MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HIKINA WHAKATUTUKI

National Science Challenges
Request for Proposals

Tranche 2 - for the following Challenges:

- Ageing Well
  Kia eke kairangi ki te taikaumātuatanga
- A Better Start
  E tipu e rea
- Healthier Lives
  He oranga hauora
- New Zealand's Biological Heritage
  Ngā koiora tuku iho
- Our Land and Water
  Toitū te whenua, toiora te wai
- Sustainable Seas
  Ko ngā moana whakauka
- Science for Technological Innovation
  Kia kotahi mai – te ao pūtaiao me te ao hangarau

February 2014

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Quick reference guide

What are the National Science Challenges (NSCs)?

The NSCs are a new strategic approach to mission-led science investment. The Challenges respond to the most important, national-scale issues and opportunities identified by science stakeholders and the New Zealand public, promote collaboration across a number of research providers, and involve a broad portfolio of multi-disciplinary research activity. They target objectives that, if achieved, will have a major and enduring benefit for New Zealand.

What Challenges are being funded and how much funding is available?

This RfP invites proposals for a research collaboration representing New Zealand's best team to deliver each of the following Challenges. The following funding is available over the next ten years.

Ageing Well *Kia eke kairangi ki te taikaumātuatanga*	up to $34.9 million
A Better Start *E tipu e rea*	up to $34.7 million
Healthier Lives *He oranga hauora*	up to $31.3 million
New Zealand's Biological Heritage *Ngā koiora tuku iho*	up to $63.7 million
Our Land and Water T*oitū te whenua, toiora te wai*	up to $96.9 million
Sustainable Seas *Ko ngā moana whakauka*	up to $71.1 million
Science for Technological Innovation *Kia kotahi mai – te ao pūtaiao me te ao hangarau*	up to $106.0 million

What can funding be used for?

Funding can be used for research, science, or technology or related activities. Funding cannot be used for capital expenditure.

Who can apply?

Legal entities representing a comprehensive range of organisations and individuals with a track record in the research area of each Challenge can submit a proposal.

When are proposals due and what information must they contain?

Proposals are due through the MBIE Portal by the end of April 2014 – refer specific dates on page 9. Proposals must include a Research Plan (outline of research strategy and research work programme) and a Business Plan (governance, management, and financial arrangements) for up to ten years.

Assessment, decision-making, and contracting

An independent assessment panel will assess proposals. The Science Board will make funding decisions. The *Gazette* notice *Criteria for Proposals for National Science Challenges Funding* dated 31 January 2014 outlines the criteria against which proposals will be assessed. If your proposal is successful, MBIE will contract with a single legal entity (Challenge Contractor) for up to ten years. The Science Board may allocate funding for an initial period of up to five years (with potential for a further five years of funding). The NSC Investment Contract (NSCIC) template that MBIE will use to contract with the Challenge Contractor is posted on the MBIE website and outlines indicative terms and conditions. The NSCIC should be read in conjunction with the explanatory note. The final NSCIC will reflect each successful applicant's governance structure.

Further information and reference documents

Refer www.msi.govt.nz/update-me/major-projects/national-science-challenges/request-for-proposals/ or e-mail contactNSC@mbie.govt.nz. MBIE will publish any questions received and answers on its website.

GST

All financial figures in this document are GST exclusive.

Introduction

This RfP invites proposals for NSC funding for a research collaboration (Challenge collaboration) representing New Zealand's best team to deliver each of the following Challenges:

Ageing Well *Kia eke kairangi ki te taikaumātuatanga*

A Better Start *E tipu e rea*

Healthier Lives *He oranga hauora*

New Zealand's Biological Heritage *Ngā koiora tuku iho*

Our Land and Water *Toitū te whenua, toiora te wai*

Sustainable Seas *Ko ngā moana whakauka*

Science for Technological Innovation *Kia kotahi mai – te ao pūtaiao me te ao hangarau*

In August 2012, the Government agreed to the creation of the National Science Challenges. The Challenges are a set of mission-led science investments that will help to address some of the most fundamental issues New Zealand faces for its future development. The process of identifying the Challenges involved significant public engagement and recommendations by an independent panel. NSC funding is for research, science, or technology, or related activities that have the potential to:

- respond to the most important, national-scale issues and opportunities identified by science stakeholders and the New Zealand public
- promote collaboration across a number of research providers and involve a broad portfolio of multi-disciplinary research activity
- enable government to take a more long-term strategic approach to managing and coordinating mission-led science investments.

