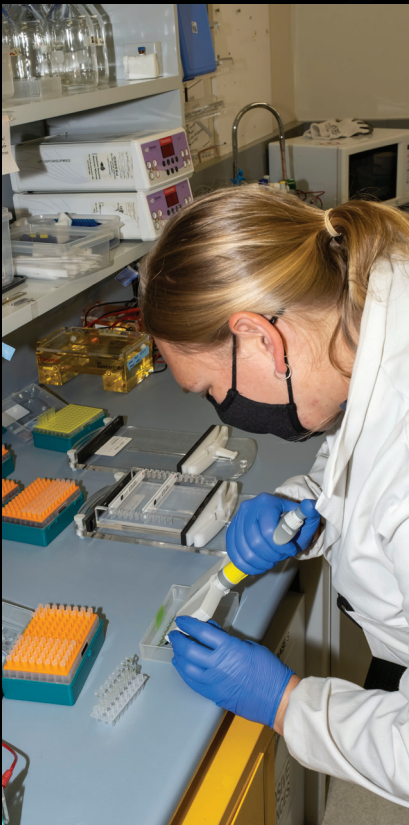




Manaaki Whenua
Landcare Research

STATEMENT OF CORPORATE INTENT

2022–2027






He Kupu Whakamihi

Ki o tātou tini mate kua wheturangitia ki te pō, moe mai rā i te okiokinga roa. Ki a tātou e mahue mai nei ki te ao tūroa hei manaaki tonu, hei tiaki tonu i te whenua me ngā momo koiora kanorau katoa o runga, tēnā tātou katoa. Anei e whai ake nei te Tauākī Whakamaunga Atu a Manaaki Whenua mo ngā tau e haere ake nei (2022–2027).

To those who have gone before us and who now adorn the night sky as stars, we acknowledge you and trust you rest easily in the long sleep. To those of us who still reside here in the world of the living and who continue to nurture and care for the whenua and the many and varied life forms upon it, we acknowledge and greet you also. We present here the Statement of Corporate Intent for Manaaki Whenua for the years 2022–2027.

Cover: Carina Davis in the GEM lab, Lincoln, working with spores of myrtle rust. Centre: Alex Fergus and Ella Hayman measuring trees at Kaituna Valley Scenic Reserve, Canterbury. Right: Ronny Groenteman inspecting horehound plants for grubs, Lake Benmore.

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Chair and CEO overview

SCI 2022–2027 Chair and CEO overview

This Statement of Corporate Intent (SCI) describes Manaaki Whenua’s approach to creating value for Aotearoa New Zealand (AoNZ) through its research, people, and partnerships. It describes how we align our intended research outcomes with government strategies, and indicates our financial position and expected performance over the period. It also shows how our work addresses the UN Sustainable Development Goals.

Our ambition

Kia mauriora te whenua me tona taiao (make the life-force and vitality of the land strong). This requires a positive reciprocal relationship between people and their natural environment – between iwi Māori and their ancestral lands.

Te Tiriti

We are committed to upholding the principles of Te Tiriti in Manaaki Whenua: Partnership, Participation, and Active Protection of Māori interests, especially in the natural environment. We have adopted a waka taurua model linking world views, and our commitment is being followed through with specific actions.

Delivering impact with our partners

To achieve positive impact, we work alongside Māori iwi as the Tiriti partner, central and local government, business and industries, community groups, and the global research sector. Over 90% of our work is funded by government, and we align closely with relevant government strategies.

Our research impacts and outcomes

We focus on four areas of impact: restoring biodiversity and beating invasive species; enhancing land, water, and soils; acting against climate change; and achieving a positive relationship between people and their environment. We target 12 outcomes that reflect our partners’ diverse needs. In *Te Āpōpōtanga Our Land, Our People, Our Future* (2021) we describe examples of our research, collaboration, and uptake that achieve those outcomes.

Research capability

We invest in people to achieve excellence in our research, and to strengthen capability and collaboration. We create the right teams across the spectrum of fundamental and applied science. Our research is ranked by citation indices to be among the leading environmental institutes globally.

Putting people at the centre

We aim to provide for health, safety, and well-being, for an equitable, diverse, and inclusive culture, and for the future of work.

Our strategic priorities

At a time of change in the environment, society, and economy, we have refreshed our 5-year strategic plan to focus on both short- and long-term priorities:

- weaving the principles of Te Tiriti into our fabric
- driving research impact with our partners
- creating a sustainable environment for our people and research to thrive.

Our commitment to the United Nations Sustainable Development Goals

In this SCI we refer to 12 relevant goals and our commitments. Our own climate action comprises our research on mitigation and adaptation; the climate leadership of our subsidiary, Toitū Envirocare; and actions to drive down our emissions and influence our sector.

Investment in our future

We will invest in line with our commitment to the principles of Te Tiriti, in new Māori research leadership, scholarships and interns, and in building our bicultural competencies among staff. We will invest in data science and related infrastructure to keep our work at the forefront of bioinformatics, ecological modelling, and spatial informatics. With government support we will invest in developing a national centre for biological security with other Crown Research Institutes (CRIs) and the Ministry for Primary Industries (MPI) in Auckland.

Toitū Envirocare

Toitū's business has grown significantly in recent years and is poised for further growth in a sector that has been activated by the risks of climate change and the Government's goal of a zero carbon Aotearoa. We will explore investment models that enable this subsidiary to deliver to its potential in contributing to that goal.

Financial outlook

Our financial outlook is influenced by uncertainties regarding the Government's R&D expenditure following Covid and global changes, and potential changes resulting from the Te Ara Paerangi science system reset being led by the Minister for Research, Science & Innovation. Known features of our outlook include the ending of several large MBIE Endeavour research contracts, remuneration expectations across the public sector given restraints and inflation, and the ending of the National Science Challenge contracts in 2024.



Colin Dawson
Chair



Dr Richard Gordon
Chief Executive

About this document

Our Statement of Corporate Intent for the period 2022–2027 provides information for the reader using the same layout as last year but limited to content that outlines changes or new initiatives. This was done deliberately to avoid unnecessary repetition and to keep the document as short and impactful as possible. As with last year’s report, it is organised into three key sections:



Context

We provide the reader with a wider perspective in this section, and explore the strategic and operating environment within which Manaaki Whenua exists.



Intent

We present our commitment to AoNZ through our strategic priorities, as outlined in our updated strategy.



Performance

Finally, we explain how we will measure our performance against our strategic intent and describe our framework for performance monitoring and reporting, and for financial reporting, which we report against in our Annual Report.



Context

Shareholder priorities

The Shareholding Ministers' priorities have been expressed in the 2022 Letter of Expectations. In this section we set out those expectations and our plans in response to them.

Te Ara Paerangi

We wish to acknowledge the support given to the science sector and CRIs, especially during the pandemic, and the opportunities being presented to enhance the system and its impacts through Te Ara Paerangi. We are contributing at several levels to support the latter process: through engaging with the other CRIs, through our own corporate submission, and through encouraging independent submissions from groups within Manaaki Whenua, notably our early-career researchers, our kairangahau Māori researchers, our technical staff, and wider support staff.

Research, Science and Innovation property portfolio

We support the desire to ensure Research, Science and Innovation (RSI) property is distributed for the betterment of the system rather than individual organisations. We note the specific expectation of Manaaki Whenua that in considering the future for our Auckland location we take a systems viewpoint. In this we continue to work with Plant & Food Research, ESR, and MPI on opportunities for co-locating with them at Mt Albert. This work continues to be driven by a strong science system focus to create a national centre for biosecurity, with all four agencies contributing by sharing facilities, expertise, and access to research users. This will become a magnet for overseas engagement and new talent. We will continue our work on the business case for this entity, noting that additional benefits may result from it, such as a centre for Pacific research at a time when climate change and Pacific trade are high priorities. We will provide a concept plan for consideration by September 2022.

Delivering on the Government's priorities

We continue to support businesses through Toitū Envirocare's carbon programmes, which reach around 500 organisations in New Zealand and the UK and are making a significant difference to help the country meet its zero emissions goals. We support the Fit for a Better World programme through our agricultural emissions reduction and future land-use research programmes, and we have strong relationships with the Department of Conservation (DOC) and the Ministry for the Environment (MfE) on conservation and environmental programmes.

Well-being and workforce inclusion

Manaaki Whenua pays close attention to people and culture, including staff well-being and inclusion. For example, in our 2021 staff engagement survey our people scored our commitment to health and safety highest at 95%; and in our review of diversity and inclusion 81% of staff felt accepted and valued as a member of their team. We have clear policies to support diversity and inclusion, and pay equity. Our pay gap for like-for-like jobs is less than 5%, and we are working to close the larger gap for overall job comparisons, which is influenced by the relatively low number of women in senior positions.

