

10 February 2016

To Challenge Parties

Aligning your Research Activities to Challenge Priorities

Intent of the National Science Challenges

National Science Challenges (NSCs) take a strategic approach to addressing critical issues for New Zealand. To that end, the Government's expectation is that research activities conducted by all Challenge Parties will consolidate around a set of top questions where research-based solutions are needed in order to address critical issues identified within each Challenge. In partnership with our stakeholders, we have clarified priority areas for future research activity for *New Zealand's Biological Heritage* Challenge. We now invite you to refer to these priorities as you develop plans for research that you may wish to align to the Challenge. This in turn will help us sharpen the focus for research funded directly by the Challenge (including allocation of "contestable" funding – see below).

Your commitment as a Collaborating Party

As a collaborating party to *New Zealand's Biological Heritage* NSC, your organisation has committed¹ to align research funded from non-Challenge sources, to complement research funded directly by the Challenge. Collectively, we can thus expand the scale and scope of total biological heritage activity in order to deliver on the Mission. Research in your organisation may already be contributing to the Challenge Mission. However, our aim is to help you, with guidance on how to align research to the Challenge, to strengthen and increase the impact and value of your research over time.

Priority research areas

Now that the Challenge is well underway, the Governance Group has agreed on a set of key priorities for aligned research (Annex 1) and can now meet its commitment to provide these priorities to you. While the priorities have a long-term focus, we intend to review (and potentially refresh) them annually to ensure they remain relevant. We anticipate that such refinement will evolve out of continued dialogue with all Challenge Parties and stakeholders.

These priorities represent critical issues where research-based solutions should have a major impact on delivery of the Challenge Mission. We have deliberately defined these priorities in broad terms to enable you to respond, drawing on your organisation's strengths and consistent with your organisation's strategy. However, we expect that collaboration across multiple organisations will be required in order to develop these research-based solutions.

Your response

As set out in the Collaboration Agreement, we look forward to the information you can provide on your aligned research activities. Please send responses to Dr Andrea Byrom (director@biologicalheritage.nz), by 30 May 2016. You may wish to discuss options and details with Andrea before submitting your response. The Collaboration Agreement specifies that your aligned research will remain under the authority of your organisation and the obligations that it may have to the funding sources that support it. Guidance as to what information about your aligned research we would appreciate receiving is also included in Annex 1.

The Research Plan

Please refer to the Research Plan² for the Challenge, as you consider your response to the priorities we have provided here. For your convenience, our consolidated priorities are shown alongside the Programme Outcomes and research projects (planned or already underway) to be funded from the Challenge envelope. We also provide a set of Challenge Outcomes and Intermediate Outcomes that have been defined by our stakeholders (Annex 2), as it will be through

¹ Collaboration Agreement – http://www.biologicalheritage.nz/_data/assets/pdf_file/0007/87361/Biological-Heritage-NSC-Collaboration-Agreement.pdf

² Research Plan – http://www.biologicalheritage.nz/_data/assets/pdf_file/0020/87311/Biological-Heritage-Proposal-REVISED.pdf

these intermediate outcomes that we expect stakeholders to create impacts from your research (as set out in the Outcomes Framework for this Challenge).

Our feedback to you

After you report aligned research planned for 2016–17, our aim is to collate an overall summary of aligned research for the Challenge, and feed this back to you. We expect this collated summary to enable you to identify:

- Research areas where you share interests with other Challenge Parties (and may therefore seek to strengthen collaboration); and
- Further research gaps and opportunities that you may wish to consider as we implement a contestable funding process for the Challenge later this year. 20% of the Challenge envelope funding has been set aside for allocation through this contestable funding process.

A summary of aligned research activities will also be included in our formal annual reporting on the Challenge.

We greatly value the support and commitment of your organisation to this important National Science Challenge. We look forward to your response to the research priorities we are now providing and to the progress that we can collectively make towards achieving the Challenge Mission.