The NSCs will involve greater alignment and co-ordination of research to generate greater impact and value from the government's science investment.

Public outreach, communication, and education are important aspects of the NSCs. Public awareness as each Challenge proceeds will help to increase understanding of how science contributes to New Zealand's well-being and will encourage a more scientific approach to tackling the challenges facing us. The NSCs will also help lift the profile of science and other disciplines among young people and may encourage them into science- and technology-based careers.

Eligibility

Who can submit a proposal for NSC funding?

A legal entity (based in New Zealand) representing a comprehensive range of organisations and individuals with a track record in the research area of the Challenge can submit a proposal under one Challenge.

Public service departments (as listed in Schedule 1 of the State Sector Act 1988) are not eligible to submit proposals.

Overseas organisations

Overseas organisations may take part in a Challenge collaboration. A Challenge collaboration may include the use of international research capability and infrastructure facilities if not available in New Zealand. However, MBIE expects that the majority of research will be carried out in New Zealand unless there are compelling reasons otherwise.

Not solely for the benefit of Challenge members

The Challenges are to address major national-scale issues and opportunities and are for the benefit of New Zealand. A proposal must not be solely for the benefit of the applicant including the organisations or individuals it represents that are taking part in a Challenge collaboration (Challenge members).

Involvement in more than one Challenge

Research organisations or individuals that are part of one Challenge proposal may also be involved in another proposal for a separate Challenge.

Funding

What activities are eligible and ineligible for funding?

NSC funding can be applied to undertake research, science, or technology ('research') or related activities that are in a Challenge specified in this RfP. Related activities can include, for example, engagement with communities, schools, businesses, and end users of research, capability development, science communication and promotion, and providing for open data and re-use of data. Funding cannot be used for capital expenditure.

Funding amounts

Total funding available for each Challenge (up to $ million)

Challenge	1st five years (from 1 July 2014)	2nd five years (from 1 July 2019)	Total
Ageing Well *Kia eke kairangi ki te taikaumātuatanga*	14.6	20.3	34.9
A Better Start *E tipu e rea*	14.2	20.5	34.7
Healthier Lives *He oranga hauora*	13.7	17.6	31.3
New Zealand's Biological Heritage *Ngā koiora tuku iho*	25.8	37.9	63.7
Our Land and Water *Toitū te whenua, toiora te wai*	27.6	69.3	96.9
Sustainable Seas *Ko ngā moana whakauka*	31.3	39.8	71.1
Science for Technological Innovation *Kia kotahi mai – te ao pūtaiao me te ao hangarau*	33.3	72.7	106.0

The total amount of funding available for each Challenge is shown in the table above. You do not have to apply for the full amount if you consider that you can address each Challenge with less funding. However, you cannot apply for more than the stated amount.

Total funding is divided into two five-year periods. You cannot apply to bring forward funding from the second five-year period to the first five-year period and you cannot carry over unspent funding from the first five-year period to the second five-year period.

Challenge work programmes can start at any time after 1 July 2014. The full amount for the first five-year period is available to the end of the five-year period regardless of the work programme start date (subject to Science Board approval). The amount available for each five-year period can be spread unevenly over the five years, ie the amounts drawn down from MBIE can vary year by year depending on need.

Mapped contracts

Total funding is made up of 'new' funding that the Government has allocated through the 2012 and 2013 Budgets and funding from 'mapped' MBIE-managed research contracts. Funding from the two sources is bundled together to produce the total funding amounts in the table above. The source of funding (whether from new funding or mapped contracts) is not relevant – the total amounts for

each five-year period can be used as the Challenge collaboration sees best to address Challenge themes and objectives.

Contracts that have been identified as being mapped to each Challenge (listed on the MBIE website) will continue to their full term as contracted (unless contract holders seek variations). There is no requirement or expectation that funding made available from mapped contracts will be used to fund extensions of existing contracts or research under way in mapped contracts.

Relationship with CRI core funding

The role of the Crown research institutes (CRIs) is to undertake research for the benefit of New Zealand as outlined in the Crown Research Institutes Act 1992. The Statements of Core Purpose (SCPs), available on the CRIs' websites, outline each CRI's purpose and target outcomes. Where there is alignment between a Challenge and the SCP of a CRI that takes part in a Challenge, it is expected that the relevant portion of the CRI's core funding will be invested in the Challenge as co-funding. The following amounts represent relevant CRI core funding for the following Challenges for the next ten years and are calculated based on 2013/14 figures. The amounts may vary – these figures should be used as a guide.