Financial resilience

We look forward to supporting MBIE's officials in their work on this theme and to learning from the outcomes of their work. Our financial resilience is good, but always subject to the swings in large contract funding and fixed Strategic Science Investment Fund (SSIF) funding levels, which account for one-third of our research revenue.

Te ao Māori

We have made an important commitment to the principles of Te Tiriti and have a plan of action to deliver on that commitment. Already we have created three new tier 3 roles for Māori leadership of research strategy, which is unprecedented in the CRIs, and have appointed into those roles. We are creating a Te Tiriti Partnership Group to develop a new, inclusive strategy for our biological collections and databases. This group includes senior Māori from related organisations. We have continued to grow our number of Māori and Pasifika staff, and have developed a major programme, Kia Māia, which will enhance the skills and confidence of our non-Māori staff when engaging with Māori.

eResearch and use of information technologies

We strongly support the New Zealand eScience Infrastructure (NeSI) and Research Education Advanced Network New Zealand as critical infrastructure, and will work closely with their other stakeholders and MBIE's officials on their future. In our Strategy 22 refresh we included the development of eResearch and data science as key tools for enhancing the research process, engagement with other researchers internationally, and accessibility to research value by users. We had an external review of our cybersecurity and are implementing its major findings. We have appointed a Tier 2 Chief Information Officer to give extra weight to all these tasks.

Policy and sector trends

The Government is implementing policies for freshwater, biodiversity, and climate change mitigation that provide impetus and focus for us in these key areas of our research. Freshwater quality is heavily influenced by land use. Targets and limits will be an integral part of the legislative direction, where our approach and research will provide valuable contributions. Biodiversity is under pressure from both land-use and predators. Climate change mitigation requires solid understanding of our national, sector-, and our land-based emissions profile and management options. All these are core strengths of Manaaki Whenua's research.

- The national budgets for greenhouse gas (GHG) emissions and proposals for achieving those budgets issued by the Climate Change Commission¹ are highly relevant to our soils, carbon, and indigenous forest research, and to the work of our subsidiary, Toitū Envirocare. In addition to our research on carbon stocks and emissions, our work on indigenous forest and soils as carbon sinks and potential removals will play an increasing role in meeting the national budgets, as recognised in the Commission's report. Manaaki Whenua is also investing in how to create 'climate smart' landscapes that will allow mitigation and adaptation to occur in tandem, and in soil carbon research assessing this important carbon sink. Toitū is helping hundreds of New Zealand organisations measure, manage, and mitigate their carbon emissions, and demand is increasing as organisations recognise the need for and benefits of taking action in this area.
- MfE and Statistics NZ continue their work on State of Environment reporting, which calls on our land and biodiversity knowledge, monitoring, and databases. Manaaki Whenua collaborates in this work, providing many of the information sources for land and biodiversity national reporting. We are also contributing to the Environmental Reporting Act (ERA) review by providing advice on and assistance for what the revised ERA would cover. We also contribute to New Zealand's role in the International Panel for Biodiversity and Ecosystem Services.
- MPI is running the Fit for a Better World initiative, which includes a research accelerator model for creating science-based solutions faster than has been possible through traditional investment pathways. Our skills and research are central to proposed projects on the human dimension of supporting change by land managers addressing climate change, and the landscape-level scenarios for climate change adaptation and resilience.

¹ National budgets in draft at the time of writing.

- Pan-sector groups such as the Aotearoa Circle have initiated projects to lead change towards sustainable and regenerative outcomes. Examples are the Sustainable Finance Forum, Sustainable Finance in the Primary Sector, Mana Kai (food sector), both agri-adaptation and tourism adaptation roadmaps, and indigenous forest carbon sinks, which call on a scientific evidence base. Manaaki Whenua will contribute strongly as a member of the Aotearoa Circle.

Science and technology trends

- There is a global trend to solve complex problems by harnessing big data and capitalising on the opportunities afforded by emerging technologies such as machine learning and artificial intelligence (AI) applications. For Manaaki Whenua, value lies in the ability of these technologies to deliver greater granularity in spatial and environmental data and assist in their interpretation; for example, using remote sensing to differentiate riparian and pastoral land use in the productive landscape.
- There is also a trend for an increased emphasis on opportunities in space. Remote-sensing techniques can be used to minimise ground-intrusive monitoring processes, such as using proximal soil sensing or delineating vegetation cover and land use.
- Molecular biology continues to be a growing field of science that offers new insights and solutions in plant, animal, and soil science, and is also highly relevant to our nationally significant biological collections.
- As more and more data become available as 'open source', there are significant issues to be addressed for indigenous data sovereignty, which we are tackling by working with Māori on a strategy for our databases through our Te Tiriti Partnership Group.
- Genomic technologies continue to offer solutions in different fields relevant to our work, but social licence to operate remains a hurdle in New Zealand. Manaaki Whenua has an interest through its membership of Genomics Aotearoa and will monitor developments as the public debate continues.

Science system trends

- Cross-CRI collaboration is a tool of growing importance for providing more impactful science and research. Examples of this are the Joint CRI Covid response taskforce, the cross-CRI Resilient Agriculture initiative, and the MPI research accelerator within the Fit for a Better World programme.
- We have participated fully in the consultation initiated by MBIE for their Future Pathways green paper and look forward to the opportunities that will be afforded the science sector in the future.
- Solving complex environmental problems requires integrated research (usually involving multidisciplinary teams). Engaging people and communities in helping develop solutions is important to ensure subsequent adoption. As a result there is an increasing trend for putting people at the centre of research in order to enhance the delivery of outcomes and impact.

Te Tiriti

Māori and the Crown are partners in Te Tiriti. As a CRI, Manaaki Whenua seeks to fulfil its role and responsibilities to uphold the principles of Te Tiriti, the first of which is partnership. After 30 years of working closely with Māori in various rohe (tribal regions) and with a number of hapū and iwi, we consider that we are still at an early stage of our journey towards genuine partnership. Manaaki Whenua shares many interests with Māori in te taiao (the environment) and in the relationship between te taiao and tangata whenua, the indigenous people of this land. These interests extend to understanding environmental change, and the institutions and processes used in society for managing that change.

Our common interests also include exploring the opportunities for future land use to meet the aspirations of hapū and iwi as kaitiaki (guardians) of the land and environment to sustain their people.

As Māori develop future land uses, Manaaki Whenua can play an increasing role by bringing “western” research-based understanding and capability to complement Māori research and Mātauranga in evaluating land-use options.

These common interests reflect another principle of Te Tiriti: the active protection of Māori interests (here, in te taiao). In this context, the plants, animals, and fungi held in the national collections that we curate are taonga (treasures) collected from the rohe of individual hapū and iwi. We therefore have a common interest in the governance of those collections and the taonga they contain, for the benefit of te taiao and future generations.

Partnering for impact

Finding and implementing solutions to the complex environmental problems facing AoNZ requires multiple stakeholder inputs and a research approach that can integrate those inputs and the relevant research disciplines. This goes beyond simple collaboration in research projects to encompass enduring, partnership-based relationships.

Partnerships take many forms across the science system and the public and private sectors. Through our subsidiary, Toitū Envirocare, we can partner with and support New Zealand businesses with their carbon management goals; through the National Science Challenges we can partner across the science system for impact in some of AoNZ’s greatest environmental challenges; and by partnering with the private and public sector we can develop real-world solutions based on our research. For example, we have worked closely with MfE, MPI, and the Northland region on expanding coverage of S-map to provide better underpinning soils information for current and future decisions.

National Science Challenges

Manaaki Whenua is proud to host the New Zealand’s Biological Heritage National Science Challenge (Bioheritage NSC), which is one of AoNZ’s 11 NSCs. We share common goals with the Bioheritage NSC and seek to maximise the impact of our research through alignment with the Challenge and its extensive network of collaborating parties and Māori stakeholders.

We also contribute to five more NSCs, which provides an important pathway for Manaaki Whenua’s work to achieve our ambition:

- Our Land and Water – Toitū te Whenua, Toiora te Wai
- Deep South Challenge: Changing with our Climate – Te Kōmata o Te Tonga (e.g. risk-based flood insurance pricing in AoNZ)
- Resilience to Nature’s Challenges – Kia Manawaroa – Ngā Ākina o te Ao Tūroa (e.g. Resilience in Practice Model programme)
- Building Better Homes, Towns and Cities – Ko ngā wā Kāinga hei Whakamāhorahora (e.g. Huritanga – Towards socio-ecological well-being-led urban systems in an era of emergency)
- Sustainable Seas – Ko ngā Moana Whakauka.

Our social researchers are becoming increasingly involved as the importance of the human dimension in achieving the Challenges’ aspirations becomes clearer.

Toitū Envirocare

Toitū Envirocare (formerly Enviro-Mark Solutions) is a wholly owned subsidiary of Manaaki Whenua. It contributes to Manaaki Whenua’s strategic goal of environmental sustainability by growing the number of organisations measuring and reducing their greenhouse gas emissions and other environmental impacts. It also contributes significantly to the Government’s and many organisations’ target of being zero carbon by 2050. The fact that Toitū is founded on science and is in government ownership means a great deal to members of Toitū’s programmes.

