landowner permissions have already been secured (95% of the total needed) to make the project possible.

Predator Free Wellington has mobilised a network of over 10,000 backyard trappers and trained 200 volunteers specifically to maintain the 1,000-device 7 km-long defence line of Phase Two. Not only have they brought communities together through a common objective, but they have also instigated the start of a rat-free generation.



Coutts St under airport tunnel, Predator Free Wellington. Photo: 2019 Ian Robertson Photography Ltd

¹² See Predator Free Wellington [2018/19 Impact Report](#), for more information.

¹³ See [Bird numbers soar to new heights on Miramar Peninsula](#), for more information.



Predator Free Wellington. Photo: 2019 Ian Robertson Photography Ltd



Predator Free Wellington. Photo: 2019 Ian Robertson Photography Ltd

Goal 7

By 2025, effective tools and knowledge will be available to achieve predator eradication on farmland.

Current assessment



ON TRACK

INTRODUCED PREDATORS ARE carriers of plant and animal pathogens that plague the primary sector and affect human health. Predator Free 2050 will therefore deliver substantial benefits to the economy. To achieve this interim goal, New Zealanders will need the right tools and strategies to remove predators from farmland.

This interim goal was on track in the 2021 assessment. Whakatipu Māhia, Towards Predator-Free Taranaki - Taranaki Taku Tūranga, Predator Free Dunedin, Predator Free Banks Peninsula, Te Korowai o Waiheke and Predator Free South Westland were noted as projects working on farmland.

The interim goal remains well on track in 2023. Predator Free South Westland aims to eliminate predators from over 100,000 ha of landscape by 2025, which includes 10,000 ha of farmland around Franz Josef and Whataroa. As part of this work, ground-based removal tools are being refined and improved by ZIP, and specially trained dogs will be used to find any remaining predators. Te Manahuna Aoraki Project is trialling a multi-species pest elimination approach across 1,500 ha of a working high-country farm.

To achieve this interim goal, we need to make tested and effective tools and knowledge more accessible to practitioners.

What approach have we taken?

Predator Free 2050 Limited's Products to Projects fund has already delivered 10 new tools that have application on farmland. For example, Taranaki Taku Tūranga – Towards Predator-Free Taranaki is already trialling new tools to defend 2,000 ha of pasture against possum re-invasion. New tools in 2022/23 include the following.

- > ZIP has developed a wildlife-friendly bait station that keeps toxic rodent baits fresh and minimises risk to non-target species.
- > Groundtruth has developed an open sensor software device by which devices on the ground can report predator detections directly to Trap.NZ.

Another 15 new tools will be available by the end of 2025, including the rat-specific toxin norbormide. All are suitable for use on farmland.

Manaaki Whenua – Landcare Research's artificial intelligence image recognition model now recognises 15 taxa, both native and exotic species.¹⁴ This model allows quicker assessment of the thousands of images that motion-triggered detection cameras produce.

Meanwhile, as part of its predator landscape genomics work, Manaaki Whenua has investigated possum dispersal across different land classes on the ring plain surrounding Taranaki Mouna and noted the effectiveness of rivers as barriers to possum re-invasion.

¹⁴ This tool uses artificial intelligence to identify images of 15 taxa commonly detected by camera traps in New Zealand: kiwi, other birds, cats, deer, dogs, ferrets, goats, stoats and weasels, possums, rodents, hedgehogs, rabbits and hares, wallabies, pigs and livestock.



Early concept image of drone dropping the biodegradable rat trap. Photo: Goodnature Ltd

Boffa Miskell has developed PoaUku, a long-life, ceramic-based lure for possums, rats and stoats. It doesn't contain food, which means it can last up to 3 months in the field.

The Cacophony Project's High Interaction Rate Trap v1 is motion-triggered, using hessian 'fences' to guide predators in. Future versions will feature real-time predator identification.

NZ AutoTraps has developed the AT220 possum and rat trap. This is a self-resetting auto-lured trap that has been combined with TrapNodes, which allows the remote monitoring of trap status, operations, and bait and battery levels.