Healthier Lives *He oranga hauora* (ESR)	up to $5.5 million
New Zealand's Biological Heritage *Ngā koiora tuku iho* (AgResearch, ESR, GNS Science, Landcare Research, NIWA, Plant and Food Research, Scion)	up to $143.4 million
Our Land and Water *Toitū te whenua, toiora te wai* (AgResearch, ESR, GNS Science, Landcare Research, NIWA, Plant and Food Research, Scion)	up to $130.5 million
Sustainable Seas *Ko ngā moana whakauka* (GNS Science, NIWA)	up to $75.5 million
Science for Technological Innovation *Kia kotahi mai – te ao pūtaiao me te ao hangarau* (AgResearch, GNS Science, Scion)	up to $10.5 million

There is no CRI core funding relevant to the Ageing Well and Better Start Challenges.

Other funding

Research funded by other government agencies and research providers, including universities and the Health Research Council, may be aligned to a Challenge where the research also contributes to the Challenge objective and outcomes.

Co-funding

You are strongly encouraged to seek co-funding from external partners, including the private sector. Co-funding indicates support from end users. In the Business Plan section of your proposal you must outline your efforts to secure co-funding from other sources (including from international sources) and plans to leverage private sector investment.

Governance

A governance structure will be required for each Challenge. Its responsibilities will include strategic direction and responsibility for the implementation and delivery of the Challenge work programme and outcomes. This will include oversight of allocating and managing funding, planning, performance monitoring and review of progress, skills development, ensuring the impact of delivery, communicating and reporting, and, if relevant, resolving disputes between Challenge members.

The governance structure should be appropriate for the complexity of the proposed activities and the number of parties involved including Challenge members. We strongly recommend that the governance structure include end users (including Māori) who can provide strategic input into shaping and delivering the Challenge work programme. Where appropriate, for example to reduce transaction costs, the Challenge collaboration may leverage or build on an existing governance structure.

If the governance structure has not been formed at proposal stage, proposals must include details on the proposed governance arrangements. If your proposal is successful, there will be a pre-contractual condition to ensure that the governance arrangements outlined in the proposal are implemented before contracting.

MBIE reserves the right to appoint an observer to the governance structure (board or equivalent body).

Structural options

For the avoidance of doubt:

- the entity that contracts with MBIE (Challenge Contractor) must be a legal entity based in New Zealand.

- the entity can be a separate, stand-alone entity established for the purpose or it may be one of the Challenge members.

- a proposal may propose a single entity that 1) contracts with MBIE and receives funding, 2) forms the governance structure of the Challenge and relationship between Challenge members and other parties involved, and 3) manages the Challenge's day-by-day activities. There can be separate entities with different functions in the Challenge, but only one Challenge Contractor.

- your Business Plan must outline your proposed governance, management, and financial arrangements and relationships between the various parties involved in the Challenge.

Governance, management, and financial arrangements are up to each applicant and can differ across Challenges. The Science Board will decide whether the proposed arrangements and structures are appropriate.

Application process

Only one legal entity (Challenge Contractor) may submit a proposal for a Challenge collaboration.

You must submit your proposal through the MBIE Portal by 12pm (noon) on the following dates for each Challenge:

Ageing Well *Kia eke kairangi ki te taikaumātuatanga*	28 April 2014
A Better Start *E tipu e rea*	29 April 2014
Healthier Lives *He oranga hauora*	30 April 2014
New Zealand's Biological Heritage *Ngā koiora tuku iho*	28 April 2014
Our Land and Water *Toitū te whenua, toiora te wai*	29 April 2014
Sustainable Seas *Ko ngā moana whakauka*	30 April 2014
Science for Technological Innovation *Kia kotahi mai-te ao pūtaiao me te ao hangarau*	30 April 2014

The MBIE Portal is a secure, online space where you apply for funding. The MBIE Portal is accessed at https://ims.msi.govt.nz/myfrst/. MBIE will not accept proposals received after the closing deadline.

If you have not previously applied for MBIE funding through the MBIE Portal in the name of the Challenge Contractor, you need to register. Refer **Appendix C: How to use the MBIE Portal**.

What information is required?

In the MBIE Portal you will be asked to provide certain information to identify and summarise your proposal.

You will be required to upload a Research Plan that outlines a 10-year research strategy and detailed research programmes for the first five years and a Business Plan that outlines your governance, management, and financial arrangements.

