B3 Science Solutions for Better Border Biosecurity AOTEAROA NEW ZEALAND

NEW ZEALAND'S BIOLOGICAL HERITAGE | Ngā Koiora Tuku Iho | National Science Challenges

Optimising innovation across the biosecurity landscape

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Ministry for Primary Industries Manatū Ahu Matua

Forest Owners Association

Department of Conservation Te Papa Atawhai

Environmental Protection Authority Te Mana Rauhī Taiao

Horticulture New Zealand

beef+lamb new zealand — By Farmers. For Farmers

Plant & Food Research Rangahau Ahumāra Kai

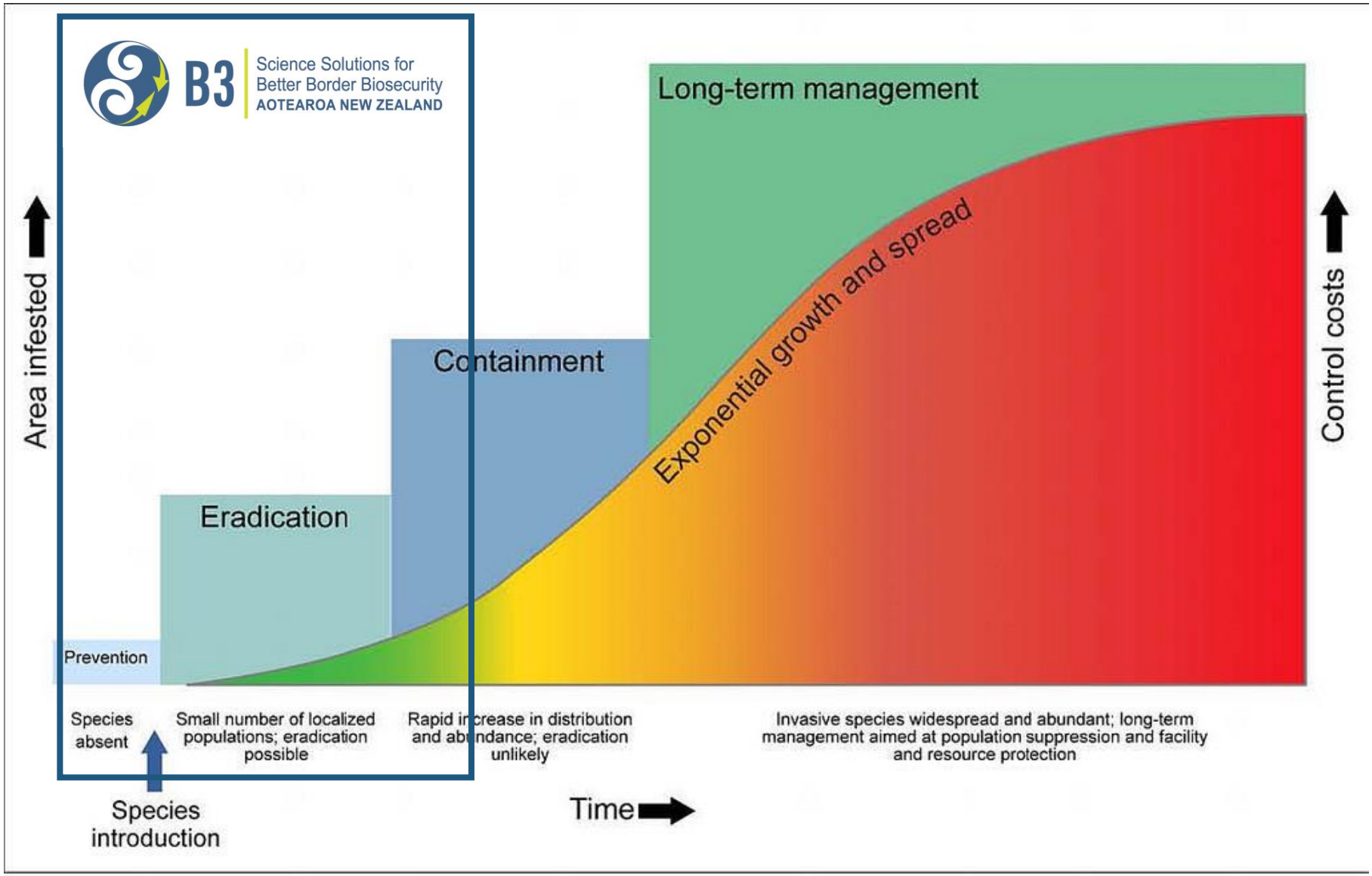
agresearch āta mātai, mātai whetū

SCION Forests • Products • Innovation

Manaaki Whenua Landcare Research

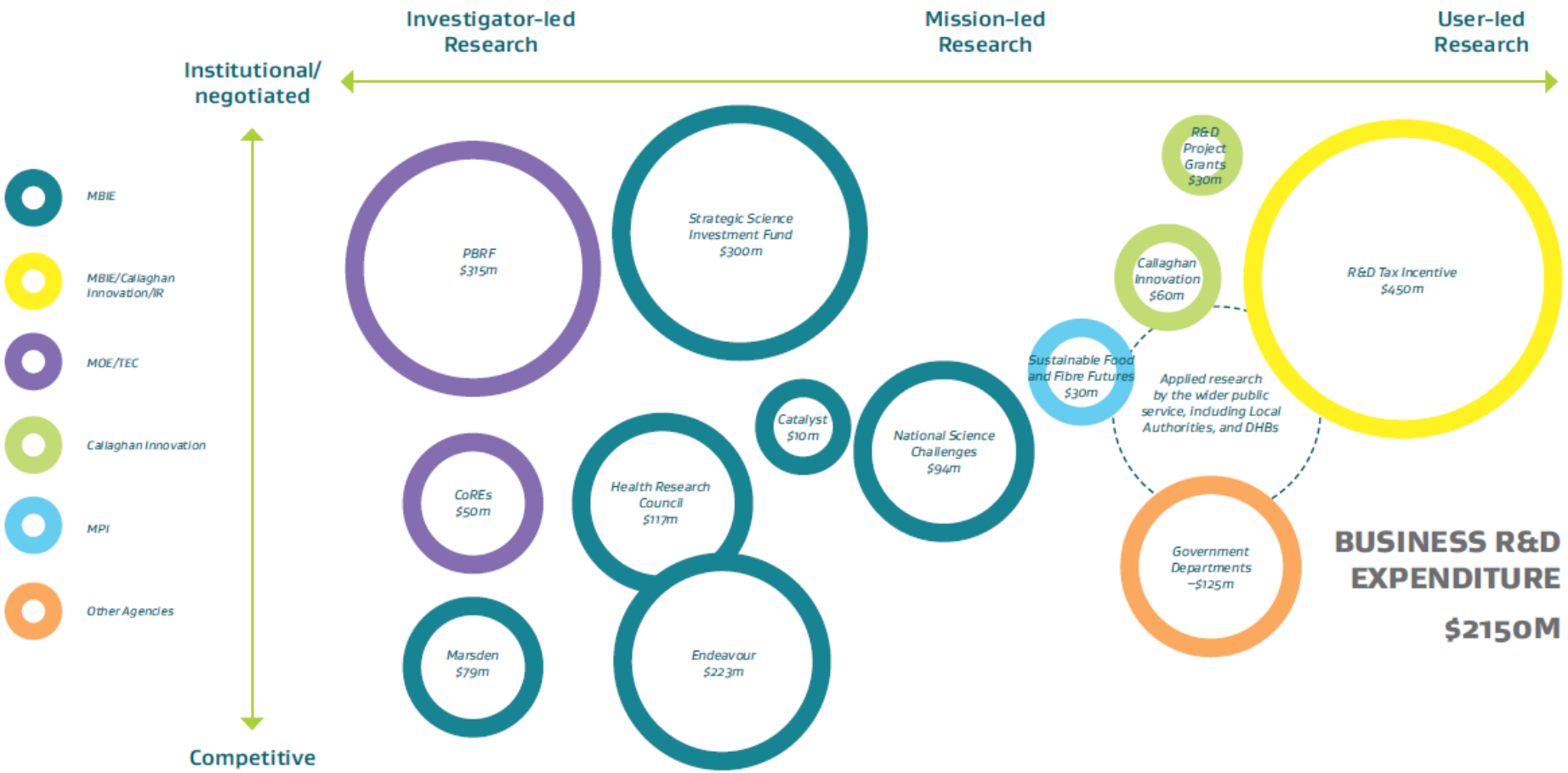
Bio-Protection Bioprotection science for New Zealand

Biosecurity continuum



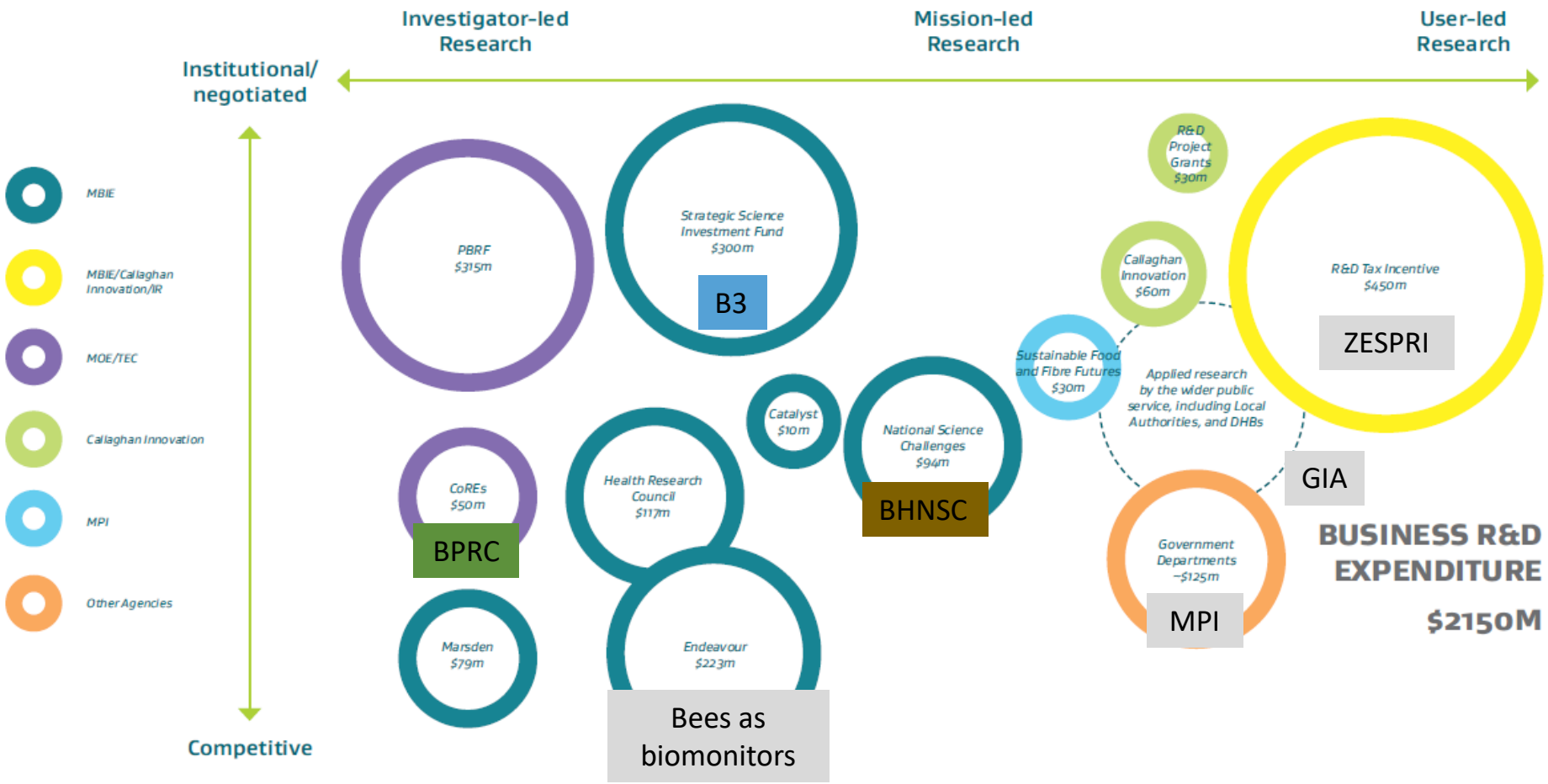
Sources: National Invasive Species Council; U.S. Department of Agriculture; National Park Service; U.S. Fish and Wildlife Service; Rodgers, L, South Florida Water Management District; Department of Primary Industries, State of Victoria, Australia; and GAO. | GAO-16-49