Having a subsidiary that can engage organisations at scale contributes greatly to Manaaki Whenua's purpose of ensuring New Zealanders have the knowledge, understanding, and tools to live in harmony with the natural environment. We will continue to invest in Toitū's ability to scale its offerings and extend its scope across sectors to help achieve 'zero carbon New Zealand' and carbon neutral government.

Science and private sector partnerships

Science and private sector partnerships continue to be key to Manaaki Whenua's approach, including:

- many research collaborations in AoNZ with CRIs, universities and other research providers, including joint postgraduate schools that enhance the talent pipeline
- emerging international research partnerships (e.g. INRAE in France and Wageningen University & Research in the Netherlands)
- relationships with key government Ministries (e.g. the Department of Conservation, Ministry for the Environment, Ministry for Primary Industries, Ministry of Foreign Affairs and Trade, and Land Information NZ)
- commercial entities (e.g. Dairy NZ, Beef & Lamb NZ, Fonterra, Orillion).

These partnerships are critical for delivering impacts that benefit AoNZ. Areas of emerging focus are:

- links where good strategic alignment exists, both in AoNZ and overseas
- new horizons for our data science
- capability and capacity
- community connections
- predator control technologies.

Disruption

Last year we wrote about the increasing need to respond to disruption. This is an ongoing priority and drives much of our strategy.

Global disruption continues in the form of the Covid-19 pandemic, climate change, losses of critical habitat and biodiversity, and social and technological changes. This disruption is also affecting our partners and the rest of the science sector: their needs are increasingly complex and finding solutions is more urgent.

- Technology disruption is almost constant. For example, advances in genomics, remote-sensing technology, big data, machine learning, and artificial intelligence (AI) will, in time, reshape the way we do research and deliver benefit to our users.
- Our market, once a stronghold of institutes and universities, is increasingly open to a range of entrepreneurial providers. We will see the advance of this entrepreneurial influence in applied research and technology development.
- The global impact of Covid-19 is seen by many people as a 'dress-rehearsal' for the increasing impacts of climate change and the climatic extremes that scientists have for many years predicted.

The CRI green paper *Te Ara Paerangi* is another input into the change likely in the wider science sector.

We are focused on developing an organisation that is agile, and whose people, processes, and systems are resilient but able to adapt to change. Our response will be built around three key elements:

1. culture – developing a culture that supports our people through disruption
2. research competencies – investing in the research competencies needed to support and navigate society through disruption
3. partnerships – continuing to seek partnership with others, combining talents to deliver benefit to AoNZ



Intent

Our ambition and purpose

Our ambition

Kia mauriora te whenua me tōna taiao (make the life-force and vitality of the land strong). This requires a positive reciprocal relationship between people and their natural environment – between iwi Māori and their ancestral lands.

Connecting tangata whenua and tangata tiriti with our ambition for our land

Previously, our vision focused on a future state of our land environment. With this refresh, we recognise the connection between people and the land environment.

Our new ambition puts a responsibility on people and requires a positive reciprocal relationship between people and their natural environment.

In pursuing our ambition, we build understanding, capability, and confidence for people whose decisions influence the natural environment.

Our purpose

Agreed in 2010, our Statement of Core Purpose (SCP) is 'to drive innovation in New Zealand's management of terrestrial biodiversity and land resources to protect and enhance the terrestrial environment and grow New Zealand's prosperity'. Under the Crown's SCP for Manaaki Whenua, we are mandated to be the lead CRI provider for:

- improving the measurement, management, and protection of AoNZ's terrestrial ecosystems and biodiversity, including those in the conservation estate
- achieving the sustainable use of land resources and their ecosystem services across catchments and sectors
- improving the measurement and mitigation of greenhouse gases in the terrestrial biosphere
- increasing the ability of AoNZ industries and organisations to develop within environmental limits and meet market and community requirements.

Research impacts and outcomes

Under our Strategy 22 refresh in 2021/22 (see following pages) we have modernised our research impacts to focus on four interlocking themes, and we have identified 12 research outcomes, reflecting the needs of our partners in government, Māori, industry, and the public, and science sectors.

Te Āpōpōtanga (the future)

In 2017 we developed Strategy 22 – our strategic priorities for the 5 years to 2022. As we approach the end of that period, significant changes are occurring in our operating environment, so we chose to update Strategy 22 for a 2- to 3-year transition period. This is called Te Āpōpōtanga.

Since 2017 we have achieved significant gains under the three pillars of Strategy 22: our culture, ways of working, and enhancing the impact of our science. Many of those gains, described in our Annual Reports, have been built into our business as usual and continue.

Te Āpōpōtanga has identified goals and priorities for the next 2–3 years. The desired outcomes of these are summarised below.

Strategic goal 1. Weave the principles of Te Tiriti into our fabric

The Treaty principles will guide Manaaki Whenua: to a balanced state of partnership with hapū, iwi, and Māori land trusts/incorporations; in finding inspiration and value while engaging science and mātauranga; in influencing our strategic leadership towards equitable outcomes; and in growing both the number of Māori researchers in the organisation and our networks among iwi and hapū.

Strategic goal 2. Drive research impact with our partners

Together with our partners we will prioritise AoNZ's needs from research (now and in the future) and develop strategic investment pathways. Research impact will be accelerated through user-centred developments. We will leverage data and digital technologies where they add value.

Strategic goal 3. Create a sustainable environment for our research and people to thrive

We will ensure our people have the right environment and personal development in which to work to their greatest potential, so that Manaaki Whenua fulfils its national role and sustains and grows its national and global impact

Key initiatives under each goal

In Strategic goal 1:

- 1.1 Bring external Māori into our leadership processes as partners, collaboratively shaping our strategy.
- 1.2 Support iwi as kaitiaki through internal Māori leadership and co-leadership of our research.
- 1.3 Enhance participation of Māori in Manaaki Whenua through supporting new kairangahau (Māori researchers) into a research career with pathways to senior roles.

In Strategic goal 2:

- 2.1 Prioritise AoNZ's needs from research (now and in the future) together with our partners and develop strategic investment pathways.
- 2.2 Invest in our research and innovation in ways that accelerate its impact.
- 2.3 Leverage data science and digital technologies to increase value for our users and customers.

In Strategic goal 3:

- 3.1. Adapt global trends in the Future of Work to meet our needs in Manaaki Whenua.
- 3.2 Be proactive in 'making our future' through the science system reset.
- 3.3 Enhance our project lifecycle systems and processes using human-centred design and effective change management.

Our four research impacts



Enhancing soils, water, and land



Soils are critical to our productive and natural landscapes, and their health is thus central to society's well-being. One of the greatest challenges facing regional and national agencies, and the food and fibre sector, is the integrated management of land and water to provide sustainable production, while simultaneously protecting downstream ecosystems and supporting diverse community and iwi values. Soils hold more water than our rivers, lakes, and aquifers. They are the pathways for pollutants from land use, and the source of sediment entering waterways from erosion. Soils are being lost by erosion from productive lands at unsustainable rates. Our work provides understanding of soils, capability to manage the effects of land use, and confidence to deploy mitigation approaches.



Restoring biodiversity, beating invasive species



AoNZ's indigenous biodiversity evolved in isolation and much is globally unique. We curate national and Pacific collections of biodiversity on land (plants, invertebrates, fungi, and microorganisms), and our research helps users understand and value its richness, observe changes and risks from exotic species, and find new uses for biological materials. Our research provides understanding of how ecosystems function, the threats they face, and how they can be restored. The potential for Māori whānau, hapū, and iwi to generate economic returns from indigenous plants continues to be a strong area of interest. We contribute to national biosecurity through providing capability and confidence in assessing biological threats and using control tools – especially at landscape scales – for weeds, pests, predators, and diseases.



Action on climate change



Climate change is the major challenge of our generation and is of specific concern to Pacific island nations. Over two decades we have redirected our research to focus on understanding AoNZ's emissions balance, supporting mitigation, and enabling adaptation and resilience to climate change. Our research has supported AoNZ's international emissions reporting, and has provided an understanding of carbon stocks in our indigenous forests and in the soil. We have designed and supported pathways for carbon sequestration and for businesses and communities to take meaningful climate action. Our Toitū Envirocare subsidiary has enabled hundreds of organisations to plan and achieve certification of their emissions management. Increasingly, Toitū members are offsetting their emissions to become carbon zero.



People and environment



Since 1996 Manaaki Whenua has built social, cultural, and economic research capability to understand people's decision-making in matters of the natural environment. We now have one of the largest dedicated groups in the Southern Hemisphere. The audience for results from this research is diverse – including central and local government, Māori organisations, primary industry, businesses, NGOs, and communities – because all parts of society affect natural resource management. Our research spans rural, conservation, and urban landscapes, and the full range of ecosystem services viewed from both Western science and indigenous knowledge systems. It supports improved natural resource decision-making in AoNZ and in the Pacific. This work is integrated with our work in all impact areas where people need improved tools for decision-making, policy, governance, regulation, planning, and strategy development.