Yours sincerely

Dr James Buwalda
Chair, Governance Group

Annex 1: Research Priorities

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| Programme 1: Real time biological heritage assessment: Ko te whakamana pūtaiao | |
| Programme Outcome: Biological heritage assessment is available at relevant scales and in real time to enable biodiversity and biosecurity impacts to be considered in management decisions | |
| Priority area for research | Reminder: Challenge-funded projects |
| <p>Future-focused tools for state-of-the-art biodiversity monitoring</p> <p>Illustrative research:</p> <p>Research to unite current monitoring frameworks at local, regional and national scales</p> <p>Development of next-generation technologies and tools that can underpin research priorities in Programmes 2 and 3</p> | <p>Mātauranga Māori characterisation of New Zealand's biodiversity</p> <p>Genetic characterisation of New Zealand's terrestrial and freshwater biota</p> <p>A national framework for biological heritage assessment across natural and productive landscapes</p> |
| Programme 2: Reducing risks and threats: Whakanoa mo ngā wero me ngā whakaaro witiwiti | |
| Programme Outcome: Prevent biosecurity invasions and mitigate damage to indigenous and managed ecosystems at landscape scale | |
| Priority areas for research | Reminder: Challenge-funded projects |
| <p>Reduce the risk of new exotic species becoming established to near-zero</p> <p>Eliminate small mammal predators (possums, rats, mustelids)</p> <p>Mitigate the biodiversity and economic impacts of weeds</p> <p>Illustrative research:</p> <p>Research to develop and deploy new technologies, practices and timely interventions for achieving cost-effective, humane and sustainable biosecurity risk mitigation at all stages of invasion</p> <p>Research to future-proof the effectiveness of NZ's biosecurity system</p> <p>Research to achieve cost-effective, sustainable and socially-acceptable elimination of pests, weeds and pathogens at large spatial scales</p> | <p>Biosecurity network interventions</p> <p>Novel wasp control technologies</p> <p>Hi-tech solutions to invasive mammal pests</p> <p>Māori solutions to biosecurity threats and incursions to taonga species</p> |

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| Programme 3: Enhancing and restoring resilient ecosystems: He pūtaiao kaha ora tonu | |
| Programme Outcome: Resilience of vulnerable ecosystems is enhanced, preventing irreversible tipping points resulting from biotic invasion and biodiversity loss compounding stressors such as land-use intensification and climate change | |
| Priority area for research | Reminder: Challenge-funded projects |
| <p>Restore threatened species and ecosystems, including taonga species</p> <p>Illustrative research:</p> <p>Research to preserve and protect dynamic and complex ecosystem feedbacks in response to drivers of global environmental change.</p> <p>Research to understand dynamic and complex ecosystem responses to management interventions aimed at protecting natural and cultural resources in social-ecological systems</p> <p>Research to enhance the ability of threatened taxa and ecosystems to build resilience to stochastic environmental effects</p> | <p>Predicting and managing ecosystem tipping points</p> <p>Customary approaches and practices for optimising cultural and ecological resilience</p> <p>Enhanced biodiversity and ecosystem services in working landscapes</p> <p>Interdependencies within and between ecosystems</p> |
| Cross-Programme Priority: People and Environmental Stewardship | |
| Priority area for research | |
| <p>Increase public engagement and motivate public support for reversing the decline of New Zealand's biological heritage</p> <p>Illustrative research:</p> <p>Frameworks to enhance the availability, accessibility, relevance, inter-operability and real-time use of biosecurity and biodiversity data</p> <p>Total economic valuation (market and non-market values) of New Zealand's natural capital</p> <p>Systems and approaches for enhancing public awareness and social licence to operate, improving environmental decision-making and removing barriers to adoption</p> <p>Research that integrates different knowledge bases to create new knowledge that improves management of our biological heritage</p> | |

Your advice on aligned research activities should include:

- Specific programmes, projects, other activities (as these can be specified);
- How this research aligns to the respective Challenge programmes;
- The value you expect this aligned research to contribute to the Challenge programmes;
- How this aligned research supports your organisation's strategy (e.g. Statement of Core Purpose for CRIs); and
- Total aligned research funding (and how you have estimated this), for the 2016–17 financial year.

