B3 Science Solutions for Better Border Biosecurity AOTEAROA NEW ZEALAND

Better Border Biosecurity

Strategic Plan 2025-2030

Better Border Biosecurity

Strategic Plan 2025-2030

B3 Partners:

BIOECONOMY SCIENCE INSTITUTE

agresearch āta mātai, mātai whetū

Manaaki Whenua Landcare Research

Plant & Food Research Rangahau Ahumāra Kai

SCION FORESTS • PRODUCTS • INNOVATION

LINCOLN UNIVERSITY TE WHARE WĀNAKA O AORAKI

Department of Conservation Te Papa Atawhai

FOREST OWNERS ASSOCIATION

Ministry for Primary Industries Manatū Ahu Matua

Horticulture New Zealand Ahumāra Kai Aotearoa

FEDERATED FARMERS OF NEW ZEALAND

Environmental Protection Authority Te Mana Rauhī Taiao

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About Better Border Biosecurity (B3)

Better Border Biosecurity (B3) is a multi-partner, cooperative science collaboration that researches ways to enhance Aotearoa-New Zealand's biosecurity system performance and ability to cost-effectively reduce the entry and establishment of new plant pests (arthropods, pathogens and weeds).

As a geographically isolated archipelago, Aotearoa-New Zealand is a country free from many pests that damage productive and natural ecosystems, or endanger human and animal health. The B3 research collaboration works to maintain this advantage by using research and its uptake to improve biosecurity.

Our aim is for our research to actively contribute to strengthening Aotearoa-New Zealand's biosecurity system, leading to a reduction in the entry and establishment of invasive pests that threaten our country's valued flora, including taonga. A biosecurity system that protects the welfare of our environment, will retain and build value in our important plant systems, and underpin investor confidence for sector growth and innovation, at the same time as maintaining market access for plant-based exports.

Our scope is pre-border, at-border, and immediate post-border research on high-impact, harmful pests in productive and natural terrestrial plant systems.

B3's collaborative partners include science agencies Plant & Food Research, AgResearch, Scion, Manaaki Whenua Landcare Research, now operating as the Bioeconomy Science Institute, and Lincoln University and end-user partners the Ministry for Primary Industries, the Department of Conservation, the New Zealand Forest Owners Association, Horticulture New Zealand and Federated Farmers. The Environmental Protection Authority has observer status.

Our Purpose

To deliver research that adds measurable value to Aotearoa-New Zealand's biosecurity system

Our Vision

A world-leading plant border biosecurity system for Aotearoa-New Zealand

Our Values

Leadership | Collaboration | Responsiveness | Science excellence | Manaakitanga | Co-innovation

Importance of Biosecurity Research

The economy of Aotearoa-New Zealand is dependent on multiple plant-based and plant-associated sectors. This includes agriculture, horticulture, forestry and tourism. In 2024, our primary industry export earnings totalled $NZ53.3 billion[1] and tourism contributed $NZ44.4 billion[2]. These industries are at risk from the introduction and establishment of unwanted pests (arthropods, pathogens and weeds) that could devastate food, feed or fibre production, reduce export opportunities, and lead to expensive ongoing control costs. Our reputation as a clean, green nation is critical for our tourism industry.

Aotearoa-New Zealand is home to a diverse array of native plant species, many of which are endemic. These plants form the backbone of our native ecosystems and support wildlife, including birds, insects, and fungi. Our native plants hold significant cultural value and national identity. A single pest incursion can disrupt native ecosystems, threatening biodiversity and ecological balance.

Overseas there are numerous examples of pests that have devastated industries or native ecosystems. For example, *Phytophthora cinnamomi*, which is listed in the top 100 of the World's Worst Invasive Alien Species[3], has decimated native ecosystems in Australia and in the USA is predicted to have cost the avocado industry alone nearly $US40 million[4]. Spongy moth, *Lymantria dispar*, is also listed among the world's 100 worst invasive alien species. In the USA it has decimated over 33 million hectares of native and commercial forest, costing $US30 million in control each year[5].