Investment landscape



NZ'S RESEARCH, SCIENCE & INNOVATION STRATEGY (Draft 2019)

Investment Landscape



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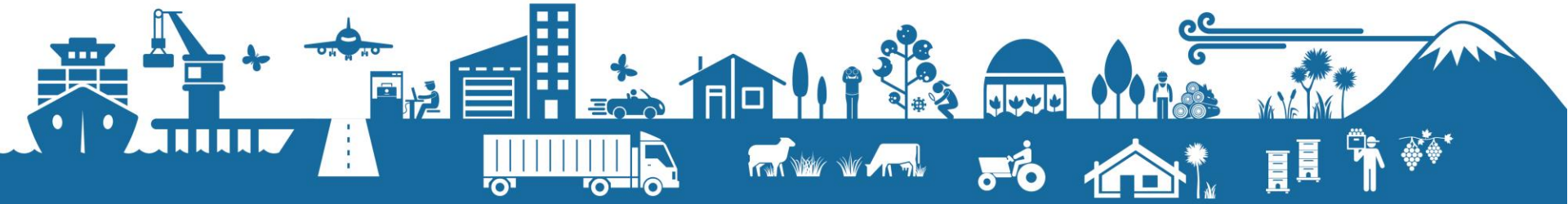
NZ'S RESEARCH, SCIENCE & INNOVATION STRATEGY (Draft 2019)

Better Border Biosecurity (B3)

Our intended impacts

- *Our research will minimise the entry and establishment of invasive pests that threaten Aotearoa NZ's valued flora including taonga*
- *This will protect our biodiversity and the welfare of our environment, retain and build value in our important plant systems, underpin investor confidence for sector growth and innovation, and maintain market access for plant-based exports*



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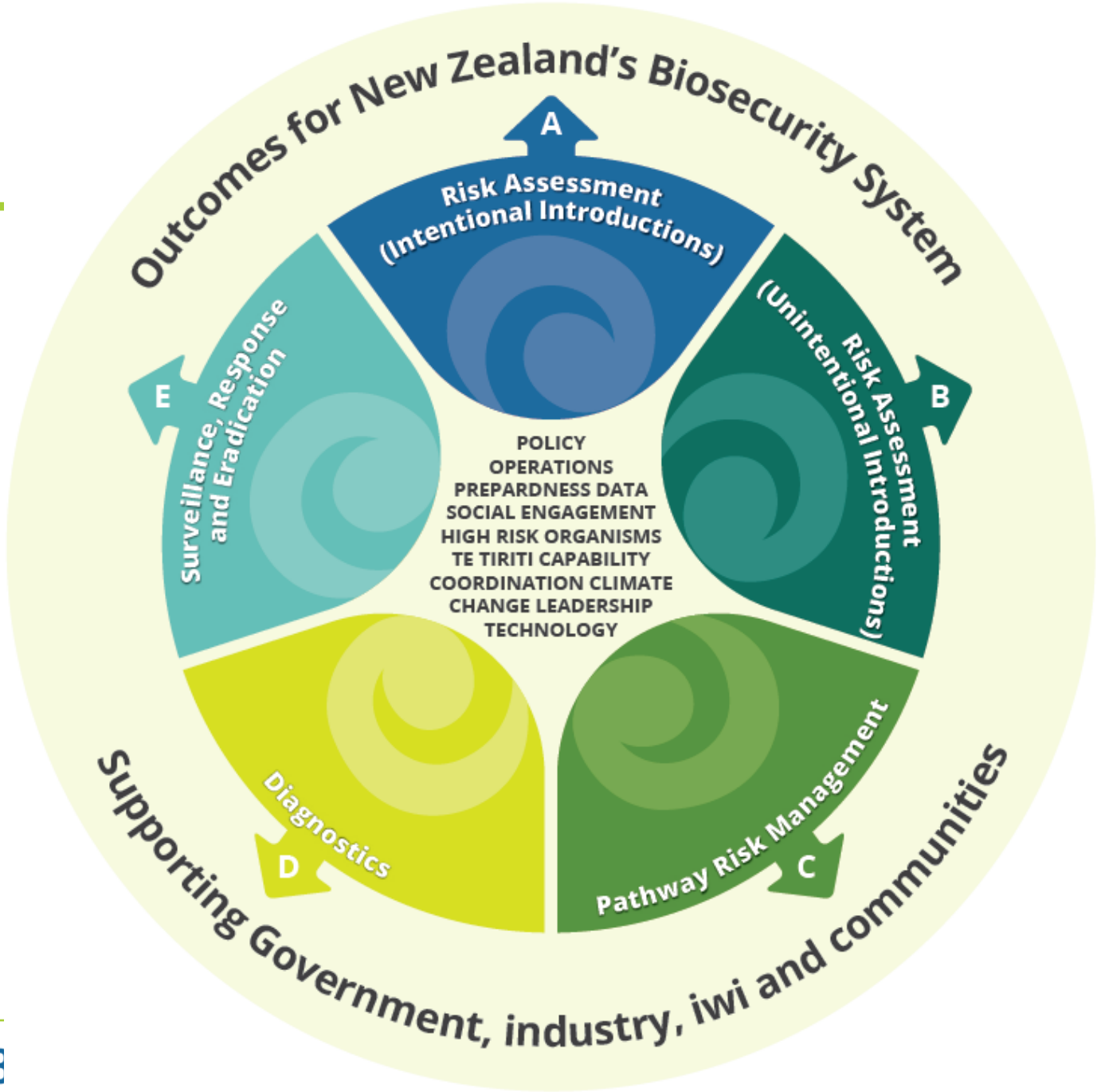
Better Border Biosecurity (B3)

