



19 November 2018

To: Andrea Byrom
Director@bioheritage.co.nz

Cc: James Buwalda
James@innovationstrategy.co.nz

Richard Gordon
GordonR@landcareresearch.co.nz

Dear Andrea,

Thank you for submitting requested documents (Overview of Progress, Financial Information and Future Strategy) for the National Science Challenge Mid-way Review and presenting to the review panel on 9 August 2018. The Science Board and MBIE appreciate the effort by all parties involved in preparing for and participating in the Review.

The Science Board met on 24 October to make funding decisions for the National Science Challenges second period of funding. The Board considered the submitted documents, the review panel's report, your response to the panel report, the Science Advisory Panel Chair's report, and information provided by MBIE.

I am pleased to advise that the Science Board has agreed to fund New Zealand's Biological Heritage at the maximum available (\$37.9 million GST excl.) for second period funding, 1 July 2019 – 30 June 2024.

The Board notes the very positive views of both New Zealand's Biological Heritage's progress to date and its Future Research Strategy, that are expressed in the reports of the review panel and the Science Advisory Panel Chair. The review panel's report, excluding funding recommendations to MBIE, is attached as Annex One.

The Board congratulates the Challenge on creating a research ethos that demonstrates excellent commitment to the principles of National Science Challenges. The Challenge's open and collaborative culture appears to have successfully engaged and built trust among Challenge parties, Māori and stakeholders, and to be coalescing biodiversity and biosecurity research across New Zealand. We thank all involved for the leadership, focus and perseverance that has been required to deliver this excellent progress, and which will stand the Challenge in good stead as it embarks on its ambitious programme of research over the next five years.

Any remaining unallocated funding from the first five-year period may be retained by the Challenge and spent as part of the second five-year Challenge Programme Agreement.

MBIE will work with you during the contracting stage to agree a set of key performance indicators that will enable the Challenge to demonstrate progress towards its objective, via the planned themes and strategic outcomes.

If you have any questions please do not hesitate to contact your MBIE lead contact, Dr Alison Fordyce (Alison.Fordyce@mbie.govt.nz) in the first instance.

I would like to take this opportunity to thank you for the considerable efforts you and your team are putting towards ensuring Challenge success.

Yours sincerely

A handwritten signature in black ink, appearing to read 'P. Williams', with a small dot at the end.

Dr Prue Williams
General Manager, Science System Investment and Performance
Ministry of Business, Innovation & Employment

Annex One: Review panel's report

**National Science Challenges
Mid-Way Review**

**New Zealand's Biological Heritage
*Ngā Koiora Tuku Iho***

**Report of the Review Panel to the
Science Board**

September 2018

Recommended guidance/actions for MBIE during the contract negotiation process

Recommendations to MBIE

- The Panel recommends that MBIE resource and facilitate some critical cross-Challenge interactions to ensure dissemination of best practice and enhance the overall outcomes of the NSC investments. Key areas apparent for discussion from review of the New Zealand's Biological Heritage Challenge would include:
 - incorporation of Mātauranga Māori and active facilitation with other Challenges to ensure they have the same high standard of engagement with iwi including co-innovation, co-design and co-implementation
 - establishment of common metadata standards and data collection/modelling standards to ensure cross-Challenge accessibility of data
 - identification of common models, data sets and data scales to maximise interoperability. For example, agree on single terrain model across challenges, and a single common climate change scenario series
- The Panel recommends that MBIE works with the Challenge to develop post-2024 planning to ensure capture of the Challenge legacy, and especially secure the new capability developed through the initiative.

Overall comments

View of Past Performance

The Panel observes that the Challenge has:

- Created an excellent, open and collaborative culture which appears to be delivering benefits for both science outcomes and challenge researchers.
- Established a partnering approach to working with Iwi/Māori that is exemplary and class leading.
- Made considerable progress in developing its approach to giving effect to Vision Mātauranga. Its work to incorporate Mātauranga Māori across all of its research projects and establish Māori-led Mātauranga Māori projects is impressive and class leading.
- Been effective in attracting \$176m of aligned funding.
- Started to be seen as the natural “home” for addressing complex issues based on its ability to pull together excellent, multi-disciplinary science capability across the system.
- Established a programme of science that balances high risk/novel research with translation and end-user needs.
- Undertaken extensive and meaningful engagement both externally and internally resulting in clarity of role, purpose and way of working.
- Established a strong cohesive and highly functional governance and management framework that is providing the Challenge with excellent guidance and direction.
- Produced an impressive list of science publications and reports in the time to date, including significant contributions from iwi/Māori researchers.
- Developed a wide range of relationships with end-users and is working actively with end-users to deliver impact.