What have we learnt?

A lot has been learnt about building trust, gaining landowner permissions and how to work around farming practices in an effective and efficient way.

No single tool will achieve this interim goal: It will require a mixture of complementary tools and new learning from research to achieve this goal.

Possums will probably be the first species eradicated from farmland: With appropriate monitoring at bridges, rivers offer an effective barrier to possum dispersal. Meanwhile, Manaaki Whenua's genetic research shows that possums rarely roam wider than 3 km in forest, which means forest remnants on farmland can be protected relatively easily from re-invasion. This makes possums the leading candidate for eradication from farmland.

Where to next?

We will continue to develop the innovative 'toolbox' needed to achieve eradication of each target species on farmland. Promising tools include the following.

- > The rat-specific toxin norbormide was first released in the 1960s, but rats didn't like eating it. The subsequent arrival of second-generation anticoagulants like brodifacoum saw norbormide shelved altogether. Invasive Pest Control, the University of Auckland and Boffa Miskell have revisited norbormide because it's more humane than brodifacoum, doesn't persist in the environment and greatly reduces any risk to non-target species (see [Redevelopment of a rat specific rodenticide norbormide](#), for more information). By reducing impurities and masking its taste, researchers have resurrected IPC Ltd norbormide and it is now in the registration process. This 'new' toxin will have applications well beyond farmland.
- > DOC's [Tools to Market](#) programme invests \$1.4 million a year in smarter, safer and more cost-effective pest control devices. DOC and Predator Free 2050 Ltd are co-funding a biodegradable rat trap, designed by Goodnature Ltd, that can be dropped by helicopter or drone. After single use, it would then compost in a couple of months. This trap could be a cost-effective way to target rats in remote and difficult locations including farmland. This project is due to be completed in late 2026.



Predator eradication on farmland

IN 2018, TARANAKI TAKU TŪRANGA –

Towards Predator-Free Taranaki set out to remove possums from 4,500 ha of the Kaitake area, as part of a wider project. The area of farmland that is now possum free has reached 2,000 ha, and any incursions are quickly identified and removed. In early 2023, the area being managed for elimination grew by 9,000 ha, embracing another 120 farms. Several different tools and methods have been used, including possum detection dogs, which are proving to be invaluable. The Kaitake Range is within the elimination area and, as part of defending the area, an extensive remote reporting trapping system and a trap barrier have been installed throughout the mountain range, using ZIP technology. After a trap goes off, it sends the team an alert, so they know which trap to check, saving a lot of time in labour. Over the past 3 years, a lot has been learnt about how to effectively use traps as a barrier to, and detector of, re-invasion. Along with motion-sensitive cameras and detection dogs to detect the last few possums in the Kaitake Range, the team have also undertaken a trial using DNA to understand movement and relatedness of remaining individual predators.

Te Manahuna Aoraki Project is working with Glenmore Station, a high-country merino, beef and deer farm near Lake Takapō/Tekapo, to eliminate possums, Norway rats, rabbits, hares and hedgehogs¹⁵ from 1,500 ha of Mackenzie Country dryland. In early April 2023, the project used aerial toxins to eliminate all resident possums and 98% of hedgehogs. It also achieved a substantial knock-down of rabbits and hares. A network of over 180 trail cameras is keeping tabs on the survivors, which are now being targeted with ground-based methods, including thermal drone-assisted ground hunting and hand-laid pindone. Surviving hedgehogs were scheduled for removal in the spring of 2023.

¹⁵ Rabbits and hares, while not a target of the Predator Free 2050 initiative, are a major driver of predator populations in this environment, and so must be removed to successfully eliminate predators. Hedgehogs are another major biodiversity threat within Te Manahuna – eating chicks, eggs, lizards, weta and other rare insects – which is why they are a target for elimination. While only one rat has been detected within the 1,500 ha trial site, they are known to be present within the wider area and so are a target of the multi-species approach developed for this environment.