- Partnership/collaboration
  - Four land based Crown Research Institutes plus BioProtection Research Centre (Lincoln Univ)
  - Primary end-users: MPI, DOC, EPA, Forest, Pastoral, Horticulture & Cropping sectors

- Science-based solutions …
  - to reduce the rate of establishment of …
  - high-impact, damaging and unwanted pests, diseases and weeds …
  - threatening New Zealand's productive and natural plant systems






Outcomes for New Zealand's Biosecurity System
A
Risk Assessment (Intentional Introductions)
B
Risk Assessment (Unintentional Introductions)
C
Pathway Risk Management
D
Diagnostics
E
Surveillance, Response and Eradication
POLICY
OPERATIONS
PREPARDNESS DATA
SOCIAL ENGAGEMENT
HIGH RISK ORGANISMS
TE TIRITI CAPABILITY
COORDINATION CLIMATE
CHANGE LEADERSHIP
TECHNOLOGY
Supporting Government, industry, iwi and communities

B3 Research Themes

Theme A. Risk Assessment for Intentional Introductions

- What are the BCA's of risk to NZ?
  - Barbara Barratt (AGR)

Theme B. Risk Assessment for Unintentional Introductions

- What are the pests and diseases of risk to NZ?
  - John Kean (AGR)

Theme C. Pathway risk management

- What are the high risk pathways and how to close/manage them?
  - Nicolas Meurisse (Scion)

Theme D. Diagnostics

- Can we identify pests and diseases when they get here?
  - Karen Armstrong (BPRC)

Theme E. Surveillance, Response & Eradication

- How can we detect incursions as early as possible?
- Can we improve our chances of their eradication?
  - Jessica Dohmen-Vereijssen (PFR)

New Zealand's Biological Heritage National Science Challenge
Ngā Koiora Tuku Iho

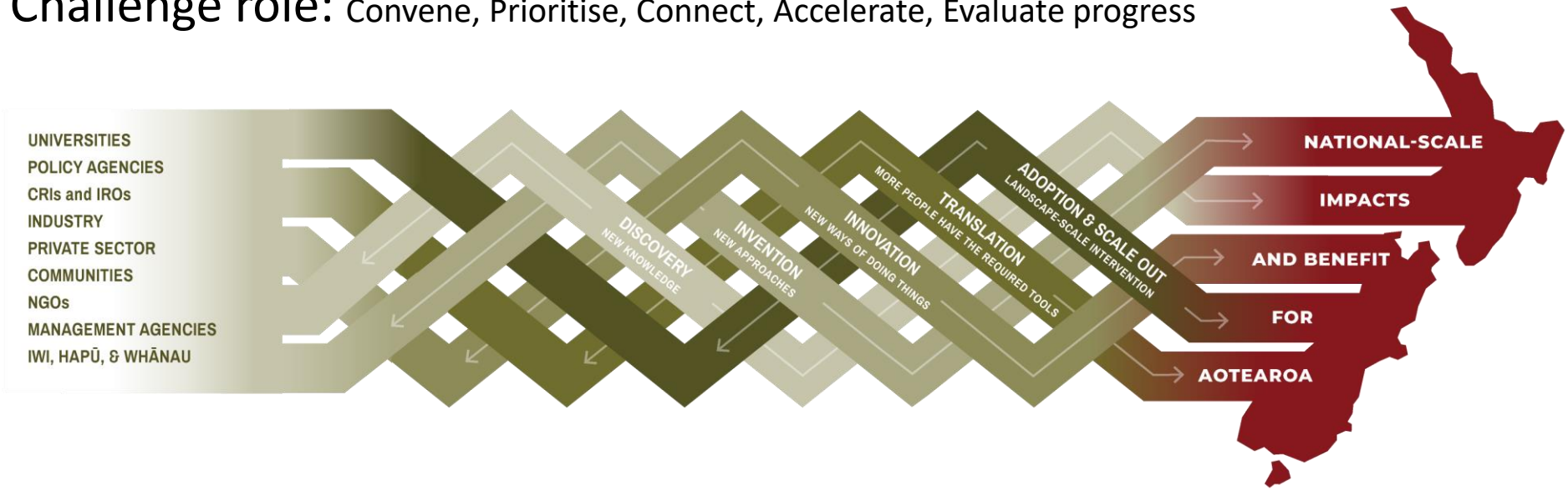
NEW ZEALAND'S BIOLOGICAL HERITAGE
Ngā Koiora Tuku Iho
National SCIENCE Challenges

