



Predator Free 2050

5-year progress report



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Goal: 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 reinvasion without the use of fences. 37

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Goal: By 2025, we will have eradicated all mammalian predators from New Zealand’s uninhabited offshore islands. 40

Goal: 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. 42

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Acting Minister's foreword



Tēnā koutou katoa,

It wasn't too long ago that a predator free New Zealand was considered by many to be unachievable – a worthy, but completely implausible dream.

I imagine there are some people who still think along those lines. But being ambitious should never be a deterrent to aiming for the stars.

Predator Free 2050 is a bold and exciting response to Aotearoa New Zealand's biodiversity crisis. Our native species are a part of our national and cultural identity. We all have a role in keeping it that way, protecting and enhancing what we have for my daughter's generation and those that follow.

As the late Sir Paul Callaghan said, and while this has been quoted often it's worth repeating, a predator free New Zealand is 'crazy', but it could also be our moonshot.

A recent review of over 9000 native land species revealed that over 3000 are threatened with or at risk of extinction. Predator Free 2050 is responding to this situation with urgency. We know native wildlife is quick to return where species are free from predation and we see this when we visit predator free offshore islands and fenced mainland eco-sanctuaries. These places provide a glimpse of how Aotearoa once was, and how it could be again in the future.

Predator Free 2050 is building on the expertise gained from decades of successful island predator eradications, and a trove of evolving knowledge, including mātauranga derived from generations of interaction between tangata whenua and te taiao. This year marks 5 years since the goal was announced and provides a fitting moment to reflect and celebrate the significant progress made so far.

Reaching the goal cannot be achieved by any single entity. It will require new ways of working together on a larger scale than we ever have before. This is reflected in the Predator Free 2050 Strategy that established a roadmap for achieving milestones using a collaborative process to align investment in research and projects.

The focus so far has been on mobilising and innovating. Community groups around the country continue to undertake predator control where they live, work and play. In fact just last week, my daughter became a member of our suburb's trapping club!

Landscape-scale predator eradication projects have launched all across the country. These projects act as pathfinders – trialling new tools and methods that help us learn more about achieving eradication at scale. There has been a strong emphasis on science innovation and research as we search for scientific breakthroughs to unlock more effective ways to eradicate predators. We are making good progress towards the Strategy's interim milestones of achieving and maintaining eradication in large mainland areas without the use of fences, and our level of pest suppression across the country already exceeds the 2025 target.

The Government is proud to join with communities, whānau, hapū and iwi, businesses, philanthropic groups, farmers, scientists and non-government organisations to build our momentum towards the long-term goal. The path is long, and we will need to learn and make improvements along the way – but the rewards will be worth it.

Nāku noa, nā



Hon Dr Ayesha Verrall

Acting Minister of Conservation



Okia Head. Photo: Crystal Brindle

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.



Summary

Predator Free 2050, moving from ongoing control of predators to coordinated, progressive nationwide eradication, is a bold response to Aotearoa New Zealand’s biodiversity crisis. Much has been achieved in the 5 years since the goal was set to rid Aotearoa New Zealand of the introduced predators that cause the most harm to native species – rats, possums and mustelids (weasels, stoats and ferrets).

Predator Free 2050 builds on the work already done by communities to protect their local environment and native species. Community support continues to grow with people contributing to projects across the country and receiving support from the Predator Free New Zealand Trust.

The Government has shown its support for this goal by investing over \$300 million in Predator Free initiatives, which bolsters other funding from local government and philanthropic organisations as well as the time and effort invested by community groups.

The Predator Free 2050 Strategy, created in 2020, developed a programme to drive change, pulling together the disparate threads inherent in such an ambitious goal. Delivered through six pathways, the Strategy is characterised by local and national collaboration across three key phases: mobilise – innovate – accelerate. Predator Free 2050 has seven interim goals (see below) to guide our work in the short term. There has been considerable progress made against these targets for 2025.

Key

-  achieved
-  on track to be achieved by 2025
-  will not be achieved by 2025
-  insufficient data

 Increase suppression by 1 million hectares.

 Predator eradication achieved in unfenced areas of at least 20,000 ha on mainland New Zealand and defended from reinvasion.

 All mammalian predators are eradicated from New Zealand’s uninhabited offshore islands.

 A breakthrough science solution has been developed that can eradicate one mammal predator from the New Zealand mainland.

 Whānau, hapū and iwi lead at least five eradication projects.

 Possums or mustelids are eradicated from a New Zealand city.

 Effective tools and knowledge are available to achieve predator eradication on farmland.

Government investment in the Tiakina Ngā Manu predator control programme run by the Department of Conservation (DOC) and in landscape-scale projects through Predator Free 2050 Limited has greatly expanded predator suppression – exceeding the 2025 target to increase the area of predator suppression on the Aotearoa New Zealand mainland by 1 million ha (from 2016 figures).

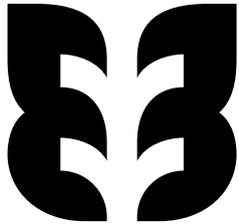
Landscape-scale predator eradication projects across the country are applying research in the field and expanding our collective knowledge base about how to eradicate predators at scale and defend diverse landscapes from reinvasion. Whānau, hapū and iwi have a key role in designing, deciding and delivering predator management projects in their rohe. Two iwi-led projects have launched so far, paving the way for more to follow.

The science community is coalescing their efforts towards research that will improve the cost, speed and scale of predator eradications. Significant research and development programmes within Manaaki Whenua – Landcare Research, the Biological Heritage National Science Challenge and Predator Free 2050 Limited have targeted predator free goals. The Tools to Market (DOC) and Products to Projects (Predator Free 2050 Limited) programmes were established to encourage innovation in tools and technology and make this available for Predator Free 2050 projects to use. Tools and techniques developed by Zero Invasive Predators in their eradication of mustelids and possums and stoats from the Perth River valley site, South Westland, represent a step-change in how we eradicate predators and defend sites from reinvasion without the use of fences.



Blue mushroom/werewere-kökako. Photo: Shellie Evans

What is Predator Free 2050?



PEOPLE – NATURE
TOGETHER WE FLOURISH
TUIA TE TAIAO

Imagine an Aotearoa where native species are safe from extinction and thriving alongside us.

Predator Free 2050 is an ambitious goal set in 2016 to make Aotearoa New Zealand free by 2050 from three introduced predators that cause the greatest harm to our native wildlife: possums, mustelids (ferrets, stoats, weasels) and rats. Achieving this goal will profoundly improve Aotearoa New Zealand's biodiversity and allow our indigenous natural taonga species like birds, bats and invertebrates to thrive alongside us in a way that current generations have never seen.

Predator Free 2050 acts as a unifying goal for all New Zealanders. Whānau, hapū, iwi, volunteers, government agencies, businesses, councils, scientists, non-governmental organisations (NGOs), philanthropists and community groups can all direct their expertise, effort and investment towards the goal.

No single entity can meet this ambitious goal alone. However, through collaboration we can achieve something greater than the sum of our individual contributions.

An Aotearoa New Zealand free from these predators would be a land abundant with wildlife, where people's connection to nature and each other is enhanced. The *tohu* created for Predator Free 2050 encapsulates this vision: Tuia Te Taiao, People – Nature, Together we flourish.

Why do we want to achieve this?

A land free of predators would save our iconic and ancient endemic wildlife from extinction and restore balance within te taiao (the environment) to be enjoyed by future generations. Kiwi, kererū, tuatara and wētā – our native species are part of our lives, languages, stories and identities.

Our birds and small invertebrates evolved over 80 million years without mammalian predators and are particularly vulnerable to introduced predators. Some species have been lost forever – since the arrival of humans, 79 species have been recorded as lost to extinction, including 59 birds.¹

Currently, 74% of New Zealand's native land birds and 84% of our native reptile species are threatened or at risk of extinction.² Time is running out to protect them, with over 25 million native birds killed each year by non-native predators.³

According to the Māori world view, when ecosystems are out of balance, the mauri (life force), wairua (spirit), mana (integrity) and tapu (sacredness) of te taiao are all affected. And if the environment is ailing, we are all in some way weakened. The health of people and the environment are inextricably linked.⁴

Predator Free 2050 reflects the Government's priority to protect, preserve and restore our natural heritage and biodiversity. As well as the devastating impact that predators have on our taonga species, introduced predators also threaten our health, economy and primary sector – they are a vector for infectious diseases such as bovine tuberculosis.

¹ Department of Conservation. 2020. Te Mana o te Taiao - Aotearoa New Zealand Biodiversity Strategy 2020, p. 17, available at www.doc.govt.nz/te-mana-o-te-taiao.

² Stats NZ Tatauranga Aotearoa. 2021. Indicator: Extinction threat to indigenous land species, available at www.stats.govt.nz/indicators/extinction-threat-to-indigenous-land-species.

³ Department of Conservation. 2020. Towards a Predator Free New Zealand: Predator Free 2050 Strategy, p. 11, available at www.doc.govt.nz/moving-towards-pf2050.

⁴ Department of Conservation. 2020. Towards a Predator Free New Zealand: Predator Free 2050 Strategy, p. 20, available at www.doc.govt.nz/moving-towards-pf2050.

Predator suppression reduces predator numbers to a level where they do less harm, while eradication gets rid of an entire predator species forever. Predator eradication will give our native species an opportunity not just to survive, but to thrive. While continual suppression locks us into an endless cycle of investment, toxin use and trapping, an eradication goal offers a chance to break this cycle for good.

The task will not be easy – predator eradication has never been achieved at this scale before. There is no manual to follow, but the rewards will be worth it. Success will strengthen people's connection to the environment and native species will flourish. Tourism will be boosted as people visit Aotearoa to enjoy our thriving, predator-free environment. The primary sector will be more productive without pest management requirements and our knowledge, expertise and tools in predator control and eradication can be exported globally.

Predator Free 2050 working outcomes

Indigenous plants and wildlife returning to abundance and richness

Whānau, hapū and iwi expressing kaitiakitanga / rangatiratanga

International standing of New Zealanders is increased through predator management, innovation and expertise

Ecosystems being restored to health

Generations of New Zealanders reconnecting with our ngahere and natural environments

Ecosystems more resilient to climate change

Who is involved in Predator Free 2050?

We all have a role to play in achieving a Predator Free Aotearoa New Zealand. Predator Free 2050 is becoming a widespread environmental and social movement where distinct contributions can combine to achieve great things.

Predator Free 2050 is a national goal, built on grassroots momentum in island eradications and mainland control by community groups and NGOs over the past 60 years.

Possums, rats, stoats, weasels and ferrets will move between conservation land, farmland, regional parks, suburban backyards and the central business district. Aligning the efforts of many organisations and people with common approaches and goals is needed if we are to achieve predator free status. This goal does not sit with a single entity – it is a movement that researchers, organisations and groups can join at any stage.

At a local level, whānau, hapū, iwi, and communities, businesses and councils are translating predator free goals into their own projects to restore the environment and enhance well-being in their own neighbourhoods.

At a national level, there is a diverse range of stakeholders across government, Crown entities, NGOs and the philanthropic sector who direct their activities to the short-term and long-term goals established in the Predator Free 2050 Strategy.⁵ The complexity of the task ahead requires collaboration at a national scale never seen before.

⁵ The roles and responsibilities of those involved in Predator Free 2050 can be found in the Predator Free 2050 Strategy.

Predator Free 2050 Strategy

The Predator Free 2050 Strategy was approved by Cabinet and launched 1 year ago. The Strategy supports a collaborative, collective approach to reach Predator Free 2050, while allowing individual agencies, organisations and community groups to continue undertaking the work that they do best.

How was the Strategy created?

As the Government's lead agency on Predator Free 2050, the Department of Conservation led the process of creating the Strategy. Initial hui were held in 2018, pulling together individuals from a diverse range of sectors to provide advice on strategic direction and subject matter expertise. Scientists, Predator Free 2050 Limited, Predator Free New Zealand Trust, conservation NGOs, business representatives, and representatives from iwi and Ngā Whenua Rāhui were involved.

Engagement with whānau, hapū and iwi was critical to the development of the Strategy, with a strong message from the beginning that 'how' we get to the goal is just as important as reaching it. Hui were held in over 15 areas around the country, to which more than 100 iwi, hapū, and rūnanga were invited. This allowed deeper understanding of whānau, hapū and iwi aspirations as kaitiaki, which were incorporated into the Strategy.

This feedback formed the basis of a discussion guide, to allow anyone who wanted to have a say to be involved. Public consultation ran over 2018/2019 with 742 survey responses and 161,663 people reached through social media (with 4300 comments/engagements received through social media). The feedback received through the public consultation was an important factor in the creation of the Strategy.

What is the Predator Free 2050 Strategy?

The Strategy is part of a wider biodiversity response guided by Te Mana o te Taiao - Aotearoa New Zealand Biodiversity Strategy 2020.⁶ Predator eradication is an essential contributor towards addressing biodiversity decline.

The Strategy and associated 5-year Action Plan are designed to align and coordinate conservation, biosecurity and biodiversity work across initiatives driven by central government, government, community, and whānau, hapū and iwi. Key shifts will be required around how we work in partnership, how we learn and collaborate, and how decisions are made.

In recognition of the long-term nature of the Predator Free 2050 goal and the research and innovation still required to get there, the Strategy sets out three phases where our efforts should be prioritised over time.

⁶ Te Mana o te Taiao - Aotearoa New Zealand Biodiversity Strategy 2020 is available at www.doc.govt.nz/te-mana-o-te-taiao.

As we are still in a learning phase, the majority of our effort and resource should align to ‘innovate’. It is important that the actions we take now help develop the tools and techniques required to scale to national application.

- > **Mobilise:** Taking the 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 are developed.

Collaborative group structure

The Predator Free 2050 Strategy set up a collaborative group structure with six strategic pathways, providing opportunities for organisations involved at a national level to coordinate with each other. The groups involve members of the Predator Free 2050 community whose work in this space has a national remit and where there is a need to align resourcing and effort.

There are currently over 50 people from 27 different organisations, agencies and entities involved across six collaborative groups. These groups are creating action plans that set the direction for each pathway and will inform an investment plan framework to span across the agencies and organisations involved, ensuring that funding is directly contributing towards achieving the Strategy.

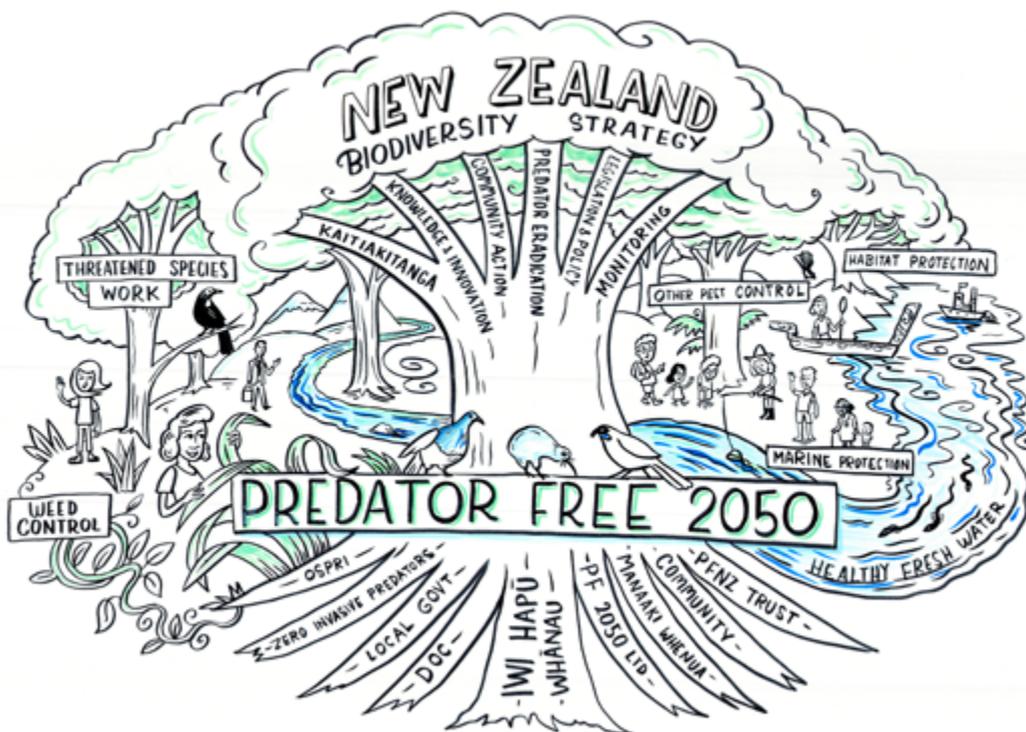


Figure 1: The Aotearoa New Zealand Biodiversity Strategy leads New Zealand's work on biodiversity. All other programmes, including work to make New Zealand Predator Free by 2050, sit beneath this canopy.

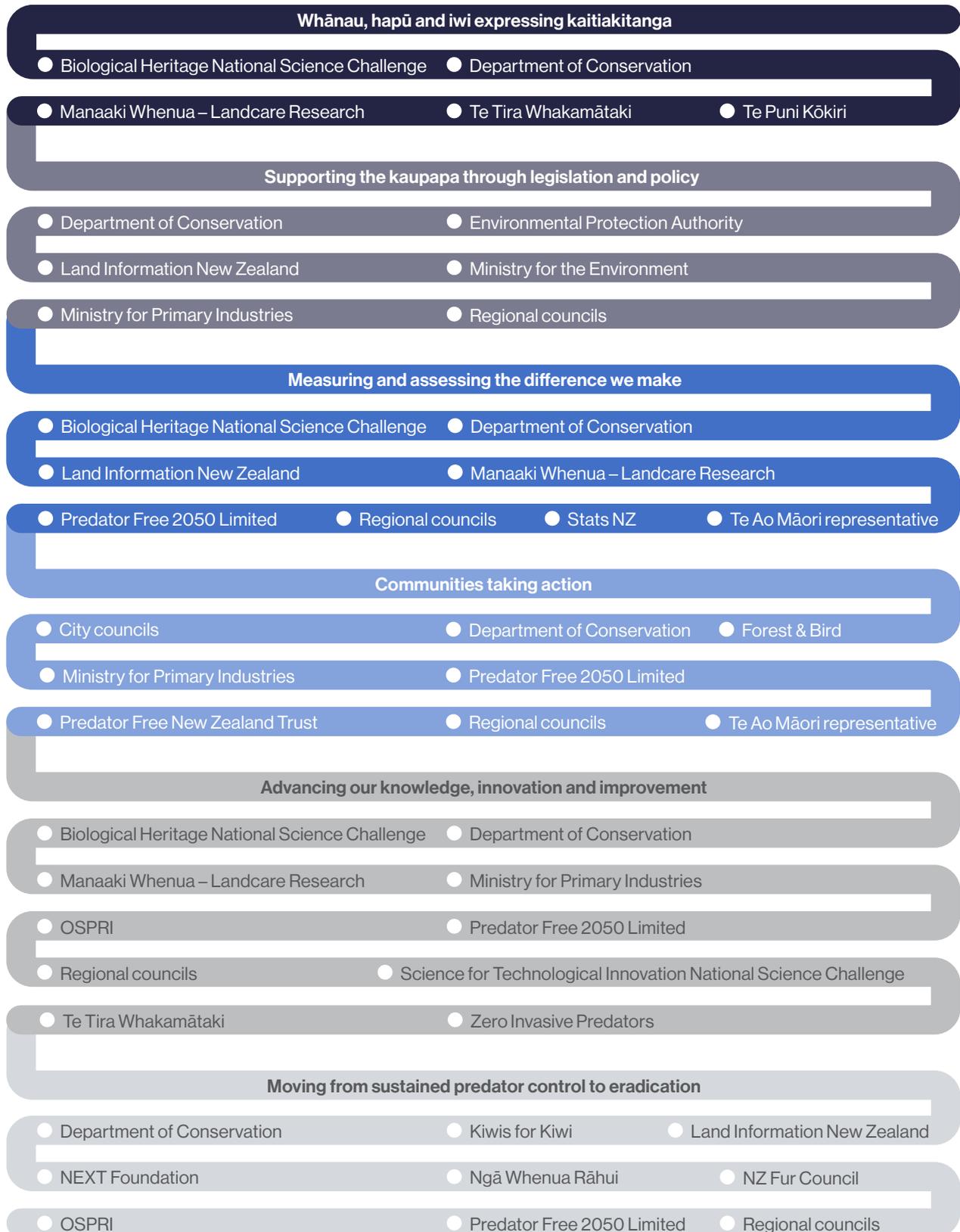


Figure 2: The six pathways outlined in the Predator Free 2050 Strategy, outlining the organisations that contribute to each pathway.