View from Lake Alexandrina towards Glenmore Station. Photo: Julia Gibson



Harlequin gecko. Photo: Sabine Bernert



Section B: How do we get there?

How do we get there?

NO ONE IN THE WORLD has ever attempted anything like the Predator Free 2050 initiative. No manual is in place to follow, so the project is relying instead on learning as it goes, a principle called adaptive management. We do have a guiding document, however. [The Predator Free 2050 Strategy](#) offers a framework to bring about the kind of societal, operational, science and innovative change this ambitious task will need. Figure 8 outlines the many threads involved, and how they might be woven together to bring success.

Figure 8 also defines three main actions along the path towards a predator-free New Zealand: mobilise, innovate and accelerate.

So far, most of our efforts and resources have focused on the two foundational actions: mobilise and innovate. From 2030, we expect to be entering the accelerate phase.



Predator Free Dunedin. Photo: Predator Free Dunedin



Goal: To eradicate mustelids, rats and possums from New Zealand by 2050

What success looks like (outcomes):

Indigenous plants and wildlife returning to abundance and richness	Ecosystems being restored to health	Whanau, hapu and iwi expressing kaitiakitanga/rangatiratanga	Generations of New Zealanders reconnecting with our ngahere and natural environments	International standing of New Zealand is increased through predator management, innovation and expertise	Ecosystems more resilient to climate change

The strategy comprises interlinked actions which describe how New Zealand will achieve the goal:

Mobilise

Taking steps needed to build predator free communities and establish regional and national collaborations.

Innovate

Developing the new and transformational tools and techniques (and the public acceptance of them) that will be required to eradicate predators.

Accelerate

Applying Predator Free 2050 tools and techniques across the landscape as fast as possible, as they're developed.

The actions are delivered through six pathways:

Whanau, hapu and iwi expressing kaitiakitanga	Communities taking action	Supporting the kaupapa through legislation and policy	Advancing our knowledge, innovation and improvement	Measuring and assessing the difference we make	Moving from sustained predator control to eradication

Implementation

5-yearly action plans will focus on the work required over the next 5 years, outline milestones within the pathways. Each of the pathways is led by a collaborative group comprising national organisations who coordinate to bring coherence to work programmes and make sense of a complex response.

Measuring success

Progress will be regularly assessed in the form of 5-yearly interim goals which focus technical effort, and progress towards our outcomes. The Strategy will be reviewed every 5 years.

How we work together

We can all play a role in achieving Predator Free 2050. The strategy has an underlying set of principles to guide how we work together.

Figure 8: The Predator Free 2050 framework outlines how components of the strategy work together to drive change

