Predator Free 2050

Interim Implementation Plan

2024–2030

PREDATOR FREE 2050
TUIA TE TAIAO

Department of Conservation
Te Papa Atawhai

PREDATOR FREE NZ

PREDATOR FREE 2050
kia uru ora, return to life

Predator Free 2050 Interim Implementation Plan 2024–2030

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Photo: James Reardon, © JamesReardon.org

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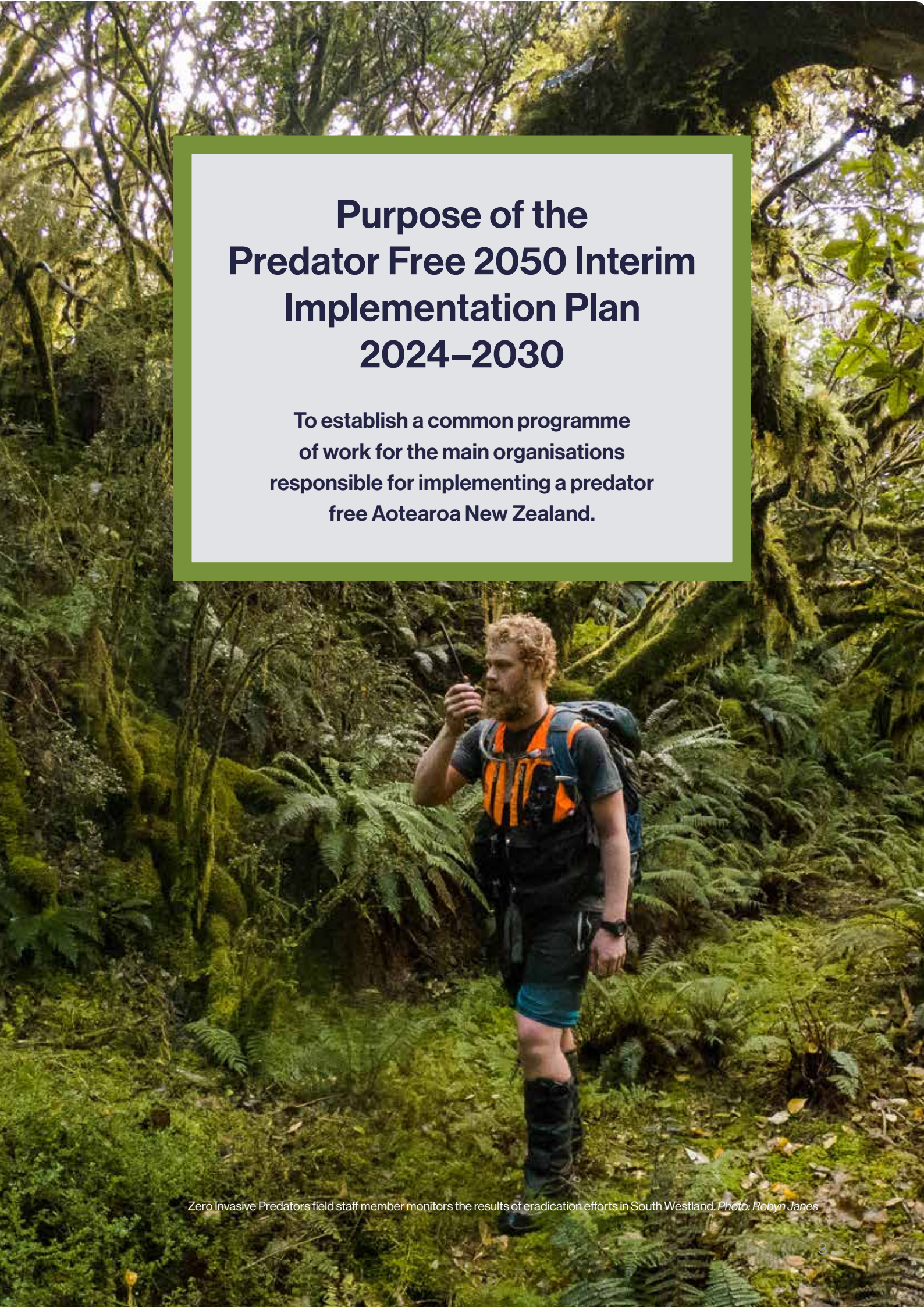
Purpose of the Predator Free 2050 Interim Implementation Plan 2024–2030

To establish a common programme of work for the main organisations responsible for implementing a predator free Aotearoa New Zealand.



Zero Invasive Predators field staff member monitors the results of eradication efforts in South Westland. *Photo: Robyn Janes*

About Predator Free 2050

Predator Free 2050 (PF2050) is a national goal to eradicate rats, possums and mustelids from all of Aotearoa New Zealand by 2050.

It is guided by the *Towards a Predator Free New Zealand: Predator Free 2050 Strategy*,[1] which is a national strategy covering the period 2020 to 2025 that sets out a vision to restore indigenous biodiversity (p 9):

> 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.

In 2024, this strategy will be reviewed and this is an opportunity to:

- reaffirm commitment to achieving a predator free Aotearoa New Zealand and set 2030 interim goals
- review how PF2050 is embedded within Te Mana o te Taiao – Aotearoa New Zealand Biodiversity Strategy 2020 (ANZBS)[2]
- more strongly incorporate a te ao Māori perspective into the strategy
- articulate the broad social, cultural and economic benefits PF2050 seeks to enable and how these will be measured
- review the list of species included in the scope of PF2050 to consider wider ecosystem implications and ensure biodiversity outcomes
- consider whether we have the right support structures (for example, advisory groups and governance) in place for the next phase of PF2050 design and implementation.

This interim implementation plan (2024–2030) will be revised when the PF2050 National Strategy review is complete in 2025, to ensure consistency and alignment.

Te Mana o te Taiao – Aotearoa New Zealand Biodiversity Strategy 2020

PF2050 is part of a wider response to implement the ANZBS, which sets a strategic direction for the protection, restoration and sustainable use of biodiversity in Aotearoa New Zealand. The ANZBS identifies introduced invasive species as one of the five main pressures on Aotearoa New Zealand's indigenous biodiversity. The species targeted in PF2050 are known to be among the most damaging invasive predators for native biodiversity here, and a problem that is intensifying with the impacts of climate change.