- Established a strong and appropriate international engagement that is deliberate and targeting net benefit to Aotearoa New Zealand.
- Yet to fully develop its communication strategy and achieve momentum in its translation activities. This is recognised by the Challenge and is a key tenet of the strategy for Phase 2.

View of Future Strategy

The Panel considers the future strategy:

- Is considered, credible and ambitious.
- Builds on the first Phase of the Challenge and refines its focus to align with identified priorities that emerge from a stock-take of all relevant New Zealand biodiversity and biosecurity-linked strategies.
- Is designed to build on the solid body of science commenced (and/or aligned) in Phase 1 and through increased emphasis on translation science is achieving a balanced portfolio across the research horizons.
- Is still in the early stages of thinking about how to achieve some of its identified Strategic Outcomes, particularly when it comes to some of the more ambitious goals (e.g. engagement of 4.7m New Zealanders). The Challenge is aware of this and planning its approach early in Phase 2.
- Coexists with a culture of inclusiveness that is building researcher engagement over time.
- Maintains the Challenge's demonstrated commitment to continuous improvement through its on-going governance and management renewal considerations.
- Builds upon the excellent work done in Phase 1 in giving effect to Vision Mātauranga by continuing to extend its focus and approach.
- Needs to be more explicit regarding plans for ensuring legacy beyond 2025, including acknowledging that biodiversity decline will not even begin to be reversed by the termination date of Challenge.

Comments against review criteria

The Panel's review was guided by the following gazetted criteria only.

6.1 (a) The proposal is collaborative and will respond to the most important, national-scale issues for New Zealand and the Challenge objective

The Science Board must consider to what extent the Challenge's strategy for research, science, technology and related activities in the second funding period builds on the Challenge's activities in the first funding period to:

- provide a strategic, integrated and multidisciplinary portfolio of research, science, technology and related activities that meets the Challenge objective and outcomes (having reference to the themes), and the needs of end-users;
- build on and make best use of relevant New Zealand and international research, capabilities and user communities, including accessing funding and support from a range of sources; and
- give effect to the Vision Mātauranga policy in clause 3.1.

The Panel reports the following against the above criteria:

- The Challenge demonstrated an excellent commitment to collaboration and has developed an operating model that appears to be supporting partners and Challenge participants to work in new and more collaborative ways. The culture established by the Challenge is seen as positive, highly collaborative and as supporting engagement both internally and externally. This was clear from several of the scientists, stakeholders and end users who uniformly commented that the Challenge had created a space for conversation across institutions and disciplines and for access to information which encouraged a collaborative and mission-oriented approach. They noted that this was a unique and positive change in the R&D community. It would appear that this outcome is an emergent property of the quality of leadership, the commitment to collective outcomes, and the approach of investing strategically in perceived science gaps while gaining full commitment from aligned research. This enhancement to the style and depth of collaboration in itself is already emerging as a major legacy from this Challenge. Effective integration and collaboration are a clear hallmark of this Challenge.
- The Challenge's collaborative culture is no accident with Challenge leadership (including the Host organization) creating the environment for active collaboration to flourish and modelling collaborative behaviour in the leadership of the Challenge. This appears to be having a cascading effect throughout the Challenge participants and was widely remarked upon by researchers working within the Challenge as being unique, welcome and beneficial to the science being undertaken within the Challenge. Indeed, Challenge researchers report realising additionality in science outcomes through the Challenge's collaborative operating model.
- This Challenge team has demonstrated impressive science progress in Tranche 1 and is clearly focused on one of the highest priority issues for NZ in seeking to reverse the decline of Biological Heritage as its central theme. The science strategy for Phase 2 builds on this theme and is refined to reflect the wider critical issues to Aotearoa New Zealand based on a review and cross-referencing of all relevant New Zealand strategies in the area to determine aligned priorities. The strategy has been the subject of extensive stakeholder consultation.
- The Panel agrees that the Challenge is focusing on an appropriate set of Strategic Outcomes within the context of the time and resources available and providing very significant leverage from MBIE investments of other resources to achieve significantly more through affiliated projects than the direct investment would secure.
- The Strategic Framework and operating model represent a logical and well-structured approach to realising benefit aligned with the Challenge's objective.
- The Challenge demonstrated its commitment to "right teams" underpinned by an ethos of excellence, capability building and commitment by the partners. The work to provide opportunities for early stage researchers within the challenge framework is encouraging.
- The Challenge demonstrated its deep commitment to working with Iwi/Māori, not only as research partners but by being committed to also working with Iwi to support the development of research methodologies embedded in tikanga and promoting the use and recognition of Mātauranga Māori. This is particularly important in relation to this Challenge recognising the significance of taonga species, biodiversity and biosecurity to Māori. The Challenge appears to be making strong progress through its approach.
- The Challenge has pulled together the full complement of relevant and high quality research capability in Aotearoa New Zealand and through international partnerships. It is impressive that the Challenge has been able to assemble a Portfolio of funded and