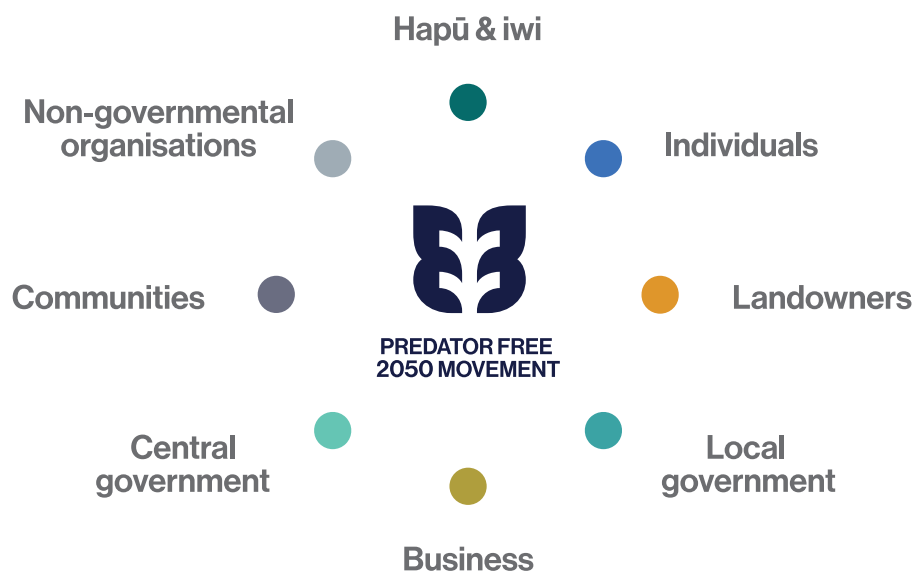
Mobilise

BY 'MOBILISE', we mean establishing support systems and policies, securing resources and engaging people. In order to accelerate eradication across Aotearoa, we will need community support and a trained workforce. No single organisation can achieve the Predator Free goal by itself: success stands or falls on our willingness to work together, so the Predator Free programme supports communities and volunteers with practical help, information and advice, and by connecting groups.

Alongside iwi, hapū, landowners and communities, more than 30 diverse organisations have put their shoulders to Predator Free 2050. The term 'we' is used throughout this document to reflect that collaboration.¹⁶

DOC is the Government's lead agency responsible for Predator Free 2050 and heads the national programme which includes developing and coordinating the implementation of the Predator Free strategy.

- > DOC suppresses predators on public conservation land and leads island eradications. It also funds tools and technology development, provides training and technical advice, and facilitates partnerships and Predator Free 2050 communities. It has the responsibility for the [National Predator Control Programme](#), the National Eradication Team, and employs regional [Predator Free Rangers](#).
- > DOC'S technical experts help develop action plans and coordinate investment in projects.



¹⁶ The roles and responsibilities of those involved in Predator Free 2050 can be found in detail in the [Predator Free 2050 Strategy](#).

Whanau, hapu and iwi have a whakapapa relationship with New Zealand's native species. As kaitiaki they have an obligation to ensure that our native taonga are protected for future generations. Tangata whenua play a key role in reaching the Predator Free goal.

Predator Free 2050 Limited is a Crown-owned charitable company established to contribute to the elimination of possums, rats and mustelids. Predator Free 2050 Limited:

- > identifies and invests in landscape-scale elimination projects, designed to establish that elimination is achievable and defensible without fences
- > is integral in driving breakthrough science, working closely with the Biological Heritage National Science Challenge, universities and Crown research institutes
- > supports the development of new and innovative tools and approaches to predator eradication
- > through funding from the Provincial Growth Fund and Jobs for Nature, invests in innovation through its Products to Projects initiative, getting tools and technology out to where they're needed.

Zero Invasive Predators (ZIP) is a charitable organisation with the mission to develop and implement techniques that eliminate pest mammals, in order to restore landscapes. ZIP's approach involves:

- > eliminating (rather than suppressing) pest mammals
- > innovating real solutions at pace and place, alongside communities
- > focusing on achieving natural heritage and biodiversity outcomes
- > working across large, diverse habitats, including farms and urban areas.

ZIP is now responsible for eliminating predators and other invasive pest species within two large-scale projects: Predator Free South Westland (107,000 ha) and Te Manahuna Aoraki Project (310,000 ha).

Manaaki Whenua – Landcare Research provides science and strategic advice. This helps us understand, for instance, the behaviour of animals that survive operations and how genomics offer clues to the movement of predators across the landscape. Manaaki Whenua is also developing species-specific toxins that exploit unique physiological and metabolic traits and helping to improve current tools.

Founded in 2013, the Predator Free New Zealand Trust is an independent charitable trust that connects everyone with a will to get involved (community groups, iwi, families and individuals) and supports them with advice, access to expertise, and encouragement. It also manages the Predator Free Apprentice Programme, funds backyard community groups and runs an online shop for equipment.

Next Foundation is a philanthropic trust that supports various predator-free initiatives, including Rotoroa Island, Project Janszoon in Abel Tasman National Park, Taranaki Mounga Project, Te Manahuna Aoraki, Predator Free Wellington, Predator Free South Westland and ZIP.

OSPRI, Federated Farmers and non-governmental organisations, such as Forest & Bird and WWF, and charities like Kiwis for Kiwi and Sanctuaries of New Zealand, are directly and/or indirectly supporting a predator free future.