For the Research and Business Plans combined there is a limit of 50 pages, to ensure that the information that you provide is concise and succinct and covers key points. Your proposal should contain adequate information for assessment purposes but there is no requirement to go up to the page limit. Font sizes should be legible (at least 11 point) and margins and spacing should be reasonable. The 50-page limit excludes references. All financial figures must be GST exclusive.

The only permitted information beyond the 50-page limit are references, the CVs of key personnel, and copies of the IP management agreement and governance agreement(s) between Challenge members. Provide CVs using MBIE's standard CV template (available at www.msi.govt.nz/update-me/major-projects/national-science-challenges/request-for-proposals). You may modify the CV template for non-scientific key personnel (eg management personnel), but do not go over the stated page limit.

Note:

- Your Research and Business Plans must outline your intended approach and arrangements as a whole for a period of up to ten years.
- Your Research Plan must also provide a detailed description of your proposed work programme for the first five years.
- If your proposal is successful, the Science Board may allocate funding for an initial period of up to five years (with potential for a further five years of funding). The description of your proposed work programme will form the basis of a Challenge Programme Agreement attached to the NSC Investment Contract. You will be required to report to MBIE on your progress each year.

Research Plan

Provide a Research Plan that sets out clearly over a period of up to ten years your proposed research and related activities and how you will carry out these activities to achieve the Challenge objective and outcomes. The Research Plan should take into account all funding available to the Challenge and should demonstrate how other relevant funding (eg CRI core funding as co-funding, and other co-funding from end users) will be integrated and aligned to achieve Challenge objectives and outcomes.

Address each outcome under each theme. However, propose different theme(s) and/or outcome(s) if you consider that they can better meet the Challenge objective, and provide an explanation.

Your Research Plan must include the following information.

Part 1 Research Plan - overall approach

1.1 10-year research plan

Provide an integrated up to 10-year research plan to achieve the Challenge objective and outcomes. The plan should outline your proposed research and related activities and how these will meet the Challenge objective and outcomes. The plan should provide a detailed description of your proposed work programme for the first five years (or up to five years) with a high-level outline of the proposed research for the rest of the 10-year period. You may propose a research plan for fewer than ten years if you consider that you can achieve the Challenge outcomes in a shorter time.

Your research plan should refer in general terms to items such as, but not limited to, the proposed research approach, portfolio of research programmes, sequencing of research programmes, performance monitoring including key performance indicators (KPIs), role of each Challenge member, and the key capabilities applied.

Research organisations: Demonstrate how the research plan establishes the best team of research organisations for the research and makes best use of existing capabilities, competencies, and infrastructure of key New Zealand research organisations. Show that the organisations involved in the Challenge have the capability, capacity, track record, skills, and experience to carry out the research.

Show how collaboration within the Challenge and with other research organisations will be promoted and used where this will make the best use of existing skills across the New Zealand science system and will avoid duplication. Show how you will leverage the capabilities of international research organisations. Show how Māori researchers/research organisations will participate in the Challenge.

If relevant, advise why you have not included any research organisation that would otherwise be considered a leading provider of research capability/infrastructure in the area of research covered by your proposal.

End users: Your research plan must show how it will meet the needs of end users. It should reflect the engagement and support of the public and end users (including Māori) in its development. Demonstrate how you involved potential end users in designing your research plan, how you will continue to involve potential end users in any modifications, and how end users will be involved in the research and/or in using the results of the research. This information could be provided in the form of a stakeholder engagement plan.

1.2 Research landscape (national and international)

Step up from existing research activity: A key principle of the NSCs is the generation of impact to address issues and opportunities of importance to New Zealand. This requires a significant step change from research currently undertaken and the way in which research is carried out, for example

multi-disciplinary collaborations. This implies more than a mere extension of existing research (although Challenge work programmes should complement current activity and avoid duplication).

Demonstrate how your proposed activities will represent a significant step change in undertaking research and delivering impact to tackle the issues under the Challenge.

Fit with existing research: Show how your proposed research fits in with other relevant current research in New Zealand and internationally that contributes directly or indirectly to the Challenge but is funded from other sources. Show how your proposed research will complement and not duplicate other research. Show how you will address gaps and opportunities in the overall research landscape.

Relevant New Zealand research may include other research funded by MBIE and other government agencies (eg Primary Growth Partnership funding from the Ministry for Primary Industries), centres of research excellence, universities, independent research organisations, and businesses.