Mission

- **Reverse the decline of New Zealand's biological heritage, through a national partnership to deliver step change in research innovation, globally-leading technologies, and community and sector action.**

The need: create **greater impact** from science

Challenge role: Convene, Prioritise, Connect, Accelerate, Evaluate progress



Our Approach: Collective Impact

The commitment to a common agenda of a group of important actors from different sectors for solving specific strategic problems that will deliver enduring national benefit.

18 Challenge Parties – all the universities, all the CRIs, Cawthron Institute, and two government departments (DOC and MPI)

Our Mission

Reverse the decline of New Zealand's biological heritage, through a national partnership to deliver a step change in research innovation, globally leading technologies and community and sector action

Our Objective

Protect and manage our biodiversity

Improve our biosecurity

Enhance our resilience to global threats and pressures

NEW ZEALAND'S BIOLOGICAL HERITAGE | Ngā Koiora Tuku Iho

National SCIENCE Challenges

Impact 1: Whakamana • Empower

1. BioHeritage Scorecard(s) for Aotearoa
2. Empowering Kaitiakitanga & Environmental Stewardship

Impact 2: Tiaki • Protect

3. Predicting Current & Future Threats
4. State-Of-The-Art Surveillance
5. Novel Tools & Strategies

Impact 3: Whakahou • Restore

6. Pathways to Ecosystem Regeneration
7. Adaptive Governance & Policy

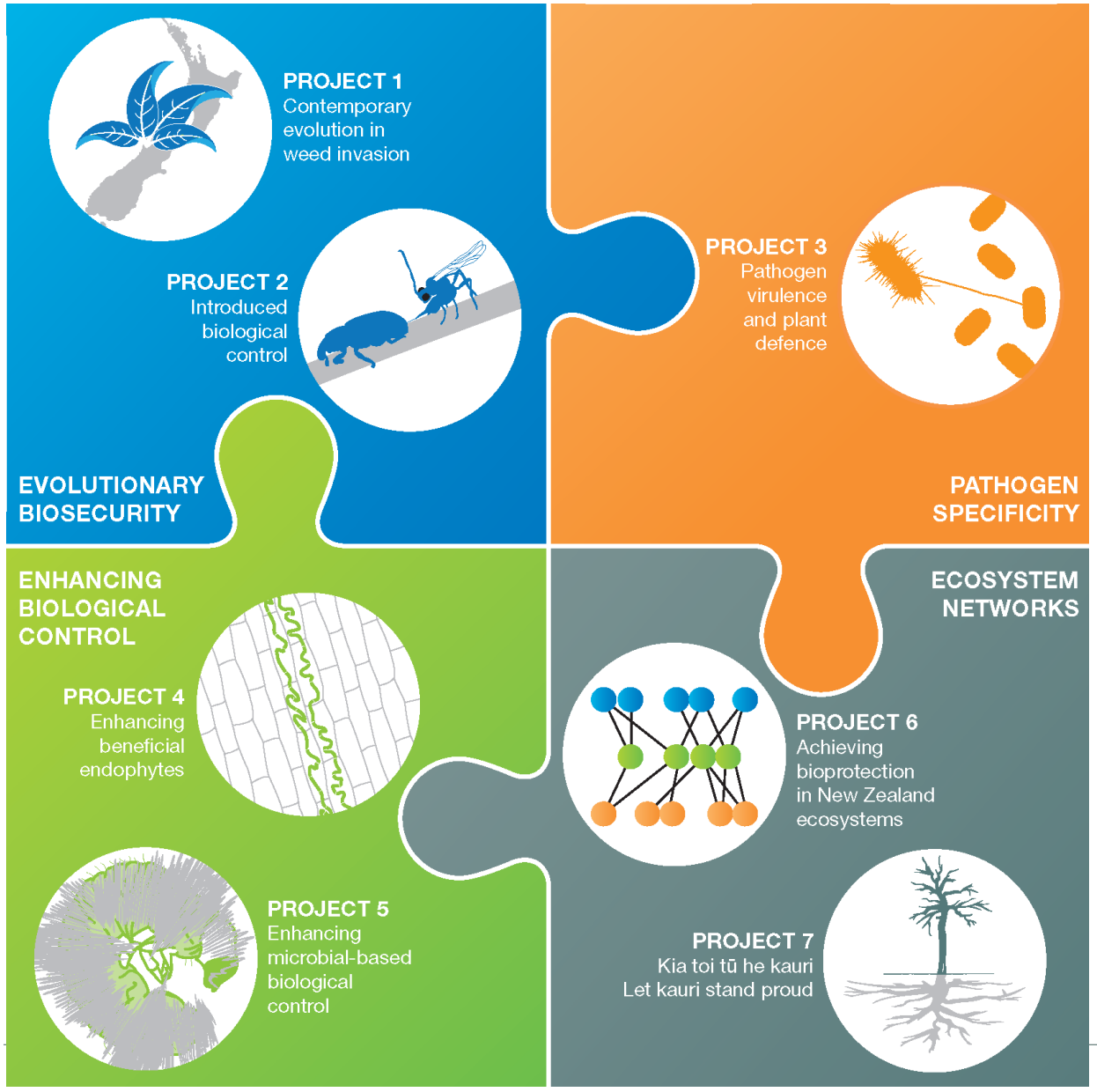
Bio-Protection Research Centre