PF2050 is an important programme to help meet international targets that Aotearoa New Zealand committed to under the Global Biodiversity Framework (Montreal 2022).[3] PF2050 plays a significant role in global Target 6:

> *Eliminate, minimize, reduce and or mitigate the impacts of invasive alien species on biodiversity and ecosystem services by identifying and managing pathways of the introduction of alien species, preventing the introduction and establishment of priority invasive alien species, reducing the rates of introduction and establishment of other known or potential invasive alien species by at least 50 per cent by 2030, and eradicating or controlling invasive alien species, especially in priority sites, such as islands.*

1 Department of Conservation. 2020: *Towards a Predator Free New Zealand: Predator Free 2050 Strategy.* Department of Conservation, Wellington.

2 Department of Conservation. 2020: *Te Mana o te Taiao – Aotearoa New Zealand Biodiversity Strategy 2020*. Department of Conservation, Wellington.

3 For more information, see Convention on Biological Diversity, Global Biodiversity Framework, Target 6.

A misty morning over the Rakeahua River valley. *Photo: Jake Osborne*

Who is involved in Predator Free 2050?

Predator Free 2050 is a movement of people and organisations.

PF2050 sets a bold ambition to meet a challenge that we do not yet know how to solve. It is a complex problem – ecologically and socially – that cannot be achieved by one organisation in isolation.

The wider PF2050 movement involves whānau, hapū and iwi, landowners, community groups, businesses, philanthropists, and schools, all working towards a future where Aotearoa New Zealand is free from predators that cause major damage to indigenous biodiversity.

The Department of Conservation is the system lead for the Predator Free 2050 Programme

The **PF2050 Programme** is funded mainly by central government and influences and supports the commitment and contribution from communities and the private sector.

The Department of Conservation Te Papa Atawhai (DOC) is the system lead for the PF2050 Programme and is responsible for developing the strategic direction to achieve the PF2050 goal. This includes reporting to decision-makers and coordinating a collaborative approach to reduce duplication and maximise investment. DOC is also responsible for ensuring the suppression and eradication of predators on public conservation land, which makes up one-third of Aotearoa New Zealand land.

The PF2050 Programme is supported by various organisations. These include local government, through landscape predator control projects, Crown Research Institutes, researchers, private businesses engaged in predator control development and national agencies (for example, PF2050 Ltd, OSPRI, Ministry for Primary Industries, Environmental Protection Authority, Ministry for the Environment, Ministry of Health and others).

A collaborative approach, involving more than 30 organisations, supports collective planning and knowledge mobilisation across the following six pathways that are critical to the success of PF2050.

- Whānau, hapū and iwi expressing kaitiakitanga.
- Empowering and inspiring communities to take action.
- Supporting the kaupapa through legislation and improvement.
- Advancing our knowledge, innovation and improvement.
- Measuring and assessing the difference we make.
- Moving from sustained predator control to eradication.

Treaty partnership is at the centre of biodiversity work, including implementation of Predator Free 2050

Whānau, hapū and iwi have a whakapapa relationship with the environment, and this connection underpins their interest and role in the management and health of the natural world. Historical alienation of land and waters, and the creation of reserves and protected species by the Crown, have prevented Māori from fully exercising tino rangatiratanga in respect of natural resources and indigenous flora and fauna (as affirmed in Article 2 of the Treaty of Waitangi).

The PF2050 Programme recognises the Crown's legislative accountability to actively engage with iwi, hapū and whānau to acknowledge the

Treaty of Waitangi. The PF2050 Programme aims to guide collaboration to actively give effect to legislation, such as section 4 of the Conservation Act 1987, demonstrating a collaborative expression of the principles of the Treaty of Waitangi. Crown agencies, through PF2050 implementation, will act in good faith with iwi, hapū and whānau to achieve Treaty settlement obligation outcomes. This includes both those that have been settled and those yet to be settled. These obligations and directions will need to be considered and resourced at all levels of PF2050 implementation.

At the heart of PF2050 is a goal to revitalise indigenous taonga for future generations. The PF2050 Implementation Plan sets out the objective to achieve this by working in a genuine Treaty partnership across all areas of the Programme. Working in partnership will require time and effort to build relationships and the courage to shape a new approach to enabling thriving biodiversity.

The Treaty partnership is particularly important at place, where the PF2050 Programme provides an opportunity to work in partnership in the delivery of eradication projects. Tangata whenua also bring distinctive knowledge, born from relationships with this whenua, which plays an important role in PF2050. Mātauranga Māori will be vital in contributing old and new approaches to help unlock how we achieve the ambitious PF2050 vision.

Other leaders in the Predator Free 2050 system

Predator Free 2050 Ltd is a Crown entity established to maintain the urgency of achieving the PF2050 goal. It is responsible for funding and supporting the development of cost-effective and scalable approaches to predator eradication in rural and urban environments, tool development, and leading investment in breakthrough science critical for achieving the PF2050 goal. Predator Free 2050 Ltd also brings non-government investment into PF2050.

Predator Free New Zealand Trust is an independent charity with funding from the Government to lead inspiring community engagement and action, including building public support for the PF2050 goal.

Zero Invasive Predators Ltd is a charitable company co-funded by the NEXT Foundation and DOC. It focuses on undertaking research and developing tools and technologies to completely remove rats, possums and stoats from large mainland areas and to protect those areas from reinvasion.

Regional councils play an important role in leading predator control on council land, supporting community conservation and PF2050 projects.

Current context

It has been 5 years since the first national Predator Free 2050 strategy for Aotearoa New Zealand was released. During this time, the Programme has focused on establishing the foundations needed for a complex multi-decade project, including:

- building a base of community support and action across Aotearoa New Zealand
- bringing the conservation and science system together with tangata whenua in a collaborative planning model
- establishing underpinning elements for breakthrough science to build on
- establishing tool development programmes to stimulate the production of new technology
- establishing operational teams to progress delivery of complex eradication projects
- supporting a range of projects that have enabled diverse eradication approaches to be tested.