substantial aligned research that all contribute to the Mission and that the 18 Challenge parties are committed to continuing this approach into Tranche 2. A truly aligned and integrated approach has been achieved.

- The Challenge should be congratulated for building respect from their 18 Parties to the point where the Challenge is trusted to coordinate the full body of science needed to address complex issues. It appears the Challenge is fast becoming the “go to” place to access multi-disciplinary science teams working collectively and collaboratively to consider complex issues facing New Zealand’s biodiversity and bio-security. With this in mind the Panel considers the platform of funded and aligned work combined with the pathways to impact should also be attractive to other research groups and funding agencies wishing to align further work with the Challenge Mission.
- At the same time there is a sharp awareness that translation of science outcomes to impact is critical to make progress towards the Mission. The Challenge has positive connections to a suite of end users and communities and the plan for Phase 2 signals increased investment in translation and adoption capability whilst continuing to support research on strategically identified components that complement elements of aligned research. The Panel considers this appropriate and encourages the Challenge to progress its thinking in this area as a matter of urgency.
- The Panel suggests that the Challenge looks explicitly to the future composition of terrestrial and aquatic ecosystems and the consequences of environmental change.

6.2 (a) The research, science and technology will be excellent quality

The Science Board must consider to what extent the Challenge’s strategy for research, science, technology and related activities in the second funding period will deliver excellence, and builds on the Challenge’s activities in the first funding period to:

- make best use of, and build the skills and expertise of New Zealand researchers to deliver the Challenge objective and outcomes (having reference to the themes), leveraging international researchers and research organisations, and allowing for the dynamic introduction of new capability, research and researchers;
- contribute to science quality, across a portfolio which appropriately balances high risk, high return research and new knowledge generation with incremental research and helping end-users to take up research (horizons balance), and appropriately balances science disciplines; and
- give effect to the Vision Mātauranga policy in clause 3.1.

The Panel reports the following against the above criteria:

- The impressive list of publications from activities in Tranche 1 speaks to a high degree of productivity and appropriate focus on high impact journals which maintain the profile of New Zealand science. The quality of outputs is supported by the International Advisory Panel who note “*the quality of the science and publication rankings, funded wholly or partly by the Challenge, provide ample evidence of the Challenge’s scientific achievement since establishment.*”
- The Publication list reflects a very high level of international collaboration (50-70%). Although we didn’t hear a great deal about the international linkages in the presentations, there are clearly some critically important connections into valuable international networks (TERN, BASE, US Long Term Research Network etc.). eDNA

is one area where the Challenge is clearly leading for New Zealand and international connections are growing.