We would therefore appreciate you presenting your response in relation to these five dimensions of your organisation's aligned research. We are working on a template that you will be able to use for presenting your response to us, and this will be available within the next month.

Where there are details in your response that you wish to be kept confidential, please let us know. We are happy to honour such confidentiality needs.

Annex 2: Outcomes and Intermediate Outcomes defined by Challenge stakeholders

The Challenge encompasses terrestrial and freshwater ecosystems, and natural and production sectors. Research activities integrated across disciplines and sectors are required. Research activities should incorporate Mātauranga Māori and scientific research in a whole-of-system approach to reversing the decline of New Zealand's biological heritage. Research activities should contribute to the Challenge Mission through *Intermediate Outcomes* (defined by stakeholders; see below) that are scalable – locally, regionally and nationally. These are provided below, to help you consider aligned research that is likely to have the greatest lasting impact for New Zealand.

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| <p>Outcomes</p> | <p>The diversity of our indigenous biological heritage is maintained and restored</p> <p>Our biological heritage and people are kept safe from damaging pests and diseases through effective operation of the biosecurity system</p> <p>The value of services provided by resilient ecosystems is enhanced and restored</p> <p>People are enabled to make decisions and take action to benefit our biological heritage</p> |
| <p>Intermediate Outcomes relating to Biosecurity</p> | <p>The contribution of science to biosecurity policy, standards, regulations, investments and operational decision-making is improved across the biosecurity system</p> <p>Public confidence, support and active engagement in NZ's biosecurity system is enhanced</p> <p>Primary sector market access and future investment opportunities are enhanced and maintained as a result of confidence in NZ's biosecurity system</p> <p>Resilience of natural and production ecosystems to new and existing pests, weeds and pathogens is enhanced</p> <p>New biosecurity risks and their likely impacts to natural and production ecosystems are better understood and appropriate interventions are in place</p> <p>The adaptability and responsiveness of the biosecurity system to changes in risks and opportunities is improved</p> <p>Biosecurity science data, information, and expertise are more available, accessible, relevant, and used in a more effective and timely way across the biosecurity system</p> <p>New technologies and practices for achieving more cost-effective, humane and sustainable biosecurity risk mitigation (pre-border, border, post-border) are developed and introduced</p> |
| <p>DRAFT Intermediate Outcomes relating to Biodiversity and Ecosystem Resilience</p> | <p>The wellbeing of current and future generations is enhanced through the use of Mātauranga Māori science and local knowledge to inform management decisions</p> <p>The diversity of New Zealand's natural and cultural heritage is restored and maintained</p> <p>Streams, rivers, wetlands and estuaries including wai tapu and wai taonga are maintained in a healthy functioning state</p> <p>A full range of threatened and taonga species are restored to a functioning, non-threatened state</p> <p>New Zealanders are inspired to actively protect their shared natural and cultural heritage</p> <p>Native plants and animals flourish across a network of protected places, including production landscapes, through enhanced connectivity between remnant native taxa, habitats and ecosystems</p> <p>New Zealand's natural and production ecosystems are resilient to global environmental change</p> <p>Measures of ecosystem resilience are monitored, trajectories understood and tipping points anticipated and mitigated</p> <p>Comprehensive biological heritage data and information are available at relevant scales and in real time to enable effects to be considered in management decisions across all environmental</p> |

domains

Iwi, hapū, and whānau are enabled to give effect to kaitiakitanga

The contribution of science to informed biodiversity policy, standards, regulations, investments and operational decision-making is improved

The multiple ecological, social, cultural and economic values associated with biodiversity and ecosystem services are well understood by society