Reflections on the first year of the collaborative group process

The collaborative group process has been reviewed externally after 1 year of operation. The review highlighted both positive feedback and challenges raised by the participants. Following the review outcomes and recommendations, the collaborative group process will be modified to improve the process.

- ✓ A Collaborative Leads Group, involving one to two representatives from each collaborative group, has begun meeting regularly to provide cross-group visibility and coordination. This is a key avenue for greater alignment, clarification of outputs and sense of shared purpose across collaborative groups.
- ✓ Reported outcomes so far have mainly been process ones – a greater sharing of information and updates and making connections were the most widely reported key achievements of the national collaborative process to date. These are an important precursor for building trust and strong relationships.
- ✓ Pathway Action Plans are on track to be finished mid-year and will inform a collective investment plan.
- ✓ A Predator Free 2050 website is under development to provide cross-group communication and visibility.

-
- ✗ COVID-19 disrupted momentum and the pace and process of group formation and joint activity in 2020, with people's time, priorities and ability to meet face-to-face significantly affected.
 - ✗ Agency representation on some collaborative groups was unstable at times which resulted in a slower pace as new members were brought up to speed. Visibility of the Predator Free 2050 goal within supporting government organisations is also variable.
 - ✗ Working in the collaborative space is a new process for many people. It has provided frustrations for some who find the slower, collaborative pace difficult. Other challenges relate to leadership, governance and incorporation of kaitiakitanga aspirations across all groups.

Case study: From separate action to collective impact

The need to strengthen national-level coordination across key contributing agencies and organisations and move from separate action to collective impact was identified as a key strategic shift in the Predator Free Strategy. A collective impact model is being used to implement the Strategy and Action Plan. This recognises that collaboration and alignment of people and resources across New Zealand is at the heart of achieving Predator Free 2050.

Collective impact is a methodology for bringing diverse stakeholders together to achieve common goals and purpose, using the conditions of a common agenda, shared measurement, mutually reinforcing activities, continuous communication and backbone support.

Over the past 3 years, DOC's Predator Free 2050 unit has used collective impact principles to build a national collaborative process to:

- > share leadership and ownership of the Predator Free 2050 vision, story, strategic goals, and the journey ahead (common agenda)
- > build role clarity, with clear lines of sight between strategic goals, investment priorities and work programmes
- > strengthen relationships and coordinate planning, research, and work programmes across key agencies and between different Predator Free 2050 workstreams
- > share accountability for progress towards jointly identified goals and targets
- > share learning in ways that facilitate continuous process/programme improvements, and more effective working-together arrangements.

The Predator Free 2050 national collaboration process is breaking new ground in Aotearoa New Zealand. While cross-government agency coordination and policy development is already occurring, there are very few precedents at a national strategic level involving such a wide mix of government agencies and other organisations to develop collaborative action planning and investment processes.

How is Predator 2050 funded?

The New Zealand Government is the primary financial investor in Predator Free 2050. As well as making substantial new funding injections over the past 5 years, existing government funding has been directed towards the goal.

This recent investment builds on the foundations laid by people and groups who were working in this area for decades prior to the announcement of Predator Free 2050. The programme still relies on the contribution of these volunteers, whānau, hapū and iwi, councils, businesses, trusts and philanthropists to contribute their diverse skills and expertise to projects and bolster government funding.

Local government across Aotearoa New Zealand contributes to Predator Free 2050 through their business-as-usual predator control activities in the regions. The combined total investment of local government is estimated to be more than \$26 million annually.

The NEXT Foundation has been a firm supporter of the Predator Free goal and as of April 2021 has invested and committed over \$50 million funding to environmental projects.

Other valued contributions have been made by Jasmine Social Investments, the Morgan Foundation, Toi Foundation, Shell New Zealand, Foundation North, Rātā Foundation, Aotearoa Foundation, Re:Wild, lottery grants and community trusts.

Local government is instrumental in delivering Predator Free initiatives

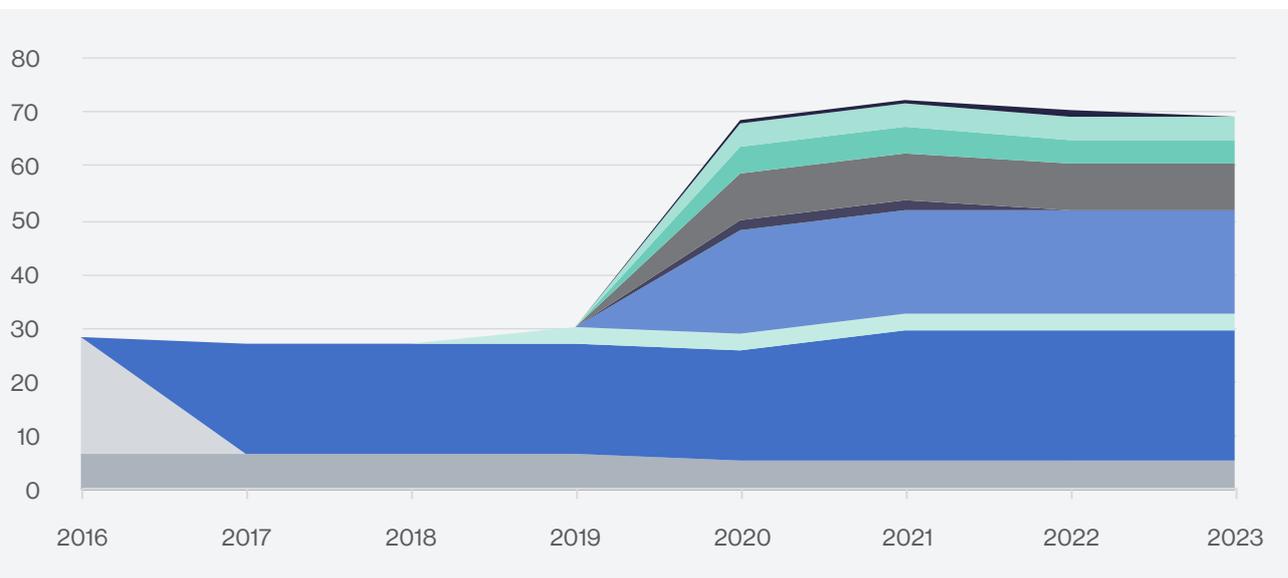
Local government (territorial local authorities and regional councils/unitary authorities) are an important contributor to Predator Free 2050. Regional councils and unitary authorities, in particular, undertake predator control and biodiversity work as part of their business-as-usual activities. As a result, when a specific Predator Free project is established in their region, they are usually an integral player.

Within these projects, local government often acts as a facilitator and connector at the regional level between national agencies, landholders, mana whenua, volunteers and the local community. At the local level, it is often local government that hold existing relationships with these partners, which can be built upon to work towards the Predator Free vision.

Across the country, local government supports Predator Free projects through direct funding and in-kind contributions, which reflects their aspiration to achieve the national goal at a local level. On occasions, local government is involved in a management and operational capacity where they hold particular expertise and/or capacity to oversee operational delivery.

Government investment in Predator Free 2050 initiatives

The Government has made a number of significant investments over the past 5 years directing more than \$300 million towards achieving the Predator Free 2050 goal.



Project title	Funding recipient	\$m value
● Accelerating Predator Free New Zealand	Predator Free 2050 Limited	28 + out years
● Battle for our Birds	DOC	21.3
● Expanding Predator Free 2050 capability (including Tiakina Ngā Manu)	DOC	81.28 + out years
● Provincial Growth Fund: Expanding predator control in the regions	Predator Free 2050 Limited	19.5
● Jobs for Nature: Community predator free projects	Predator Free 2050 Limited	76
● Jobs for Nature: Predator Free Apprenticeship Programme	Predator Free New Zealand Trust	4.5
● Jobs for Nature: Raukūmara Pae Maunga Restoration Project	DOC, Ngati Porou and Te Whānau ā Apanui	34.49
● Jobs For Nature: Kaimai – Mamaku Ranges Forest Restoration Project	DOC, iwi/hapū and community	18.51
● Jobs for Nature: Kiwi conservation activities	Kiwis for Kiwi	19.7
● Jobs for Nature: Predator Free South Westland	Predator Free South Westland Limited	3

Figure 3: Government investments in Predator Free 2050 from 2016/17 to 2020/21.

Estimated annual spend on Predator Free activities by national agencies

National agencies have spent approximately \$75 million annually on Predator Free activities over the past 5 years.⁷ We can expect to see this figure increase over the next few years due to the funding that has been committed to long-term Predator Free landscape-scale projects.

The relative level of investment by national agencies over the past 5 years is shown below. DOC, Predator Free 2050 Limited, Manaaki Whenua – Landcare Research, Biological Heritage National Science Challenge, Land Information New Zealand, Stats NZ, the Ministry for Primary Industries, Environmental Protection Authority and the Ministry for the Environment are government funded. The OSPRI contribution is a 60/40 split between farmer contribution and government. The Predator Free New Zealand Trust is funded by a mix of government, business partnerships and philanthropic contributions.



Figure 4: Relative level of investment in predator free activities 2016–2021.

⁷ Estimated combined annual average based on data collected during the creation of this report.

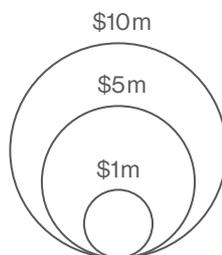
Regional projects supported by Predator Free 2050 Limited

Predator Free 2050 Limited helps to connect regional Predator Free projects around Aotearoa New Zealand with available Crown funding and support. Over the past 5 years, Predator Free 2050 Limited has partnered with a diverse range of organisations including central and local government, philanthropic organisations, businesses, community groups, whānau, hapū and iwi to launch 15 large landscape predator eradication projects (as at April 2021).

Each project requires a unique approach due to the landscapes, ecological systems and target species in each region. The infographics on the following pages present the collaborative system of cash funding and in-kind contributors for each project.⁸ In-kind contributions have not been presented as a dollar amount, but these contributions are critical to large regional projects.

Funding key

- Council
- Farmers
- Philanthropy
- Government
- Other



Predator Free 2050 Limited

Predator Free 2050 Limited was created by the Government to accelerate the number of large-scale predator eradication projects and drive breakthrough-focused research initiatives, leveraging Crown investment through attracting funding from private philanthropy.

Its expression of interest processes and brokering of funding agreements have drawn other investors and organisations into coordinated projects led by councils, community trusts and iwi entities across 730,000ha of mainly private land.

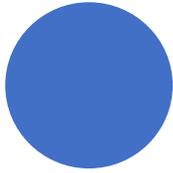
Predator Free 2050 Limited's research strategies and funding have also incentivised ambitious research collaborations, resulting in publication of the full genomes for ship rats and stoats, new detection capabilities and potential for enhanced data management. Its Products to Projects initiative has fast-tracked availability of new eradication and defence focused field tools.

A new capability development programme and wrap-around project support model is designed to further boost research and operations and give confidence to new investors in the Predator Free 2050 mission.

⁸ The following projects are not included in this section as they are in initial planning stages – Predator Free Southland, Tū Mai Toanga project (Aotea/Great Barrier Island), Tūhoe-led e Urewera project (islands and peninsulas around Lake Waikaremoana).

Predator Free Whangārei

Contributors



Predator Free 2050 Limited
(\$6m over 5 years)

- > Community conservation groups
- > Department of Conservation



Northland Regional Council
(\$1.3m)

- > Kiwi Coast
- > Whangārei District Council

Project lead

Northland Regional Council

Te Korowai o Waiheke – Towards Predator Free Waiheke

Contributors



Predator Free 2050 Limited
(\$2.6m over 7 years)
(\$0.7m from Jobs for Nature)



Auckland Council (\$3.39m)

- > Backyard and community groups
- > Department of Conservation
- > Donors
- > Fullers
- > Giltrap Motors
- > Lasso Media
- > Man o War Station
- > Minter Ellison
- > Pest control contractors



Foundation North (\$0.875m)

- > Rarowhara
- > Technical Advisory Group
- > Waiheke businesses
- > The Waiheke Collective (including conservation groups, organisations, mana whenua, and individuals)
- > Waiheke High School
- > Waiheke Local Board

Project lead

Te Korowai o Waiheke Trust

Māori Partners

- > Ngāti Paoa

Korehāhā Whakahau

Contributors



Predator Free 2050 Limited
(\$2.4m over 5 years)

> Department of Conservation



Jobs for Nature
(\$2.5m from the
Kaimahi for Nature fund)

> Ngāti Awa Group Holdings

Project lead

Te Rūnanga o Ngāti Awa

Predator Free Hawke's Bay – Whakaorangia Te Matau-a-Māui

Contributors



Predator Free 2050 Limited
(\$1.62m over 4 years)



Aotearoa Foundation (\$0.665m)

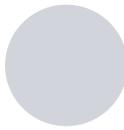


Department of Conservation (\$0.4m)



Zero Invasive Predators (\$0.03m)

> Biological Heritage
National Science Challenge



Hawke's Bay Regional Council
(\$3.23m)



Manaaki Whenua –
Landcare Research (\$0.6m)



Maungaharuru Tangitu (\$0.06m)



Farmers (\$0.12m)

> Whangawehi Catchment
Management Group

Project lead

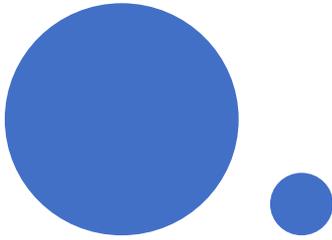
Hawke's Bay Regional Council

Māori Partners

- > Te Kōpere o te iwi o Hineuru Trust
- > Maungaharuru Tangitū Trust
- > Ngāti Pāhauwhera Development Trust
- > Rongomaiwahine iwi

Towards Predator Free Taranaki – Taranaki Taku Tūranga

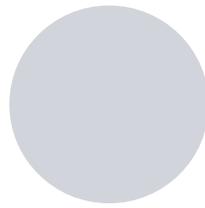
Contributors



Predator Free 2050 Limited
(\$11.7m over 5 years)
(\$0.75m from Jobs for Nature)

Manaaki Whenua –
Landcare Research (\$0.3m)

- > Department of Conservation
- > Federated Farmers
- > Stratford District Council
- > South Taranaki District Council



Taranaki Regional Council (\$8.5m)

New Plymouth District Council
(\$0.41m)

- > Taranaki Mouna Project
- > Wild for Taranaki
- > Zero Invasive Predators

Project lead

Taranaki Regional Council

Māori Partners

- > Ngāruahine
- > Ngāti Maru
- > Ngāti Mutunga
- > Ngāa Rauru
- > Ngāti Ruanui
- > Ngāti Tama
- > Taranaki Iwi
- > Te Āti Awa

Predator Free Wellington

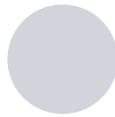
Contributors



Predator Free 2050 Limited
(\$3.725m in 2018)
(\$7.6m from Jobs for Nature)



Greater Wellington Regional Council
(\$2.6m)



Wellington City Council (\$2.6m)



New Zealand Lottery
Grants Board (\$0.25m)



Wellington Community Trust
(\$0.025m)

- > 36 backyard trapping groups
(active across 50 suburbs and 32 schools participating in the pilot schools programme)
- > Capital Kiwi
- > Forest & Bird

- > Manaaki Whenua – Landcare Research
- > NEXT Foundation
- > Papa Taiao
- > Victoria University of Wellington
- > Wellington Airport
- > Zealandia

Project lead

Predator Free Wellington Ltd

Māori Partners

- > Ngāti Toa Rangatira
- > Taranaki Whānui ki Te Upoko-o-Te-Ika-a-Māui

Capital Kiwi

Contributors



Predator Free 2050 Limited
(\$1.1m)



Wellington Community Trust (\$0.5m)



Philanthropy (\$0.65m)



Kiwis for Kiwi (\$0.25m)



Wellington City Council (\$0.1m)



Department of Conservation
(\$0.03m)

- > Community groups
- > Greater Wellington Regional Council

- > Goodnature
- > Landowners
- > Meridian Energy

Project lead

Capital Kiwi Trust

Māori Partners

- > Ngāti Toa Rangatira
- > Taranaki Whānui ki Te Upoko-o-Te-Ika-a-Māui

D'Urville Island project – Rangitoto Birdsong

Contributors



Predator Free 2050 Limited
(\$0.975m over 5 years)



Marlborough District Council (\$0.5m)



Rātā Foundation (\$1m)



NZ Lotteries Grant Board (\$0.31m)

- > Department of Conservation

- > Landowners

Project lead

D'Urville Island Stoat Eradication Charitable Trust (DISECT)

Māori Partners

- > Ngāti Koata

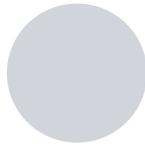
Predator Free Lake Brunner – Rerenga ki taonga o ngā manu ki Kotuku Moana

Contributors



Predator Free 2050 Limited
(\$4.4m from the
Provincial Growth Fund)

- > Community groups
- > Department of Conservation
- > Lake Brunner Community Catchment Care Group



West Coast Regional Council
and partners (\$4.2m)

- > Local farmers
- > OSPRI
- > Tai Poutini Polytechnic
- > Zero Invasive Predators

Project lead

West Coast Regional Council

Māori Partners

- > Te Rūnanga o Ngāti Waewae

Pest Free Banks Peninsula – Te Pātaka o Rākaihautū

Contributors



Predator Free 2050 Limited (\$5.11m)



Department of Conservation
(\$1.28m)

Merrell (\$0.05m)

- > The Cacophony Project
- > Living Springs



Environment Canterbury (\$2.25m)



Christchurch City Council (\$0.2m)

- > Rod Donald Banks Peninsula Trust
- > Selwyn District Council
- > Summit Road Society

Project lead

Banks Peninsula
Conservation Trust

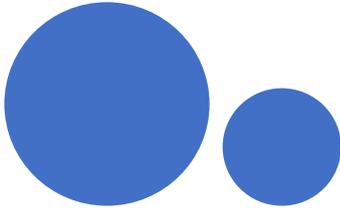
Māori Partners

Ngāi Tahu rūnanga:

- > Ōnuku Rūnanga
- > Te Hapū o Ngāti Wheke (Rāpaki) Rūnanga
- > Te Taumutu Rūnanga
- > Te Rūnanga o Koukourarata
- > Wairewa Rūnanga

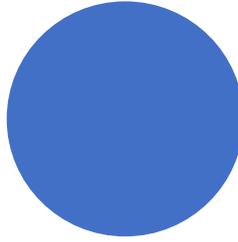
Predator Free South Westland

Contributors



Department of Conservation (\$9m)
(\$3m from Jobs for Nature)

- > Jasmine Social Investments
- > Jobs for Nature
- > NEXT Foundation



Predator Free 2050 Limited
(\$12m over 5 years)

- > OSPRI
- > South Westland community
- > Zero Invasive Predators

Project lead

Predator Free
South Westland Ltd

Māori Partners

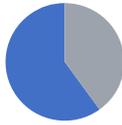
- > Te Rūnanga o Makaawhio

Predator Free Dunedin

Contributors



Predator Free 2050 Limited
(\$4.33m over 5 years)
(\$0.15m from Jobs for Nature)