Collectively, we have made significant advances and are on track to achieving most of the ambitious 2025 interim goals set in the *Towards a Predator Free New Zealand: Predator Free 2050 Strategy.* The PF2050 Programme Bi-Annual Progress Report sets out the achievements and learnings in detail. What remains is a goal that still lies beyond our current capacity and capabilities. PF2050 cannot be achieved through hard work alone. Breakthroughs in research, tools, methods and approaches are essential for making the vision of a predator free Aotearoa New Zealand real. With funding to support the main elements of the 2024 to 2030 implementation phase secured, the wero (challenge) is to unlock the knowledge and innovation required for a step-change in the scale and complexity of what is necessary to achieve the goal. This implementation plan describes how we propose to do that.

Komene Cassidy, Tame Malcolm, Paulette Tamati-Eliffe and Tumai Cassidy at Kura Reo Taiao. *Photo: Rawhitiroa Photography*

Stewert Island/Rakiura. *Photo: Te Rūnanga o Ngāi Tahu*

Predator Free 2050 Programme implementation 2024 to 2030

This document aims to establish a programme of work for the main organisations responsible for implementing the PF2050 Programme for Aotearoa New Zealand.

What are the objectives for the next 5 years?

The period 2024 to 2030 is a critical phase for the PF2050 Programme to prove that a predator free Aotearoa New Zealand is possible and how it can be achieved. During this phase, the focus will be on a targeted set of projects to help achieve the following objectives.

A **We have the tools and techniques to feasibly eradicate predators in diverse landscapes.**

B **We have a clear, evidence-based plan in place to achieve the Predator Free 2050 goal.**

C **We have an authentic Treaty partnership in all areas across the Predator Free 2050 Programme.**

D **We have the support of New Zealanders.**

E **We can demonstrate the benefits for Aotearoa New Zealand in achieving Predator Free 2050 and attract the investment needed to achieve the goal.**

By achieving these objectives, we aim to secure the trust and confidence of the Government and New Zealanders to continue PF2050 and fund it to completion.

This implementation plan identifies priority work that will help achieve these objectives. This work is described in the table on page 12. These priority pieces of work will be regularly reviewed and adjusted where needed to ensure they are tracking the Programme towards success.

Benefits for Aotearoa New Zealand from the Predator Free 2050 Programme by 2030

Successfully achieving the objectives set out to the left will result in the following **Programme benefits** for New Zealanders and the environment. By 2030, we will be able to demonstrate that we can:

1 **Deliver better biodiversity outcomes more sustainably than ongoing predator suppression.**

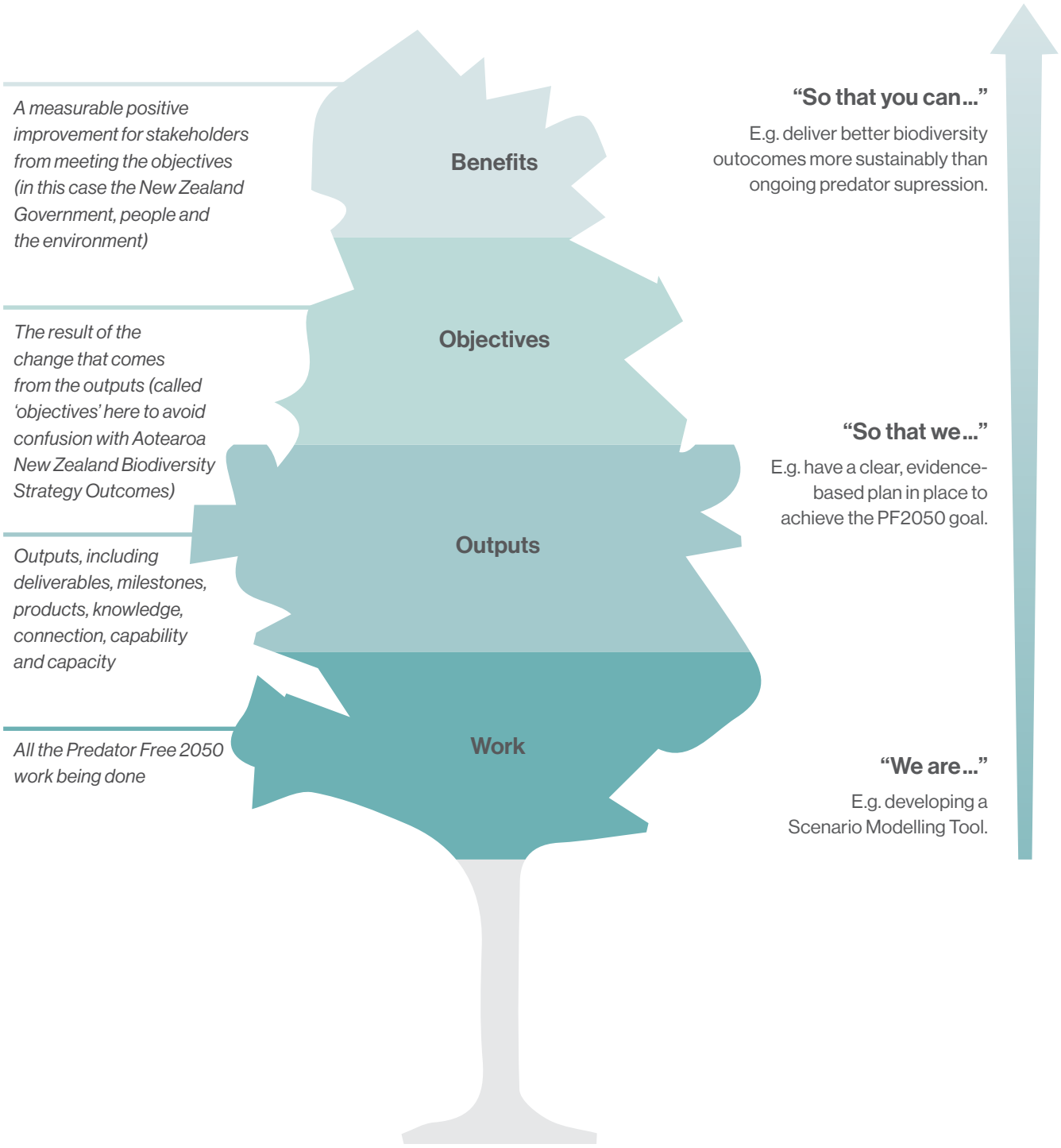
2 **Increase the resilience of Aotearoa New Zealand's indigenous biodiversity to respond to climate change and make progress towards international climate obligations.**

3 **Uphold Treaty obligations and realise opportunities of the Treaty relationship.**

4 **Make progress towards the ANZBS outcomes and Global Biodiversity Framework targets.**

How will we know we are successful?