Aotearoa-New Zealand has its own examples. The establishment of *Pseudomonas syringae* pv. *actinidiae* (Psa) is estimated to have cost the kiwifruit industry $NZ1billion[6], with ongoing costs predicted. The exotic Argentine stem weevil (*Listronotus bonariensis*) and clover root weevil (*Sitona lepidus*) are estimated to cause over $NZ400 million per annum of damage in our pastures[7]. Numerous exotic weeds such as old man's beard (*Clematis vitalba*), moth plant (*Araujia hortorum*) and wild ginger (*Hedychium gardnerianum*), smother or complete with our native plants, indelibly altering our forest ecosystems.

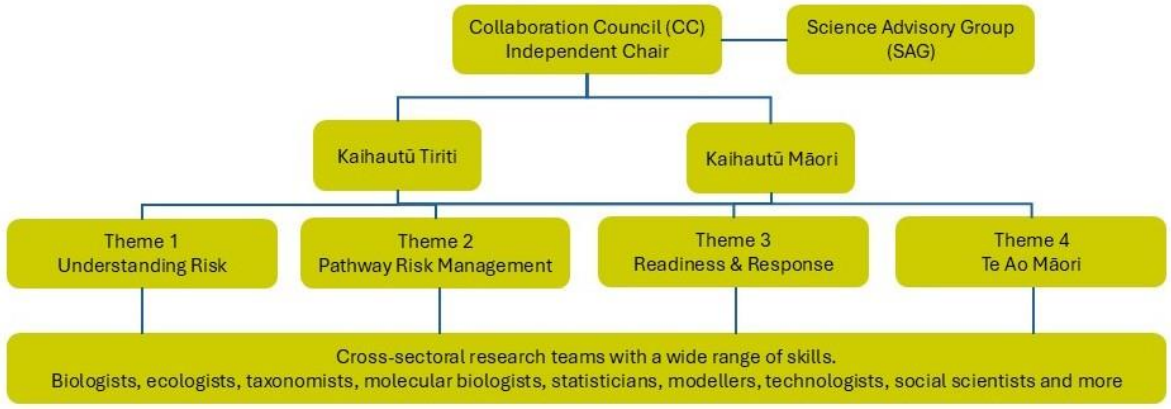
These examples highlight the importance of a secure biosecurity system, to protect what New Zealander's value – our land, people, culture, economy, and future. Underpinning our biosecurity system is research. This strategy outlines how B3 research will contribute to improving and advancing Aotearoa-New Zealand's biosecurity system.

[1] https://www.mpi.govt.nz/dmsdocument/65736-2023-24-MPI-annual-report
[2] https://www.stats.govt.nz/information-releases/tourism-satellite-account-year-ended-march-2024/
[3] https://www.iucngisd.org/gisd/100_worst.php
[4] https://www.sciencedirect.com/science/article/pii/S0885576525001742#bib8
[5] https://www.scientificamerican.com/article/very-hungry-and-very-invasive-caterpillars-are-a-munching-through-u-s/
[6] https://kvh.org.nz/assets/documents/KVH-new-grower-pack-Dec-2022.pdf
[7] https://www.tandfonline.com/doi/full/10.1080/00288233.2018.1478860

B3 Structure & Relationships

B3 is governed by a Collaboration Council made up of representatives from each of the collaborative partner and observer organisations. The Science Advisory Group (SAG), made up of high-ranking scientists from the B3 parties, assesses and recommends research projects. Directorship of B3 is co-led by the Kaihautū Tiriti and Kaikautū Māori, with Theme Leaders, supported by Organisational Representatives, leading each of B3's four research Themes. Project Leaders and their teams make up the B3 science programme and undertake the research within the B3 programme (Figure 1).

B3 Structure



Māori have strong connections to the biological heritage of Aotearoa-New Zealand, as intergenerational guardians of significant natural resources and indigenous knowledge, and owners and managers of commercial assets with views and belief systems that can underpin biosecurity decision-making, governance and stewardship. B3 is committed to ensuring our biosecurity research and innovation are developed in genuine partnership with Māori (See B3 Māori Strategy, Page 5).

In addition to our collaborative partners and observer organisations, B3 proactively engages with a range of national biosecurity entities such as industry bodies, local councils, the Government Industry Agreement Plant Biosecurity Council, Brown Marmorated Stink Bug Council, Fruit Fly Council, Xylella Action Group, Spotted Wing Drosophila Action Group, Lepidoptera Readiness Working Group, Tauranga Moana Biosecurity Capital and Plant Pass.