- A unique feature of the science and publication output is that Māori authors are involved in 20% of publications. This is impressive indeed and well above the norm. The Panel would like to encourage the Challenge to codify its guidelines for authorship in this regard if it hasn't already done so to ensure appropriate recognition is attached to this practice.
- Having all the CRIs and Universities involved means this Challenge has assembled the full complement of expertise needed to deliver the Challenge objective and deliver a science strategy that is well balanced across the research horizons.
- The Challenge has been thoughtful about its development of international collaborations. It has targeted institutions and researchers where it perceives strategic benefit to the Challenge (e.g. the Challenge as 'net receiver of benefit' philosophy). By contrast, in relation to international collaborations based on Mātauranga Māori and partnering with Iwi, the Challenge is taking a progressive collaboration approach, recognising and sharing Aotearoa New Zealand's relatively progressive approach to the rights of indigenous people and research in this area.
- The Challenge has adopted a best/right team approach which the Panel believes to be highly relevant. The Challenge is encouraged to continue to pursue this approach, while ensuring that the metric of 'best' includes aspects of career development, community engagement and other non-traditional metrics of science excellence. The Panel also believes there is an opportunity to extend its best/right team approach into the international context, with the non-traditional metrics above used to evaluate where benefits might be shared with international participants, particularly with regard to early- and mid-career scientists. The Panel observes that some overseas agencies have funding mechanisms which the Challenge may be able to access to facilitate exchanges and secondments as well as employment or collaboration.
- The challenge has demonstrated its commitment to support early stage researchers through its contestable funding round and is providing excellent opportunities to build collaborative teams across the partners to support researchers working in new collaborative models.
- The work the Challenge is doing to support Māori researchers to achieve greater career progression is excellent. Their thoughtful consideration of the barriers to progression for researchers spread too thinly across organisations is well done and their commitment to criteria creating baseline requirements for consideration of Mātauranga Māori in all research projects is both useful and effective.
- The Challenge is doing excellent work integrating Mātauranga Māori alongside established research and science methodologies in its research projects to explore the linkages between traditional knowledge and science. In undertaking this novel work, it is realising considerable insights and learnings beneficial to the science and collaborating parties. The Challenge is to be applauded for taking such novel and holistic approaches in its science.
- The Panel considers the inclusion of a Native American Indian researcher on its ISAP to be an excellent approach to gaining an independent indigenous perspective into the ISAP and is further demonstration of the Challenge's careful and nuanced consideration of issues such as Vision Mātauranga.
- The Panel suggests that a communication plan is developed for each project at its outset and nested within the overall Challenge strategy, to ensure that potential engagement with the international science community, national decision makers and policy makers, and regional and local agencies, communities and others involved with

implementation, are involved with and aware of the research outcomes and their implications.

6.2 (b) The proposal is focused on delivering impact

The Science Board must consider to what extent the Challenge's strategy for research, science, technology and related activities in the second funding period will deliver impact, and builds on the Challenge's activities in the first funding period to:

- realise a credible pathway to create the impacts necessary to achieve the Challenge's objectives and outcomes (having reference to the themes);
- deliver benefits and additionality to New Zealand and to New Zealand science; and
- give effect to the Vision Mātauranga policy in clause 3.1.

The Panel reports the following against the above criteria:

- The Challenge has given considerable thought to its pathway to impact and is clearly focused on delivering impact with a well-defined path towards the Mission. To date it has made some small investment in Knowledge Brokers who are creating meaningful links to end-users. Where it connects to end user communities in rural industries, in biosecurity delivery and in Māori engagement the Challenge is very well placed to deliver impact. While this work is acknowledged, the Panel considers the Challenge needs to increase its investment in this area to accelerate and intensify its pathway to impact.
- The Challenge is aware of the need to proceed at pace to develop its translation capacity. To date the thinking is relatively underdeveloped but the Challenge is committed to progressing this work early in Phase 2. This is an area where inadequate funding may severely undermine the ability of the Challenge to deliver against its objectives. For Phase 2 the Challenge management has been able to instil an approach of co-innovation and co-design for future investments, which was endorsed by Challenge Parties, participant scientists and end users as an effective path to collective impact. Through this mechanism the Challenge has achieved a trusted and authoritative position among Parties and built a platform for ongoing progress towards the Mission. End-users expressed a desire for further co-innovation, co-design and co-delivery in pockets of particular relevance. This would seem to be fertile ground for the Challenge.
- It is clear that 2024 will not see the Mission achieved (nor was it expected to be), but the portfolio of integrated activities will provide a legacy of outcomes and approaches with real prospect to achieve it over time. Ensuring that the legacy is supported through an enduring mechanism or entity is something for MBIE to consider well before then Phase 2 of the Challenge comes to an end.
- A key objective of the strategy (and a significant legacy) is the ambitious objective of engaging and empowering all 4.7 million New Zealanders to recognise the value of their Biological Heritage and to demand ongoing action from government to stabilise and protect it. Building the weight of public opinion will require an increasing proportion of investment in social sciences to engage with the wider community and to inform and energise public opinion to ensure the legacy of the Challenge is both achieved and sustained.
- The overall approach to Mātauranga Māori, the level of engagement with Māori in governance, in appropriate science activity and in delivery of meaningful outcomes to