As system lead, DOC is responsible for monitoring the Programme and will measure the achievement of significant outputs, progress towards achieving the **2030 objectives**, and the realisation of **ANZBS outcomes** and **Programme benefits**. Further work is required with implementation partners to develop measures of success and to establish monitoring.



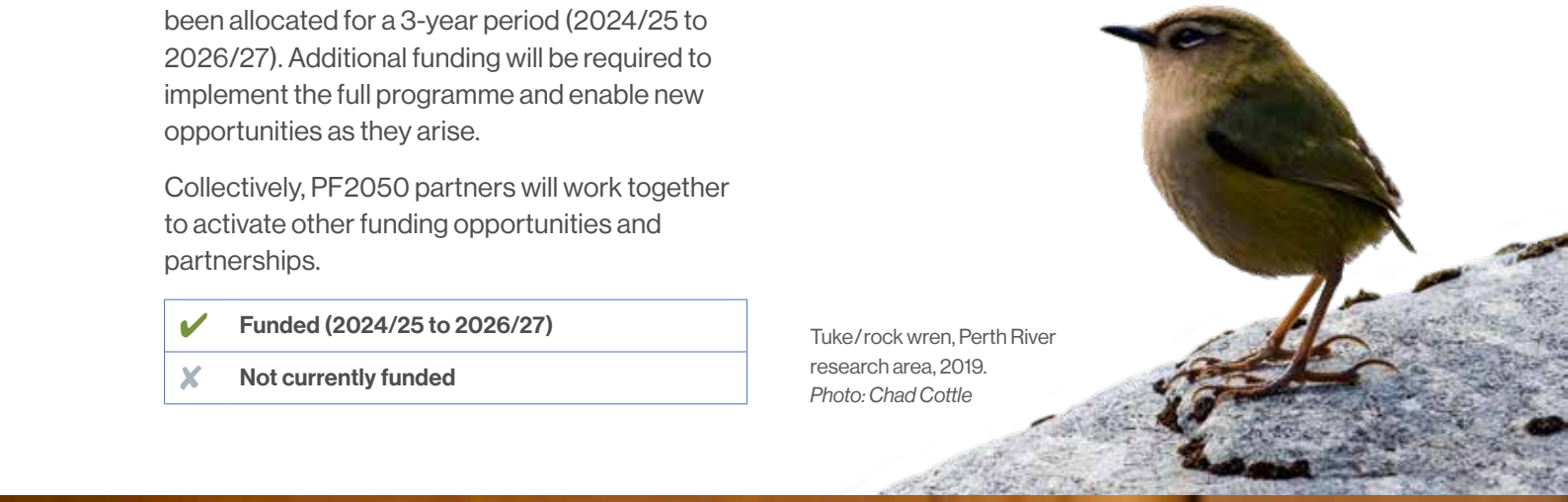
Our process for connecting work to benefits for Aotearoa New Zealand

Predator Free 2050 Implementation Plan work programme

This implementation plan describes the programme of work required to meet the PF2050 objectives by 2030. Funding for priority work has been allocated for a 3-year period (2024/25 to 2026/27). Additional funding will be required to implement the full programme and enable new opportunities as they arise.

Collectively, PF2050 partners will work together to activate other funding opportunities and partnerships.

✔	**Funded (2024/25 to 2026/27)**
✘	**Not currently funded**



Tuke/rock wren, Perth River research area, 2019. *Photo: Chad Cottle*

Kura Reo Taiao Kaiako Puke Timoti. *Photo: Rawhitiroa Photography*

	2030 Objective	Why this matters now	Where we will focus (outputs)	Led by	Funding
A. We have the tools and techniques to feasibly eradicate predators in diverse landscapes					
1	**We know how to achieve complex eradications on the mainland at a scale greater than 100,000 hectares in diverse habitats**	To date, eradication on the mainland has only been achieved and sustained using fences. **Backcountry habitats** The Predator Free South Westland project has focused on achieving the interim goal set in the *Towards a Predator Free New Zealand: Predator Free 2050 Strategy* (p 25) that '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'. We are working towards eradicating possums, mustelids and rats from 107,000 hectares (ha) by 2025 through an approach that creates a core predator free area with a managed width of boundary on either side. When achieved, this will be a significant milestone for the PF2050 Programme and provide confidence that we can achieve and maintain eradication in the backcountry on the mainland. The next challenge is to increase this scale across new and more complex habitats. **Urban and rural habitats** PF2050 Ltd has invested in 18 landscape projects which have been working towards eradication goals. These projects provide an opportunity to learn how we might achieve eradication in diverse landscapes through an experimental approach to design and research. For example, the Wellington region has announced it has eradicated all target species from Te Motu Kairangi / Miramar Peninsula. This project has demonstrated how community collaboration and finding shared values can help achieve a goal in urban environments. Building on this and other eradications that are underway, it is now critical that we develop effective and reliable approaches for urban and rural environments that are socially acceptable, scalable and cost efficient.	1. Agree on criteria for feasibility and metrics for eradication success and ensure they are consistently understood and applied across the system.	DOC (collectively developed)	✔
			2. Complete eradication of 107,000 ha block in Predator Free South Westland (phase #1) with independent verification of eradication success against key metrics (as agreed in 1.1).	Predator Free South Westland Limited (Te Rūnanga o Ngāi Tahu, DOC, PF2050 Ltd and Zero Invasive Predators Ltd [ZIP])	✔
			3. PF2050 Ltd urban and rural landscape projects are demonstrating that predators can be cost-effectively eliminated at increasing scale. With embedded research and development (R&D), projects are developing best practice approaches for elimination, field testing new tools and technologies, and increasing our understanding on how to build community support and secure landowner permissions for operations. Priority projects include: • Predator Free Wellington • Tū Mai Taonga • Banks Peninsula • Te Manuhuna Aoraki • Predator Free Dunedin • Whakatipu Māhia. Further investment in Taranaki Taku Tūranga is also being explored.	PF2050 Ltd (in partnership with landscape projects, developers, researchers and regional councils)	✔