Building community capability

Communities everywhere have rallied around the Predator Free 2050 goal. It's a key priority of the programme to support communities with knowledge, tools, and best practice to manage pests.

The Predator Trapping Methods course run by [Nelson Marlborough Institute of Technology \(NMIT\)](#) and [Te Pūkenga](#), and developed jointly between NMIT and DOC, helps communities develop their own predator control plans and teaches best practice trapping methods. Since July 2021, nearly 720 people have attended courses at 24 locations across the country. It has responded to requests from iwi and hapū by taking the course directly to groups like Ngā Whenua Rāhui, Moeraki Rūnanga and Te Pu-a-Nga Maara. COVID-19 restrictions prompted the development of an online version, making the course more inclusive.

[A Practical Guide to Trapping](#), colloquially known as the “ranger in your back pocket”, is a free resource available to communities that includes best practice trapping advice. The third edition is in progress.

The Predator Free Apprentice Programme aims to increase the number of experienced animal predator control specialists around the country. Apprentices are hosted by experienced pest control professionals, and so far, everyone who has completed the programme is still employed by their host organisation.

The Predator Free New Zealand Trust Predator Free Communities Programme supplies communities with humane traps and other equipment. Since 2016, it has received more than 800 applications and awarded \$500,000 worth of predator control equipment to 140 communities.





Trapping methods course attendees, Te Pu-a-Nga Maara, February 2023. Photo: DOC

18,645 
trapping guides
distributed since July 2021


1,000+
people
attend predator control
workshops each year


The achievements of
1,900+
community groups
have been mapped, along with
predator control data from various
agencies, Queen Elizabeth II and
Predator Free 2050 Limited projects.


A toolkit has been developed to support
community groups with the administrative
aspects of running a group. This includes
funding advice, help with communications,
volunteer management and more.



The Trust's website provides a one-stop shop for anything people need to know about getting started or improving their predator control.

By supporting and convening PF2050 communicators and project leads across the country, the Trust helps organisations better reach their communities. Two Trust-run workshops assembled more than 80 communicators and project leads from across Predator Free 2050 to discuss best practices, messaging principles and emerging trends in media and communications.

ZIP and Predator Free 2050 Limited partnered in 2022/23 to enable ZIP to establish and deliver an immersion-based training opportunity to increase the number of people capable of delivering predator eradication. Attendees are trained in various aspects of initiating, establishing, administering and implementing predator elimination projects. This programme could potentially be run by ZIP and/or other providers throughout New Zealand.



As a result of these communications workshops: values-based guides have been developed on topics such as cats, dogs, toxins, and important Predator Free 2050 messaging.



Building wooden trap boxes. Photo: Predator Free New Zealand Trust

Tangata whenua leadership

Tangata whenua play a pivotal role in Predator Free 2050. Whānau, hapū and iwi relate through whakapapa to New Zealand's indigenous plants and animals and, through kaitiakitanga, they carry an obligation to ensure taonga species are protected for future generations.

Central to tikanga are the values of manaakitanga, and they extend to the land and waters, practised through mātauranga.

Mana whenua confer customary authority across rohe, so that Predator Free 2050 projects rely heavily on iwi as landowners, managers and decision-makers. Furthermore, mātauranga Māori underpins operational and scientific practice, part of the transformational change success requires. This indigenous knowledge will be more widely accessible, thanks to a mātauranga-based pest control and eradication framework in development between iwi and Manaaki Whenua – Landcare Research.

A Māori strategy to achieving Predator Free 2050

In 2023, the Kaitiakitanga Rōpū (whānau, hapū and iwi expressing kaitiakitanga collaborative group)¹⁷ started work on a Māori predator free strategy. Informed by Māori influencers, thought leaders and kaitiaki, the plan will embed tangata whenua perspectives and leadership in the Predator Free 2050 programme to better guide and deliver its work.



Long-tailed bat/pekapeka.
Photo: Chris Hillock

¹⁷ The Predator Free 2050 Strategy set up a collaborative group structure for each of the six strategic pathways, with the “whānau, hapū and iwi expressing kaitiakitanga” pathway recognising the kaitiaki role of whānau, hapū and iwi ([Section 5](#), Predator Free 2050 Strategy).