Much of our research work is focused where these research impacts overlap. This integration is important to many of our partners, who must address issues collectively and not in isolation. Our partners address not only the integration of land, water, and biodiversity, but also the integration of social, economic, and cultural dimensions.

Our research has 12 research outcomes, which are needed by our partners.



Our research outcomes



1. Critical knowledge of the wealth, state, and trends in our biodiversity, soils, and lands informs natural resources decision-making



2. Hapū and iwi act confidently as kaitiaki of their whenua using science and mātauranga Māori



3. Māori land trusts and incorporations achieve their aspirations for their land



4. Ecological restoration is guided by knowledge of past and present ecosystems



5. Land-use, soils, and erosion are managed to improve freshwater quality



6. Productive lands are regenerative at the landscape scale



7. Risk and harm from invasive organisms are mitigated



8. Biosecurity tools are available with social licence



9. Communities and regulators have adaptation pathways for climate change



10. Greenhouse gas emissions and removals are managed to mitigate climate change



11. Environmental decisions are underpinned by advanced geospatial information



12. National environmental outcomes are improved by integrating social practice theory, policy tools, and economics

Our science and technology goals

Research priorities by portfolio

Our research is clustered into seven investment portfolios in which work is combined across different revenue sources. The list below shows the current research themes by portfolio, which evolve according to our partners' needs and our success in contestable bidding. Each theme is connected with one or more of our 12 research outcomes.

Society, Culture and Policy

- enable integrated policy and management across landscapes and people
- rangahau mō te kaitiaki (research for the kaitiaki)
- understand environmental preferences, attitudes, and behaviour (e.g. Survey of Rural Decision Makers)
- enable better-informed and more transparent resource management decisions to enhance system resilience (e.g. work with the Building Better Homes, Towns and Cities National Science Challenge, and Northland Regional Council)
- inform and improve environmental policy and governance.

Climate Change Adaptation and Mitigation

- integrate the management of carbon, water, and nutrients (e.g. improved pasture management for multiple outcomes)
- develop accurate quantification of, and changes in, terrestrial greenhouse gases (GHGs) and carbon stocks to further refine AoNZ's reporting under the Emissions Trading Scheme
- develop and evaluate cost-effective technologies to mitigate terrestrial GHG emissions (e.g. inhibitors of nitrous oxide emissions from pastures)
- determine the biophysical and socio-economic consequences of climate change
- design land-based climate adaptation solutions and pathways for AoNZ that build on biodiversity and ecosystem services.

Characterising Land Resources

- characterise soil attributes and their spatial variability (e.g. using S-map for improved land-use decisions at local and government level)
- generate credible spatiotemporal land-cover and land-use data (e.g. the Land Cover Database to enable understanding of how AoNZ's land cover is changing and to help inform environmental reporting and policy development)
- map and characterise ecosystem services, and enable scenario analysis to test policy interventions
- integrated modelling of land resource information, including uncertainty and its implications for land sustainability and resilience (e.g. policy development, community-led decision making, and economic and social development)
- deliver online multi-platform access for stakeholders to AoNZ land resource data.

Managing Land and Water

- protect and improve soil and ecosystem health (underpinning policy and decision making for regional councils and landowners)
- understand erosion processes and manage sediment impacts in rivers (e.g. SedNet, an erosion and sediment prediction model supporting regional councils and the National Policy Statement for Freshwater Management [NPS-FM])
- integrate land and water management, including catchment policy implementation (to meet sustainability and NPS-FM requirements).

Biota

- enhance and enable identification and understanding of plants, arthropods, fungi, and bacteria, to underpin AoNZ's biosecurity
- manage and improve the collections and databases that underpin AoNZ's biodiversity and biosecurity management systems
- develop and promote systems to enhance awareness of and access to data from our biological collections and databases (e.g. new informatics platforms to make data easily available).

Plant Biosecurity and Biodiversity

- develop tools and methods to beat weeds (e.g. culturally acceptable ways to manage weeds)
- determine ecological baselines for ecosystem conservation (e.g. DNA techniques to reconstruct our unique biodiversity)
- increase understanding of ecosystem resilience and how to protect and improve it (e.g. potential impact of myrtle rust)
- identify and apply weed biocontrol agents (e.g. against broom)
- harness molecular ecology for biosecurity and biodiversity
- measure and interpret biodiversity change and its implications (e.g. remote sensing).

Wildlife Management and Conservation Ecology

- investigate the outcomes of different management regimes for species and ecosystem conservation (e.g. modelling outcomes from management)
- support biocultural approaches to biosecurity and biodiversity (e.g. indigenous knowledge of native ecology)
- guide and evaluate effective landscape-scale predator eradication (e.g. supporting eradication initiatives)
- develop safe and cost-effective vertebrate predator control tools and technologies (e.g. species-specific toxins)
- support TB freedom and wildlife disease management (e.g. surveillance and eradication programme design).

Our future capability

Workforce and the future of work

Covid-19 has rapidly reshaped expectations and practices relating to work. Having embraced these drivers, we expect the following to be enduring changes:

- a flexible approach to remote ways of working, which involves continuing to reduce our travel carbon footprint, and efficient use of our physical assets
- an increased use of virtual communication to add value for our partners, including convening stakeholder groups.

Building capability within Manaaki Whenua

Manaaki Whenua is committed to the development of the capability of our people. Every staff member has access to at least 3 days a year of professional development. Our focus for 2022 will be on leadership development. We have partnered with the New Zealand Institute of Management and Leadership and have six staff members attending their Emerging Leaders Programme in 2022. Two programmes specifically designed for Manaaki Whenua will be piloted in 2022:

- Leadership Capability, for frontline leaders
- Empowering Leaders, for our second- and third-tier leaders.
- Manaaki Whenua runs annual Talent and Succession & Capability Review processes for our science staff. The outputs of these processes inform focus areas for career development.

Building a diverse and inclusive work culture

A key facet of our culture is embracing diversity. This recognises that complex (or wicked) problems, such as climate change, will only be solved if we can bring together a diversity of thought, experience, values, perspectives, and skills. To help us navigate this journey we established an internal Diversity and Inclusion working group. The group annually reviews its priorities and focuses on a wide range of diversity issues, including building bicultural capability among staff through Māori language training, recognising and celebrating neurodiversity, and introducing staff training on unconscious bias.

Our challenge has been to lift the proportion of Māori and Pasifika staff to better represent national demographics. We recently supported a new approach to our Intern programme with four Māori and two Pasifika interns, helping to build future pathways into the organisation.

Manaaki Whenua produces an annual Gender and Ethnic Pay Gap report, which includes an action plan to support a reduction of the pay gap. This analysis, supported by an independent investigation by an external consultancy, highlighted the lack of women in senior positions at Manaaki Whenua as the main driver of our vertical pay gap. Our focus will be on ensuring the activity in our action plan is achieved and that we follow the recommendations and best practice outlined in *Kia Toipoto*, the Public Service Commission's Action Plan.

Capability in science

Science staff levels are stable (approximately 260 full-time equivalents). Given our recent increases in soil science capability to support research on improved freshwater quality, the stable staffing mostly reflects natural attrition in systematics and ecosystems. We are continuing to increase support for data science and digital tools through increased recruitment in research software development.

- We have recruited three senior kairangahau Māori to leadership roles to give effect to our Treaty commitments within Manaaki Whenua's four impact areas. We are expecting a te ao Māori perspective to form a natural integrative platform for much of our research as we look to the future, and we will seek to increase our capability accordingly.

Māori partnership

With our Statement of Commitment to Te Tiriti now signed, and three new kaihautū third-tier Māori leaders recruited, work is now gathering pace to embed Te Tiriti principles into our operating model. For example, following the review of our collections and databases, we are creating a Te Tiriti Partnership Group to oversee the implementation of a comprehensive strategic plan to connect hapū and iwi to the taonga we hold on their behalf as our Te Tiriti partner. Te Rōpū Rangapūtanga Tiriti mō ngā Kohinga, Raraunga hoki a Manaaki Whenua will have an inaugural membership drawn from across Māori perspectives in indigenous data sovereignty, Wai262 claimant voices, and iwi and Māori land trust lived experiences, as well as key end-users.

This will help to inform an initiative with other CRIs to develop a standard policy on Māori data sovereignty by June 2024.

The new kaihautū have started their critical engagement with Research Portfolio Leaders. There is an expectation that each Portfolio Leader will co-develop their 3-yearly Portfolio Strategy, Annual Portfolio Plan, and overall SSIF allocations with one or more kaihautū. This expectation is in keeping with the principle of increased Māori co-design and co-leadership of our research agenda, as signalled in our recently signed Statement of Commitment to the Principles of Te Tiriti o Waitangi.