	2030 Objective	Why this matters now	Where we will focus (outputs)	Led by	Funding
		Complex island environments As the third-largest island in Aotearoa New Zealand, achieving a predator free Stewart Island / Rakiura would be a significant and recognisable accomplishment for the movement. It has been identified as the next strategic eradication location because of the following. • Increased scale and complexity: At 176,000 ha and with a mix of conservation, urban and rural land, it would demonstrate the PF2050 Programme's ability to achieve eradication in increasingly complex environments. • Treaty partner readiness and benefit: Ngāi Tahu and the community have invested in supporting the vision of a predator free Rakiura for more than a decade. • Opportunities are available for philanthropic co-funding (between 30% and 50%) to support the feasibility and delivery of this project. The next step is to undertake trials and a feasibility assessment to prove it is possible so that operations can start.	4. Complete a 2-year feasibility planning, trial and review process for Predator Free Stewart Island / Rakiura to determine whether eradication is feasible, worthwhile and sustainable. Planning will cover five critical areas: operational delivery, biosecurity, community and Treaty partner engagement, outcome monitoring, and science and research.	Te Rūnanga o Ngāi Tahu, DOC, ZIP and Te Puka Rakiura Trust	✔
			5. The PF2050 Ltd Products to Projects programme is accelerating the development and commercial availability of new tools and technologies (such as species-specific toxins) for scaling up urban and rural applications.	PF2050 Ltd	✔
			6. Continued investment in the Tools to Market programme for close–medium horizon R&D and tool development.	DOC	✔
			7. Make priority investments as directed by the PF2050 Interim Knowledge & Innovation Plan (Appendix 1).	DOC (working with others)	✔
			8. Scale eradication at future sites as informed by technical advice and scenario modelling from 2026/27.	TBC	✘

	2030 Objective	Why this matters now	Where we will focus (outputs)	Led by	Funding
2	**We know how to cost-effectively defend boundaries in diverse mainland habitats to prevent the re-establishment of target species**	We will need to continually defend boundaries as we roll out eradication across the country. Improved, cost-effective and transferable solutions that allow us to rapidly detect and intercept invaders are essential. With multiple strategic eradication projects already underway, and feasibility planning for others advancing, the sooner we can improve our toolkit for boundary defence and develop confidence in the approach, the more cost effective the PF2050 Programme will become and the more opportunities will be available to accelerate the Programme.	1. Demonstrate that the boundaries of the Predator Free South Westland project are defendable at an acceptable cost and with methodologies that are sustainable and can be transferred into other contexts.	Predator Free South Westland Limited (Te Rūnanga o Ngāi Tahu, DOC, PF2050 Ltd and ZIP)	✔
			2. The Products to Projects programme is accelerating the development and commercial availability of new tools and technologies (such as species-specific toxins) for scaling up urban and rural applications.	PF2050 Ltd	✔
			3. Continued investment in the Tools to Market programme for close-medium horizon R&D and tool development to unlock new approaches to detect, intercept and remove invaders.	DOC	✔
			4. Test new tools and approaches to intercept and remove invaders in a range of national contexts (i.e. urban environments, agricultural land not bordered by natural barriers, warmer and/or lower altitude environments) to identify and inform optimum solutions.	Collectively undertaken by implementation partners at place	✔
			5. Embedded R&D in PF2050 Ltd priority urban and rural landscape projects is demonstrating how to cost efficiently and effectively defend boundaries and maintain predator elimination gains. Priority projects include: • Predator Free Wellington • Tū Mai Taonga • Banks Peninsula • Te Manuhuna Aoraki • Predator Free Dunedin • Whakatipu Māhia. Further investment in Taranaki Taku Tūranga is also being explored.	PF2050 Ltd (in partnership with landscape projects, developers, researchers and regional councils)	✔

	2030 Objective	Why this matters now	Where we will focus (outputs)	Led by	Funding
			6. Priority investments as directed by the PF2050 Interim Knowledge & Innovation Plan (Appendix 1).	DOC (working with others)	✔
3	**We are underway with Aotearoa New Zealand's largest offshore island eradication project – Maukahuka / Auckland Island – and research, development and innovation (RD&I) advancements allow us to sustain and grow the predator free island network**	Uninhabited island eradications provide confined environments for testing tools and methods that can be extrapolated to mainland settings. Aotearoa New Zealand's uninhabited offshore islands are also vital biodiversity hotspots, containing high levels of endemism and providing refuge for diverse species. With more easily defendable boundaries, these islands help us to secure significant biodiversity outcomes, develop and test tools, and demonstrate the return of biodiversity that PF2050 is supporting ecologically. One of the current PF2050 interim goals (Goal #3) is to eradicate all mammalian predators from Aotearoa New Zealand's uninhabited offshore islands by 2025. This goal is possible but not in this timeframe. • Around 161 islands (80,000 ha) still have predators and only a few of these are currently feasible to eradicate and confidently defend. Due to reinvasion pressure, islands within 1.5 kilometres of the mainland or pest sources are not considered currently feasible within the limits of existing tools and techniques. • 328 islands are already predator free but this existing network remains vulnerable until we improve our capability to effectively detect incursions and respond in a timely manner. The next phase of work includes: • RD&I developments that increase the effectiveness of protection on existing predator free islands (e.g. self-reporting artificial intelligence cameras with real-time monitoring) • transformational tools or technology to expand the predator free island network (e.g. bait development programme) • progressing eradication at sites that are feasible, defendable and sustainable. Maukahuka / Auckland Island is the highest priority site for eradication, and significant effort and investment have gone into feasibility planning. The project will enable the development of critical transferable tools to help other projects (e.g. cat bait registration, critical for the progression of Stewart Island / Rakiura).	1. Invest in an RD&I programme to increase defence of the existing predator free island network and expand the network of island eradications with new and improved tools.	DOC	✔
			2. Undertake operational planning and initiate the delivery of Maukahuka / Auckland Island eradication.	DOC in partnership with Te Rūnanga o Ngāi Tahu)	✔ Funding for 2 years from the International Visitors Levy (IVL)