OSPRI (\$3m)



Dunedin City Council (\$1.8m)



Otago Regional Council (\$1.5m)

- > Blue Penguins Pukekura
- > Department of Conservation
- > Dunedin Amenities Society
- > Forest & Bird
- > Landscape Connections Trust
- > Manaaki Whenua – Landcare Research
- > Open Vue
- > Orokonui Ecosanctuary

- > The Otago Chamber of Commerce
- > Otago Peninsula Biodiversity Group
- > Otago Polytechnic
- > Quarantine Island - Kamau Taurua
- > Save the Otago Peninsula Inc.
- > University of Otago
- > Wild Dunedin
- > Yellow-eyed Penguin Trust

Project lead

Predator Free Dunedin
Charitable Trust

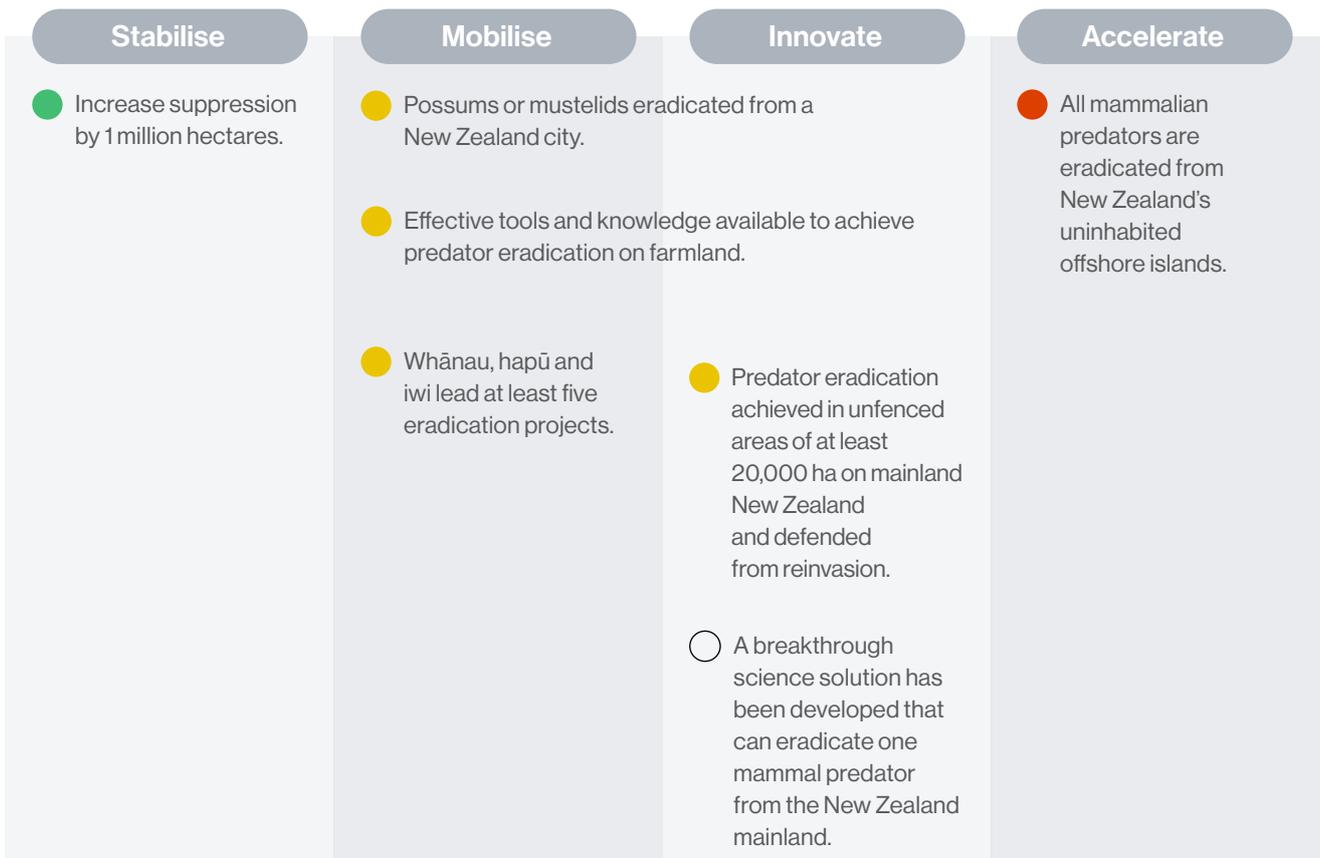
Māori Partners

- > Kāti Huirapa Rūnaka ki Puketeraki
- > Te Rūnanga o Ngāi Tahu
- > Te Rūnanga o Otakou

Assessment of progress against the interim goals

Due to the long-term time frame of Predator Free 2050, four interim goals were set in 2016 to provide a path for the short term, and three further goals were added in 2020. The goals relate to the different phases of the programme and show us where to focus technical effort, consider how eradication will work outside of conservation land (eg, on farms and in urban settings) and ensure that whānau, hapū and iwi are involved through leading their own projects or in partnerships.

One of the main functions of this report is to assess the progress that has been made so far and provide an early indication of whether the Predator Free programme is on track to meet the goals by the 2025 target date. Consideration of the actions required to defend gains or advance progress is also included in the assessment.



Key

- achieved
- on track to be achieved by 2025
- will not be achieved by 2025
- insufficient data

Figure 5: Summary assessment of progress against the interim goals.

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

Assessment

This interim goal has been achieved through a combination of an increase in the hectares of sustained control for possums by DOC, and Predator Free 2050 Limited projects – a total increase of 1,083,767 ha. This calculation excludes areas under sustained control by DOC for other predator species, as well as predator control undertaken by other organisations or agencies such as OSPRI, local government or community groups, which means the total increase in the area under predator suppression since 2016 is likely to be considerably higher.

Data from DOC's annual reports shows that in the 2015/2016 year 773,233 ha were treated under sustained control for possums.⁹ By the year ending 30 June 2020, this same measure was at 1,576,000 ha. This means that DOC has an additional 802,767 ha under suppression for possums since 2015/2016 – largely due to increased investment in the Tiakina Ngā Manu predator suppression programme. Since its establishment in 2016, Predator Free 2050 Limited has invested in a number of large landscape-scale predator eradication and suppression projects across the country. As at May 2021, there were 281,000 ha under sustained predator control through projects with Predator Free 2050 Limited involvement.¹⁰

Background

The intent of this goal is to ensure we are continuing to protect areas and species that need it most, effectively 'buying us time' while the technologies that are needed for eradication are developed.

While the ultimate goal of Predator Free is to eradicate all predators, suppression is necessary in the meantime. It ensures we are collectively thinking about the end result – what we are trying to preserve, and ensuring there are viable populations from which to repopulate areas as they become predator free.

At its simplest, suppression reduces or controls predator numbers (and impacts), ensuring predators don't rise above a certain threshold. Suppression requires cyclical treatment (ie, an intention to go back to treat the area again).

In most times, the ability to suppress is particularly important, as the predator numbers spike dramatically, as do the impacts on native flora and fauna. Suppression allows us the ability to manage these spikes.

⁹ Department of Conservation Te Papa Atawhai. Annual reports available at www.doc.govt.nz/annual-reports.

¹⁰ Data from Predator Free 2050 Limited website at www.pf2050.co.nz.

Where to from here?

In contrast to suppression, eradication is not simply control intensified – it requires every last individual predator to be removed. Techniques used to suppress or control predators cannot simply be ‘ramped up’ to achieve eradication. Suppression and eradication are two very different models that require very different planning and funding.

When the goal was set, 1 million ha of additional suppression on an ongoing basis was presumed to be the right amount to ‘hold the line’ against predators and defend our taonga species while we developed technologies for eradication. Now that the goal has been achieved, it is timely for the Predator Free programme, in particular the ‘Moving from suppression to eradication’ collaborative group, to investigate this premise and reconsider what the optimal level of predator suppression is, and whether the areas currently targeted are the highest priority.

If this investigation shows that we now have enough coverage of the right areas (eg, the most at risk) under suppression, there is a strong case for retaining this level of suppression rather than increasing it. Future investment can be targeted to other parts of the Strategy and other interim goals yet to be achieved.



Fergus Sutherland checks a trap on Te Rere yellow-eyed penguin reserve in The Catlins. *Photo: Forest & Bird*

Goal: 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 reinvasion without the use of fences.

Assessment

Based on the significant progress already made, and promising upcoming projects, this goal is on track for achievement by 2025. The Zero Invasive Predators (ZIP) Perth River valley project trial has successfully eliminated possums, stoats (and rats down to very low numbers) in a 12,000ha area.

Whakatipu Māhia is also on track to complete possum eradication on the Māhia Peninsula (14,500ha) by 2022. How these projects are able to defend eradicated areas from reinvasion over the coming years is the critical factor in achieving this interim goal.

Background

We know that predator free offshore islands and fenced sanctuaries are able to be defended from reinvasion. Our largest eradication to date is still the 12,000ha Motu Ihupuku/Campbell Island. This work is inspiring the next frontier – achieving eradication on mainland Aotearoa New Zealand and defending it without the use of fences. The challenge in this goal is solving ‘scale’ and ‘defence from reinvasion’.

The Perth River valley was chosen by ZIP to be the trial site of its ‘remove and protect’ model due to the boundaries created by its fast-flowing rivers. The Predator Free South Westland project will provide a learning ground for the next phase which expands this area up to 100,000ha over the coming years. The lessons learnt in the design and planning of the 50,000ha Maukahuka Pest Free Auckland Island project will also have applicability for large-scale mainland sites.

Other projects are currently adding to the collective body of knowledge regarding barriers for reinfestation. Predator Free Wellington employs a virtual barrier which comprises the Wellington airport runway with bait stations and traplines across adjacent suburbs, and at the other end of the city, Capital Kiwi is testing a barrier comprised of intensive trapping networks across the peninsula.

The Taranaki Taku Tūranga project has designed a virtual barrier at Pukeiti, on the slopes of Mt Taranaki, using 1300 traps to form the front line and prevent the reinvasion of possums. Te Manahuna Aoraki in the upper Mackenzie basin and Aoraki Mount Cook National Park is investigating using natural barriers like mountain ridgelines and waterways. Manaaki Whenua – Landcare Research is working closely with these projects and provides underpinning technical research that informs operational decisions.

Where to from here?

The next aim is to increase the scale of sites and to eradicate and defend them without fences – the key focus behind this interim goal. There are three programmes of work planned to address scale and defence from reinvasion: Predator Free South Westland, Predator Free Rakiura/Stewart Island and Farms as Barriers.

Adding the Whataroa catchment to the Perth Valley site will expand it to over 20,000ha, which is the next step to achieving eradication over areas of 100,000ha – enabling eradication across Aotearoa New Zealand. The whole South Westland project encompasses over 100,000ha and is being run by the Predator Free South Westland charitable company working with ZIP. This uses an ‘adaptive management’ approach where the project team learns and adapts their methods as they go.

The project to eradicate predators from Rakiura/Stewart Island (160,000ha) was launched in late 2020. This project will use a pre-planning design approach which involves field trials and design planning to reduce uncertainty and develop an operational plan with a high certainty of success. Given that Rakiura is home to over 400 people, the project will require social buy-in and trust.

Both the South Westland (adaptive management) and Rakiura (applied design) approaches are valid, and their results will help us develop an optimal delivery model for large-scale eradication on the mainland in the future.

The ability to defend eradication sites is critical to maintaining the gains made and seeing a return on investment. If we cannot defend sites, it is not cost-effective to eradicate predators as they will repopulate. There are two approaches being developed by the South Westland and the Farms as Barriers programmes.

South Westland is testing the use of geographic features such as fast-flowing West Coast rivers, Kā Tiritiri o te Moana/the Southern Alps and fiords as barriers. This will enable these large contiguous forest systems on the West Coast and Fiordland to be broken into manageable chunks for monitoring and responding to reinvasions. This method is highly dependent on the geographical area and has limited application across the rest of the country.

The second approach is Farms as Barriers. This is an applied science programme funded by the Biological Heritage National Science Challenge and DOC to develop eradication tools for farmland that will also create barriers to predator movement (ie, the eradication infrastructure will dispatch an invading predator before it can cross the farmland to the other side). We expect a working model for broader application within 5 years. This will open up the ability to defend large bush areas surrounded by farmland in the North Island, eastern South Island and Southland.

Both scale and defence from reinvasion need to be developed concurrently. All of these projects are on a 5-year horizon, which, if successful, will then give us the tools to roll out eradication approaches across most of Aotearoa New Zealand.

Case study:

From ongoing pest control to eradication of predators

This shift takes us from ongoing pest control, continually trying to 'hold the line', to coordinated and connected landscape-scale eradication, leaving Aotearoa free of these predators once and for all.

Zero Invasive Predators Ltd (ZIP) was set up in 2015 by founding partners DOC and NEXT Foundation to help drive the research and development needed to eliminate predators and successfully protect areas from reinvasion. ZIP has adopted a fast-paced adaptive management approach to trial technologies which it is developing, enabling rapid innovation.

Their aim is to develop "operationally ready, innovative, strongly supported technologies to completely remove rats, possums and stoats from large mainland areas, and then protect those areas from reinvasion". This approach has led to success in the Perth River valley, South Westland with the elimination of possums and stoats from 12,000 hectares of rugged backcountry by applying the 'remove and protect' model, which comprises the following tactics:

- > **Minimise reinvasion by establishing predator barriers.** ZIP research (supported by OSPRI) confirmed that rivers can act as an obstacle to possum movement. This is foundational research for landscape-scale elimination projects and the use of natural barriers to prevent predators reinfesting the area.

- > **Completely remove predators within the protected area (behind those barriers).** ZIP has also been trialling the '1080 to Zero' approach, which uses the toxin 1080 (currently the most commonly used tool for predator suppression at scale) but with an adapted methodology to completely remove predators from an area. The aerial operation is followed up by ground-based methods including trapping, hunting and localised bait stations. An underlying premise is that once the area is cleared of predators, there is no need for repeated, large-scale use of aerial 1080 in the project area. The idea that 1080 could just be used as a one-off method to completely eliminate predators, rather than continual use to control them, is appealing to many people. In field trials in the Perth River valley, ZIP has had success with eliminating possums and stoats using this model, and is making progress towards eliminating the last few rats that remain there too.
- > **Detect any surviving predators and remove these predators before they are able to re-establish a viable population.** ZIP has also had success in developing remote reporting tools to enable quick responses to breaches and to help protect these predator elimination areas. Ensuring reinvasion is minimised and responded to effectively is as critical as ensuring all individuals are removed in the beginning. This will need to be an area of continued focus for the Predator Free programme as a whole.

ZIP focuses research and development on developing, testing and applying new tools and techniques for each of these tactics. Their work at the Perth River valley site is a significant step forward in our understanding of what it takes to eliminate predators from the mainland and protect the area from reinvasion.

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

Assessment

Offshore islands are rich in biodiversity and are often home to many native species that can no longer survive on the mainland where predators are present. Offshore islands have provided an opportunity to manage these places – with defensible natural boundaries and size – within the limits of current technology. Over 110 uninhabited islands are currently predator free and our expertise in island eradications is considered world leading. However, we are 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 complete eradication.

Background

DOC is the lead delivery agency for island eradications on public conservation land. Historically operations have occurred on a project-by-project basis, requiring repeated investment in capability and delays associated with this. In 2021, DOC established a National Eradication Team to provide the opportunity for continuity of skills and resources to deliver eradication efficiently. This team will help to establish the internal infrastructure to deliver this goal and to take a holistic view of all island projects.

A key milestone to deliver this interim goal is the eradication of pigs, cats, and mice from the subantarctic Auckland Island. At 46,000 ha, Auckland Island is the fifth largest island in New Zealand and is approximately the same size as all previous island eradications put together. DOC invested \$3 million over 3 years to complete the design work for the eradication of pigs, cats, and mice from Auckland Island (Maukahuka Pest Free Auckland Island project). The design work was completed in 2020 and reported that the island eradication will take approximately 10 years. The bulk of the operational planning and cost estimates have been done, so the project is ready for implementation when there is funding and support to begin the project.

There has been other activity over the past 5 years which contributes towards this goal, including:

- > The eradication of mice from the subantarctic Antipodes Island (2100ha) was confirmed in 2018. DOC partnered with public supporters, the Morgan Foundation, WWF NZ and Island Conservation to deliver the 'Million Dollar Mouse' project in 2016, attracting extensive support.
- > The eradication of mice from Motuareronui/Adele Island (2017) and Te Hoiere/Maud Island (2019) by DOC.
- > DOC's response to pest incursions on islands that are currently predator free. The Auckland Council is also involved, particularly in maintaining predator-free status post-eradication through island biosecurity functions in the Hauraki Gulf/Tikapa Moana and supporting incursion responses.

Where to from here?

Eradication investigations and project success to date demonstrate how progressive advances in planning and technology can lead to success in increasingly complicated eradications of invasive mammalian predators. However as projects increase in complexity and scale, so do the risks (expense, ecological, reputational). The detailed design and planning study for the Maukahuka project invested in an evidence-based approach, addressing key uncertainties with scaled field testing of methods. This gives clarity for decision-makers regarding the size and challenge of the work and provides a best practice model for future eradications.

In 2021, DOC's National Eradication Team will further define the scope of this interim goal and identify which islands are feasible and worthwhile to make predator free. The team will create different plans to achieve the intent of the goal on new time frames for investment. These plans will also take into account innovation in eradication technologies which has expanded the potential for process improvements.

Goal: 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.

Assessment

There has not yet been one single breakthrough science solution that meets the definition of this goal, and the nature of scientific research makes it challenging to give a measure of progress against a goal calling for a 'breakthrough' science solution by a certain date. Therefore, instead of providing an assessment of the likelihood of achieving this goal by 2025, this section will outline some of the key areas of progress in science relating to Predator Free over the past 5 years.

Background

Manaaki Whenua and the Biological Heritage National Science Challenge (BHNSC) were already undertaking research into pest management, but since Predator Free 2050 was established they have intensified this focus and launched new areas of investigation.

Manaaki Whenua is working on the development of species-specific toxins that will be critical to achieving eradication in productive landscapes. Supported by the Ministry of Business, Innovation and Employment's Endeavour Fund, Manaaki Whenua began a 5-year research programme in 2019 'Eradication Science: Eliminating the last survivors to achieve predator freedom'. The programme is investigating the development of novel tools, based on predator behaviours, that will help eradication efforts by ensuring the last few individual predators in an area can be caught.

BHNSC is contributing to solutions that will control or eradicate at least one pest from mainland Aotearoa New Zealand. BHNSC has already invested over \$1.5 million into Predator Free research and continues to be a strong partner to the Predator Free 2050 programme through its Tranche 2 work. BHNSC work has included social research (bioethics panel and public attitudes toward new pest control technologies) and applied science including the development of a rodent-specific toxin, research into new technologies for eradication of predators, best use of existing tools/toxins, and development of AI camera technology to identify mammal pests, co-funded by ZIP.

The Predator Free 2050 goal has led to the launch of new organisations and programmes which contribute to innovation and research. As outlined on page 39, ZIP has been a leader in innovation of tools and techniques for predator eradication.

DOC's Tools to Market programme aims to make smarter, safer and more effective tools and technology available to the Predator Free 2050 community within a 1–5-year time frame. The first developed product (a new long-life rat lure) is being progressed by Wellington UniVentures for market availability.

Tools to Market completed procurement rounds in 2017 and 2019 and currently includes six active projects, spanning lures, traps, toxins and drones for bait application. DOC has already committed close to \$7 million into this programme and works closely with Predator Free 2050 Limited to coordinate and achieve maximum value from their collective investments in predator control technology.