Stewardship of our unique biological heritage is every New Zealander's responsibility. However, our biological heritage is under threat from invasive organisms and new pressures emerging in a rapidly changing global environment.

The mission of New Zealand's Biological Heritage National Science Challenge (the Bioheritage NSC) is to reverse the decline of AoNZ's biological heritage through a national partnership to deliver a step-change in research innovation, globally leading technologies, and community and sector action.

There is no single solution: it is a complex problem, and AoNZ's environmental, economic, and cultural prosperity are heavily dependent on our biological heritage. The Bioheritage NSC brings together researchers across institutions and disciplines, communities, agencies, and knowledge areas (mātauranga Māori, Western science) to transform understanding and the ways we manage our biodiversity, improve biosecurity, and enhance resilience to harmful organisms.

The Bioheritage NSC is hosted by Manaaki Whenua. It comprises 18 formal collaborating Challenge Parties, along with a network of communities and partners spanning the research and innovation sector, communities, non-government organisations, business and industry, and the public. Manaaki Whenua is contracted by MBIE to deliver the Bioheritage NSC work programme, along with a national platform, Ngā Rākau Taketake: Saving Our Iconic Trees, via the SSIF.

With \$37.8 million in National Science funding and an additional \$33.4 million for kauri dieback and myrtle rust research through Ngā Rākau Taketake, the Bioheritage NSC has an integrated research programme and strategy focused on strategic outcomes and impacts. Three impact areas that structure the research are:

- Impact 1: Whakamana • Empower – New Zealanders value our biological heritage, understand how it is changing, and are inspired to take action to protect it
- Impact 2: Tiaki • Protect – New Zealand's biosecurity system is world class
- Impact 3: Whakahou • Restore – New Zealand's natural and production ecosystems are resilient and thriving.

Manaaki Whenua supports and works closely with the Bioheritage NSC to deliver its research strategy and mission through key roles on the leadership team, general management, and administration, along with researchers and strategic alignment of our SSIF and other investments. A commitment to and focus on new ways of doing and approaching science, and generating new knowledge and tools, in a Treaty-led model in partnership with Māori, is critical to building additionality and impact, and ultimately to reversing the decline of our biological heritage (<https://bioheritage.nz/>).



Context

Over the past 12 months there has been further rapid acceleration in climate action and disclosure, both domestically and overseas.

The high-profile COP26 meeting in Glasgow in November 2021 further increased awareness of the urgency of climate action, reinforced by the IPCC AR6 report, which confirmed the scientific consensus on the causes and impacts of the climate crisis.

Within the AoNZ context there has been a significant shift in momentum, including the Climate Change Commission advice, the commitment to a carbon neutral government by 2025, the legislation to require climate-related financial disclosure by major listed entities, and He Waka Eke Noa, addressing the agricultural sector.

Since 2001 Toitū's programmes have ensured that AoNZ companies benefit from international best practices, applied science, and effective tools. For example, we produced the first internationally accredited GHG certification scheme. Though developed for AoNZ business needs, our offerings now serve over 700 clients worldwide.

Since 2006 we have certified over 3,100 GHG inventories for companies from AoNZ and overseas, representing more than 213 million tonnes of GHG emissions. Through our Toitū carbonzero and Toitū carbonreduce programmes we have helped these companies measure, reduce, and compensate for their carbon emissions. On average, our members achieve over 20% reduction in emissions in a 3- to 5-year period. In the last financial year alone our global members reduced 674,345 tonnes of emissions compared to their respective base years.

Toitū Climate Positive, launched in 2021, goes beyond operational emissions to help organisations understand and engage with the emissions impact of their supply chain – an increasingly vital aspect of overseas compliance and competitiveness – as well as achieving reductions in line with climate science and ensuring a net positive impact on the climate annually.

Intent

Toitū's vision is captured in the following statement:

Our purpose is to catalyse action for a zero-carbon future.

Expanding on this statement, we have developed the following outcome that will underpin AoNZ's climate action:

Every organisation in Aotearoa, public or private, knows their carbon emissions, has an ambitious plan to reduce them, and is aggressively executing that plan.

Our aim is to maximise our impact to enable AoNZ to achieve its 2050 net zero goal. We want to ensure active sustainability (kia toitū te noho a te tangata ki te ao tūroa). We want to provide expertise (ngaiotanga). We must be people-focused and customer-led (manaaki tangata).

Toitū's platform and advice provide valuable data and inputs to help AoNZ meet its Te Tiriti o Waitangi obligations, where understanding the sources of emissions will assist in mitigating the impacts to Māori iwi and hapū, who stand to be among the hardest hit by climate change. There is a significant opportunity for Māori-owned businesses and farms to differentiate through being low-carbon operators and to benefit from sequestration on Māori-owned land.

Toitū is now in year 2 of its reset strategy, and is planning for year 3. The first 2 years have been delivered in line with the plan. As we continue to work to increase the ability of AoNZ industries and organisations to develop within environmental limits and meet market and community requirements, we are prioritising the following strategic imperatives, unchanged since last year.

- *Expand our reach:*
 - ensure our equitable, cost-effective, and fit-for-purpose products and services are available to a wider cross-section of the economy
 - expand our team, build partnerships, and leverage digital capabilities to reach more prospects
 - develop capability to respond to the emerging needs of specific sectors (e.g. agricultural, financial, infrastructure, government, Māori business)
- *Create the ecosystem:*
 - develop our role within the wider climate action ecosystem, promote best practice and expand capability
 - identify and work with complementary partners to make client action easier and more seamless
 - remove duplication of effort across the sector
 - work with partners to develop a thriving New Zealand Voluntary Carbon Market that enables AoNZ businesses to play their part in decarbonising the economy and achieve our national 2030 and 2050 goals.
- *Educate and advocate:*
 - invest more time and effort into making our knowledge and expertise available to current and potential clients, including running webinars, publishing relevant content, and sharing our expertise across relevant forums
 - ensure our carbon programmes and the associated claims remain aligned to international best practice
 - educate our clients about evolving standards and expectations and support them to remain current.
- *Make action easy:*
 - invest in our internal systems and processes to make it easier for our people to do their work efficiently and with high quality
 - build on our legacy systems and processes, redesigning them to enable greater scale, higher efficiency, and fewer errors.

Toitū has doubled in size over the past 2 years – in terms of client numbers, employee numbers, and revenue. As we continue to grow we are considering investment in strategic transformation to enable ongoing rapid growth that will meet the needs of AoNZ and international organisations seeking to take meaningful climate action.



Performance

External review and input

Science Advisory Panel

In 2021/22, with input from our Science Advisory Panel (SAP) chair and supported by specific domain expertise, we reviewed our (biological) Nationally Significant Collections and associated research. The purpose of the review was to understand how we can derive greater value for AōNZ. Part of the review involved a hui with senior Māori experts to explore what being a good Treaty partner means for our collections and databases.

In 2022/23 we will start implementing the recommendations from the review. To do this we will establish a Te Tiriti Partnership Group, comprising key Māori and representatives from MPI, DOC, and the Museum of New Zealand. With them we will determine how to implement the recommendations from the review, and co-develop a strategic plan across all the collections and databases and prioritise the key actions. Going forwards, the Te Tiriti Partnership Group will review progress annually and agree priorities for use of SSIF for the following year. In light of this significant work, we will not undertake a SAP review of science excellence in 2022/23, having just completed a 3-year cycle of reviews that has covered all our research. SAP reviews of science excellence will recommence in 2023/24.

Outcome Advisory Panel

We continue to draw on the Outcome Advisory Panel (OAP) to understand current and future stakeholder needs and how we are delivering on information required. With retirements and end-of-term changes for the OAP, the make-up has changed to reflect current drivers and the direction of Te Āpōpōtanga, with representation now from the local government sector and Māori agribusiness.

The OAP continues to provide valuable feedback on a twice-yearly basis, enabling our Board to hear feedback from the sectors represented by the OAP members. For next year, the focus will be on engaging with the OAP on Manaaki Whenua's revised strategic direction. This process began at the February 2021 meeting, where initial discussions on strategic impact goals were explored, providing necessary feedback to help our direction with the development.