Photo: Rawhitiroa Photography

	2030 Objective	Why this matters now	Where we will focus (outputs)	Led by	Funding
B. We have a clear, evidence-based plan in place to achieve the Predator Free 2050 goal					
4	**We have an evidence-based plan to roll out eradication at scale across the mainland**	To increase significant investment in PF2050, a clear plan must be in place for how PF2050 can be achieved. Using the evidence to inform decisions, we need to know and demonstrate that the next phase is: A. achievable – we have the knowledge, approaches, tools, technology and people, and the confidence we can secure landowner permissions B. worthwhile – we can achieve significant ecological, social, cultural and economic benefits for Aotearoa New Zealand C. sustainable – we can maintain the predator free status at an acceptable cost. The PF2050 Programme does not currently have a resourced function in place to provide technical and evidence-based advice to decision-makers. A scenario modelling tool, as well as a national data model, is under development to ensure evidence, data and insights can underpin strategic decisions. These need to be complemented with an advisory function to plan implementation across sites and progress and refine knowledge and innovation investments. Connection across these areas is essential so that research and new knowledge can inform implementation, and data from implementation can provide feedback on knowledge gaps and needs.	1. Develop a system-wide knowledge and innovation plan (which spans the spectrum of knowledge needs across breakthrough science, mātauranga Māori and social sciences) (PF2050 Interim Knowledge & Innovation Plan in Appendix 1).	Collectively developed	✔
			2. Invest in mid–far horizon research or 'breakthrough science' to support developments across predator control, biosecurity, surveillance and detection, as well as to uncover novel approaches to support PF2050.	PF2050 Ltd in partnership with research entities	✔
			3. Complete and maintain scenario modelling tools to support objective decision making.	DOC and Manaaki Whenua – Landcare Research	✔
			4. Build and maintain a qualitative modelling tool to support objective decision making in socially complex rural and urban environments, incorporating social, cultural, economic, policy and current status of local activities in addition to technical inputs.	PF2050 Ltd	✔
			5. Pilot a national data model and standards (in line with Te Mana o te Taiao – Aotearoa New Zealand Biodiversity Strategy 2020 (ANZBS) Outcomes Monitoring Framework) to ensure consistent information is collected from PF2050 projects that allow the PF2050 Programme to test the impact of its interventions.	DOC	✔
			6. Establish a technical advisory function to undertake strategic planning of implementation and eradication pathway(s), as well as advise on knowledge and innovation prioritisation.	TBC	✔
			7. Scope the capacity and capability requirements to ensure the required workforce, with all skill requirements, is available to deliver eradication at increasingly larger scales.	TBC	✔

	2030 Objective	Why this matters now	Where we will focus (outputs)	Led by	Funding
			8. Invest in growing the professional sector so that clear career pathways can meet the roll out requirements, supported by national training institutes (e.g. PFNZ Apprenticeships Scheme, Conservation Dogs, Nelson Marlborough Institute of Technology).	Not funded	✘
			9. Start to build the operational capability needed to deliver at least 1 million hectares per annum from July 2031.	Not funded	✘
	C. We have an authentic Treaty partnership in all areas across the Predator Free 2050 Programme				
5	**Predator Free 2050 can demonstrate that it supports an authentic Treaty partnership**	A Māori strategy is currently under development, led by the PF2050 Kaitiakitanga Rōpū, to guide the PF2050 Programme towards a true Treaty partnership. It will inform the revision of the national PF2050 Strategy in 2025. An important pou within the Māori Strategy is that PF2050 is underpinned by Te Tiriti, meaning the PF2050 Programme goals must align with the Treaty of Waitangi commitments and promises, as well as Māori values and knowledge. Being underpinned by the Treaty means: • incorporating Māori goals, objectives and aspirations into the PF2050 system, strategy and approach • articulating the PF2050 systems commitment to the Treaty of Waitangi • developing guidelines and metrics for assessing the performance of the PF2050 system in giving effect to its Treaty commitments and obligations. Currently, we do not have a mechanism within the PF2050 Programme to assess how it is performing in giving effect to the Treaty commitments, obligations and opportunities. Indicators are also limited within the ANZBS Outcomes Monitoring Framework to adequately evaluate progress towards agreed te ao Māori outcomes. An approach to the measurement of outcomes, and how we are giving recognition to the Treaty, its promises and guarantees, will be essential to progressing towards a true Treaty partnership.	1. Implement priority initiatives from the PF2050 Māori strategy that provide a pathway for the PF2050 Programme to align with Treaty of Waitangi commitments and promises, as well as Māori values, knowledge, goals, objectives and aspirations (this could include resolving systems issues or research and policy).	TBC	✔
			2. Implement a Treaty audit framework (with guidelines and metrics) to assess the progress of the PF2050 Programme in giving effect to Treaty commitments and obligations and whether the design and implementation of the Programme reflect an authentic partnership.	DOC and Treaty partners	✔
			3. Develop ecological and cultural indicators as well as data collection methods and evaluation procedures for the PF2050 and ANZBS Outcomes Monitoring Framework that reflect te ao Māori perspectives.	DOC (working with technical experts)	✔
			4. Ensure that Māori are represented across the PF2050 Programme and that Māori values and knowledge, rights and interests are incorporated in the decision-making processes.	DOC / TBC	✔

A flock of kea in the upper Perth valley. *Photo: Carey Lintott*

	2030 Objective	Why this matters now	Where we will focus (outputs)	Led by	Funding
6	**Predator Free 2050 empowers kaitiakitanga and centralises the role of mātauranga Māori**	Introduced predators have not only caused biodiversity loss but have negatively affected the health and wellbeing of people and living indigenous knowledge systems. This includes mātauranga Māori, which has been threatened by the transformation of the environment itself and by the way Māori have been able to interact with the environment through laws and legislation, which have often restricted the space for Māori to exercise rangatiratanga and kaitiakitanga. When Māori cannot exercise kaitiakitanga over the environment of their rohe and taonga, they are not able to properly exercise the essential rights and responsibilities affirmed in the Treaty, including preserving and passing on related mātauranga. Relationships with taonga, and the interwoven responsibilities of rangatiratanga and kaitiakitanga, are vital elements of what it is to be Māori. Without these ongoing relationships, these central features of te ao Māori cannot survive, and this mātauranga cannot be used to support the regeneration of the environment or programmes like PF2050. Mātauranga Māori approaches to pest management hold untapped potential for the PF2050 Programme. Since the establishment of PF2050, nearly all science investment has been in Western-based knowledge approaches. A significant opportunity exists for the PF2050 Programme to invest in supporting the recovery of mātauranga and its application to uncover new approaches to making PF2050 projects more effective. An opportunity also exists to deliver PF2050 projects in partnership with hapū and iwi in an inclusive way that recognises Māori rights and interests, and respects and uses indigenous knowledge alongside Western approaches. By enabling indigenous innovation and collaboration, it is not only possible to uncover ancient solutions to current problems, but vital relationships, responsibilities and practices can also be sustained and elevated.	1. Use the PF2050 Mātauranga Māori Contestable Fund and Mātauranga Kāhui to incentivise mātauranga-based solutions at place that have the potential to contribute to PF2050.	DOC (Ngā Whenua Rāhui)	✔
			2. Target mātauranga Māori research priorities to support sustainable and culturally appropriate predator control methods and approaches that will affect predator management. Priorities are to be identified in the Knowledge and Innovation Plan outlined in 4.1.	TBC	✔
			3. Continue investment in the wānanga series to support the knowledge mobilisation and exchange of mātauranga Māori for PF2050.	TBC	✔