The 2017–2020 Predator Free 2050 Limited research strategy has focussed on this goal. The company invested \$1 million per annum in research, which has contributed to:

- > The publication of world-first, reference-quality genomes for the ship rat and stoat.
- > A new co-designed data standard for predator free trapping and bait-station data, which is now being transitioned to operational use. This is a critical requirement for enabling more powerful data sharing and analysis.
- > Evidence that thermal/AI cameras can increase predator detections by 5–50X, and the availability of this technology for use in landscape projects.

The genome research represents a significant advancement in our understanding of the biology of these animals and sets the foundation for future research pathways to potentially achieve this goal.

The Products to Projects initiative is funded by the Provincial Growth Fund and administered by Predator Free 2050 Limited, which has dispersed over \$6.5 million to fast-track research, development and production of new predator control and eradication tools and technologies. Fifteen products have been funded across a range of technologies, including lures, data reporting and management, camera technology, toxin use, and resetting traps. Four products are now available for purchase. A second Products to Projects funding round was launched in 2021 through Jobs for Nature.

Where to from here?

It is critical that the many organisations working in science and research and development continue to develop a coordinated way of working to make the best use of the funding available. The ‘Advancing our knowledge, innovation and improvement’ collaborative group has an important role here. Their action plan for the next 5 years will give a clearer picture of the true cost of investing in research and technology to identify the game-changing and breakthrough initiatives required to roll out large-scale eradication activities.

Building on collaboration with BHNSC and previous gains, Predator Free 2050 Limited has developed a new research strategy for 2021–2024 to guide scientific investment of \$3.5million per year. This focusses on breakthroughs to achieve eradication on larger scales, unlocking understanding of predator gene functions, and developing capability in sciences including mātauranga Māori. BHNSC has signalled their support for Predator Free 2050 in their Tranche 2 strategy, including a focus on pest control tools: a fast-fail approach to the use of artificial intelligence to support landscape-scale detection and mop-up of invasive mammals (for under \$10 per hectare) and a mātauranga Māori-based tool for control or eradication of invasive mammal pests.

It remains likely that upcoming research will not result in a single ‘breakthrough science solution’, but rather this goal could be achieved in the future through a composite of new tools and techniques.

Goal: 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 underway across the country.

Assessment

Currently, there is one iwi-led predator eradication project up and running, Korehāhā Whakahau, led by Ngāti Awa. A recently announced Tūhoe-led Te Urewera project is soon to begin. Achieving this goal is within reach for 2025, as scoping and launching an extra three projects is feasible within the remaining time frame for this goal. However it is critical that this goal alone is not the whole ambition for involvement by whānau, hapū and iwi in Predator Free 2050 strategy, projects and research. It is just one measure of a broader set of outcomes envisaged in the 'Whānau, hapū and iwi expressing kaitiakitanga' pathway of the Predator Free Strategy.

Background

Korehāhā Whakahau was created by Te Rūnanga o Ngāti Awa (a post-settlement governance entity mandated to represent the 22 hapū of Ngāti Awa) and launched in 2020. Backed by Predator Free 2050 Limited and Kaimahi for Nature (Department of Conservation), Korehāhā Whakahau is the first iwi-led Predator Free 2050 project. It seeks to eradicate possums from approximately 4700ha of land within the rohe (tribal area) of Ngāti Awa over a 5-year period and contribute to the protection and enhancement of te taiao.



Korehāhā Whakahau kaimahi. Photo: Merenia Hudson

Hapū of Ngāti Awa have already been protecting their whenua as kaitiaki nō muri mai anō (forever); this is just a continuation of that work, but it allows Ngāti Awa uri (descendants) to be employed to undertake that mahi. The project contributes to the capacity and capability of Ngāti Awa to be kaitiaki, providing 16 jobs to develop a strong workforce of kaimahi with transferable skills that will support whānau and support kaitiakitanga for hapū of Ngāti Awa now and into the future.

Korehāhā Whakahau is an exciting look at how an iwi-led project can use both mātauranga Māori and Western science to create positive outcomes for te taiao. Iwi-led projects demonstrate the key role that Māori play in the movement towards a Predator Free New Zealand and contrast with programmes where mana whenua are involved or engaged in programmes led by others.

In April 2021, Predator Free 2050 Limited announced their funding contribution for the Tūhoe-led project to support the removal of predators from islands and peninsulas around Lake Waikaremoana and the development of 10 permanent jobs.

It is commonplace for non-iwi-led large landscape-scale projects to partner with or involve mana whenua in their projects, however, site identification or design work is not always carried out by whānau, hapū and iwi at the outset.

Where to from here?

Whānau, hapū and iwi are looking to Predator Free projects to create employment opportunities for rangatahi (young people) at home and elsewhere, and to provide the training they need to achieve this. Launching more iwi-led projects is likely to lead to training and employment opportunities for rangatahi within their rohe (tribal area), as well as achieving this interim goal by 2025.

The experience of the Korehāhā Whakahau project will help the development of iwi-led research techniques to eradicate predators. This will enable Ngāti Awa to share what they learn with other iwi, the community and landowners involved in large-scale predator programmes.

Non-iwi-led projects can learn from projects that have a strong relationship with mana whenua and identify ways in which their own projects could be enhanced by working with mana whenua to achieve common goals.

Case study:

From variable to flourishing Treaty partnership

The Treaty partnership shift recognises the key role that whānau, hapū and iwi play in the movement towards a Predator Free New Zealand, by designing, making decisions and delivering predator management projects and playing a central role in broader regional collaborations.

The Taranaki Mouna Project (TMP) began in 2016. The project aims to secure the mountain, ranges and islands of Taranaki from pests, restore and revitalise wildlife and improve ecological resilience. The project's relationship with the iwi of Taranaki will always be a work in progress but it is built on foundations of inclusivity from the outset. TMP and the Taranaki Iwi Chairs Forum report that the following aspects of the project are critical to their relationship. This case study unpacks some of the underpinning processes and activities of the TMP that may be applicable to other projects across Aotearoa New Zealand.

Project structure: The board structure includes a Taranaki Iwi Chair Forum seat to ensure mana whenua representation alongside an independent chair, and a NEXT Foundation representative. There is also strong representation in operational levels (note that this is not a replacement for engagement with mana whenua). This is a natural reflection of the project's recognition that knowledge of place and people is crucial to achieving their objectives.

Inclusive decision-making: At all levels of the project, decision-making is shared. From the annual strategic planning process through to operational decisions, mana whenua are making decisions, not being consulted about them.

Aligning project objectives with mana whenua objectives: When TMP created and reviewed their project strategy, they first scanned the strategic objectives set by mana whenua and designed their project to deliver outcomes that could support existing iwi strategies. Iwi have deep insight into community and connection that facilitates social licence to improve biodiversity outcomes.

Values-based relationship: TMP makes a genuine attempt to be led by te ao Māori beliefs and frameworks. Māori values drive everything from strategic frameworks to operational decisions – they inform the 'why' for TMP. Whanaungatanga (relationships) lies at the heart of the project, which cultivates and cares for the relationships of people to place and each other in the present, past and future – whanaungatanga to deliver outcomes is seen as a superpower of the project.

Social outcomes: TMP targets social and environmental outcomes through its work to restore the mouna, a view steeped in the te ao Māori belief that the health of people and the land are inextricably linked. A recent initiative invited recidivist youth offenders to work at TMP, which had positive outcomes for both the project and the rangatahi.

Employment creation: The project initially outsourced operational work to DOC, but has also embarked on a longer term project to build capacity within the rohe and provide employment opportunities to rangatahi. Employment and training opportunities are targeted to the current skills within the iwi and are designed to provide a pathway for rangatahi to develop beyond entry level jobs into technical and project management roles.

Inclusivity: TMP works to a set of values designed to build strong relationships and create an inclusive team culture. Those values are mana motuhake/authority, te tirohangaroa/forward looking, manaakitanga/reciprocity, kotahitanga/collaboration, kia tika kia pono/transparency, transformational, business-like and effective.

TMP tries to reduce the barriers that prevent many people from engaging with environmental initiatives. People are able to contribute to the project at all levels, equally valuing those who turn up to help as a one-off contribution or on a regular basis.

The inclusion of iwi at all levels of the project structure has been a rallying point which has facilitated the involvement of local authorities; without iwi this does not happen. The role of TMP as an 'honest broker' independent from authorities has been important in building trust, balancing power disparities and uplifting the mana of all parties involved.



Release of whoi in Egmont National Park by students from the local Egmont Primary School. *Photo: Pat Murphy*

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

Assessment

Urban trapping groups have gone from strength to strength across the country over the past 5 years. At this stage, Predator Free Wellington and Capital Kiwi have made the most progress towards this goal and eradication of possums or mustelids in Wellington could be achieved by 2025. Significant challenges do lie ahead – particularly in defending gains made while expanding throughout the city. Predator Free initiatives in Auckland and Dunedin are also gathering momentum and achieving results. The community effort required for success cannot be overestimated, as it will take the support of most of a city’s inhabitants for an urban eradication to be successful.

Background

Capital Kiwi’s goal is to restore a large-scale wild kiwi population on Wellington’s back doorstep. An extensive trapping network to target stoats has been set up across the greater Wellington peninsula, (23,000ha) and is monitored by council and community groups. Alongside this, Predator Free Wellington has a 30,000ha total project area which has been divided into five phases. Phase 1 successfully eradicated possums, stoats, weasels and Norway rats from Te Motu Kairangi/Miramar Peninsula, an area of around 800ha, and has defended these gains for close to a year. The peninsula is also estimated to be 90% free from ship rats. From the outset, Predator Free Wellington needed almost 100% support from people living on Te Motu Kairangi/Miramar Peninsula to be able to set up bait stations on approximately 50m x 50m grids and traps on approximately 100m x 100m grids across the entire peninsula. Over 3000 permissions were given for Predator Free Wellington team members to enter homes, businesses and work with other stakeholders to implement and service the eradication grid weekly over 6 months.

In Auckland, under the Regional Pest Management Plan and funded through a targeted rate, Auckland Council is scaling up possum suppression to reach a goal of at least 50% of mainland rural Auckland (179,000ha) within the next 5 years. The Council considers this project to be a stepping stone to achieving possum-free peninsulas.

Predator Free Dunedin's City Sanctuary project has started with three pilot suburbs to trial and understand the best ways to engage, support and collaborate with communities to help achieve city-wide predator control. Predator Free Dunedin is providing funding and support for residents and community groups to start trapping and monitoring outcomes. The longer term goal for the City Sanctuary project is to spread across 8,000ha of suburb and city landscape.

Where to from here?

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. Predator Free Wellington's Phase 2: Island Bay to City has recently begun. This area is home to approximately 60,000 people, a zoo, a hospital and the central business district and is a complex and challenging target. Research into technology that will help us defend better in urban landscapes will be critical.



Figure 6: Capital Kiwi mustelid trap network.

Case study:

From people being told to care to people's behaviour supporting thriving wildlife

This shift acknowledges that people and their behaviours are at the heart of Predator Free 2050, and as already said – we need to shift the way we think, behave and act. We will do this based on solid evidence and new and innovative methods from the social and behavioural sciences.

Before there was 'Predator Free Wellington', there was 'Predator Free Miramar' and several other urban trapping groups run by passionate locals who had a vision of a city where people live with nature and threatened species thrive. Wellingtonians clearly support thriving wildlife with two-thirds of people reporting in a Wellington City Council survey that they are either involved in Predator Free work or are keen to be, and backyard trapping groups now exist in every suburb.

Predator Free Wellington intentionally set out to retain enthusiasm in the community despite the project transitioning into a more professionalised phase with paid staff members and external funding. The strategy was two-fold. First, to connect with community groups and ask if they wanted to be involved in the Predator Free Wellington vision, and if yes – how could Predator Free Wellington support them to do so? Secondly, to deploy paid field staff for targeted eradication operations within defined areas.

Predator Free Miramar was instrumental in paving the way for the eradication success on the peninsula in a number of ways:

- > The existing volunteer trapping network meant there were fewer rats and predators to target from the start of the project. Heat maps from the project showed a direct correlation between gaps in the volunteer trapping network and hot spots with increased bait take.
- > The community was already aware of the benefits of Predator Free work and community members spread the word about Predator Free Wellington to their connections and networks.
- > Volunteer trappers managed operations at the northern end of the peninsula. This included checking, baiting, reporting, monitoring and reporting tasks which meant paid staff could focus on the urban zones.
- > Community buy-in to the goal is crucial when considering an exit strategy for an eradication project. There are now 20,000 pairs of eyes on the peninsula that might spot a possum or stoat and report this to the project team.

Predator Free Wellington shows how large-scale projects can harness and encourage people's behaviour to support thriving wildlife. Community support lies at the heart of this project and is critical to its success. The project also targets social and economic outcomes for the city and its people. Some of the lessons learned in Phase 1 of the project include:

- > There is no one-size-fits-all approach to engagement. Some people may be drawn to the project for the biodiversity benefits, but other people may be more interested in removing pests because they are a nuisance and cause damage to their property.
- > Social media is a powerful tool to ensure people stay connected and share their own stories and experiences with the project.
- > Identifying motivating ideas such as being the 'world's first predator free capital city' can help with momentum.
- > Sound planning and preparation is key to assure people that activities involving toxins and traps are safe. Predator eradication involves a high level of trust in the premise that the project will be done once, and done right.



Kōtare/kingfisher in the Te Motu Kairangi/Miramar Peninsula.
Photo: © Janice McKenna

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

Assessment

The Whakatipu Māhia and Taranaki Taku Tūranga projects are several years into delivering predator control with eradication as the goal, and the newly established Predator Free South Westland project will apply ZIP's 'remove and protect' methodology to farmland on an increased scale. The combination of these landscape-scale programmes covering significant farmland areas and the imminent establishment of the Farms as Barriers operational research programme indicates that this interim goal is on track to be achieved by 2025.

Background

Introduced predators are a potent vector for spreading disease to our country's primary sector. To manage this risk and respond to disease outbreaks, approximately \$69m is spent every year on TBfree programmes. The economic rationale for eradicating predators is clear for the primary sector. Ridding predators from conservation land reduces the pest populations that harbour bovine tuberculosis (TB) that might infest farmland, and TBfree programmes often treat the margins of forests, which contributes to conservation outcomes.

To achieve this goal, New Zealanders will need tools and strategies to remove predators from private farmland. There are a number of promising projects and research initiatives that relate to this. Whakatipu Māhia is one of three projects that comprise Predator Free Hawkes Bay and is on track to have completed eradication of possums on the 14,500ha peninsula by June 2022. Whakatipu Māhia has employed local people to set up over 6500 bait stations across 11,000 ha and enjoys strong support from the community for the initiative. Once completed, the farming community, iwi and broader community plan to restore biodiversity and continue to employ local people to develop the region and raise the profile of the area.

Taranaki Taku Tūranga is another large landscape-scale project with a significant amount of farmland within its boundaries. The project is working with over 1100 private landowners to remove mustelids from more than 75,000ha, with an eventual aim to work with 4500 private landowners. The recently launched Predator Free South Westland project will also contribute to our collective knowledge base regarding predator eradication on farmlands.

These large projects work with Manaaki Whenua – Landcare Research to apply research at scale. Manaaki Whenua’s research into modelling of pest eradication and proof of pest-freedom, the behaviour of mustelids on farmland, knowledge of how to achieve eradication and species-specific toxins are vital to achieving eradication in productive landscapes.

Where to from here?

At a national level, DOC is investing in Farms as Barriers, an operational research programme that will be coordinated through the New Zealand Biological Heritage National Science Challenge. The concepts behind Farms as Barriers are that research – and good partnerships with farming partners – is needed to expand the suite of tools and strategies in order to remove predators from farming landscapes, defend them from reinvasion, and determine whether farmland can act as a barrier to reinvasion. This programme aims to develop a working model within 5 years.

The Biological Heritage National Science Challenge Ngā Koiora Tuku Iho Strategy 2019–24, explicitly aims to build partnerships across a number of related investments to connect and coordinate existing efforts and create maximum impact. The collaboration inherent in the Farms as Barriers programme aims to achieve nationally significant outcomes for Predator Free 2050 that are greater than would be possible if parties acted independently.

The work of large landscape projects will continue to develop our understanding about how to eradicate at large scales. For example, a future area of research by the Whakatipu Māhia project is how to defend long linear boundaries of suppression and eradication areas efficiently and cost-effectively so that these defences can be rolled out across the region.



Harlequin gecko. Photo: Sabine Bernert

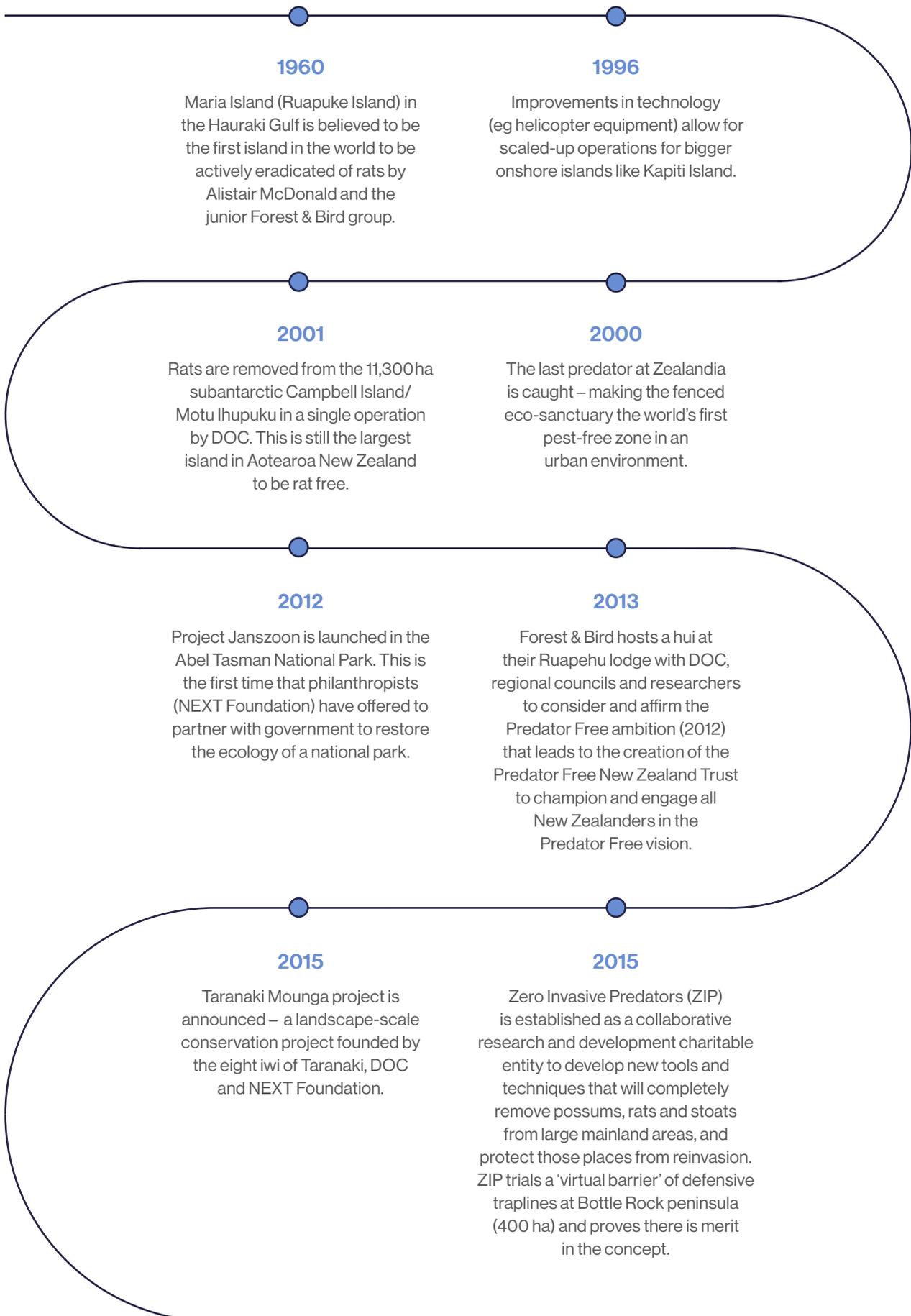
The first 5 years

The amount of activity undertaken in pursuit of the Predator Free 2050 goal cannot be captured completely, so the remainder of the report outlines an overview of work in progress and snapshots of projects being undertaken.