Performance monitoring and reporting

Non-financial performance indicators²

Indicator	Measure	2020/21 actual	2021/22 forecast	2022/23 target
End-user collaboration	Revenue per FTE from commercial sources (\$000s) ^{a,b}	\$60.5	\$60	>\$60
Research collaboration ^{a, b}	Percentage of papers co-authored (total)	90.1%	86%	75–90%
	Co-authored with other AoNZ organisations	28.5%	30%	25–30%
	Overseas co-authors	40.0%	36%	30–35% ^c
	Both AoNZ and overseas co-authors	21.7%	20%	20–25% ^c
Technology knowledge exchange and	Commercial reports per scientist FTE ^a	0.79	0.75	0.75–0.85
	Availability of data from our SSIF-funded databases, collections, and information systems (assessed by a variety of metrics appropriate to each; metrics online)	Increasing trends Refer to annual reports for detail		
	Response rate for requests to our SSIF-funded biological collections and associated infrastructure (specimen transactions, identifications, visits)	98%	98%	>95%
	New and improved products, processes, and services	41	40	>35 ^c
	Presentations to stakeholders and community groups	113	94 ^c	100 ^c
Science quality	Impact of scientific publications (mean journal citation score) ^{a,b}	4.0	4.0	3.5–4.5
Financial indicator	Revenue per FTE (\$000s) ^a	\$213	\$239	\$240
Stakeholder engagement and feedback	Percentage of relevant end-users who have adopted knowledge and/or technology from Manaaki Whenua ^{d, e}	64%	64%	>65%
	Percentage of relevant funding partners and other end-users that have a high level of satisfaction in our ability to set research priorities ^{d, f}	48%	48%	>60%
	Percentage of stakeholders involved in a specific research team/partnership that have a high level of confidence in our ability to form the best team for the collaboration we are involved in ^{b, d, f}	58%	58%	>65%
	Staff invited to participate in stakeholder meetings or workshops.	145	104	100 ^c
Vision Mātauranga	Number of positive strategic partnerships with iwi and Māori organisations in which we link science and mātauranga, and address Māori goals and aspirations ^b	112	80	>100
Commercialisation	Number of new and existing licensing deals involving Manaaki Whenua-derived IP (including technologies, products, and services)	23	25	20–25
High-performance culture	Staff engagement in survey evaluations	75%	75%	>80%
	Staff retention rate	93%	90%	>90%

^a Generic indicators required by MBIE across all CRIs are at the Manaaki Whenua Group level; the rest are at Parent level.

^b Common with or related to SSIF Programmes Investment Contract key performance indicator(s).

^c Uncertainty due to ongoing effects of Covid-19.

^d Based on an internally run stakeholder survey administered biennially.

^e Does not include survey respondents who were unsure.

^f Those who scored 8, 9, or 10 on a 0–10 scale.

² Indicators for operational areas such as good employer, health, and safety, and our environmental performance, can be found on our website: www.landcareresearch.co.nz/about/sustainability.

UN Sustainable Development Goals and Well-being Targets

As a signatory to the United Nations Sustainable Development Goals (SDGs), AoNZ reports on its progress towards meeting each of the 17 goals. As the CRI for our biodiversity and land environment, Manaaki Whenua directly contributes to this country's responses and responsibilities. Since their release in 2015, the SDGs have provided an internationally accepted and comprehensive framework for sustainable development to be used by governments and organisations. In its reporting, AoNZ aligns its well-being framework with the SDGs.

Our assessment of the alignment between our Strategy goals and the SDGs, which involved a materiality evaluation among key stakeholders, was initially reported in our Annual Report for 2019/20 and then further developed in 2020/21. We have now established a priority list of 12 SDGs relating to our science and to our strategy as an organisation. Our process has been certified as meeting the AA1000 global standard.

We have used those 12 goals as the framework for our Sustainability Policy and have worked towards setting our own targets. In Appendix 3 we indicate the SDGs to which our research and organisational activities contribute, and also show our progress with the SDGs as a framework for our target setting. Our experience of target setting for the SDGs has been that targets and KPIs are more readily set in the management of our operations, which is under our control, than in the impact of our research, where we are dependent on the actions of others.

Financial reporting

Group financial performance and position

For the financial year ending 30 June	2021/22		2022/23		2023/24		2024/25		2025/26	
	Target	Forecast	Target	Target	Target	Target	Target	Target	Target	Target
Revenue	104,143	102,069	115,624		112,955		107,083		113,109	
EBIT ¹	1,598	1,531	(799)		411		1,454		4,130	
NPAT ²	1,015	1,218	(199)		528		1,161		2,992	
Total assets	83,475	109,427	110,669		112,982		114,183		116,862	
Capital expenditure	7,724	5,567	7,041		9,858		23,496		23,639	
Dividend	\$Nil	\$Nil	\$Nil		\$Nil		\$Nil		\$Nil	
Equity ratio ³	59.6%	50.9%	45.8%		45.2%		45.8%		47.2%	
Gearing ⁴	\$Nil	\$Nil	\$Nil		\$Nil		\$Nil		\$Nil	

Explanatory notes to table

¹ EBIT: earnings before interest, financial lease charges and tax, and after committed business development expenditure and technology service expenditure.

² NPAT: net profit after tax.

³ Equity ratio: average shareholders' funds ÷ average total assets.

⁴ Gearing: interest-bearing debt ÷ interest-bearing debt + shareholders' funds, expressed as a percentage.

In 2022/23 Manaaki Whenua's revenue is budgeted at \$115.6 million, up by \$13.6 million compared with the 2021/22 forecast. This reflects:

- increased revenue as a result of Covid delays (which impacted revenue in FY22), additional revenue from the sale of land, and increased revenue from Toitū activity, reflecting market conditions.

Revenue risk continues to be high in 2022/23 as several MBIE Endeavour research investments come to an end. The business remains confident that other project bids will be won to backfill the projects that are ending.

The Manaaki Whenua Board is presently considering strategic investment in Toitū Envirocare to realise its full potential to help AoNZ meet its zero carbon goals. This investment and its return are not shown in the above table.

Return on equity (Appendix 1)

Manaaki Whenua must continue to be flexible in responding to changes in the external environment and pursuing strategic opportunities. In determining a rate of return to shareholders, we use the following principles.

- The rate of return on equity (RoE) needs to ensure the financial sustainability of the organisation.
- The Board may propose a lower RoE so that it can support the databases and collections and strategic investments that will enhance science, provide benefit to AoNZ, and underpin future value, including from Toitū Envirocare.
- The targeted RoE will be reviewed by the Board over the planning period as other strategic investment opportunities with long-term benefits are presented.

Balance sheet

Manaaki Whenua's science requires an ongoing investment in scientific equipment if we are to secure revenue and be financially sustainable.

Cash flow and dividend

Manaaki Whenua expects to continue to deliver positive operating cash flows, with earnings before income tax, depreciation, amortisation, and fair value adjustments (EBITDAF) of \$5.3 million in 2022/23. Capital Expenditure in 2022/23 is expected to be \$7 million.

Based on the strategic capital investment needs identified above, no dividend is planned during the period of this SCI. However, the Manaaki Whenua Board will review this annually.

Risks

There is forecasting uncertainty associated with Manaaki Whenua's revenue budgets. There are risks and opportunities from competition, research funding constraints, and disruptive technologies with the potential to affect capability and future business sustainability.

Revenue risk is high in 2022/23 and 2023/24 as several MBIE Endeavour research investments come to an end. The recent focus of Endeavour investment on 'frontier innovation' is not fully aligned with the CRIs' focus on strategic research, which spans the frontier-to-applied spectrum, with a strong focus on impact for the benefit of Aotearoa. Therefore, we have moderated our expectations of continuing the recent level of investment.

Manaaki Whenua will actively monitor and respond to any emerging financial risks.

The image shows two handwritten signatures in black ink. The signature on the left is 'Colin Dawson' and the signature on the right is 'Paul Reynolds'. Both signatures are followed by a horizontal line.

Colin Dawson
Chair

Dr Paul Reynolds
Deputy Chair

30 June 2022

Appendix 1: Additional financial indicators

For the financial year ending 30 June	2021/22 Target	2021/22 Forecast	2022/23 Target	2023/24 Target	2024/25 Target	2025/26 Target
Operating margin ¹	7.0%	7.1%	4.6%	6.3%	8.3%	10.8%
Profit/FTE	\$14,793	\$16,825	\$11,063	\$14,058	\$16,816	\$22,171
Quick ratio ²	2.59	2.61	3.22	2.74	1.57	1.25
Interest coverage ³	27.2	28.7	21.4	28.5	35.7	49.1
Profit volatility ⁴	14.8%	7.1%	5.9%	5.5%	7.3%	9.6%
Forecasting risk ⁵	3.3%	(4.3%)	1.8%	1.1%	2.3%	5.9%
RoE ⁶ (after investment)	1.0%	2.4%	(0.4%)	1.1%	2.3%	5.5%
Revenue growth	2.7%	(2.0%)	13.3%	0.9%	(2.8%)	9.7%
Capital renewal ⁷	1.46	1.01	1.15	1.47	3.15	2.91

Explanatory notes to table:

¹ Operating margin: EBITDAF ÷ revenue, expressed as a percentage and per FTE (EBITDAF is earnings before interest, income tax, depreciation, amortisation, and fair value adjustments).

² Quick ratio: (current assets – inventory – prepayments) ÷ (current liabilities – revenue in advance).

³ Interest cover: EBITDAF ÷ interest paid.