Korehāhā Whakahau

KOREHĀHĀ WHAKAHAU, the first iwi-led Predator Free 2050 project, aims to eradicate possums without using toxins from an area of the rohe of Ngāti Awa, including Whakatāne, Ōhope and Ōhiwa, by 2025. The project has provided career pathways, built capacity and capability among Ngāti Awa, and upheld the expression of kaitiakitanga.

In 2022, Predator Free 2050 Limited supported the rūnanga to launch an initiative to understand how mātauranga might be embedded in pest eradication.

Through interviews, archival research, and exploration of various waiata, mōteatea, tauparapara, karakia, and other forms of representing mātauranga, the Korehāhā Whakahau Rangahau team will gather Ngāti Awa knowledge, histories and traditions of te taiao to help solve landscape-scale eradication challenges in their rohe.

“We will identify how mātauranga can make the greatest impact in caring for the bush, in supporting the goals of Predator Free 2050, and most importantly, growing our ability to be kaitiaki across the rohe of Ngāti Awa.”

Kairangahua Mātāmua (Senior Researcher)
Rob Whitbourne



Korehāhā Whakahau, September 2022. Photo: Stuart Attwood

Innovation and learning

TO INNOVATE IS TO ENABLE a change in practice, whether this is through the development and implementation of new tools and technologies or by finding new ways to use existing tools more effectively.

As we test these new tools and methodologies, the results offer lessons that in turn help us make future decisions.

Several agencies are working on new tools, technology, and methods we'll need to achieve Predator Free 2050. This includes DOC's National Eradication Team and Tools to Market programme, Manaaki Whenua – Landcare Research, ZIP, Predator Free 2050 Limited and Endeavour programme-funded research. Examples of progress in innovation and adaptive management are described in Section A: Interim goals.

Case study



Scenario modelling tool

Manaaki Whenua – Landcare Research and the Biological Heritage National Science Challenge are developing a simulation model to help develop a strategic roadmap to achieve Predator Free 2050. This scenario modelling tool will be used to evaluate the feasibility of eradication scenarios being considered, enabling a strategic approach to roll out eradication programmes over large landscapes nationally.

The prototype is now ready to compare more complex and realistic eradication scenarios, and may eventually help managers choose the best eradication strategy for a given site and scale.

By 2025, the tool will be part of a modelling framework designed to be sufficiently sophisticated to give managers confidence in the way they prioritise sites, projects and resources.



Kiekie in flower, Ōkārito. Photo: Cam Eddy

Accelerate

ONCE WE HAVE proof of concept – that we can remove all target predators from an area and prevent them from re-establishing – we can ‘accelerate’ the Predator Free 2050 programme by rolling out those new tools and techniques across New Zealand. Even during this ‘acceleration’ phase, the approaches will continue to be refined and tailored to respond to the unique constraints and opportunities of each site.

Strategic large-scale projects will better prepare us for this phase.

1. **Predator Free South Westland** is an ambitious 5-year project (2020 to 2025) to eliminate possums, rats and stoats from around 107,000 ha of forest, townships and rural land. The project shows that landscape-scale predator elimination is possible on the mainland, and that it is already under way.

2. **Te Manahuna Aoraki Project** is building on the success of Predator Free South Westland to eliminate predators from three-quarters of Aoraki Mount Cook National Park by 2025 and is developing methods to eliminate predators from large East Coast dryland areas.
3. **Auckland Island** provides an opportunity to increase remote island eradications, and success will see the last remaining mammalian predators removed from the subantarctic world heritage area. The experience gained will benefit other large-scale island and mainland eradications.
4. **Rakiura/Stewart Island** (175,000 ha) will be one of the largest island eradications in the world. Importantly, it will also be on an inhabited island in New Zealand waters, so the project will provide invaluable learning for the mainland.

We will maintain important landscape projects to engage and empower locally led predator eradication initiatives.