The following sections provide:

- > A timeline of events
- > An overview of some of the highlights of the first 5 years of work
- > Snapshots of community involvement
- > Connection to te ao Māori
- > Landscape-scale projects launched
- > Investment in technology and research and development.

Before 2016



2016

July

Predator Free 2050 goal is announced by Rt Hon Sir John Key.

September

Predator Free Wellington is announced – a collaborative project between Greater Wellington Regional Council, Wellington City Council and NEXT Foundation.

November

Predator Free 2050 Limited is established to coordinate and co-fund breakthrough-focussed science and large regional projects.

2017

January

Biological Heritage National Science Challenge launches project: 'High-tech solutions to invasive mammal pests'.

May

Parliamentary Commissioner for the Environment Dr Jan Wright releases her report 'Taonga of an island nation: Saving New Zealand's birds'.

June

Predator Free New Zealand Trust launches an online shop that sells humane traps and other items to the general public. Over 1,400 traps were sold by the end of July 2018.

Auckland Council and Predator Free New Zealand Trust host the inaugural 'Pestival' in Auckland with over 400 community groups and individuals in attendance.

August

DOC launches Predator Free online toolkit for communities on the DOC website.

ZIP trials in Orongorongo confirm rivers can act as obstacles to possum movement. This is foundational research for landscape-scale eradication projects.

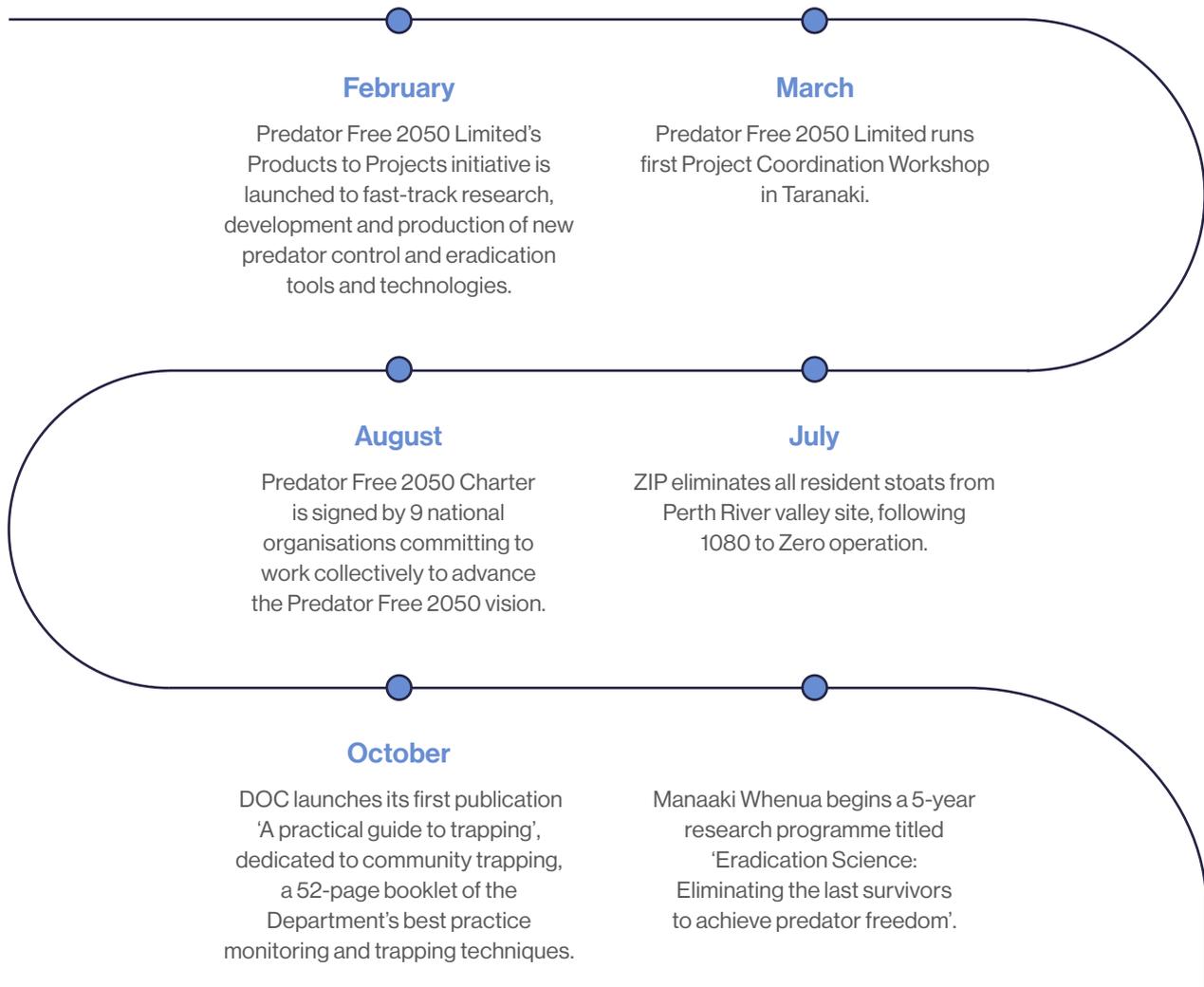
Predator Free New Zealand Trust joins forces with Kiwibank to roll out a backyard trapping programme and schools programme throughout the country. The 3-year programme supports over 66 backyard communities and 51 schools.

DOC Tools to Market programme launched to invest in the development of new predator control tools and technology.

2018



2019



2020

March

National Predator Free 2050 Strategy and 5-year Action Plan released by DOC.

COVID-19 Level 4 halts in-person predator eradication across the country.

Ship rat genome sequence published by Australia–New Zealand Collaborative Research Group.

June

The elimination of possums from the Perth River valley in the ZIP trial shows it is possible to remove predators from a large mainland environment without fences.

April

Predator Free New Zealand Trust releases the report 'Better together? A review of community conservation hubs in New Zealand' which looks into hubs, their challenges, benefits and what support they need to ensure success.

July

Stoat genome sequence is published by Manaaki Whenua-led research group.

August

Release of 'Te Mana o te Taiao – Aotearoa New Zealand Biodiversity Strategy', which incorporates many of the Predator Free outcomes, recognising them as critical to achieving thriving nature and people.

October

Predator Free 2050 Limited launches new projects: D'Urville, Banks Peninsula, Korehāhā Whakahau (first iwi-led project), Whangārei, Lake Brunner. The tohu is designed as an emblem for the Predator Free 2050 movement.

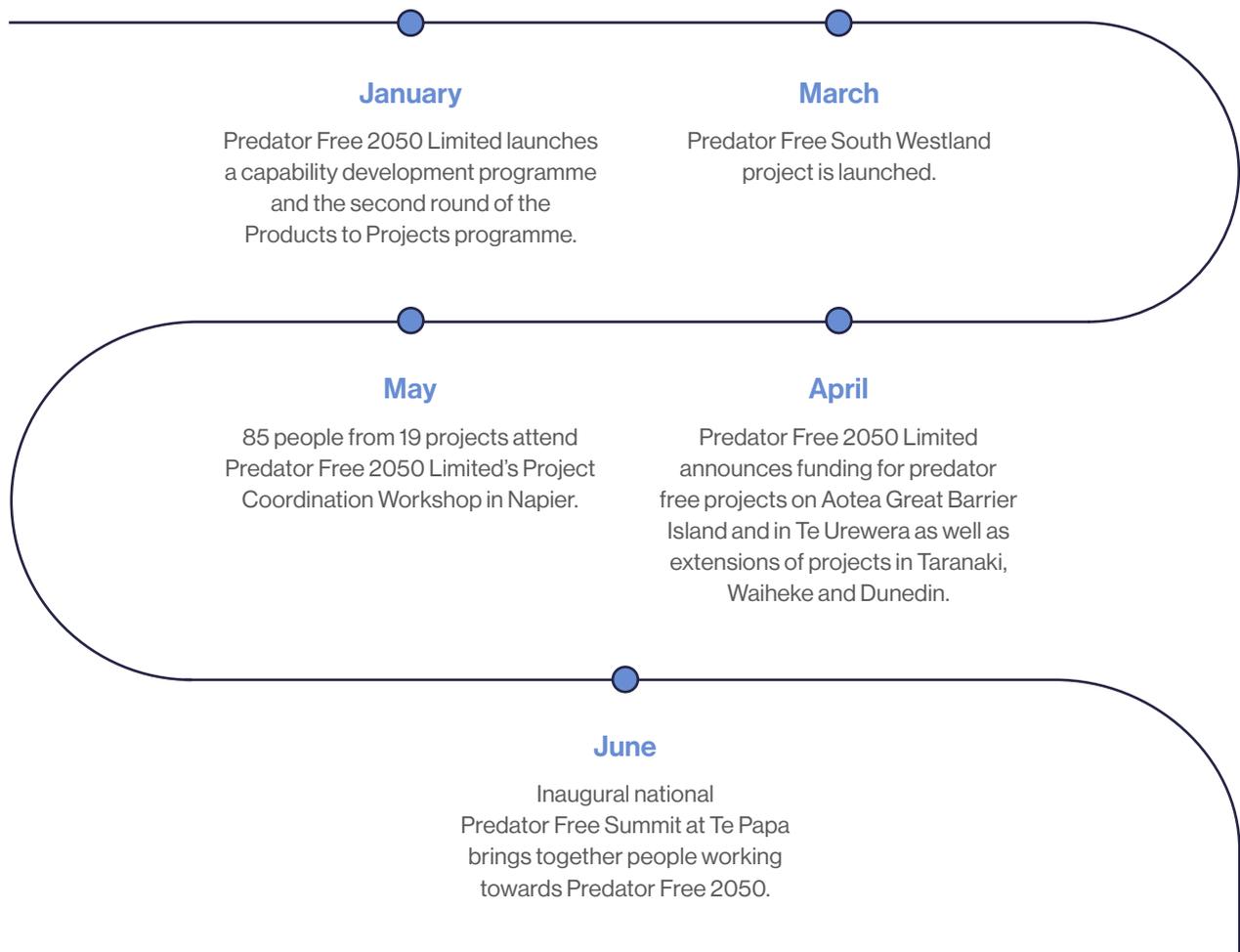
Jobs for Nature fund commits \$76 million for regional predator eradication projects through Predator Free 2050 Limited and \$4.5 million to the Predator Free Apprenticeship Programme with the Predator Free New Zealand Trust.

December

Predator Free 2050 Limited announces funding for a Predator Free project in Southland.

First DOC Tools to Market project is completed. Led by Victoria University of Wellington, this project successfully created lures that attract a number of rat species. Wellington UniVentures is now progressing the lures to develop products, which will be available commercially.

2021



Highlights of the past 5 years

Progress has been made in the first 5 years of the Predator Free goal, with 19 large-scale projects in progress, many of these building on critical work undertaken by community conservation groups. Organisations are working together at a national level to align their efforts and reduce duplication and waste. Public awareness, buy-in and contribution has increased. The science community is coalescing their efforts towards research and investment that will improve cost, speed and scale of predator eradications.

This section outlines some commonly identified benefits of the national Predator Free goal. Further research in this area would help to quantify some of the reported impacts.

Biodiversity outcomes

- > Initial findings from some of the first large-scale predator eradication projects have shown promising biodiversity outcomes even after a short period of time. For example:
 - Native birds such as kea, kākā and kākāriki have begun to recover in the Perth River valley, just 18 months from the initial predator removal operation (which successfully eliminated stoats and possums, and 99% of rats).¹¹
 - Monitoring of the Antipodes snipe on Antipodes Island shows that they are now 2.7 times more abundant than they were in the first 3 years of monitoring (pre-eradication), and nearly 10 times more abundant than they were in the years immediately before and after the mouse eradication in 2016.
 - Tūi numbers nearly trebled after predator eradication in Ipipiri/Bay of islands.¹²

¹¹ Zero Invasive Predators, 2020. 'Great news: Native birds are beginning to recover in the Perth River valley!'

¹² Predator Free New Zealand Trust, 2020. 'Tūi numbers treble in predator control study'.

Community connection with te taiao and with each other

- > Research by Dr Danielle Shanahan¹³ backs up a common sentiment heard by community organisers that the social aspect of community predator control is valued highly. Community trapping groups form social networks and Dr Shanahan's research showed that levels of depression, anxiety and stress are lower in people who spend more time in natural spaces and greater health benefits were found amongst those who take part in predator trapping.
- > Feedback from project leaders often mentioned the positive social and mental health outcomes for people employed in Predator Free projects – their team members are learning, and growing their confidence socially.

Increased funding into the system

- > There has been an unprecedented financial investment by Government of over \$300million directed to Predator Free initiatives. The goal has changed mindsets regarding the possible scale of projects and has broadened the approach to encompass all threats in a landscape rather than a single species or pest.

Research and development

- > New tools and technology:
The Tools to Market (DOC) and Products to Projects (Predator Free 2050 Limited) programmes have led to the creation of new traps, long-life lures, and predator identification technology. Four products from the Products to Projects programme are already in the market and available to the public.
- > 'Learning by doing' is the approach used in landscape-scale eradication projects. Applying tools on the ground and attempting eradications across urban, rural and conservation lands are increasing the collective knowledge base. Early work by ZIP in the Perth River valley site has helped establish the effectiveness (or not) of various existing and modified tools and technologies.
- > Manaaki Whenua is leading a Ministry for Business, Innovation and Employment Endeavour research programme 'Eradication Science: Eliminating the last survivors to achieve predator freedom' focussed on development tools and techniques to target the small proportion of predators that survive after pest control operations.

¹³ Predator Free Wellington, 2020. 'New research shows health benefits for Wellington's backyard trappers.'

Alignment of investment in the science system

- > An overarching ambitious goal, requiring scientific advancement to get there, has incentivised research and innovation in predator study. The strategic milestones provide targets for research and encourage alignment of efforts between projects.
- > Research funding has increased to allow scientists to focus on key questions and 'blue sky' research that otherwise would not have been a priority.

New large projects established

- > Predator Free 2050 Limited is investing in 15 large regional projects outside of conservation lands (as at April 2021). These flagship projects inspire others and provide opportunities to learn about eradication across larger, more complex landscapes, eg, rural/forestry/conservation/urban mixes.

Gearing the national system towards collaboration

- > Creating a national Predator Free 2050 Strategy in 2020 has been a key mechanism for encouraging the 27 national level organisations that contribute to Predator Free 2050 towards a common direction of travel. Government investment in the system has also led to agencies working more collaboratively in pursuit of common goals.

Increased public awareness and community engagement with the Predator Free goal

- > The 'Public Perceptions of New Zealand's Environment' 2019 survey¹⁴ reported an increase from 2016 data in:
 - predator control at people's homes
 - volunteer work involving predator control
 - strong support for maintaining or increasing citizen and agency effort to control rats, possums, stoats and ferrets.
- > There are also anecdotal reports of an increased social expectation for predator control at the landscape scale and normalisation of intensive trapping in urban areas. Predator Free Wellington estimates there are around 20,000 households in Wellington trapping in their backyards and reserves.¹⁵
- > The Predator Free New Zealand Trust has seen a steady increase in backyard trapping around the country in the past 5 years, along with primary and secondary schools keen to teach their students about protecting native species.

¹⁴ Hughey, K. F.D.; Kerr, G.N. and Cullen, R. 2019. Public Perceptions of New Zealand's Environment: 2019. EOS Ecology, Christchurch.

¹⁵ Predator Free Wellington, 2020. Predator Free Wellington 2019/2020 impact report.

Community involvement

Community involvement is the beating heart of the Predator Free movement, and the goal will not be achieved unless a broad and diverse range of New Zealanders contribute.

There is an increasing awareness that environmental objectives will not succeed without a strong social movement behind them. Many different groups and thousands of people have contributed to what we have achieved so far, as the Predator Free movement builds upon the predator control and biodiversity initiatives undertaken before the goal was announced.

Different communities in Aotearoa New Zealand connect with Predator Free objectives in different ways. Tangata whenua have a whakapapa relationship with te taiao and have always known that health of people and the environment are inextricably linked. Tauwiwi populations may express an ethic of 'wise stewardship' through environmental activism and volunteering. Farmers and landowners can express their connection to the land through predator control – preventing disease and its associated cost and animal welfare implications as well as a desire to restore and protect the land that sustains their livelihoods.

Community groups

Over the past 5 years, community-led groups have expressed support for the national Predator Free goal, while carrying out their aspirations on a local level in a way that suits them best. New Zealanders have expressed their creativity and enthusiasm to engage others in this cause and grow a wider social movement. People are setting up trapline rosters, coordinating and sharing data to enhance their decision-making, designing posters, holding fairs and events to draw attention to their local projects – and importantly, are having fun while doing it. Some groups act independently, while others get support from Predator Free New Zealand Trust, local councils, the Department of Conservation, Predator Free 2050 Limited and Forest & Bird. Community groups also provide a critical contribution to landscape-scale projects across the country – many of which would not have launched without that support.

The Predator Free 2050 Strategy outlined seven principles to guide Predator Free work. The following snapshots are examples of how different community groups naturally express these principles in their work.



Friends of the Blade. Photo: Bay Conservation Alliance



Whakatāne Kiwi Trust. Photo: Bay Conservation Alliance

Collaboration

The Bay Conservation Alliance delivers shared support services (eg, accounting, operational support including health and safety guidance, fundraising, project management) to member community groups to help sustain these groups for long-term success. The Bay Conservation Alliance also holds member events to connect people in the area.

Members with a predator free focus benefitting from the Bay Conservation Alliance include:

- > Aongatete Forest Project
- > Friends of the Blade
- > Halo Whakatāne
- > Kaharoa Kōkako Trust
- > Manawahe Eco Trust
- > Manawahe Kōkako Trust
- > Mokaihaha Kōkako Trust
- > Ōtanewainuku Kiwi Trust
- > Te Whakakaha Trust
- > Whakatāne Kiwi Trust.

Connection

Kids Restore the Kepler is a school-based programme that engages young people and the wider community through hands-on conservation education.

Kids Restore the Kepler has protected 530ha of native forest and thanks to the local community, the education component of the project is thriving, and hundreds of students are engaged with the project each year.

The educational success of the project can be attributed to the close collaboration with the schools and learning centres, so that environmental education and conservation work are delivered as part of the schools' curricula.



Learning about trap repair. *Photo: Kids Restore the Kepler*

Environment at particular places

Friends of Flora is a community group established in 2001 by a group of dedicated locals who had noticed a gradual decline in bird numbers in the Wharepapa/Mt Arthur area.

Friends of Flora is implementing a conservation strategy to restore and protect threatened flora and fauna in the Flora Stream catchment area in Kahurangi National Park.

Friends of Flora and the Department of Conservation maintain a collaborative management partnership, sharing resources and expertise for the ongoing successful management of the wider Flora Stream area.



Bill and Maryann from Friends of Flora on Cobb Ridge. *Photo: Paul Ewers*



Tatau Pounamu Collective. Photo: Tatau Pounamu Collective

Inclusivity

The Tatau Pounamu Collective is a community collective of stakeholders using environmental and health and wellbeing initiatives to engage with the Eastside community in Rotorua. The Collective is committed to community-led principles including working collaboratively and using a strengths-based capacity building approach. The Tatau Pounamu Collective is guided in its mahi by the values of whanaungatanga, wairuatanga, manaakitanga and whakapapa.