Biosecurity work requires a focus beyond Aotearoa-New Zealand's borders and many B3 projects have strategic links to international research. B3 and its parties are part of a number of strategic formal and informal relationships to strengthen connections with overseas research and policy work. This includes Memoranda of Understanding with Plant Biosecurity Research Initiative and the Centre of Excellence for Biosecurity Risk Analysis, Australia.

B3's primary investment comes from the Ministry for Business, Innovation and Employment's (MBIE) Strategic Science Investment Fund (SSIF), which is allocated to Plant & Food Research, AgResearch, Scion and Manaaki Whenua Landcare Research, now operating as the Bioeconomy Science Institute. A portion of this fund is allocated to biosecurity research and these funds are administered by B3. B3 researchers also work co-operatively on related projects funded from a range of sources.

B3 Science

B3's research activities are centred on four themes that reflect the priority areas of biosecurity activity for Aotearoa-New Zealand, the border biosecurity continuum, and a pragmatic way to link to the activities of B3's operational stakeholders.

- **Theme 1 Understanding Risk**
  Improved tools and methodologies for identifying hazards, assessing risk, predicting impacts and ascertaining where in the system mitigation measures are best targeted for intentional and unintentional introductions.

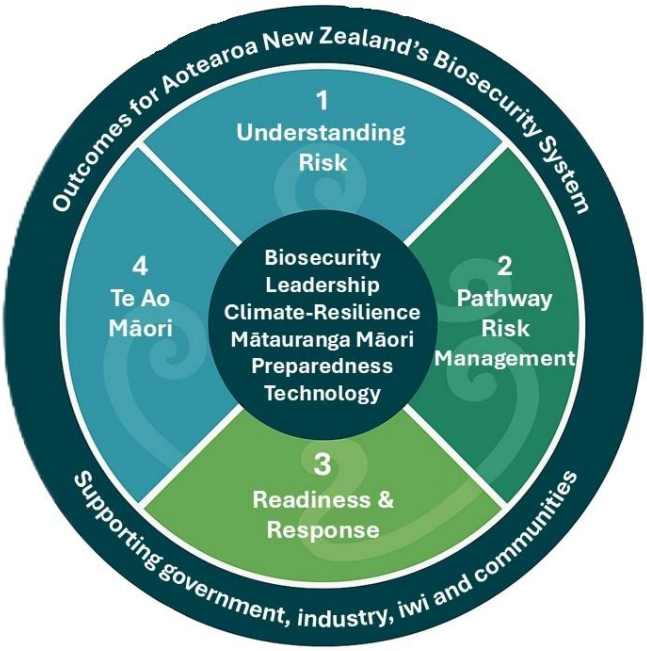
- **Theme 2 Pathway Risk Management**
  Fit-for-purpose tools and methodologies for reducing risks along importation pathways.

- **Theme 3 Readiness & Response**
  Tools and strategies for preparedness for and response to incursions of invasive plant pest species, including diagnostic methods and tools to enable informed biosecurity decisions.

- **Theme 4 Te Ao Māori**
  Kaupapa Māori research with the view to embedding mātauranga into biosecurity outcomes that ensure tiakitanga of the whenua, taiao, ngahere and Aotearoa kātoa.

Mātauranga Māori is woven into our work, strengthening our collective ability to protect Aotearoa's environment, primary industries, and cultural heritage.

Research outputs from our projects are delivered to government, industries, iwi, communities, the wider public and researchers predominantly via peer-reviewed publications, written reports, presentations, workshops, hui, wānanga, expert advice, and uptake and use of novel tools.



B3 Māori Strategy

B3 is committed to strengthening meaningful partnerships with Māori in all its work. Our approach is guided by the principles of the Treaty of Waitangi, with a focus on respectful engagement and shared stewardship. This we call our 'Te Tiriti-based approach'. B3 recognises the unique contribution of mātauranga Māori to science and biosecurity, and will champion the importance of, and inclusion, of it in our research programme. B3 will support Māori-led priorities in conservation and the bioeconomy through inclusive, collaborative research.

Below is B3's Māori Strategy that outlines our vision, mission and how we will deliver on this commitment.