Co-funding: Outline the sources of any co-funding, their nature (cash or in kind), and the proposed research that it will support. Show how relevant CRI core funding will be embedded in the Challenge as co-funding.

Linkages to international research: Describe how you will use international expertise to augment your research, to enhance knowledge creation by linking with world-class international research groups in relevant fields, and to create enhanced and enduring international research partnerships for New Zealand by linking with relevant international initiatives.

Fit with sector and research strategies: Show how your proposed research fits with the overall strategic direction of the relevant industry sector(s). Refer to sector strategy documents if they exist. Show how your proposed research fits with any relevant research strategies, including Māori development strategies.

Linkages to other Challenges: Explain any linkages between your proposal and other relevant Challenges (based on currently available information on the other Challenges). Show how you will work with other relevant Challenges and share relevant information and identify opportunities between researchers, end users, and other parties involved in them.

1.3 Research team and skills

Composition of research team: Provide evidence that you have established the best team for your research and proactively promoted and incorporated collaboration with other research organisations and individuals where this will make the best use of existing skills across the New Zealand science system and will avoid duplication.

Provide information about the research team involved in your proposal and identify key researchers. Information about team members should include their role, track record and experience, and evidence of peer recognition (eg awards and prizes).

If relevant, advise why you have not included any researcher who would otherwise be considered a leading investigator in the area of research covered by your proposal.

International linkages: Explain how you will leverage international knowledge, skills, and experience. Provide information about the international researchers who will be part of the Challenge and how and to what extent they will be involved in the Challenge.

Skills development: Show how the skills and expertise of researchers will be built over the life of the Challenge. Outline processes for the training and career development of researchers involved, particularly for PhDs, post-docs, and researchers in the early or mid stage of their careers.

Infrastructure: Outline arrangements for ensuring access to significant research infrastructure, including how Challenge members will share infrastructure and avoid duplication of existing investment in infrastructure.

Collaboration: Outline how your proposed collaboration arrangements are fit for purpose and will support the achievement of the Challenge objective and outcomes. Outline the formal and informal mechanisms by which researchers from the same or different disciplines, organisations (in New Zealand and internationally), and/or teams will work together in the Challenge. Describe the connections and collaborations between Māori organisations and researchers who undertake to deliver Vision Mātauranga objectives. Outline how researchers and end users will develop a shared understanding of objectives and outcomes. Outline the systems that will be used to enable multi-disciplinary research. Show how research results, data, tools, and infrastructure will be shared across teams and organisations.

1.4 Research portfolio and quality

Prioritisation: Describe the processes used to identify, assess, prioritise, and select research programmes to address the Challenge. This could include, for example, the use of a contestable process within the Challenge.

Quality: You are encouraged to seek independent review of the quality of your proposed research programmes before you submit your proposal. Outline any process used to review the research programmes outlined in your proposal. Outline methods for ensuring on-going quality assurance in delivering the research, once the research work programme is under way. This could include, for example, the use of an international science advisory panel. Outline any other activities that will contribute to outstanding science quality.

Portfolio: Describe the portfolio of research and how it includes both high-risk/high-return programmes as well as incremental research. Describe how the Challenge provides researchers with the opportunity to pursue innovative, extraordinary, or unconventional research that will push the boundaries of science in a Challenge. For example, you may wish to fund investigators, rather than programmes, to undertake research that contributes to achieving Challenge outcomes.

Dynamism: Describe the methods that will be used to allow the dynamic introduction of new capability, research, and researchers into the Challenge.

You must allocate a portion of total Challenge funding (excluding CRI core funding) to a separate pool from which you will allocate funding through a contestable process open to existing Challenge members and to other researchers/research organisations outside the Challenge. The amount of contestable funding is not defined, but the amount and timing of allocation should be sufficient to achieve the objective of refreshment.

Describe your approach to contestable funding, including:

- how much you will set aside for contestable allocation (eg fixed $ amount or a % of total funding) and how you have decided on this amount
- the regularity of contestable allocation rounds
- the research questions or investment priorities for which you will call for funding, and how the questions and priorities will be set
- the process to call for proposals for funding
- assessment and decision-making criteria and processes and how you will incorporate independent peer review and/or assessment panel
- contracting, monitoring, and reporting.

For guidance, you may wish to consider the way in which MBIE allocates science-led funding through its annual contestable rounds.