⁴ Profit volatility: the standard deviation of the past 5 years' profit, scaled by average profit.

⁵ Forecasting risk: 5-year average of return on equity, less forecast return on equity.

⁶ Return on equity: NPAT ÷ average shareholders' funds, expressed as a percentage (NPAT is net profit after tax). Shareholders' funds include share capital and retained earnings.

⁷ Capital renewal: capital expenditure ÷ depreciation expense + amortisation expense.

Appendix 2: Collections, databases and information systems







		Accessibility Goals and Key Performance Indicators
 <p>National Soils Data Repository (NSDR)</p> <p>5,900+ New Zealand soil profile descriptions, plus analytical data on their chemical, physical, and mineralogical characteristics. Includes the National Soils Archive, a reference collection of soil samples for the NSDR. - https://viewer-nsdr.landcareresearch.co.nz/</p>		<p>ALL</p> <p>Service availability uptime is ≥90%.</p> <p>Number of data sets provided online to users is maintained or increases.</p>
 <p>Land Resource Information Systems (LRIS)</p> <p>Includes the New Zealand Land Resource Inventory (NZLRI), Land Use Capability (LUC), fundamental Soils Layer (FSL), and related datasets and materials. Presents general land characteristics and land evaluation information, plus a range of environmental, climatic, management and production attributes. - http://lris.scinfo.org.nz - https://ourenvironment.scinfo.org.nz/</p>	<p>Used for National and regional state-of-environment monitoring, forest and shrubland inventory, biodiversity assessment, trend analysis, and infrastructure planning.</p>	<p>EACH</p> <p>NSDR and LRIS More services added, and new data sets uploaded.</p> <p>Develop new routes to our data building on test APIs and visualisation created last year.</p> <p>User numbers (direct or indirect) are maintained or increase.</p>
 <p>Land Cover Database (LCDB)</p> <p>A classification of land-cover change across New Zealand in a series of 5 snapshots dating back to 1996. Contains 33 mainland classes (35 including the Chatham Islands). - http://lris.scinfo.org.nz - https://lris.scinfo.org.nz/layer/104400-lcdb-v50-land-cover-database-version-50-mainland-new-zealand/ - https://vizbe.landcareresearch.co.nz/</p>	<p>Used by regional and central government, primary industry, and the finance, environment, and education sectors.</p>	<p>Data support environmental reporting and resource management instruments, and their implementation at the regional level.</p> <p>User confidence is maintained or increases.</p>
 <p>S-map</p> <p>A national system that provides comprehensive, quantitative soil information to support sustainable development and scientific modelling. - https://smap.landcareresearch.co.nz - http://lris.scinfo.org.nz</p>	<p>The Pacific Soils Portal is an important part of our soils information - https://psp.landcareresearch.co.nz/</p>	<p>S-map The breadth of soil information for users is extended.</p> <p>New tools added to aid users and maximise value of data.</p>
 <p>National Vegetation Survey (NVS) Databank</p> <p>A national repository of plot-based vegetation survey data from 121,000+ survey plots going back over 70 years. Covers Northland to Stewart Island, the Kermadec and Chatham Islands, and from coastal to forests to high alpine. - http://nvs.landcareresearch.co.nz</p>	<p>Key part of New Zealand's biodiversity and biosecurity information infrastructure.</p>	<p>Requests for public domain data met immediately or within 2 weeks if complex.</p> <p>>20 new electronic data sets added annually.</p> <p>Registered NVS user numbers are maintained or increase.</p> <p>NVS data underpins national-scale plant biodiversity trend reporting.</p>

 Database

 Collecton

  Nationally significant

 Significant

 <p>Allan Herbarium (CHR)</p>	<p>New Zealand's national herbarium with 700,000+ specimens of New Zealand and South Pacific algae, lichens, liverworts, mosses, ferns, and seed plants. - www.landcareresearch.co.nz/allanherbarium</p>	<p>Used by New Zealand's biodiversity and biosecurity systems, benefiting conservation, forestry, horticultural and agricultural sectors.</p>	<p>ALL</p> <p>A 2-week response time for 90% of loan requests.</p> <p>Page views and visitor numbers for the Systematics Collections Data portal are maintained or increase.</p>
 <p>New Zealand Arthropod Collection (NZAC)</p>	<p>Largest collection of New Zealand insects and related arthropods with 7 million+ specimens. Includes the National Nematode Collection of New Zealand (NNCNZ). - www.landcareresearch.co.nz/nzac</p>		<p>EACH</p> <p>CHR and NZAC The NZ Threat Classification System uses new taxonomic information.</p>
 <p>New Zealand Fungarium (PDD)</p>	<p>Primary information source on New Zealand and Pacific fungi with 105,000+ dried fungal specimens, and voucher specimens documenting most plant diseases recorded in New Zealand. - www.landcareresearch.co.nz/pdd</p>		<p>PDD and ICMP Maintain or increase cultures and specimens used in scientific literature, and DNA sequences generated. New specimens accessioned.</p>
 <p>International Collection of Microorganisms from Plants (ICMP)</p>	<p>One of three major international collections for plant and soil bacteria, with living cultures of 22,500+ strains of bacteria and fungi from plants and soil. - www.landcareresearch.co.nz/icmp</p>		<p>CHR – 6,000+ NZAC – 7,000+ PDD – 500+ ICMP – 300+ new cultures.</p>
 <p>Ngā Tipu Whakaoranga - Māori Plant Use Database</p>	<p>2,400+ records on Māori names and cultural uses of New Zealand native plants, fungi, and algae. - http://maoriplantuse.landcareresearch.co.nz</p>		<p>Used for research into traditional and new uses.</p>
 <p>Te Kohinga Harakeke o Aotearoa (National New Zealand Flax Collection)</p>	<p>Living collection of <i>Phormium</i> species of cultural, economic, and historical interest. - www.landcareresearch.co.nz/harakeke</p>	<p>A 1-day turnaround for 100% of weaving material orders.</p> <p>All weaving cultivars represented online with Māori names and stories.</p>	

 Database
  Collector
   Nationally significant
  Significant

Appendix 3: Our alignment to the UN Sustainable Development Goals and provisional KPIs for corporate sustainability

Our research outcomes and the UN Sustainable Development Goals

Our research outcomes and activities align with the UN Sustainable development Goals, as shown in the table below.

UN SDG	Our goal statement	Our outcome statements
 <p>15. Life on land (and in water, from SDG14) Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.</p>	<p>We will empower stakeholders to:</p> <ul style="list-style-type: none"> • conserve, restore, and protect land-based ecosystems, soils and their services • reverse the decline of indigenous biodiversity and natural habitats • reduce the impact of invasive species • develop the sustainable use of land resources • develop equitable policies through partnership. 	<p>Critical knowledge of the wealth, state, and trends in our biodiversity, soils, and lands informs decision-making.</p> <p>Ecological restoration is guided by knowledge of past and present ecosystems.</p> <p>Hapū and iwi act confidently as kaitiaki of their whenua using science and mātauranga Māori.</p> <p>Risk and harm from invasive organisms are mitigated.</p> <p>Biosecurity tools are available with social licence.</p>
 <p>2. Zero hunger End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.</p>	<p>We will inform the development of food production systems that enhance soil, land, water, and ecosystem services, and ensure climate change adaptability, while working especially with Māori in Aotearoa New Zealand and indigenous peoples in Pacific nations.</p>	<p>Māori land trusts and incorporations achieve their aspirations for their land.</p> <p>Productive lands are regenerative at the landscape scale.</p>
 <p>6. Clean water and sanitation Ensure availability and sustainable management of water and sanitation for all.</p>	<p>We will guide the use of land in ways that improve freshwater quality, enhance water-use efficiency, protect, and restore water-based ecosystem services, and support integrated catchment-based governance and management.</p>	<p>Land use, soils, and erosion are managed to improve freshwater quality.</p>
 <p>11. Sustainable cities and communities Make cities and human settlements inclusive, safe, resilient and sustainable.</p>	<p>We will inform the development of integrated policies and planning that enhance resource-use efficiency, ecosystem services, climate change mitigation and adaptation, resilience to natural disasters, and inclusive governance processes, while decoupling waste from growth.</p>	<p>Communities and regulators have adaptation pathways for climate change.</p> <p>Environmental decisions are underpinned by advanced geospatial information.</p>
 <p>13. Climate action Take urgent action to combat climate change and impacts.</p>	<p>We will empower organisations, sectors and the nation to measure, manage, reduce, and mitigate their greenhouse gas emissions; understand climate risk and increase resilience; create opportunities, and develop policies and plans that integrate social, economic, cultural, and environmental dimensions.</p>	<p>Communities and regulators have adaptation pathways for climate change.</p> <p>Carbon emissions and removals are managed to mitigate climate change.</p> <p>The work of Toitū Enviocare.</p>
 <p>16. Peace, justice and strong organisations Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels.</p>	<p>We will support the development of responsive, inclusive, participatory, and representative decision-making and governance by our stakeholders and the Treaty Partner, Māori.</p>	<p>National environmental outcomes are improved by integrating social practice theory, policy tools, and economics.</p>

Provisional non-financial KPIs for corporate sustainability

The table below shows how our corporate activities align with the UN Sustainable Development Goals, including proposed KPIs.