Guardianship

Kaitiakitanga and guardianship principles can be seen in kura kaupapa Māori and English-medium schools with initiatives that are run by regional councils, Predator Free New Zealand Trust, eco sanctuaries and local community groups. These programmes teach children about the impact of introduced predators on native species and how they can take collective action to care for the environment.

Adaptability

Ngā Kaimanaaki o Te Waimapihi / Polhill Protectors group based in urban Wellington epitomises adaptability. The goal is to be 'Neighbourly with our natives' and the group has grown in numbers and scope since it formed in 2015. The group started out with a focus on trapping, and once that was working well, added new goals like promoting responsible pet ownership within the community to protect the often ground-dwelling native birds. Through signage, events and online communication, the group encourages their neighbours to keep cats indoors and keep dogs on a lead.

The group has effectively used social media to celebrate their successes and grow their online and on-the-ground community. Recently, after forming a relationship with mana whenua, the group adapted their name to be bilingual. The group hopes that celebrating their te reo Māori name 'Ngā Kaimanaaki o Te Waimapihi' will acknowledge iwi mana whenua, and in doing so, help protect the awa (waterway) and ngahere (forest) the name denotes.



Ngā Kaimanaaki o Te Waimapihi / Polhill Protectors.
Photo: Ngā Kaimanaaki o Te Waimapihi / Polhill Protectors



Ngā Kaimanaaki o Te Waimapihi / Polhill Protectors.
Photo: Ngā Kaimanaaki o Te Waimapihi / Polhill Protectors



Waipa District Council's Susan Emmitt and Society Committee member Tom Davies with the first mustelid traps for protecting *Pirongia* kōkako. *Photo: Jill Davies*



Kōkako ecologist Amanda Rogers and volunteer Adam Hittmann banding a second generation *Pirongia* kōkako chick in March 2021. *Photo: Kathryn Jones*

Courage

In order to give kōkako a safe home, *Pirongia Te Aroaro o Kahu Restoration Society* has two sites under predator control, with 2500 bait stations, 222km of bait lines and 110 mustelid traps. The last *Pirongia* kōkako were removed in 1996 to ensure their survival, so returning birds with *Pirongia* lineage in 2018 was of great importance. But the difficulty in gaining permission to re-establish the species highlighted the dire situation for unprotected relic populations, prompting the group to take on pest control for one of these key populations at Okahukura, Northern Pureora Forest. Both kōkako populations are doing well, thanks to strong support from community volunteers, with the second generation of kōkako hatched on Mt *Pirongia* fledging successfully in 2021.

Predator Free New Zealand Trust

The Predator Free New Zealand Trust is an independent trust established in 2013 to help connect the huge numbers of people involved in conservation – including agencies, community groups, landowners, iwi and farmers – and engage all New Zealanders in a predator free vision. Some of the Trust's key initiatives include:

- > A one-stop online shop to help people get involved in predator control, including:
 - how-to guides and resources (guides and videos)
 - compelling stories of people undertaking predator control
 - profiling the latest predator control research
 - how to find and connect with others undertaking predator control
 - administration toolkit – all the necessary information for community groups to set up and support a community group
 - help to buy a trap and other necessary equipment.
- > Local workshops and webinars to easily share up-to-date and relevant information.
- > The Predator Free Farm Award, which acknowledges the valuable work that farmers have been doing as part of the nationwide Predator Free movement.
- > Backyard trapping and school groups – the Trust continues to support these groups by providing funding and account management support, although these programmes aren't expanding due to a lack of corporate sponsorship.
- > The Predator Free Apprenticeship Programme, which aims to grow the number of experienced animal pest control specialists to support the predator free vision. The two-year programme provides a career path for people wanting to work in predator control and will increase the capacity and capability of the sector.

Department of Conservation

The Department of Conservation supports community initiatives in a number of ways, including the development of best practice techniques for communities.

DOC launched a Predator Free online toolkit and 'Predator Free 2050: A practical guide to trapping' guide is kept updated with best practice tools and techniques and is available freely on the DOC website.¹⁶ This has been downloaded over 4000 times since it was published in October 2019, and more than 14,000 hard copies have been printed and distributed.

DOC has partnered with the Nelson Marlborough Institute of Technology to design and deliver a Predator Trapping Methods course for communities, offered in person and online. Over 450 participants have completed this course since it was established in 2018. The course has been run 25 times in venues all across the country, from Invercargill to Mitimiti and has been confirmed as a microcredential qualification.

The DOC Community Fund supports community-led conservation projects on public and private land and the Ngā Whenua Rāhui programme aims to protect the natural integrity of Māori land and preserve mātauranga Māori.

Regional Predator Free rangers and district rangers across the country support communities to establish predator control programmes in their regions, share best practice, organise events and support local training initiatives.

¹⁶ 'Predator Free 2050: A practical guide to trapping' is available at www.doc.govt.nz/pf2050-trapping-guide.

Online tools for community use

Trap.NZ is a free online tool for New Zealanders to manage their predator control projects. It can be used for recording trap, bait, monitoring and biodiversity outcome data. Trap.NZ was started by Groundtruth Ltd in 2013 and has grown to support predator control initiatives nationwide. Trap.NZ has also received investment from Predator Free 2050 Limited to support and develop the platform.

To ensure that Trap.NZ can continue to be available and developed for the public good, a group has been set up to provide governance and ongoing support for the system. Members of the collaborative include a number of regional and city councils, philanthropic groups, and Manaaki Whenua. The Trap.NZ website and app provide real-time data for over 3000 predator control projects. This facilitates smarter operational decisions and provides a valuable resource for research and planning on a national scale. A number of DOC operations will join Trap.NZ in 2021.

The growth in Trap.NZ use reflects the general upwards momentum of predator control initiatives in the community. From 2016 to early 2021, user numbers have increased from 504 to nearly 18,000 and projects have increased from 134 to just over 3000.

3193

projects

3238970

records added

207047

predators killed this year



10735

mustelids



88128

rats



35918

possums



19184

hedgehogs

Figure 7: A snapshot in May 2021 of the real-time data from Trap.NZ.

Case study:

From top-down decision-making to local ownership of solutions

This shift recognises that local people need to have a say about their places. With this approach, national organisations need to shift from supplying solutions for local communities to a supporting and facilitating role, with the local solutions emerging from the people at that place.

The Banks Peninsula Conservation Trust is an example of how to enable local people to have a say about their places. Formed in 2001, the Trust has had a long history of community-led environmental initiatives on Banks Peninsula, for example the Wildside Project which, in partnership with Environment Canterbury, the Department of Conservation and the Christchurch City Council, is potentially the longest-running landowner-driven predator control project in the country, launched 30 years ago after landowners noticed a decline in penguin numbers.

The landscape-scale project Pest Free Banks Peninsula was a community-initiated programme, and the Trust was chosen to lead the programme because of its status as a covenanting authority, existing relationships with farmers and private landowners as well as its advocacy roles and ability to weave together community initiatives across the peninsula.

Pest Free Banks Peninsula/Te Pātaka o Rākaihautū has a Memorandum of Understanding signed by 14 partners including the mana whenua of the rohe. Ngāi Tahu principles have been incorporated into the strategy for the project – and ‘community led’ is one of them. Other ways in which local leadership is apparent within the Pest Free Banks Peninsula project is the focus on employing locals to do the work, and also the partnership with local technology company, The Cacophany Project, which is trialling new technology in the field with local people involved in the trials.

Predator Free 2050 and te ao Māori

Predator Free 2050 presents an opportunity to strengthen the partnership between Māori and Government through collaboration on a common goal. Government agencies can express and enact Treaty of Waitangi principles through working together with whānau, hapū and iwi to protect shared taonga species and re-invigorate human connection to the environment.

The Predator Free 2050 Strategy acknowledged that “Māori values, practices and stories are integral to the Predator Free kaupapa, and Māori knowledge and energy is crucial to the success of an ambition with no global precedent ... when Māori exercise their rangatiratanga – their authority and sovereignty – Predator Free 2050 gains the potent force that is kaitiakitanga, the custodianship that nurtures the welfare of the land, and by natural extension, the people”. Te Mana o te Taiao – Aotearoa New Zealand Biodiversity Strategy shares similar ambitions, so there is an opportunity for the two strategies to work in conjunction here.

There have been a number of positive actions so far, including the establishment of a dedicated ‘Whānau, hapū and iwi expressing kaitiakitanga’ collaborative group and the funding of iwi-led eradication projects. However, significant work remains to meet the ambition set out in the Strategy, particularly in the areas of capacity and capability building, and mātauranga Māori.

Capacity and capability building

There is high demand from Predator Free projects and research initiatives for mana whenua and Māori involvement and leadership. Predator Free organisations must first build relationships and trust with whānau, hapū and iwi and deepen their own capacity and capabilities in engagement with Māori and tenets of mātauranga to ensure the Predator Free movement reflects the priorities of whānau, hapū and iwi.

This may lead to greater involvement by tangata whenua in the Predator Free movement, which would alleviate the current over-reliance on a small group of people to provide input from a Māori world view and identify Māori expertise in the field. Investment in talent identification and support for agencies best able to deliver this would also make the system more sustainable.

At a local level, investment is still needed to increase the capability and capacity of people to work in Predator Free projects at all levels. In light of the long-term nature of the Predator Free goal it would be appropriate to establish multi-year training programmes to build capacity in governance and management by Māori of Predator Free initiatives.

Mātauranga Māori

Although there has been positive intent to embed mātauranga Māori in the collaborative group action plans, it is widely acknowledged that there is still significant work required to fully understand and action this aspiration. The current Predator Free science investment system is not yet geared towards mātauranga Māori, eg, programmes for research and tool development are not explicitly set up to fund mātauranga Māori initiatives which may discourage practitioners from applying for funding.

There is great potential for Predator Free projects to support and grow mātauranga Māori at the local level too, for example creating wānanga opportunities for ako (learning and teaching). These ideas reflect a broader goal to support the development of whānau, hapū and iwi capacity so that Māori people can govern, manage and implement the use of mātauranga Māori, to ensure that the knowledge is treated with respect and applied appropriately.¹⁷



Collecting kawakawa leaves for rongoā. Photo: Flying Saucer

¹⁷ Malcolm, Tame. 2021: Māori knowledge can help New Zealand get rid of predators but it can't be 'whitewashed'. Guardian News & Media, available at www.theguardian.com/world/commentisfree/2021/jan/25/maori-knowledge-can-help-new-zealand-get-rid-of-predators-but-it-cant-be-whitewashed.

Landscape-scale projects

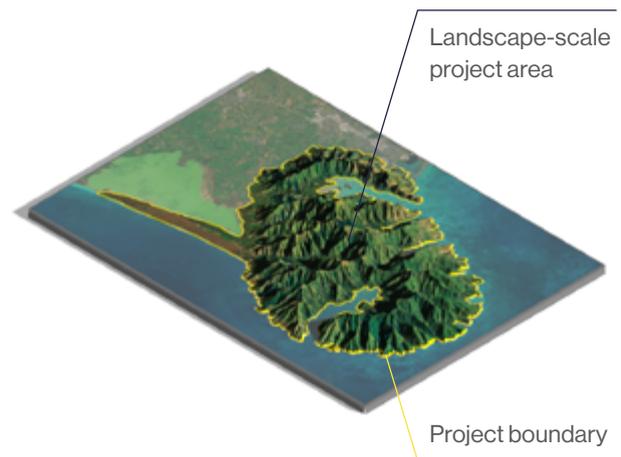
There are currently more than 20 large landscape-scale projects that include a focus on predator eradication and control. These projects are a critical part of Predator Free learning and development and act as 'pathfinders' during this early stage of progress towards the goal. The projects provide an opportunity for new methodologies and planning approaches to be trialled and for research and technology developed in the lab or workshop to be tested at scale. The projects also draw attention to the Predator Free movement, which contributes to raising awareness within the public.

Note

The following projects are not included in this section as they are in initial planning stages:

- > Predator Free Rakiura
- > Predator Free Southland
- > Tū Mai Toanga project (Aotea/Great Barrier Island)
- > Tūhoe-led Te Urewera project (islands and peninsulas around Lake Waikaremoana)
- > Raukūmara Pae Maunga Restoration Project
- > Kaimai – Mamaku Ranges Forest Restoration Project.

Key to the following maps



* Denotes founders, where known.

Predator Free Whangārei

Imagining what is possible for our district's flora and fauna when we remove the devastating effects of possums, rats and mustelids.

Start date	July 2020
Eradication target	Possums
Suppression target	Mustelids, rats, possums
Hectares	9000 (possum eradication) 60000 (predator suppression)



Project lead

Northland Regional Council

Contributors

- > Community conservation groups
- > Department of Conservation
- > Kiwi Coast
- > Predator Free 2050 Limited
- > Whangārei District Council

Te Korowai o Waiheke Towards Predator Free Waiheke

Te Korowai o Waiheke is a charitable trust established by the local community to eradicate predators from our beautiful island.

Start date	September 2018
Eradication target	Mustelid eradication and rats eradication pilot
Suppression target	–
Hectares	9300



Project lead

Te Korowai o Waiheke Trust

Māori partners

- > Ngāti Paoa

Contributors

- > Auckland Council
- > Backyard and community groups
- > Department of Conservation
- > Donors
- > Foundation North
- > Fullers
- > Giltrap Motors
- > Lasso Media
- > Man o War Station
- > Minter Ellison
- > Pest control contractors
- > Predator Free 2050 Limited
- > Rarowhara
- > Technical Advisory Group
- > Waiheke businesses
- > The Waiheke Collective (including conservation groups, organisations, mana whenua, and individuals)
- > Waiheke High School
- > Waiheke Local Board

Korehāhā Whakahau

Mā te ngaruru ō ngā whenua maru ō Ngāti Awa, ka noho momoho ngā taonga koiora, taonga tuku iho, hei oranga whānui mō ngā whakatipuranga.

As the lands of Ngāti Awa flourish, opportunities abound for future generations to enjoy their ecological, environmental, and cultural uniqueness.

Start date	June 2020
Eradication target	Possums
Suppression target	Predators
Hectares	4700



Project lead

Te Rūnanga o Ngāti Awa

Contributors

- > Department of Conservation
- > Jobs for Nature
- > Ngāti Awa Group Holdings
- > Predator Free 2050 Limited

Predator Free Hawke's Bay Whakaorangia Te Matau-a-Māui

Native species thrive where we live,
work and play.

Start date	July 2018
Eradication target	Possums
Suppression target	Predators
Hectares	14500 (possum eradication) 84100 (predator suppression)



Project lead

Hawke's Bay Regional Council

Māori partners

- > Te Kōpere o te iwi o Hineuru Trust
- > Maungaharuru Tangitū Trust
- > Ngāti Pāhauwhera Development Trust
- > Rongomaiwahine iwi

Contributors

- > Aotearoa Foundation
- > Biological Heritage National Science Challenge
- > Department of Conservation
- > Farmers
- > Manaaki Whenua – Landcare Research
- > Maungaharuru Tangitū
- > Predator Free 2050 Limited
- > Whangawehi Catchment Management Group
- > Zero Invasive Predators

Taranaki Mouna Project

Restore the ecological vitality of
Taranaki Mouna for him, for us.

Start date	2016
Eradication target	–
Suppression target	Predators
Hectares	34000



Project lead

Taranaki Mouna Project Limited

Māori partners

- > Ngāruahine
- > Ngāti Maru
- > Ngāti Mutunga
- > Ngāa Rauru
- > Ngāti Ruanui
- > Ngāti Tama
- > Taranaki Iwi
- > Te Āti Awa

Contributors

- > Department of Conservation*
- > Jasmine Social Investments*
- > Kaitake Ranges Conservation Trust
- > Kiwis for Kiwi
- > Manaaki Whenua – Landcare Research*
- > NEXT Foundation*
- > Rotokare Scenic Reserve Trust
- > Shell NZ*
- > Taranaki Kiwi Trust
- > Toi Foundation*
- > Towards Predator-Free Taranaki
- > Wild for Taranaki

Towards Predator-Free Taranaki Taranaki Taku Tūranga

Trialling the eradication of possums across forest, farmland and urban areas and incorporating sustained control of mustelids throughout the region's long-running community possum control programme, in preparation for when predator eradication at this scale is achievable.

Start date	May 2018
Eradication target	Possums
Suppression target	Predators
Hectares	4500 (possum eradication) 286100 (predator suppression)



Project lead

Taranaki Regional Council

Māori partners

- > Ngāruahine
- > Ngāti Maru
- > Ngāti Mutunga
- > Ngāa Rauru
- > Ngāti Ruanui
- > Ngāti Tama
- > Taranaki Iwi
- > Te Āti Awa

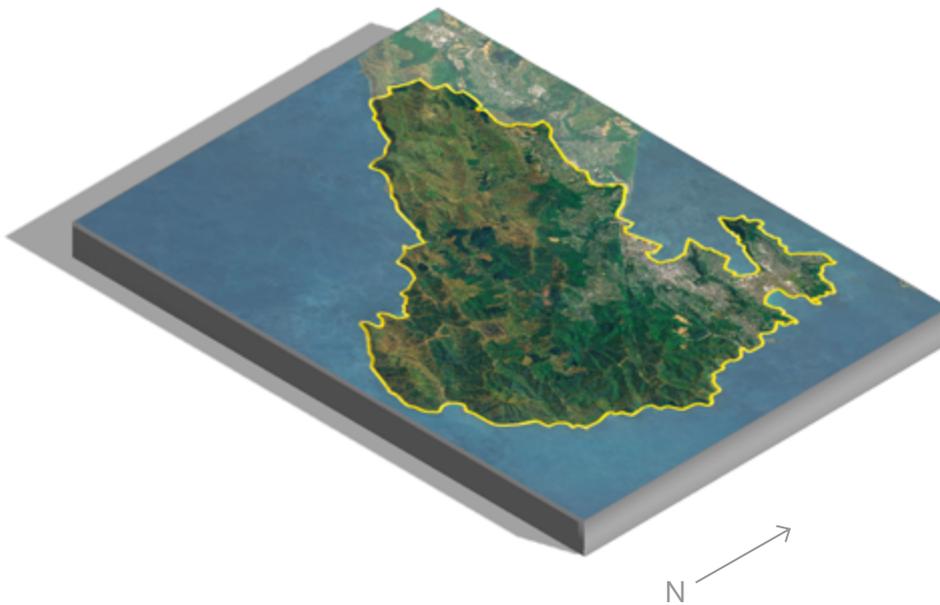
Contributors

- > Department of Conservation
- > Federated Farmers
- > Manaaki Whenua – Landcare Research
- > New Plymouth District Council
- > Predator Free 2050 Limited
- > Taranaki Mounga Project
- > Taranaki Regional Council
- > Stratford District Council
- > South Taranaki District Council
- > Wild for Taranaki
- > Zero Invasive Predators

Predator Free Wellington

Creating the world's first predator-free capital city where communities and native wildlife thrive.

Start date	August 2018
Eradication target	Possums, stoats, weasels and rats
Suppression target	–
Hectares	30000



Project lead

Predator Free Wellington Ltd

Māori partners

- > Ngāti Toa Rangatira
- > Taranaki Whānui ki Te Upoko-o-Te-Ika-a-Māui

Contributors

- > 36 backyard trapping groups (active across 50 suburbs and 32 schools participating in the pilot schools programme)
- > Capital Kiwi
- > Forest & Bird
- > Greater Wellington Regional Council*
- > Manaaki Whenua – Landcare Research
- > NEXT Foundation*
- > New Zealand Lottery Grants Board
- > Papa Taiao
- > Predator Free 2050 Limited
- > Victoria University of Wellington
- > Wellington Airport
- > Wellington City Council*
- > Wellington Community Trust
- > Zealandia

Capital Kiwi

Capital Kiwi's mission is to restore a large-scale wild kiwi population to Wellington's backyard.