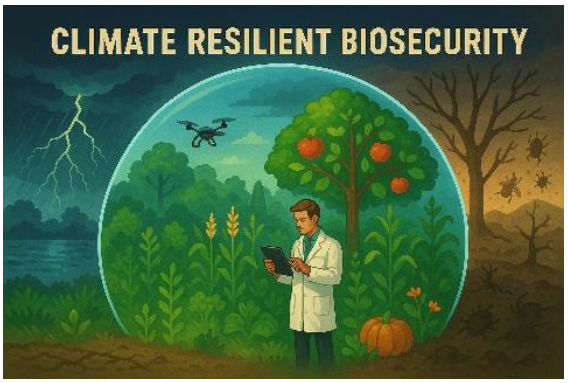
B3 Strategic Direction

Our Strategy Direction responds to the biosecurity imperatives currently facing Aotearoa-New Zealand's natural, urban and productive plant landscapes (see Appendix 1 for Strategic Influences). It reflects the country's current and expected future fiscally constrained environment, which needs science and research to find ways to achieve better biosecurity outcomes at lower cost.

Below are B3's strategic, high-level research areas for focus over the next five years.

Climate-Resilient Biosecurity

- Real-time monitoring of shifting pest and disease threats due to climatic and land use changes
- Climate-adapted biosecurity strategies
- International collaboration on climate-driven biosecurity risks
- AI-powered models to predict changes in invasive species movements associated with climate and land use changes

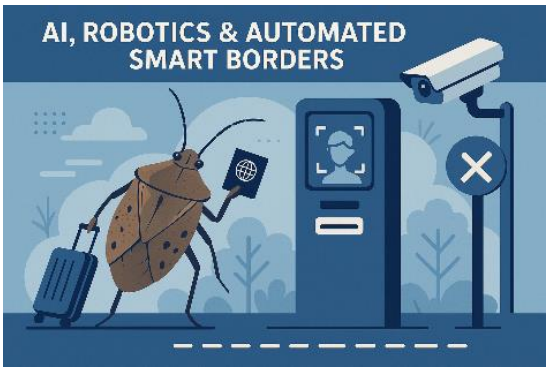


Why it matters:

- Invasive species risk is changing because of changes in climates, weather events and land use globally. These changes can shift pest distribution and abundance overseas, opening new pathways, and in Aotearoa-New Zealand it can change what pests establish.
- Aotearoa-New Zealand's native ecosystems, urban areas and primary industries are highly vulnerable to new incursions linked to climate and land-use changes.

AI, Robotic & Automated Smart Borders

- AI and automated border surveillance
- Robotic pest detection or eradication systems
- Smart traps, automated pest identification, real-time biosecurity monitoring
- Predictive analytics for outbreak forecasting
- Cost-effective cost, competitive tools and technologies



Why it matters:

- Automation can increase what we can survey, reduce the workload on human inspectors, improves detection accuracy and reduce costs.
- AI and other predictive analytics can predict and prevent incursions before they become widespread.

Te Ao Māori

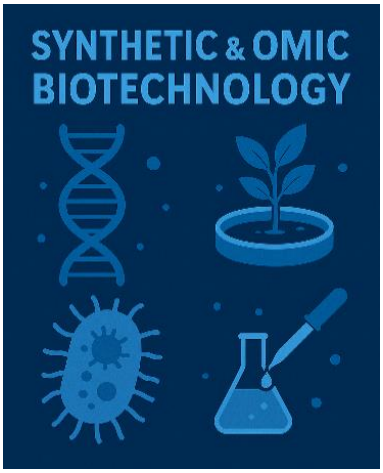
Refer to B3's Māori Biosecurity Strategy (Page 5)

- Kotahitanga – Partnership: Nurture the nationwide network of Māori champions, our existing research partnerships and mātauranga Māori research programmes
- Rangatiratanga – Participation: Co-innovated, developed and co-led research programmes, developing rangatahi and leading a Pasifika biosecurity network
- Tiakitanga – Protection: Kaupapa Māori-driven research programmes, with pest and disease identification training, and vision mātauranga and Te Tiriti based wānanga

Why it matters:

- The unique knowledge and perspective of Māori is realised through the ability of iwi/Māori to actively participate as kaitiaki (custodians) across the biosecurity system, recognising and respecting the Treaty of Waitangi.
- Stronger biosecurity partnerships lead to a stronger biosecurity system and better outcomes.