accommodate the Māori viewpoint of Biological Heritage is truly impressive. The Challenge has taken some novel steps to build Māori science capability and through investing in some projects which adopt a new way of doing science from a Māori perspective through Māori knowledge holders empowered to lead and direct research. Iwi/Māori representatives also reflected that the Challenge has ‘opened doors’ previously closed to them, which enabled community engagement with the innovation sector outside the remit of the Challenge, and that such access would remain open. The Challenge has demonstrated growing expertise in working with Iwi/Māori and is encouraged to continue to expand its knowledge and practice in this area.

- Particularly worthy of comment is the adoption of a suite of Māori-derived values for the whole Challenge which provide a strong cultural framework for the integrated, collaborative and caring approach the Challenge embodies. This is reflective of the need for shifting cultures across the research community which the Challenge is addressing head on. It was inspiring to hear leading researchers state that the “values” of the Challenge were one of the attractions to their involvement.
- The Challenge’s work with Iwi partners appears to be delivering impact both in terms of science outcomes and uptake but also in increasing engagement both by and with the science community and Iwi/Māori. While the volume of projects at this stage is relatively small, the model and delivery to date is very promising and to be encouraged
- An area the Challenge could strengthen is how its pathway to impact interests/dovetails with the responsibilities and mandate of other parts of the New Zealand system. For example, working with DoC, MfE, MPI, Regional Councils and the private sector to explore how translation science and end-user engagement can be aligned with other responsibilities in relation to engagement may assist the Challenge to refine/further develop its model (for example in State of the Environment reporting).
- Given the growth in volume of biosecurity incursions and the associated risk profile for Aotearoa New Zealand’s primary sector, it is puzzling that MPI does not appear to have fully committed to the Challenge. The Panel encourages the Challenge to continue to work with MPI to seek a deeper and more meaningful contribution by MPI.

6.2 (c) Decision-making and accountability arrangements are sound and enduring

Based on the Challenge’s performance during the first funding period and any proposed changes, the Science Board must confirm that the Challenge’s governance, management, and financial structures, including decision-making and accountability arrangements, are effective, appropriate and give effect to the Vision Mātauranga policy in clause 3.1.

- The Host organization, Manaaki Whenua – Landcare Research, has demonstrated outstanding commitment to the Challenge and contributed arguably above and beyond the level required. This appears to have contributed to the Challenge’s ability to foster its collaborative culture by virtue of having a “safe” and benevolent host committed to supporting the Challenge’s success without any suggestion of either a subservient or a competitive relationship between the two.
- The Challenge/Host relationship is clearly documented with the accountability and governance alignment between the Challenge and Host defined in an MoU but - more importantly - evidenced by the commitment of both to regular engagement at management and governance levels.

- The Challenge has enjoyed and benefitted from stable, fit-for-purpose governance structures and capability since its establishment. A constant and committed Governance Group and Challenge Directorate have provided excellent leadership to the Challenge and fostered an excellent collaborative culture.
- The Challenge's Governance Framework continues to evolve as the Challenge learns and adapts its model. Its intention to revisit its current separation of Kāhui and Governance Group is one demonstration of the way the Challenge is constantly reassessing the governance arrangement's fitness for purpose, and of its willingness to explore the potential adoption of novel models.
- The Challenge has embedded strong Māori voices at all levels of its framework.
- The Panel endorses the Challenge's consideration that Pacifika involvement be sought as part of ongoing efforts to further broaden the Challenge's cultural connection.
- The Panel observes that the Challenge directorate has been light in Phase 1 with some delays in appointments resulting in a slowing of critical activities (e.g. preparation of a strategic communications plan). The Panel considers this needs to be addressed in Phase 2 to ensure the Challenge is well positioned to continue with its pathway to impact work.