Start date	2018
Eradication target	Stoats
Suppression target	-
Hectares	23455



Project lead

Capital Kiwi Trust

Contributors

- > Department of Conservation
- > Community groups
- > Goodnature
- > Greater Wellington Regional Council
- > Kiwis for Kiwi
- > Landowners
- > Meridian Energy
- > Predator Free 2050 Limited
- > Wellington City Council
- > Wellington Community Trust

Māori partners

- > Ngāti Toa Rangatira
- > Taranaki Whānui ki Te Upoko-o-Te-Ika-a-Māui

Predator Free D'Urville Island Rangitoto Birdsong

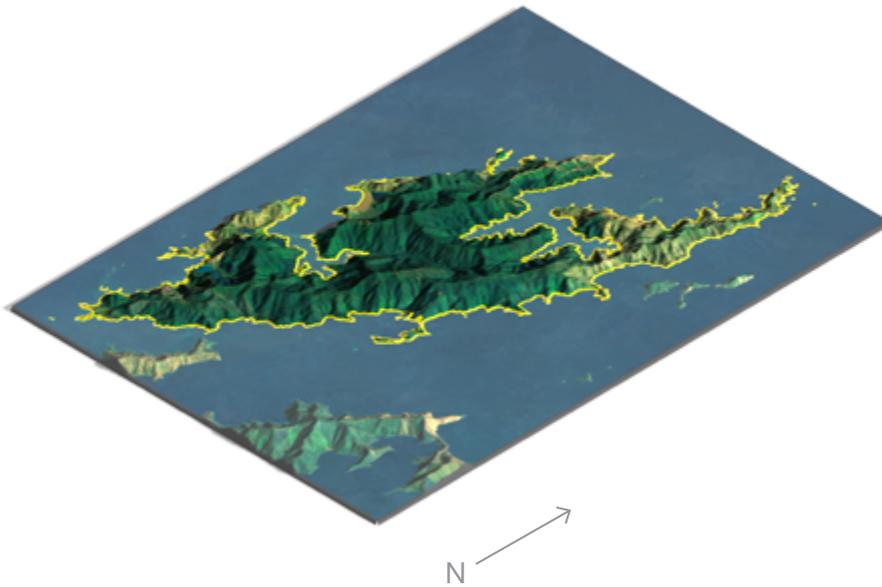
A community project to eradicate stoats in order to restore endangered birds such as kiwi, kākā and kākāriki, as well as endangered reptiles and insects to D'Urville Island.

Start date	August 2020
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Eradication target	Stoat
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Suppression target	–
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Hectares	16782
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Project lead

D'Urville Island Stoat Eradication
Charitable Trust (DISECT)

Māori partners

> Ngāti Koata

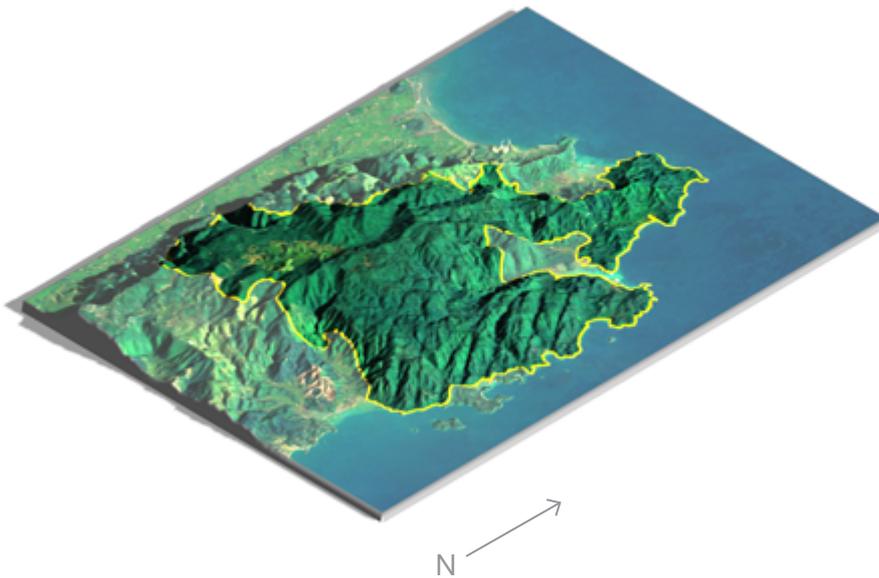
Contributors

- > Department of Conservation
- > Landowners
- > Marlborough District Council
- > NZ Lotteries Grant Board
- > Predator Free 2050 Limited
- > Rātā Foundation

Project Janszoon

Ambitious goals to restore the area by 2042 – a privately funded ecological transformation of Abel Tasman National Park.

Start date	2012
Eradication target	–
Suppression target	Predators and pests
Hectares	22530



Project lead

Project Janszoon Trust Company Ltd

Māori partners

- > Manawhenua ki Mohua
- > Ngāti Tama
- > Ngāti Rarua
- > Te Ātiawa

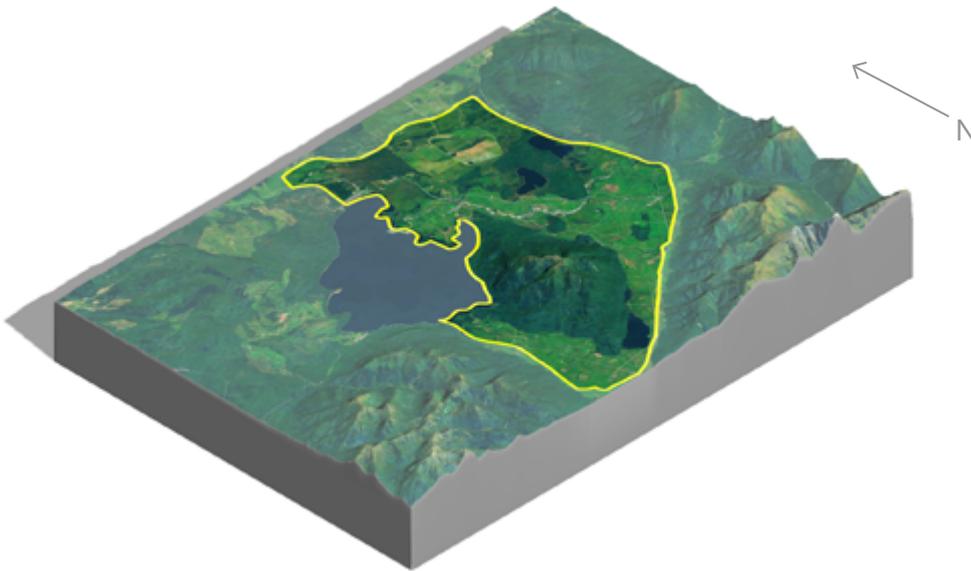
Contributors

- > Abel Tasman Birdsong Trust
- > Abel Tasman concessionaires
- > Air New Zealand
- > Department of Conservation
- > Local community
- > NEXT Foundation*

Predator Free Lake Brunner Rerenga ki taonga o ngā manu ki Kotuku Moana

Halt the decline of endangered or threatened species, allowing them to thrive and eventually repopulate an area from the 'Mountains to the Sea'.

Start date	May 2020
Eradication target	Possums
Suppression target	Predators
Hectares	3700 (possum eradication) 11000 (predator suppression)



Project lead

West Coast Regional Council

Māori partners

> Te Rūnanga o Ngāti Waewae

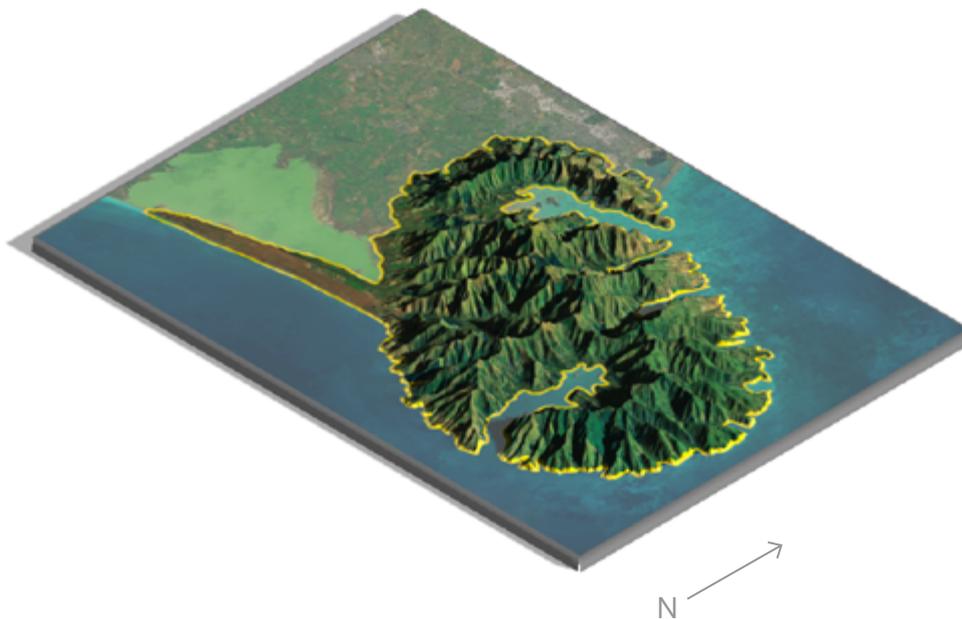
Contributors

- > Community groups
- > Department of Conservation
- > Lake Brunner Community Catchment Care Group
- > Local farmers
- > OSPRI
- > Predator Free 2050 Limited
- > Tai Poutini Polytechnic
- > West Coast Regional Council
- > Zero Invasive Predators

Pest Free Banks Peninsula Te Pātaka o Rākaihautū

A collaborative programme to protect and enhance biodiversity on the peninsula through the widespread eradication of animal pests.

Start date	August 2020
Eradication target	Possums (Extended Wildside project - 23 000ha), mustelids, possums, hedgehogs, feral cats (Kaitorete - 5 000ha)
Suppression target	–
Hectares	28000



Project lead

Banks Peninsula Conservation Trust

Māori partners

Ngāi Tahu rūnanga:

- > Ōnuku Rūnanga
- > Te Hapū o Ngāti Wheke (Rāpaki) Rūnanga
- > Te Taumutu Rūnanga
- > Te Rūnanga o Koukourarata
- > Wairewa Rūnanga

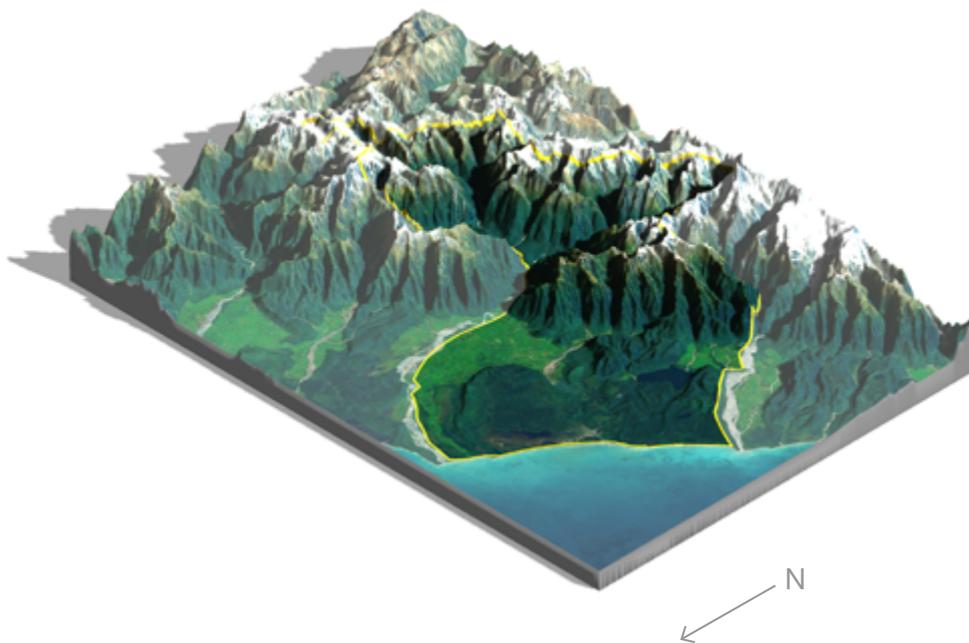
Contributors

- > The Cacophony Project
- > Christchurch City Council
- > Department of Conservation
- > Environment Canterbury
- > Living Springs
- > Predator Free 2050 Limited
- > Rod Donald
Banks Peninsula Trust
- > Selwyn District Council
- > Summit Road Society

Predator Free South Westland

An ambitious 5-year project to eliminate possums, rats and stoats from 100,000 hectares of land between the Whataroa and Waiiau (Waiho) Rivers, the crest of the Southern Alps / Kā Tiritiri o te Moana, and the shores of the Tasman Sea / Te Tai-o-Rēhua.

Start date	March 2021
Eradication target	Possums, rats and stoats
Suppression target	–
Hectares	100000



Project lead

Predator Free South Westland Ltd

Māori partners

> Te Rūnanga o Makaawhio

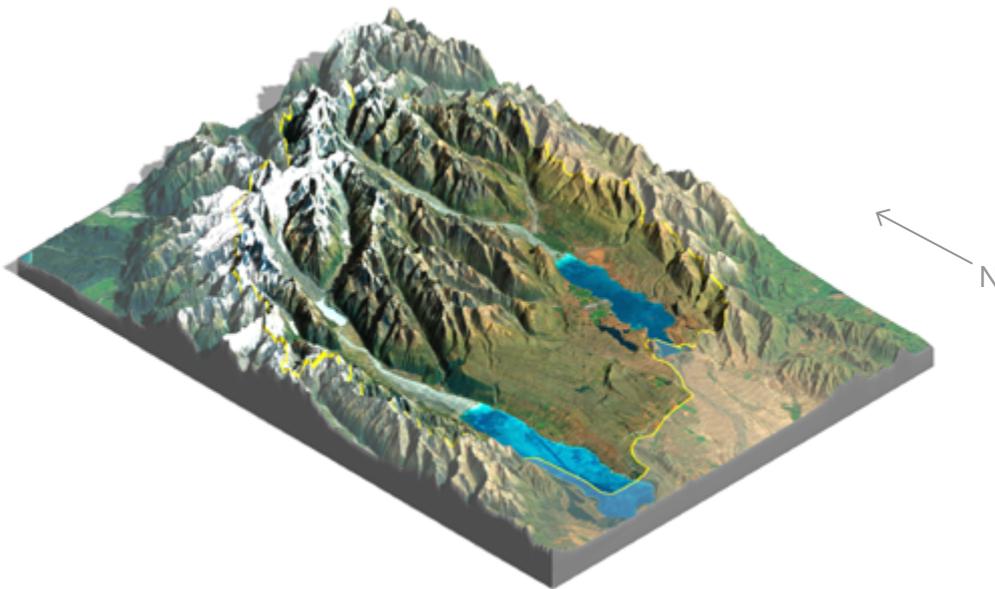
Contributors

- > Department of Conservation*
- > Jasmine Social Investments*
- > Jobs for Nature*
- > NEXT Foundation*
- > OSPRI*
- > Predator Free 2050 Limited*
- > South Westland community*
- > Zero Invasive Predators

Te Manahuna Aoraki

Restoring the natural landscapes and threatened species of the upper Mackenzie Basin and Aoraki/ Mount Cook National Park.

Start date	2018
Eradication target	Predators
Suppression target	–
Hectares	310000



Project lead

Te Manahuna Aoraki

Māori partners

- > Te Rūnanga o Arowhenua
- > Te Rūnanga o Moeraki
- > Te Rūnanga o Waihao

Contributors

- > Aotearoa Foundation*
- > Department of Conservation*
- > Environment Canterbury
- > High country land owners*
- > Jasmine Social Investments*
- > Land Information New Zealand
- > Ministry of Defence
- > NEXT Foundation*
- > Predator Free 2050 Limited*
- > Project River Recovery
- > Predator Free Aoraki
- > Re:Wild*

Predator Free Dunedin

A conservation collective formed to create a biodiversity-rich city.

Start date	October 2018
Eradication target	Possums
Suppression target	Stoats and rats
Hectares	9000 (possum eradication) 30000 (total)



Project lead

Predator Free Dunedin
Charitable Trust

Māori partners

- > Kāti Huirapa Rūnaka ki Puketeraki
- > Te Rūnanga o Ngāi Tahu
- > Te Rūnanga o Otakou

Contributors

- > Blue Penguins Pukekura
- > Department of Conservation
- > Dunedin Amenities Society
- > Dunedin City Council
- > Forest & Bird
- > Landscape Connections Trust
- > Manaaki Whenua – Landcare Research
- > Open Vue
- > Orokonui Ecosanctuary
- > OSPRI
- > The Otago Chamber of Commerce
- > Otago Peninsula Biodiversity Group
- > Otago Polytechnic
- > Otago Regional Council
- > Predator Free 2050 Limited
- > Quarantine Island - Kamau Taurua
- > Save the Otago Peninsula Inc.
- > University of Otago
- > Wild Dunedin
- > Yellow-eyed Penguin Trust

Technology and research and development

The social and technical challenges of a goal as ambitious as Predator Free 2050 are immense. Success will require the more effective use of existing tools alongside the development of new tools and social science research to understand the motivations of people to engage and support Predator Free 2050.

Early conceptual work by the 'Advancing our knowledge, innovation and improvement' collaborative group has categorised the scientific effort required into three knowledge themes, shown on the following page.

Predator Free 2050 occupies the research and technology interests of a wide range of organisations – and a lot of progress has been made over the past 5 years through over 50 research and development initiatives (these are outlined in further detail in Appendix A). These initiatives can be broadly grouped into three categories: tools (eg, new lures, traps and methods to control and eradicate predators), research (eg, scientific research to underpin tools or methodology development) and software (eg, new software to improve data management).



Figure 8: Scientific effort categorised into Predator Free knowledge themes.

The following graphs ¹⁸ show that the distribution of research and development initiatives across the three knowledge themes is what you would expect at the start of the Predator Free 2050 movement – a focus on researching and creating approaches and tools for achieving eradication at scale. Most of the effort is building on existing technologies and research, and there is constant scanning of technologies being developed in other sectors and offshore

that might have applicability to Predator Free. As time passes and our expertise in eradication grows, we can expect to see investment grow in research and development aimed at maintaining eradication gains and reinvasion monitoring. Although there are several research initiatives regarding building and maintaining public support, the amount of investment in this area is comparatively low.