Advanced Biotechnology

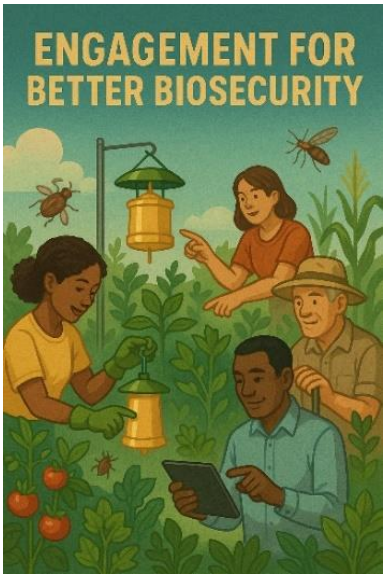


- Synthetic biotechnology for pest eradication
- High-throughput, rapid, cost-efficient and accurate methods to detect unwanted pests
- Identification and characterisation of invasive and organisms
- Alternative and more effective methods to chemical for incursion responses

Why it matters:

- Faster, more precise, cost-efficient and high-throughput detection methods allow faster and more effective responses, reducing the chance that unwanted organisms could spread and establish during incursions.
- Custom-designed, highly specific biotechnology could allow eradication of pests that are highly invasive and difficult to contain.

Engagement for Better Biosecurity



- Understand how people perceive risks, make decisions, and choose what practices to follow, and how this influences biosecurity
- Identify barriers to adoption or social licence of biosecurity tools and technology
- Determine best methods for fast and effective communication of biosecurity information to ensure uptake and prevent misinformation

Why it matters:

- In Aotearoa-New Zealand we have a biosecurity team of 5 million people. To be effective, this requires a collective effort across the country and trust across the biosecurity system in science, scientists, industry and government.
- People are diverse; social science provides way for us to connect to and empower everyone in our team of 5 million.

B3 Strategic Plan

Our Strategy Plan reflects the current external factors that are expected to influence B3 as an entity, and the impacts of B3's research and biosecurity in Aotearoa-New Zealand. Below is B3's high-level strategic plan for the next five years to ensure our native environments and plant-based bioeconomy remain protected from invasive pests now and in the future.

Bioeconomy Science Institute integration

In July 2025, the four Crown Research Institutes, Plant & Food Research, AgResearch, Manaaki Whenua Landcare Research and Scion, merged into the New Zealand Institute for Bioeconomy Science Ltd. (trading as the Bioeconomy Science Institute) to drive innovation and enhance the value of Aotearoa-New Zealand's bioeconomy, fostering economic growth and ensuring environmental prosperity. In July 2026, the Bioeconomy Science Institute will transition from a Crown Research Institute into a Public Research Organisation. Biosecurity is critical for a prosperous Aotearoa-New Zealand.

B3 will:

- Facilitate the integration of B3 into the Bioeconomy Science Institute
- Work with end-users and stakeholders to develop action plans and strategies that can be seamlessly adopted into the Bioeconomy Science Institute to ensure continuity for biosecurity research over the transition
- Advocate for biosecurity research and funding in the Bioeconomy Science Institute.
- Provide evidence of the importance and value of biosecurity research and biosecurity to Aotearoa-New Zealand's plant-based bioeconomy
- Advocate for retention and replacement of critical biosecurity expertise to ensure Aotearoa-New Zealand is ready to respond to a variety of invasive pests, pathogens and weeds.

Improving science excellence and research adoption

As a research entity science excellence and research adoption are critical metrics for determining how well we are fulfilling our mission and measuring the real-world impacts of our research. Science excellence builds our reputation nationally and internationally. Research adoption can lead to more funding and collaborations, and greater end-user and stakeholder trust.

B3 will:

- Ensure publication of research in peer-reviewed journals
- Increase the impact rating of journals for B3 publications
- Work with end-users to develop pathways for research adoption and implementation
- Recognise the importance of high-risk, high-failure research for scientific advancement and progress, and the valuable knowledge and insights this generates
- Track and reporting on how the research has been adopted or operationalised by end-users and how it has added value to Aotearoa-New Zealand's biosecurity system
- Hold a biennial B3 conference to share research outcomes with stakeholders and end-users.