UN SDG	Our goal statement	Our provisional target/s
 <p>3. Good Health and Well-being</p>	<p>We will empower our people to commit themselves 100% to health, safety and well-being while executing our own responsibilities as their employer.</p>	<ol style="list-style-type: none"> Every staff member feels that MWLR cares about their well-being. Every staff member believes MWLR is committed to the health and safety of its people. Implement relevant actions from the 2022 HSE Operational Plan by 30 July 2022.
 <p>5. Gender Equality</p>	<p>We will ensure gender equity in participation, leadership opportunities, conditions and reward in all aspects of our work, using enabling technologies where appropriate.</p>	<ol style="list-style-type: none"> Gender pay gap of less than 4% within each pay grade. Gender leadership representation of 40% female, 40% male, 20% any gender identity. Implement relevant actions from the 2022 Gender Equity Action Plan by 30 July 2022.
 <p>8. Decent Work and Economic Growth</p>	<p>We will achieve sustainable economic performance that supports innovation, entrepreneurship, job creation, staff development, fulfilling roles, and advancement opportunities with fair remuneration.</p>	<ol style="list-style-type: none"> Financial sustainability to ensure ability to invest in the medium/long term, and provide fair remuneration. Every staff member feels their role is satisfying.
 <p>10. Reduced Inequality</p>	<p>We will enhance the inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion, or economic, or other status and sustain income growth for our lower earners.</p>	<ol style="list-style-type: none"> Every staff member feels included at MWLR. Implement relevant actions from the 2022 Equity Diversity and Inclusion Action Plan by 30 July 2022. Also refer to targets 1, 4, 5, 6, and 8.
 <p>12. Responsible Consumption and Production</p>	<p>We will measure and manage our own consumption and outputs to sustain and restore natural resources, reduce waste and emissions and foster a circular bio-economy, while through our procurement and services encourage other to adopt sustainable practices.</p>	<ol style="list-style-type: none"> 5% annual reduction on the previous year in: <ul style="list-style-type: none"> - total waste to landfill - total potable water consumption. All procurement processes recognise and prioritise suppliers' sustainability and ethical sourcing practices. See <i>Climate Action for GHG targets</i>
 <p>13. Climate action</p>	<p>We will measure, reduce, and mitigate our greenhouse gas emissions, understand climate risk to our business, and increase our resilience.</p>	<ol style="list-style-type: none"> Positive net carbon emissions through Toitū's Climate Positive Programme. 5% annual reduction of gross emissions per \$m revenue. Retain post FY22 at least half of the reduction in flying kms achieved during Covid-19 per \$m revenue.
 <p>17. Partnerships to achieve the Goals</p>	<p>We will partner nationally and globally to build capacity, enhance knowledge and data sharing and access to science and technology, and enhance the Global Partnership for Sustainable Development</p>	<p>Māori</p> <ol style="list-style-type: none"> All partnerships with Māori organisations are based on Te Tiriti principles. Year on year an additional 10% of staff feel they are equipped to work in partnership with Māori groups. <p>End-users</p> <ol style="list-style-type: none"> Partnership/engagement plans for major stakeholders are in place by 30 June 2022. <p>Science partners</p> <ol style="list-style-type: none"> ≥55% of papers are co-authored with other AoNZ institutes and ≥ 60% of papers are co-authored with international institutes. <p>International development</p> <ol style="list-style-type: none"> Develop a strategy to enable MWLR to transfer knowledge and technology to developing countries and grow their capacity, enabling their sustainable development, by 30 June 2022.

Appendix 4: Business policies

We operate in accordance with the purpose and principles as stated in the Crown Research Institutes Act 1992 and have statutory obligations under other acts, including the Companies Act 1993 and Crown Entities Act 2004. Our business policies include the following.

Dividend policy

The Board will notify the shareholding Ministers within 3 months of the end of each financial year of:

- the amount of dividend (if any) recommended to be distributed to the shareholders
- the percentage of tax-paid profits the dividend represents
- the rationale and analysis used to determine the amount of dividend.

In determining the amount of surplus funds, consideration will be given to:

- shareholder policies on dividends and capital structure
- providing for strategic and capital investment requirements (including equity investments) without recourse to the Crown for equity injections to the company
- working capital requirements (including subsidiaries/businesses in which equity is held)
- the ongoing financial viability of the company, including its ability to repay debt
- the extent of debt financing in relation to the prudent borrowing capacity of the company
- obligations of the Directors under the Companies Act 1993 and other statutory requirements.

With the projected profitability and capital requirements of the organisation in the course of this planning period, we are not projecting to pay dividends to the shareholder.

Risk policy

Manaaki Whenua has risk management and compliance processes in place and operating effectively across the agency. The risk management framework identifies, classifies, reports on and mitigates business risk. Risk reporting to the Audit and Risk Committee and the Board is done every 6 months, or as a risk arises.

Accounting policies

A summary of our accounting policies is included in our Annual Report. The current Annual Report can be found on our website: <http://www.landcareresearch.co.nz/about/sustainability/annual-reports/>.

Shareholder consent for significant transactions

The Board will obtain prior written consent from the shareholding Ministers for any transaction or series of transactions involving full or partial acquisition, disposal or modification of property (buildings, land and capital equipment), and other assets with a value equivalent to or greater than \$10 million or 20% of the company's total assets (before the transaction), whichever is the lesser.

The Board will obtain the prior written consent of shareholding Ministers for any transaction or series of transactions with a value equivalent to or greater than \$5 million or 30% of the company's total assets (before the transaction) involving:

- acquisition, disposal or modification of an interest in a joint venture, partnership or similar association
- acquisition or disposal, in full or in part, of shares or interests in a subsidiary, external company or business unit
- transactions that affect the company's ownership of a subsidiary or a subsidiary's ownership of another entity
- other transactions that fall outside the scope of the definition of the company's core business or that may have a material effect on the company's science capabilities

- intellectual property transactions, which, wherever possible in advance, will be notified in the quarterly reports to shareholding Ministers.

Appendix 5: Other matters required by the Crown Research Institutes Act 1992

Activities where shareholder compensation is required

Where the Government wishes Manaaki Whenua to undertake activities or assume obligations that will result in a reduction of the organisation's profit, or net worth in terms of investment in research, the Board will seek compensation sufficient to allow the organisation's position to be restored.

No requests for compensation are currently under consideration.

Other matters specifically requested by the shareholder

Section 16(3) of the Act requires Manaaki Whenua to furnish an estimate of the current commercial value of the Crown's investment.

The Board is satisfied that the net asset position (or total equity) is a reasonable proxy for the commercial value of the Group. The net asset position, as shown in accordance with the company's accounting policies for 30 June 2021, was \$52.7 million.

Glossary

CCC	Climate Change Commission	
CRI	Crown Research Institute	
DOC	Department of Conservation	www.doc.govt.nz
EBIT	Earnings before interest, financial lease charges and tax, and after committed business development expenditure and technology service expenditure	
EBITDAF	Earnings before income tax before depreciation, amortisation, and fair value adjustments	
GHG	greenhouse gas	
KPI	key performance indicator	
LCDB	Land Cover Database	www.lris.scinfo.org.nz/layer/104400-lcdb-v50-land-cover-database-version-50-mainland-new-zealand
MBIE	Ministry of Business, Innovation and Employment	www.mbie.govt.nz
MFAT	Ministry of Foreign Affairs and Trade	www.mfat.govt.nz
MfE	Ministry for the Environment	www.mfe.govt.nz
MPI	Ministry for Primary Industries	www.mpi.govt.nz
NSC	National Science Challenge	
NPAT	Net profit after tax	
SCI	Statement of Corporate Intent	
SCP	Statement of Core Purpose	
SDGs	UN Sustainable Development Goals	
S-map	A national system that provides comprehensive, quantitative soil information to support sustainable development and scientific modelling	www.smap.landcareresearch.co.nz
SSIF	Strategic Science Investment Fund (MBIE)	www.mbie.govt.nz
Te Āpōpōtanga	Our updated strategy for the period 2022-24	
Te Pae Kahurangi	The CRI review commissioned by MBIE and published in July 2020	www.mbie.govt.nz/assets/te-pae-kahurangi-report.pdf

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Holden Hohaia	General Manager, Māori Development
Dr Stephen Lorimer	General Manager, Development
Chris McDermott	Chief Information Officer
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Science working for New Zealand

The Crown Research Institutes (CRIs) proudly work, individually and collectively, to create a more prosperous, sustainable and innovative New Zealand



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