	2030 Objective	Why this matters now	Where we will focus (outputs)	Led by	Funding
	D. We have the support of New Zealanders				
7	**Predator Free 2050 is a widely supported national initiative at the grassroots level and politically**	We know that an increase in funding is needed to achieve the PF2050 goal. This is estimated to be between $200 million and $300 million per year for around 15 years. To access this, we need to engage key influencers to support PF2050 and grow and sustain grassroots support for the Programme. The predator free goal and its outcomes will need to be deeply held across Aotearoa New Zealand to enable the permissions, consents and access required to undertake eradication activities across the different land tenure types. This means achieving widespread social acceptance and the political will to require actions on non-Crown land. Partnerships with iwi and Māori landowners are essential for success. A significant challenge is public awareness, support and participation in the goal. A large proportion of New Zealanders do not understand the need for a goal like PF2050. We need to shift the thinking of the around 80% of New Zealanders who currently believe the natural environment is in an adequate to very good state. PF2050 Programme communications also require increased coordination. Currently, PF2050 is not presenting a compelling story about its vision, value and collective progress towards the goal. We have established a model that spreads communication resources thinly over multiple organisations, allowing organisational communications but missing an opportunity to tell a 'whole of PF2050' goal-centric story. We need to work on a coordinated and effective PF2050 Programme story that can build widespread awareness and support in important audiences. While each organisation in the PF2050 Programme has a unique and valuable role, by communicating as a strong collective we will extend our reach and work to build and inspire confidence in significant stakeholders.	1. Continue work to inspire and empower the grassroots movement to increase awareness and participation in PF2050.	Predator Free New Zealand Trust and DOC	✔
			2. Expand community engagement and communications to reach new and vital audiences, creating a broad sense of mainstream awareness, incentives and action.	TBC	✘
			3. Enable and support individuals and community groups with access to resources, expertise, shared knowledge and funding.	Predator Free New Zealand Trust and DOC	✔
			4. Tell an engaging and informed story around PF2050 and the progress being made towards the goal, with a focus on being authentic, current and compelling for different audiences. This will be complemented by PF2050 organisations actively sharing their learnings and progress with the wider sector, the public and other interested stakeholders.	TBC	✔
			5. Establish a coordinated programme of engagement with non-governmental funders (philanthropic, businesses, iwi) to build awareness and support for PF2050.	Collectively developed	✔
			6. Revise the national PF2050 Strategy and gain endorsement from Cabinet.	DOC	✔

	2030 Objective	Why this matters now	Where we will focus (outputs)	Led by	Funding
E. We can demonstrate the benefits for Aotearoa New Zealand in achieving Predator Free 2050 and attract the investment needed to achieve the goal					
8	**We understand the ecological, cultural, social and economic outcomes and the associated long-term benefits to Aotearoa New Zealand, as well as the costs of inaction**	To secure a significant increase in funding to accelerate the PF2050 Programme, we will need to be clear on the benefits of PF2050 to Aotearoa New Zealand (ecological, cultural, social and economic) and have evidence to justify it. To date, we have not invested sufficiently in the outcome monitoring required to assess the effectiveness of PF2050 interventions, whether they are having the desired effect or any unintended consequences. While we know that achieving the PF2050 goal will have wide-reaching benefits for the people, environment and economy of Aotearoa New Zealand, along with our standing in the international community, we are lacking concrete analysis on the benefits of action and costs of inaction. PF2050 also plays a role in building climate resilience, and the potential exists for the Programme to help meet international climate obligations. Early work is underway to understand what impact predator eradication is having on carbon stocks and how this can provide an alternative for Aotearoa New Zealand carbon sequestration investment and enable alternative mechanisms to fund PF2050.	1. Establish outcome monitoring under the ANZBS Outcomes Monitoring Framework for all strategic investments and a toolkit for communities to measure impact.	DOC	✔
			2. Commission an analysis of the broad benefits of achieving a predator free Aotearoa New Zealand (cultural, ecological, social and economic) and the costs of inaction.	TBC	✔
			3. Complete a study to understand the impacts of predator management on carbon storage in forests and whether it can improve carbon sequestration for the benefit of biodiversity and climate resilience.	ZIP (in partnership with PF2050 Ltd, NEXT Foundation, and National Institute of Water and Atmospheric Research)	✔
9	**We have an evidence-based business case for investment in Predator Free 2050 that can attract government and philanthropic funding**		1. Initiate co-development of a plan with Treasury to secure funding from 2030 to fund PF2050 to completion.	DOC	✔
			2. Secure co-funding from non-governmental partners to support PF2050 and establish the mechanisms to enable it.	PF2050 Ltd	✔

Appendix 1. Interim Predator Free 2050 Knowledge & Innovation Plan 2024–2030

This cross-system plan identifies priority research and development needs for Predator Free 2050 (PF2050) across the natural sciences, applied management, and research and development (R&D) areas. It includes needs that are:

- across public conservation land (labelled [A]);
- in urban and rural contexts (labelled [B]); or
- considered common across contexts (labelled [C]).

Note: It does not include a social research component, the goals and priorities of which are yet to be developed. A comprehensive process is also being developed to identify mātauranga Māori research goals, with the intent to weave these plans together over time. Nevertheless, the portfolio proposed here should both address tangata whenua needs and aspirations and be co-developed and guided through appropriate partnerships.