Impact and value of B3 and biosecurity

Demonstrating impact shows how our research delivers value for money and the importance of biosecurity to Aotearoa-New Zealand, leading to better plant border biosecurity outcomes and protection of our plant bioeconomy. Organisations that can clearly show their research is making a difference are seen as leaders and innovators, and this reputation can attract top researchers, funding, and future opportunities.

B3 will:

- Maintain an outward-focussed B3 website that documents our projects and outputs
- Work with impact specialists from each of the research organisations to document impact of B3 over the last 20 years
- Share evidence of impact with research and biosecurity leaders and decision makers.
- Work with end-users to ensure future research outcomes will deliver impact
- Engage proactively and strategically with national and international committees, organisations and events.

National and international connectedness

Aotearoa New Zealand has a world-class biosecurity system because of its dedicated and well-connected community of scientists, industry and government regulatory bodies, community groups and individuals. This community is crucial to ensuring our biosecurity system is ready to meet the predictable and unpredictable challenges of the future. B3 has a role in ensuring connectivity across this community.

B3 will:

- Build stronger collaboration and a future focus with national universities on biosecurity issues, leveraging initiatives already in place between the Bioeconomy Science Institute and Aotearoa-New Zealand universities
- Maintain and or build collaborations with strategically important international researchers and research organisations, and strengthen these relationships through formal agreements such as MOUs
- Engage and strengthen relationships with Aotearoa-New Zealand government agencies and industry bodies around aligned areas of biosecurity
- Use national and international collaborations to
    - Develop opportunities to apply for other funding sources, leveraging off the collective skills of B3
    - Regularly scan for new or developing overseas pest threats and technologies that could improve detection, mitigation or eradication of unwanted pests, pathogens and weeds
- Determine how B3 can actively contribute to and participate in national strategies such as: The Ministry for Primary Industries Biosecurity System Action Plan[8], One Biosecurity[9], One Health Aotearoa[10].

[8] https://www.mpi.govt.nz/about-mpi/strategy/
[9] https://research.lincoln.ac.nz/our-research/faculties-research-centres/centre-of-excellence-the-centre-for-one-biosecurity-research-analysis-and-synthesis-cobras
[10] https://onehealth.org.nz/

A committed Treaty of Waitangi-based approach

B3 values enduring partnerships with Māori, recognising the importance of mutual respect and shared commitment to protecting our native estate. Our work is guided by the principles of the Treaty of Waitangi, and our Te Tiriti-based approach focuses on the shared goal of building a strong, inclusive biosecurity system for all New Zealanders.

B3 will:

- Reflect Treaty of Waitangi principles throughout the B3 structure including governance, leadership, investment, engagement, integrated decision-making, research, and implementation.
- Support, invest in and deliver research that reflects Māori perspectives and priorities in biosecurity.
- Commit to holding meaningful consultation, in safe and inclusive environments, with iwi/Māori.
- Commit to building enduring relationships with iwi/Māori both prior to project development and after completion.
- Participate in, and build Māori researcher presence at wānanga, hui, conferences, forums and workshops.
- Commit to transparent reporting back to Māori partners.

Appendix 1 Strategic Influences

B3's 2025–2030 Strategy responds to the biosecurity imperatives currently facing Aotearoa New Zealand's natural and productive plant landscapes.

It builds on:

• Three previous B3 Strategies

- Better Border Biosecurity Strategic Plan 2010/11–2016/17
- Better Border Biosecurity (B3) Strategy 2016–2020
- Better Border Biosecurity Strategic Plan 2020–2025

Is informed by:

• Relevant strategies from related activities

- Ministry for Primary Industries Strategic Intentions Kawatau Ā-Rautaki 2024–2028
- Ministry for Primary Industries Science Strategy – Rautaki Putaiao 2015
- Department of Conservation General Policy 2020
- Primary Sector Science Roadmap - Te Ao Tūroa 2017
- Conservation and Environment Science Roadmap 2017
- Plant Biosecurity Research Initiative Strategy 2023–2028
- Biosecurity New Zealand Strategic Action Plan 2025
- Te Mana O Te Taiao. Aotearoa New Zealand Biodiversity Strategy 2020

Incorporates priorities identified by:

- The B3 Collaboration Council and Leadership team

B3

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