Background

1. MBIE formed an independent Panel with the following Members:

Jenn Bestwick (Chair)	Associate at The Project Office
Anake Goodall	Company Director, Adjunct Professor, University of Canterbury
Dr Gary Fitt	Science Director, Health and Biosecurity, CSIRO, Australia
Professor Charles Daugherty	Emeritus Professor of Ecology, Victoria University of Wellington
Dr Dan Metcalfe	Research Director, Land and Water, CSIRO, Australia

2. Panel Members declared the following interests at the time of their recruitment and before the Panel meeting.

Panel Member	Nature of Interest	Potential conflict	Resolution
Jenn Bestwick (Chair)	Previous consultancy	Assisted Manaaki Whenua/Landcare Research and GNS with Strategic Planning 2017	Noted
Professor Charles Daugherty	Director	Zero Invasive Predators Ltd	Noted
Professor Charles Daugherty	Trustee	Predator Free NZ Trust	Noted
Professor Charles Daugherty	Chair	Hawke's Bay Biodiversity Trust	Noted
Professor Charles Daugherty	Emeritus Professor	Victoria University of Wellington	Noted
Dr Dan Metcalfe	CSIRO Land and Water Business Unit Review 2018	Dr Andrea Byrom, Challenge Director for NZ's Biological Heritage NSC, was a member of the review panel	Noted
Anake Goodall	Worked with Kāhui member Gail Tipa at Te Rūnanga o Ngāi Tahu before 2011		Noted

Anake Goodall	Employed Co-Innovator Nigel Scott at Te Rūnanga o Ngāi Tahu before 2011		Noted
Anake Goodall	Worked with Glenice Paine, Governance Group member and Kāhui Chair, at Te Rūnanga o Ngāi Tahu before 2011 and the Environmental Protection Authority before 2014		Noted
Anake Goodall	Was a fellow Trustee with Project Leader Dr James Ataria on the board of special character school Te Pā o Rākahautū between 2014 and 2017		Noted
Anake Goodall	Offered general advice to all NSCs on Vision Mātauranga issues after their establishment		Noted
Anake Goodall	Co-Innovator James Mansell is an Edmund Hillary Fellow and Anake Chairs the Hillary Institute of International Leadership which owns Edmund Hillary Fellowship Limited		Noted

3. The Panel met in Wellington on 8–10 August 2018.
4. During the meeting, the following Challenge representatives made a presentation to the Panel:
 - James Buwalda
 - Andrea Byrom
 - Melanie Mark-Shadbolt
 - Nick Waipara
 - Duane Peltzer
 - Thomas Buckley
 - Devon Mclean
 - Glenice Paine
 - Jan Hania
 - Monica Gerth
 - Waitangi Wood
 - Jason Tylianakis
 - Catherine Febria
 - Peter Millard
 - Andrew Harrison
 - Ken Hughey
 - Campbell Leckie
 - Veronica Herrera
 - Nick Maling
 - Cheri van Schravendjik-Goodman

The Panel used this opportunity to ask questions of the Challenge representatives.

The Challenge representatives also provided the following additional written information to the Panel:

PowerPoint presentations

- Midway review: Assessment Panel August 2018
- Vision Mātauranga and Mātauranga Māori – past and future Strategy
- Science Quality & Excellence
- Governance, Management, Decision-Making & Accountability

Other documentation:

- Complete list of outputs from the Challenge, 2015-2018.
- Bios for Biological Heritage attendees
- Collaboration between National Science Challenge
- Governance Group + Manaaki Whenua Board Mutual commitment
- Governance Group and Kāhui Māori mutual commitment (Final draft pending approval)

Statement of intent from:

- Better Border Biosecurity
 - Te Pūnaha Matatini
 - Genomics Aotearoa
 - Bio-Protection Research Centre (draft)
 - Ngā Pae o te Māramatanga (draft)
5. During the meeting, Stephen Goldson, Chair of the Challenge's science advisory group, appeared by teleconference to speak on his report and to answer questions from the Panel.
 6. The Panel discussed the information received and reached a consensus decision on a recommendation to the Science Board.
 7. The Panel began drafting this report during its meeting. The Panel Chair, in consultation with Panel Members, completed this report after the Panel meeting.