Next two years

Strengthening systems will be a particular focus over the next 2 years. This will include a 5-year review of the Predator Free 2050 Strategy. This review will be initiated in 2024 and will consider:

- > reassessing and resetting the interim goals for the next 5-year period (2025 to 2030)
- > any changes in direction due to new understanding gained from scientific results
- > challenges or unforeseen roadblocks that have been identified
- > the definitions of strategic outcomes
- > the pest animals included in the 2050 target.



Feral cat eating a parakeet, Auckland Island. *Photo: DOC*

Glossary

Technical terms

biodiversity	Means the variability among living organisms from all sources, including land, marine and freshwater systems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems.
community group	A group operating to provide a specific service in a community, for the public benefit of the members of the community.
ecosystem	A community of plants, animals and microorganisms in a particular place or area interacting with the non-living components of their environment (eg air, water and mineral soil).
elimination (of predators)	This term has yet to be defined and published for use by Predator Free 2050. It has been used in this report to explain the step before 'eradication' on mainland sites where predator species have been removed and their re-invasion is being continuously managed.
endemic species	Indigenous species that breed only within a specified region or locality and are unique to that area.
eradication (of predators)	When every individual from a population of a pest species has been removed from a defined geographic area.
introduced species	Species that are 'non-native'. <ul style="list-style-type: none">> Invasive species: introduced species that spread rapidly or widely and cause harm to the environment.> Pest species: introduced species that have the potential to cause significant economic, environmental or cultural negative effects.

nature	A holistic term that encompasses the living environment (te taiao), which includes all living organisms and the ecological processes that sustain them. The Predator Free 2050 Strategy uses the term 'biodiversity' to refer to biological diversity and 'nature' when considering the wider processes, functions and connections in the natural environment, of which biodiversity is a part.
re-invasion (of predators) /incursion	The entry of an individual into a pest-managed landscape. Expected to be managed to low rates to maintain eradication. The threshold for what constitutes low tends not to be a number but defined by the ability to remove re-invaders faster than they can re-establish.
semiochemical	A pheromone or other chemical that conveys a signal from one organism to another to modify the behaviour of the receiving organism.
suppression (of predators)	Also called 'predator control'. When a population of a pest species is controlled (either naturally, eg by a predator, or by management) to levels below its natural carrying capacity in the environment.
taxa	A scientifically classified group or entity: such as a species, family, or class.

Glossary

Te reo Māori terms

hapū	Kinship group, clan, tribe, subtribe. A section of a large kinship group and the primary political unit in traditional Māori society.
iwi	Extended kinship group, tribe, nation.
kaitiaki	Guardian, trustee, minder.
kaitiakitanga	The exercise of guardianship by the tangata whenua of an area in accordance with tikanga Māori in relation to natural and physical resources; includes the ethic of stewardship.
manaakitanga	Hospitality, kindness, generosity, support.
mana whenua	Territorial rights, authority over land or territory.
mātauranga Māori	This is the body of knowledge originating from Māori ancestors. This includes the Māori world view and perspectives, Māori creativity, and cultural practices.
mōteatea	A lament, traditional chant, sung poetry. A general term for songs sung in traditional mode.
rangatira	Chief, supervisor, employer.
rohe	Territory, area, place.
rūnanga	Council, tribal council, assembly, board.

tangata whenua	Local people, hosts, indigenous people.
taonga	Treasure, anything prized; applied to anything considered to be of value.
tauparapara	Incantation to begin a speech. Tauparapara are a type of karakia. The actual tauparapara used are a way that tangata whenua can identify a visiting group, as each tribe has tauparapara particular to them.
te taiao	Earth, world, environment.
tikanga	Correct procedure, custom, habit, practice, convention, protocol. The customary system of values and practices that have developed over time and are deeply embedded in the social context.
waiata	Song, chant.
wānanga	To meet and discuss, deliberate, consider.
whakapapa	Genealogy, genealogical table, lineage, descent.
whānau	Extended family, family group.
whenua	Land.