A National Centre of Research Excellence (CoRE) hosted by Lincoln University

- **Seven partner organisations**
- **Established in 2002**
- **Conducting fundamental through to applied research**
- **All plant based primary sectors covered**
- **Links with key bioprotection groups in NZ**

An institute of research and postgraduate training

Bio-Protection Research Centre

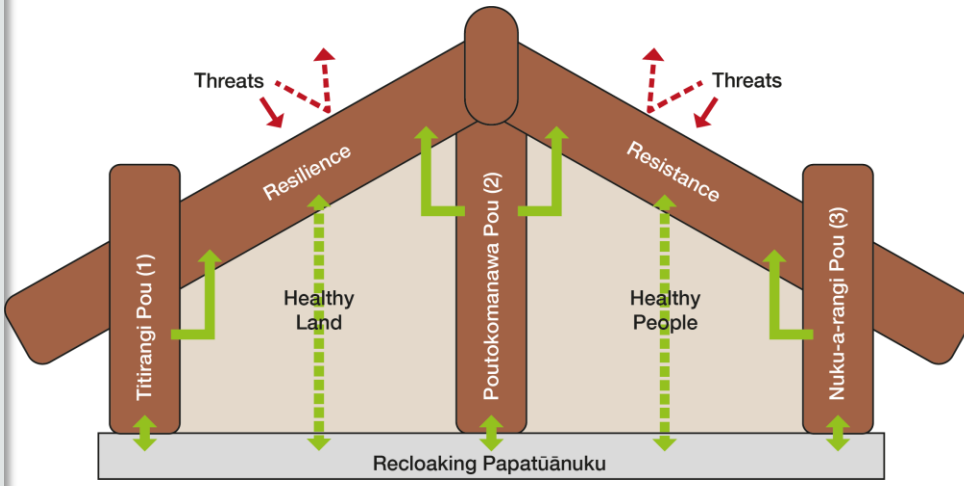


Bioprotection Aotearoa

together under a Taiao to protect our landscapes from pathogens, pests and weeds

Bioprotection Aotearoa will protect our landscapes from pathogens, pests and weeds.

Our Whare conceptual framework functions on all levels



Biosecurity Innovation Landscape

Shared

- Strategies
- Objectives
- Funding
- Partners
- Board members
- Advisors
- Project leaders
- Stakeholders

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Plant & Food RESEARCH RANGAHAU AHUMĀRA KAI

agresearch āta mātai, mātai whetū

SCION FORESTS • PRODUCTS • INNOVATION

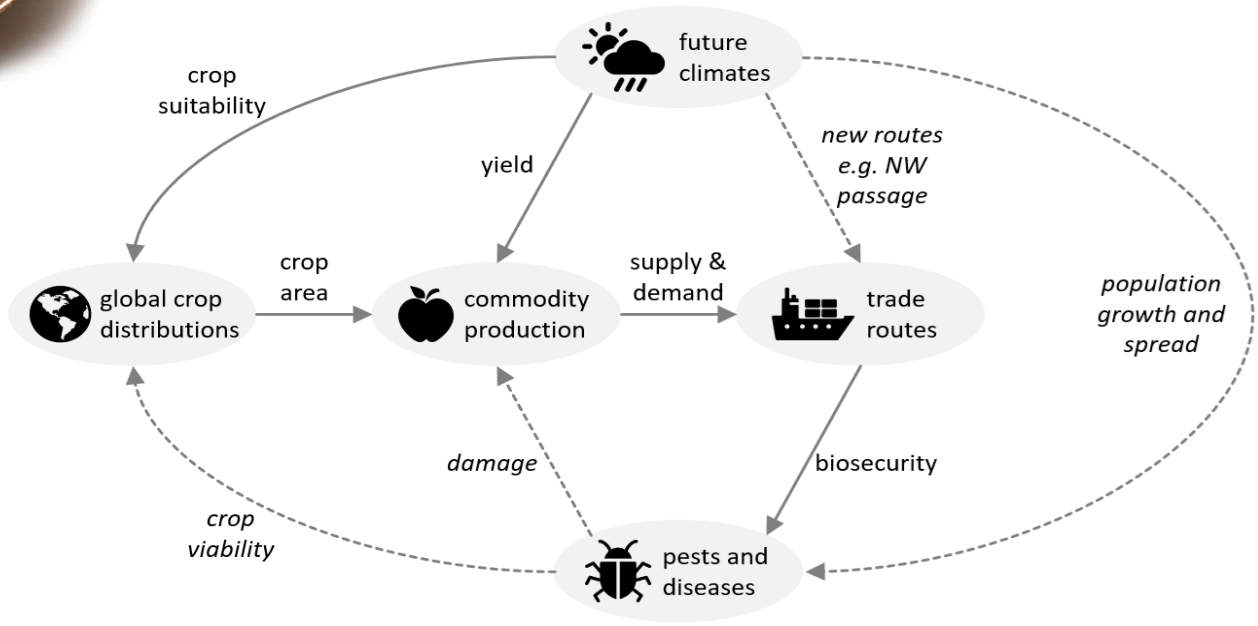
Manaaki Whenua Landcare Research

Bio-Protection Bioprotection science for New Zealand

Xylella fastidiosa and its NZ vectors

- Knowledge on the distribution of potential endemic insect vectors of *Xylella fastidiosa*, including their host plants, seasonality, and movement between the native and productive estate
- The information will be incorporated into MPI and DOC *Xylella fastidiosa* risk assessments for the productive and native estate and industry response plans through the Xylella Action Group