A detailed Knowledge & Innovation Implementation Plan containing the specific research questions to address the priorities identified here will be developed as a next step.

Theme	Priorities	Why are these priorities?
1. Refining the toolbox. Allowing end-users to select the right tool with confidence.	**1.1. First-generation genetic control for rat populations** – Addressing the critical need for more cost-effective approaches to rat elimination at scale, particularly in more complex habitats.[B]	Attempting a proof of concept remains a priority for rat elimination. Benefits include having the potential for step-change population control / elimination approaches, potentially being self-disseminating and theoretically more effective than current approaches at low densities, and having a reduced likelihood of non-target effects as a design criterion. Risks to outcome success are reduced by proof of concept already having been achieved for mice and informing development for rats.
	1.2. Improved fundamental capabilities of species-selective toxins – Improving selective toxins to achieve the efficient and more cost-effective elimination of rats and mustelids in predominantly urban and rural contexts.[B]	Underpinning research into the chemistry, pharmacology, and both carrier and target molecular interactions of norbormide (for rat control) and PAPP (for mustelid control) is needed to better overcome barriers to their effective use. While toxin use would remain an issue in some contexts, empowering the better use of these target-selective toxic agents would extend the scenarios in which they can be used. Advances are likely to be made, as this is an under-researched area for these agents.
	1.3. Reduced potential for non-target impacts of toxins – Improving the utility of selective toxins by developing new bait formulations and new delivery mechanisms for their effective use.[B]	Toxins are a mainstay of current landscape-scale elimination efforts and successes, but their use is limited by the potential for non-target impacts.

Theme	Priorities	Why are these priorities?
2. Assessing and refining elimination at scale. Identifying the best scalable tactical solutions for achieving elimination, stratified by key contexts.	**2.1. Mustelid elimination** – Improving selective toxin use and developing approaches for other tools with the potential to achieve elimination in areas where the use of non-selective toxins is not socially acceptable.[C] **2.2. Rat elimination** – Building operational best practice for emerging tools such as norbormide paste bait, and developing suitable approaches for other key tools with the potential to decrease the cost of rat elimination at scale.[C]	No project to date has achieved mustelid elimination without toxin use, and it is likely that trapping alone will be insufficient. However, there are large gaps in our toxin capabilities, and social acceptability in many communities is hindered by the non-specific nature of the currently proven toxins. As for mustelids, no project to date has been able to achieve rat elimination without toxin use, and it is likely that trapping alone will be insufficient. Additionally, elimination achievement has come at a much greater cost than for other targets, and this will likely also be the case in rural contexts. Therefore, greater efficiencies are required for elimination in all contexts.
3. Defending elimination. Developing improved and/or more cost-effective scalable solutions for detecting and removing survivors and reinvaders, and for reducing reinvasion rates.	**3.1. Improved survivor and reinvader detection** – Providing guidance on the best combinations and necessary intensities of detection tools and approaches (detection dogs are one priority).[C] **3.2. Increased cost-effectiveness of detection** – Developing more cost-effective tools and systems for detection at scale.[C]	A critical and widely expressed system need is understanding how to deploy current and new detection tools optimally across a landscape to detect both survivor and re-invader individuals. Each device type may be limited in its ability to detect a species at a very low population density, so combining different methods is likely to increase the overall detection probability both to remove individuals and to allow increased confidence in declarations of eradication. Current approaches to detection still have relatively intensive hardware (e.g. networks of remote thermal cameras) or time (e.g. detection dog use, for which there is also limited national capacity) requirements. Public notification may fill the gap in highly populated areas, but cost-effective approaches are generally needed.
4. Understanding space use by target species. Understanding how target species use the landscape to optimise the distribution of tools.	**4.1. Improved understanding of space use** – Understanding the spatial behaviours of survivors and reinvaders (including landscape pathways).[A] **4.2. Reduced reinvasion** – Increasing the effectiveness of barriers to reinvasion (natural, artificial and combined).[C]	Understanding how target species use a landscape can guide the placement of detection and control devices. As densities are reduced, individuals may use space differently by extending their normal home ranges or aggregating in certain habitat patches within a landscape (refugia), particularly in variable landscapes such as urban and production environments. Similarly, in the reinvasion context, species may select or avoid some landscape components when dispersing, while natural and artificial landscape elements may act as barriers or pathways for dispersal. Understanding how animals use the landscape can inform the optimal distributions and densities of devices for the detection and removal of residual or invading individuals. A combination of physical (natural or artificial) or virtual boundaries paired with mop up tools will be required to ensure the maintenance of predator free areas in the pauses between areas of elimination expanding. Understanding the effectiveness of both natural and artificial boundaries is essential for defending areas post-eradication.

Theme	Priorities	Why are these priorities?
5. Predicting system responses. Understanding the wider ecosystem outcomes of selective species management.	**5.1. Understanding predator guild responses to control.**[A] **5.2. Using prey manipulation to enhance the effectiveness of control.**[A] **5.3. Understanding biodiversity outcomes.**[A] **5.4. Carbon benefits of vertebrate pest elimination** – Aiming to monetise carbon sequestration benefits resulting from PF2050 operations, thus helping to meet the cost of the movement.[B]	There has been increasing interest from project managers about the benefits and/or negative consequences of removing, or significantly reducing the densities of, target species. These effects can potentially include ecological 'release' of non-target pest populations (e.g. mice) through the removal of behavioural suppression or stronger competitors, bait/trap shyness in non-target pest individuals through the non-lethal exposure to tools aimed at other species, and benefits such as positive biodiversity outcomes. Understanding pest guild responses to management can also guide the order of species eradication and may provide insight into using trophic (feeding) relationships to 'supercharge' removal programmes by controlling the target species' food supply to drive increased interactions with traps or baits (i.e. integrated pest management). Continuing efforts to demonstrate and quantify carbon benefits to a standard of proof that is sufficient for policy uptake remains a priority potential new funding stream for the PF2050 movement to pursue. The trials required for such work are a world first in their scale and potential to provide both proof of concept and proof of applicability. The financial design of a mechanism that links carbon benefits to pest control would also be a world first and of interest to governments, non-governmental organisations (NGOs) and conservation efforts globally.