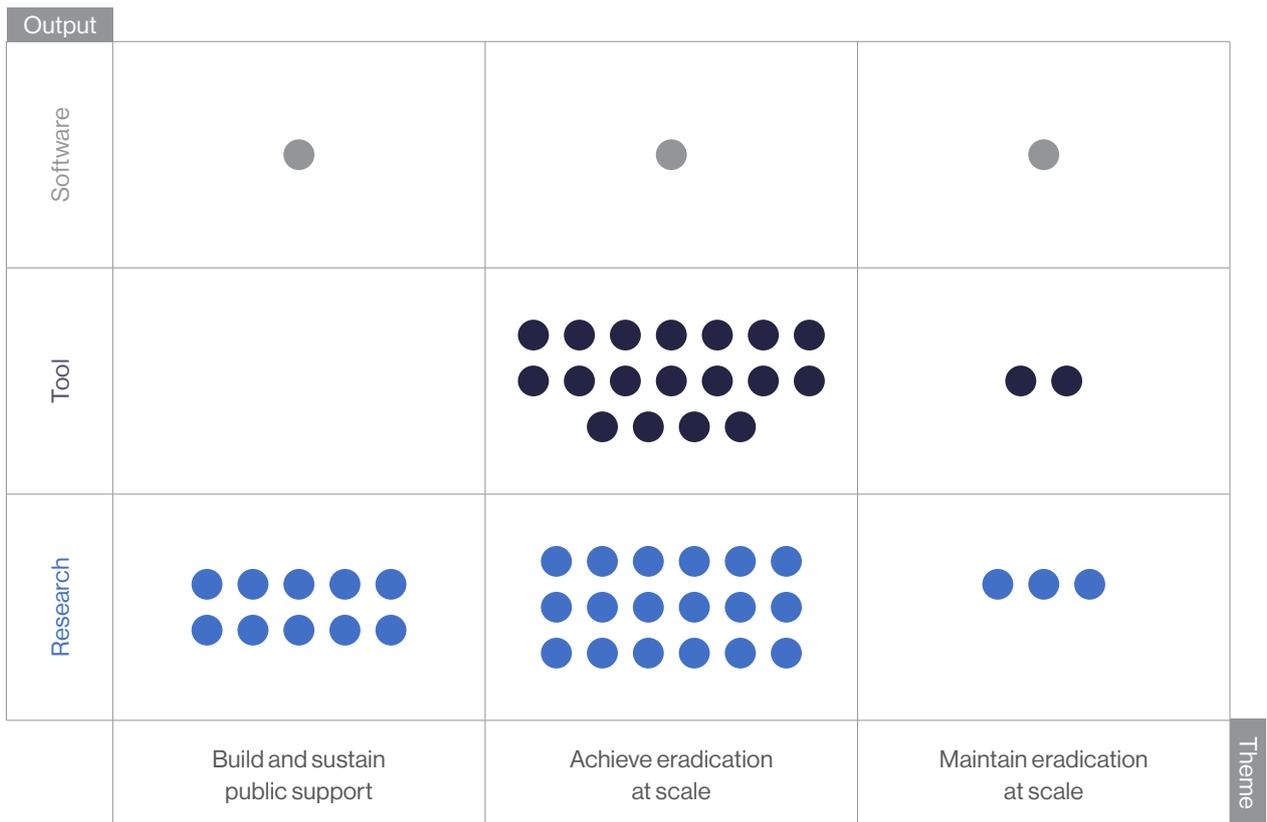


Figure 9: Distribution of initiatives across themes and outputs. Each ● represents one initiative.

¹⁸ This data is approximate, based on information from publicly available sources and data provided to DOC.

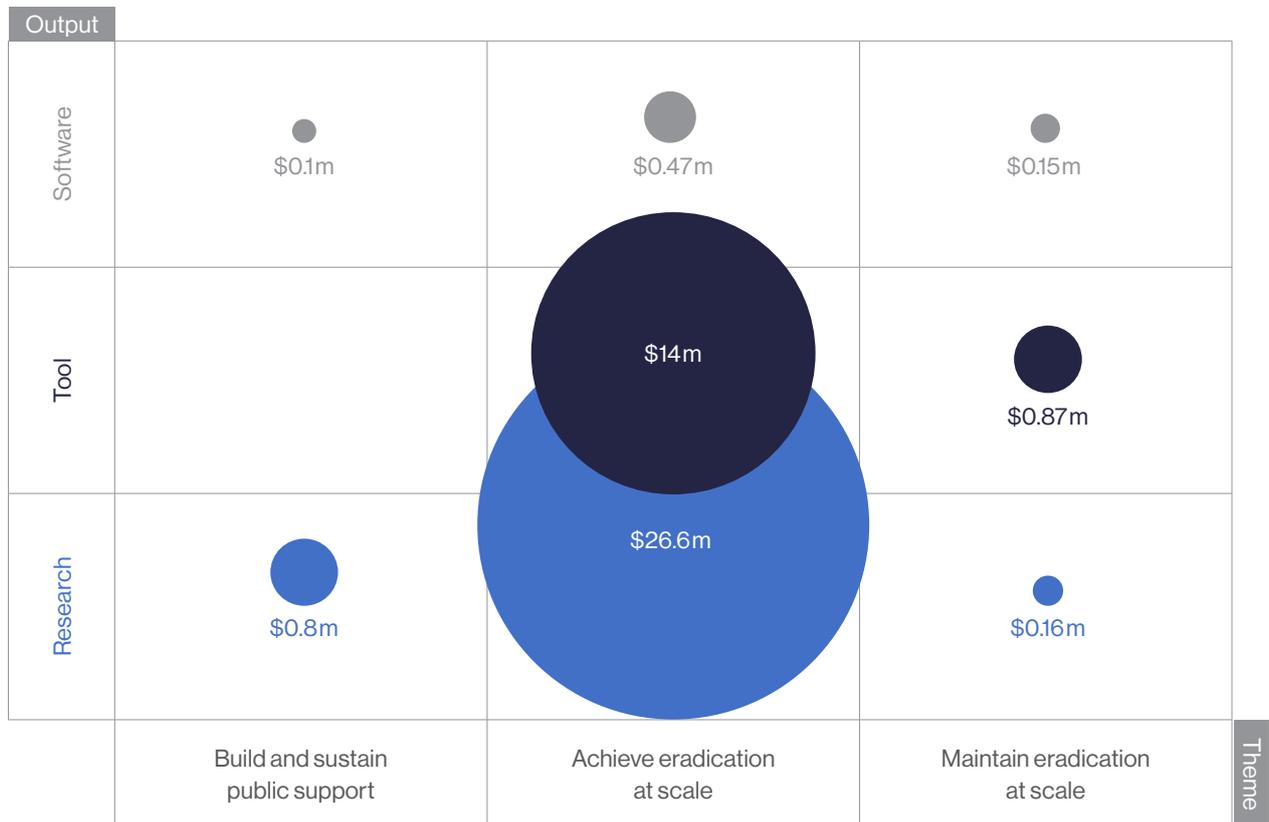


Figure 10: Aggregate funding of initiatives across themes and outputs. Each bubble represents approximate aggregate funding for the corresponding section.

Case study:

From a performance-driven to a learning-based approach

New Zealanders are ‘learning by doing’ in initial large landscape projects across the country.

As we learn, we need to be prepared to change course as we go, informed by better understanding of predators, of ecology and of people. And learning from projects needs to be shared so the wider Predator Free 2050 community can benefit.

This shift reflects the uncharted waters faced by Predator Free 2050. It assumes we don’t have all the answers and need the opportunity to ‘fast fail’, to be agile and adapt.

Te Manahuna Aoraki is a transformational biodiversity project in the upper Mackenzie Basin and Aoraki / Mount Cook National Park. The project aims to restore the natural landscapes and threatened species of the area, including braided rivers and alpine areas and the animals they are home to, such as kaki/ black stilt, ngutu parore/wrybill, tarapirohe/ black-fronted tern, robust grasshopper, kea and tuke/rock wren. The project’s founding partners are Te Rūnaka o Arowhenua, Te Rūnaka o Moeraki, Te Rūnaka o Waihao, DOC and the NEXT Foundation.



Researcher Nick Foster checks a trail camera near Aoraki/Mount Cook. *Photo: Robyn Janes*

This project is using a learning-based approach – it has been set up to include a development phase at the outset and is undertaking a number of projects to advance biodiversity gains and provide critical learnings for the future. The goal is to protect the unique dryland ecosystem values across 310,000 ha of the upper Mackenzie Basin by removing pests. Collaboration is key to success, with key partners including iwi, DOC, and landowners involved in shaping the initial projects, and informing the long-term plan. A decision on whether to proceed past the development stage will be made before June 2022. Examples of the project’s research projects include the following.

Mountains as barriers

Research led by Otago University PhD student Nick Foster used a mix of detection devices including chew cards, tracking tunnels, motion-activated cameras and GPS transmitters to study how far predators range in alpine areas. The study will help to understand how effectively mountains may act as barriers to predators – which will influence the future design of project areas.

Outcome monitoring for predator control

Monitoring data is essential for the teams to understand the impact of their interventions in the environment. The project team is doing research and baseline monitoring for native birds, lizards and invertebrates to understand the effect that the trapping networks have had on these threatened species survival.

Robust grasshopper fence

A purpose-built predator exclusion fence has been erected to protect 6,000 sq m of prime habitat for the endangered robust grasshopper. This trial is thought to be the world's first fenced habitat designed for an insect and is the first initiative that protects the robust grasshopper from most mammalian predators. Te Manahuna Aoraki will conduct monitoring to understand the impact that removing predators has had on the insect's survival.

Predator Free fence trial

In the event that Te Manahuna Aoraki extends beyond the development phase, there may be a need to build predator proof fencing to protect parts of the project area against reinvasion. The project is trialling three different predator-proof fence designs at altitude in the Two Thumbs Range to understand how they endure the extreme weather conditions found in the project area.

Stoat elimination trial

The project is testing whether it is possible to completely remove stoats from the challenging mountainous site of about 2150 ha on the western side of the Malte Brun Range in Aoraki Mount Cook National Park. The site was chosen because most of the potential reinvasion sites surrounding the area are above 2400m in elevation and surrounded by glaciers, reducing the probability of stoats crossing, and creating a natural barrier to re-invasion.

Trapping will be undertaken alongside a detection network using new technology like ZIP motor lures and trail cameras to understand how many stoats are present in this remote alpine zone and how predator control is reducing numbers. This study will help Te Manahuna Aoraki plan the future predator control that would best suit these alpine environments.

NEXT Foundation

Strategic philanthropy fund NEXT Foundation is providing considerable leadership, innovation and funding to enable Aotearoa New Zealand to become predator free by 2050. Since its formation NEXT has committed \$50million towards a number of landscape-scale restoration projects. It was also instrumental in establishing and funding, in partnership with DOC, Zero Invasive Predators – the charitable trust tasked with developing the tools and techniques to genuinely innovate in the predator free space.

As an independent catalyst NEXT is providing leadership by bringing together business and philanthropic funders to join with whānau, hapū and iwi, government, and other agencies, to invest in game-changing landscape-scale conservation projects. These projects are achieving biodiversity gains and community engagement at a scale that is leading to long-term social, environmental and economic transformation, and inspiring others to act.

In 2014 the NEXT Foundation and the Government signed the Tomorrow Accord, which commits the Crown to maintaining the ecological gains made by NEXT Foundation environmental projects. Agreed outcomes will see the Department of Conservation taking over responsibility for maintaining those gains as each transformation is achieved and the accord can also be used as a blueprint for other philanthropic organisations.

Appendix A: Research and development initiatives

Research initiatives

Project title	Funder(s)	Organisation(s) involved	Predator target
Biosecurity 2025 Science Strategy	> Biological Heritage National Science Challenge	> MPI	Multiple predators
Biosphere Data Commons Phase One	> Predator Free 2050 Limited > NEXT Foundation > Tindall Foundation > Project Crimson > Biological Heritage National Science Challenge	> Noos Ltd	
Developing Possum Specific Poisons	> Ministry of Business Innovation and Employment	> Biological Heritage National Science Challenge	Possums
Drones for possum detection and precision baiting	> Predator Free 2050 Limited > OSPRI	> Manaaki Whenua – Landcare Research > Envico Technologies	Possum
Eradication Science: eliminating the last survivors to achieve predator freedom	> Predator Free 2050 Limited	> Manaaki Whenua – Landcare Research	Multiple predators
Evaluating the Papa Taiao Predator Free Secondary Schools Leadership and Awards	> Predator Free 2050 Limited	> Papa Taiao Earthcare	
Evaluating the potential of foliage penetrating radar systems for detecting brushtail possum in New Zealand forests, and scoping novel technologies for advancing PF2050's mission.	> Predator Free 2050 Limited > OSPRI	> Envico Technologies > Island Conservation > Candy Group	Possum
Identifying key conditions for biodiversity and social outcomes from community led conservation	> Predator Free 2050 Limited > NEXT Foundation	> The Catalyst Group	Multiple predators
Influence of previous predator control on the personality of brushtail possum (<i>Trichosurus vulpecula</i>) populations	> Predator Free 2050 Limited	> University of Otago	Possum
Landscape Genetics of Brushtail Possums in New Zealand	> Predator Free 2050 Limited	> Massey University	Possum
Landscape-Scale Research and Development to Completely Remove Possums	> Predator Free 2050 Limited > Department of Conservation > NEXT Foundation	> Zero Invasive Predators	Possum

Project title	Funder(s)	Organisation(s) involved	Predator target
Low-cost eradication of possums from native forest	<ul style="list-style-type: none"> > Predator Free 2050 Limited > OSPRI > Manaaki Whenua – Landcare Researchh 	<ul style="list-style-type: none"> > Manaaki Whenua – Landcare Research 	Possum
Mammal pest control tool supporting Predator Free 2050	<ul style="list-style-type: none"> > Biological Heritage National Science Challenge 	<ul style="list-style-type: none"> > Biological Heritage National Science Challenge 	Multiple predators
More birds in the bush: large-scale restoration across complex forests	<ul style="list-style-type: none"> > Ministry of Business Innovation and Employment 	<ul style="list-style-type: none"> > Manaaki Whenua – Landcare Research 	Multiple predators
Position paper on the role of genetic and genomic technologies	<ul style="list-style-type: none"> > Biological Heritage National Science Challenge 	<ul style="list-style-type: none"> > Biological Heritage National Science Challenge 	Multiple predators
Public perceptions survey	<ul style="list-style-type: none"> > Biological Heritage National Science Challenge > Predator Free 2050 Limited 		
Quantitative decision support for eradication	<ul style="list-style-type: none"> > Quantitative decision support for eradication > CISS > Manaaki Whenua – Landcare Research 	<ul style="list-style-type: none"> > Manaaki Whenua – Landcare Research 	Multiple predators
Realistic population modelling of gene drive strategies for rodent control in New Zealand	<ul style="list-style-type: none"> > Predator Free 2050 Limited > Cornell University > Manaaki Whenua – Landcare Research > National Institute of General Medical Sciences 	<ul style="list-style-type: none"> > Manaaki Whenua – Landcare Research > Cornell University 	Rats
Research Programme: Hi-tech solutions/small mammals	<ul style="list-style-type: none"> > Biological Heritage National Science Challenge 	<ul style="list-style-type: none"> > University of Auckland > Department of Conservation 	Multiple predators
Research Programme: Novel Technologies & novel pest control perspectives (inc. Public perceptions of pest control and social licence)	<ul style="list-style-type: none"> > Biological Heritage National Science Challenge 	<ul style="list-style-type: none"> > Department of Conservation 	Multiple predators

Project title	Funder(s)	Organisation(s) involved	Predator target
Shared data standards for predator-free relevant data	> Predator Free 2050 Limited	> Multiple agencies	
Social research on novel pest control methods	> Predator Free 2050 Limited > Biological Heritage National Science Challenge	> Manaaki Whenua – Landcare Research > DOC	Multiple predators
Stakeholder network analysis' needed for Predator-Free NZ (with Shaun Hendy UoA)	> Biological Heritage National Science Challenge	> University of Auckland	
Strategic Science Investment Fund: Landscape Scale Projects	> Ministry of Business Innovation and Employment	> Manaaki Whenua – Landcare Research	Multiple predators
Stoat genome assembly, and landscape genetics	> Predator Free 2050 Limited > Manaaki Whenua – Landcare Research	> Manaaki Whenua – Landcare Research	Mustelids
Testing the efficacy of the Victor Professional rat trap for catching ship and Norway rats and Modified Victor stoat and rat trap for catching Norway rats*	> Predator Free 2050 Limited	> Manaaki Whenua – Landcare Research	Multiple predators
Thermal Camera & AI Predator Monitoring Tool	> Predator Free 2050 Limited > Genomics Aotearoa > CSIRO	> University of Otago > CSIRO	Rats
Wellington Rats: A look at home ranges and detection probabilities	> Predator Free 2050 Limited	> University of Wellington	Rats
Wielding knowledge of the spatial and temporal distributions of invasive small mammals across an altitudinal gradient to refine and advance mainland pest eradication strategies in the uplands of the Mackenzie Basin	> Predator Free 2050 Limited > Te Manahuna Aoraki	> Te Manahuna Aoraki	Multiple predators
Zero Density Possum Maintenance and Consequences for Competing Rats	> Predator Free 2050 Limited	> University of Auckland	Multiple predators

Key

* denotes products already on the market

Tool initiatives

Project title	Funder(s)	Organisation(s) involved	Predator target
AutoDispense - A low cost, open-source, automated, multi-species lure delivery system	> Predator Free 2050 Limited > Department of Conservation	> Boffa Miskell Ltd	Multiple predators
Long life, solid state lures for rodents, possums and mustelids	> Predator Free 2050 Limited > Murdoch University > Pukaha Mount Bruce > Forest Life Force restoration trust > Northland Regional Council	> Boffa Miskell Ltd	Multiple predators
Development of a new bait to control stoats using PAPP	> Department of Conservation	> Department of Conservation	Mustelids
LoraWAN Repeater Software & Hardware	> Predator Free 2050 Limited	> EcoNode	Multiple predators
Spitfire - Toxin delivery device	> Predator Free 2050 Limited > Department of Conservation	> Envico Technologies	Multiple predators
Using drone technology to eradicate predators	> Department of Conservation	> Envico Technologies	Multiple predators
Aerially deployed biodegradable rat trap	> Department of Conservation	> Goodnature	Rats
Autorat – a rat optimised automatic trap, lure and digital data system	> Predator Free 2050 Limited	> Goodnature	Rats
Hammerforce: Multi-Species self-resetting Trap	> Predator Free 2050 Limited > Hammerforce Ltd	> Hammerforce Ltd	Multiple predators
Automated pest detection – PAWS® pest identification sensor pad	> Department of Conservation	> Lincoln Agritech > Boffa Miskell Ltd > Red Fern Solutions	Multiple predators
Extending a Norway rat-selective pesticide to also target ship rats	> Department of Conservation	> Manaaki Whenua – Landcare Research	Rats
Image recognition - An integrated approach for camera trap data	> Predator Free 2050 Limited > Groundtruth	> Manaaki Whenua – Landcare Research	Multiple predators
New methods to evaluate the vulnerability of native birds to PAPP	> Department of Conservation	> Manaaki Whenua – Landcare Research	

Project title	Funder(s)	Organisation(s) involved	Predator target
AT220 Auto Rebait Reset*	> Predator Free 2050 Limited	> NZ Autotraps	Possum and rat
Norbormide formulation for rat control	> Predator Free 2050 Limited > IPC Ltd	> University of Auckland > Boffa Miskell Ltd > IPC Ltd	Rats
Developing a long life multispecies lure	> Department of Conservation	> University of Canterbury	Multiple predators
Bringing long-life rat lures to market	> Department of Conservation	> University of Wellington	Rats
Backcountry (A.I. Enabled Auto-Reporting) Detection Camera	> Predator Free 2050 Limited	> Zero Invasive Predators	Multiple predators
Products that enable the 'Remove and Protect' Approach (ZIP Motorlure, ZIP Outpost, ZIP PossStop)*	> Predator Free 2050 Limited > Department of Conservation > NEXT Foundation	> Zero Invasive Predators	Multiple predators
Zero Invasive Predators: AI Predator detection camera	> Biological Heritage National Science Challenge	> Zero Invasive Predators	Multiple predators

Key

* denotes products already on the market

Software initiatives

Project title	Funder(s)	Organisation(s) involved	Predator target
TrapNZ Collaborative 2018-19 and 2019-20 Work Programmes	<ul style="list-style-type: none"> > Predator Free 2050 Limited > Hawkes Bay Regional Council > Predator Free Wellington > Project Janszoon > Taranaki Mouna Project > Northland Regional Council > Taranaki Regional Council > Regional Council BioManagers 	<ul style="list-style-type: none"> > Groundtruth Ltd 	
FlexiComms: remote communications for nation-wide deployment of devices	<ul style="list-style-type: none"> > Predator Free 2050 Limited > Red Fern Solutions Ltd 	<ul style="list-style-type: none"> > Red Fern Solutions Ltd 	
Digital Products - Design for manufacture and tooling of high catch rate live capture trap	<ul style="list-style-type: none"> > Predator Free 2050 Limited > NEXT Foundation > Manaaki Whenua – Landcare Research > Jasmine Social Investments 	<ul style="list-style-type: none"> > The Cacophany Project 	