Global change



A review of disinfestation research

Pathways

- Cargo
- Vessels
- Mail
- Passenger
- Environment

Priority pests and diseases

- Insects
- Mites
- Pathopgens
- Nematodes
- Spiders

Treatments

- Chemical
- Fumigants,
- Pesticide dips,
- Sprays,
- Aerosols
- Non-chemical
- Physical treatments: cold, heat, pressure etc;
- Energy treatments: irradiation, microwave, radio frequency etc;
- Controlled atmosphere

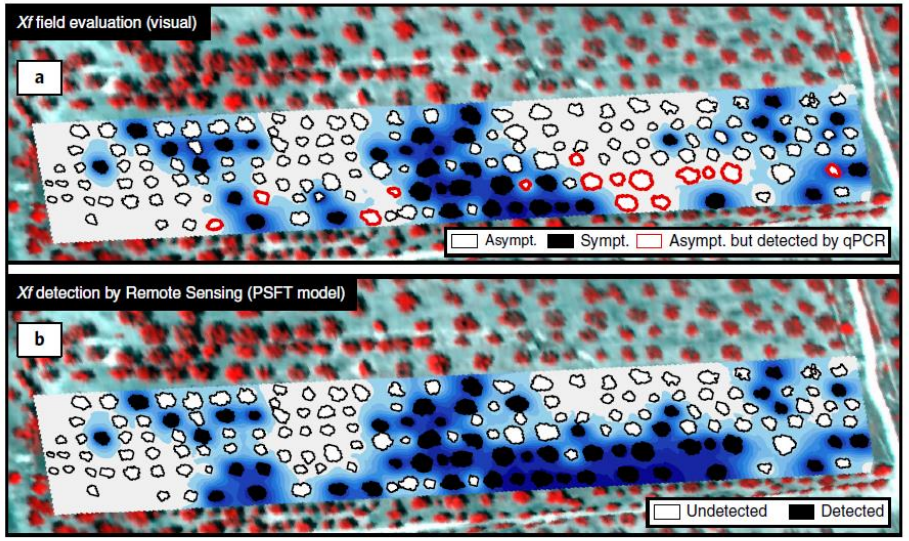
Stink bug infested ships back to Auckland, where they're running out of cars

Julie Iles · 15:07, Feb 24 2018

E: Surveillance

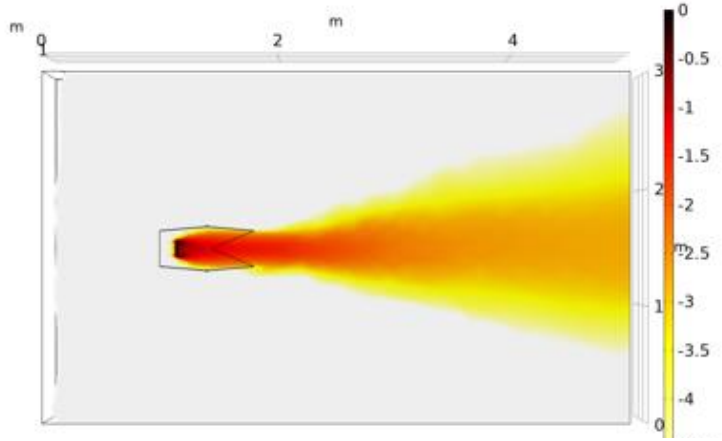
Rapid response to Biosecurity threats in nurseries

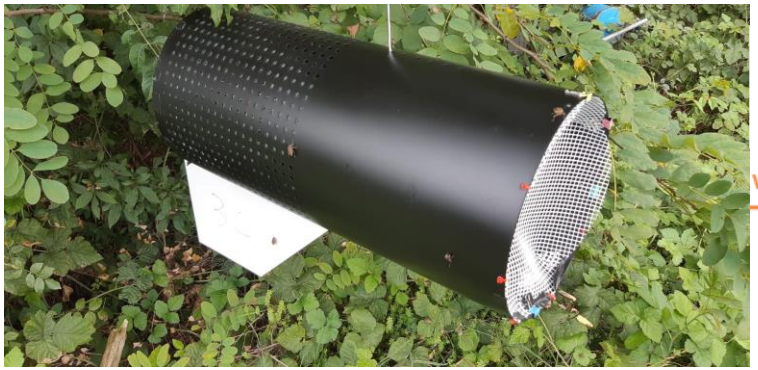
- Rapid detection of pathogen invasions, before visible symptoms are detectable, could enable early eradication
- Identification of specific hyperspectral signatures for the detection of invasive *Phytophthora* species in asymptomatic plants



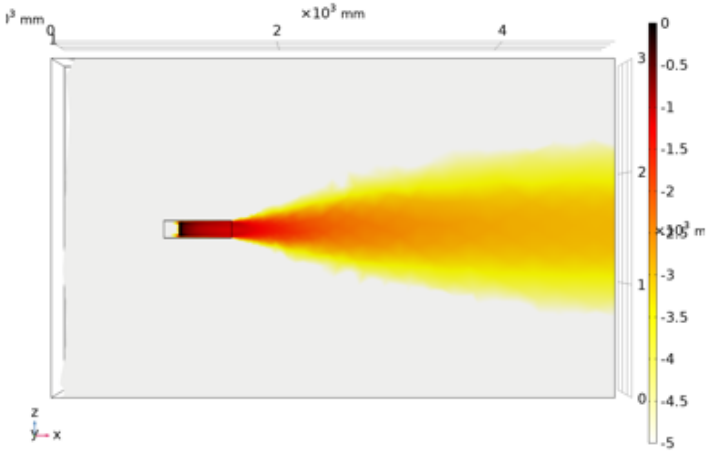
Aerodynamic designed traps

wind





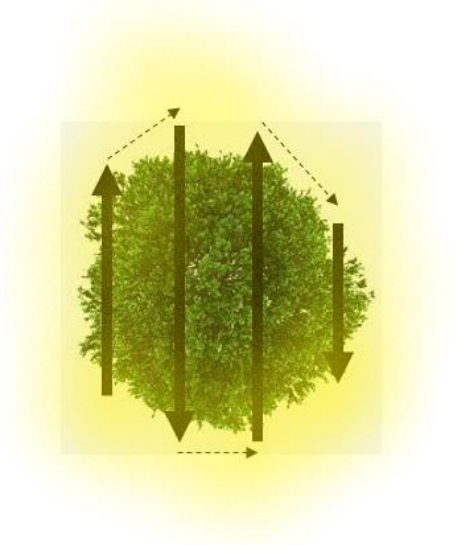
wind

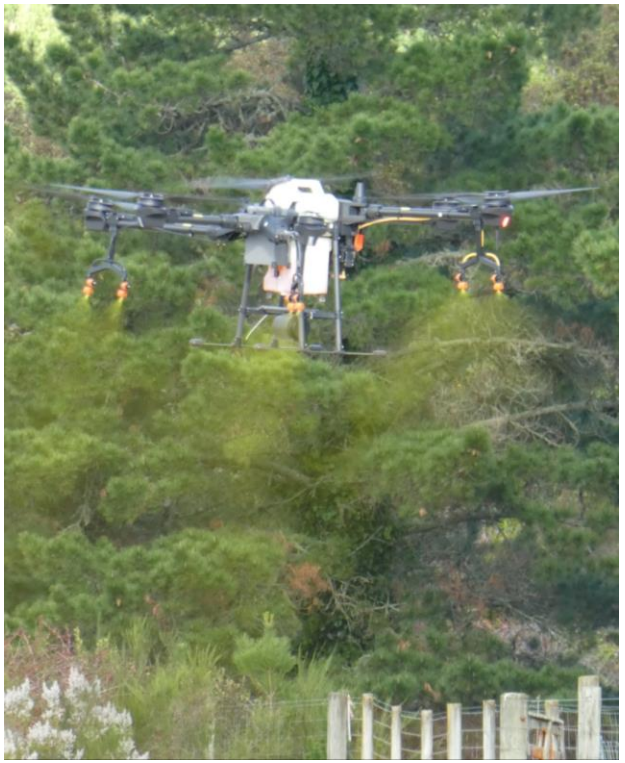


The plume is predicted to be narrower and more concentrated.

UAVs for spot spraying large urban trees

- Evaluating the suitability (fit for purpose) of next generation UAV spray technology for lower impact precision spraying in urban areas.





He Tangata, He Taiao, He Ōhanga
a values-based biosecurity risk assessment framework for Aotearoa

- Greater participation in risk-based decision-making for biosecurity

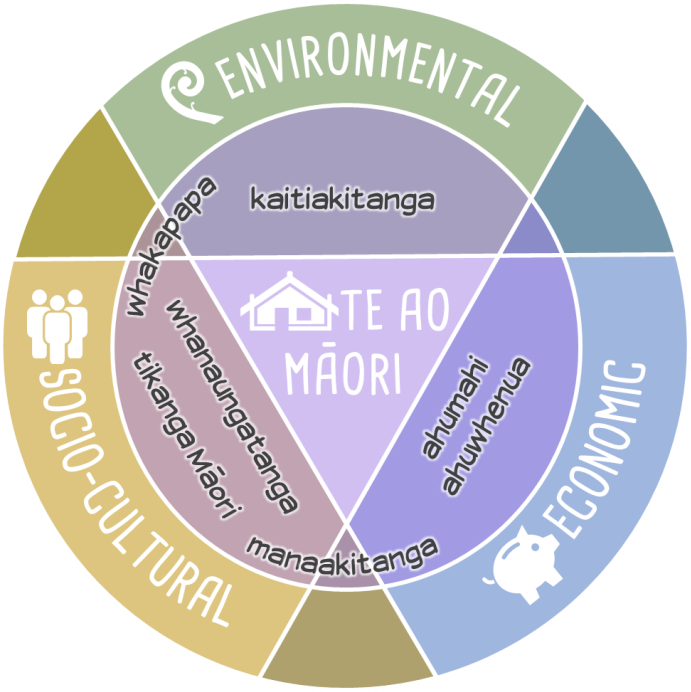
  We are all in this together

- A more holistic consideration of the fuller set of values

  It's not just about the economy

- Improved biosecurity risk assessment and management

  Better tools and processes



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