1.5 Vision Mātauranga (VM)

The NSCs are to give effect to the VM policy (refer www.msi.govt.nz/get-connected/unlocking-Maori-potential/). The VM policy aims to unlock the science and innovation potential of Māori knowledge, resources, and people for the benefit of New Zealand. It focuses on four themes:

(a) indigenous innovation – contributing to economic growth through distinctive science and innovation

(b) taiao/environment – achieving environmental sustainability through iwi and hapū relationships with land and sea

(c) hauora/health – improving health and social wellbeing

(d) mātauranga – exploring indigenous knowledge and science and innovation.

It is expected that Māori researchers/research organisations, end users, and/or stakeholders will play a vital role in the delivery of the Challenge at all levels. In giving effect to the VM policy, demonstrate how the proposed research responds to distinctive issues and needs of Māori and Māori communities and identify how Māori, both individually and collectively, can participate in research initiatives to achieve the outcomes sought.

It is important to assess VM-related research opportunities and methodologies in the early stages of research planning for the Challenge. This will require strong leadership of VM initiatives to ensure that VM is integrated within a Challenge collaboration, and not in an isolated manner. Explain how you will integrate Māori knowledge and perspectives into the Challenge and identify research with potential to deliver VM outcomes. These VM outcomes may include, depending on the Challenge:

- distinctive products, services, or systems derived from Māori knowledge
- new knowledge to support kaitiakitanga
- approaches and solutions to Māori health and social well being
- enhanced capability of Māori businesses to increase productivity.

1.6 Impact

Benefits: Outline the nature and size of the benefits the proposed research plan is expected to have for New Zealand. Include the benefits of the proposed research plan to New Zealand science. Outline the additional value the Challenge will deliver, including by addressing gaps and opportunities.

Costs: Provide an analysis of the expected balance of the benefits and costs of the proposed research.

Pathway to impact: Demonstrate a credible and convincing pathway from research to the achievement of Challenge outcomes. Show all steps involved from research to impact (up to and including technology transfer and further commercialisation). Specify:

- the nature of your research outputs, how they will be used, adopted, applied, or implemented by end users, and who the end users will be (eg sectors, government, businesses, Māori organisations, communities, and individuals)
- the nature and magnitude of the expected impact of the research
- how you will identify and address barriers to successful implementation.

Risks: Outline the key risks associated with your proposed research and your proposed risk mitigation actions. Justify investment in activities that entail particularly high risk by outlining potential benefits.

1.7 Open data

MBIE is committed to ensuring that all science data generated through its investments meets minimum expectations of good data management and availability to the public. MBIE requires parties receiving funding to comply with the New Zealand Government Open Access and Licensing Framework (refer http://ict.govt.nz/guidance-and-resources/information-and-data/nzgoal/). Explain how you will meet this requirement and seek to maximise benefit to New Zealand by providing for the access and re-use of data generated.

1.8 IP management

Provide a copy of the proposed IP management agreement between Challenge members (this is in addition to the 50-page limit). The nature of IP agreements is up to Challenge members. However, experience indicates that IP agreements should address:

- the declaration, valuation, and use of existing confidential information and registered IP
- the ownership of new IP (including IP associated with mātauranga Māori or Māori knowledge)
- selling or licensing rights to access and use new IP (including to third parties)
- rights to represent the IP for sale or licence
- lodgement, maintenance, and protection of new IP
- the apportionment of revenues
- any restrictions on publishing research results
- a process for the resolution of disputes
- arrangements for the payment of costs and cost recovery
- exit and entry arrangements, eg on-going IP access for members who leave or for new members, and for when the partnership terminates.

1.9 Related activities - public outreach, communication, and education activities

The NSCs are important, national-scale initiatives that, if the objectives are achieved, will have a major and enduring benefit for all New Zealanders. They will make an important contribution to the leadership challenge set by the NSC panel for the Science and Society initiative, ie to improve public awareness and engagement with science and innovation, skills, and evidence-based decision-making.

Public outreach, communication, public engagement, and education activities are an important and required component of NSC activity and NSC funding can be used for such activities.

Outline how you will involve the public in your proposed research, how you intend to engage the public with your proposed research, and the outreach, communication, and education activities you intend to undertake.

1.10 Monitoring of performance, evaluation of impact

Devolution of management and control to collaborative parties under the NSC approach will be balanced with increased performance monitoring and evaluation, but without excessive transaction costs. MBIE requires adequate, regular monitoring of Challenge performance to ensure demonstrable and measureable progress towards achieving the Challenge objective and outcomes. Challenge performance is subject to monitoring and review and MBIE may undertake a review in the first five years.

Outline your proposed performance monitoring and evaluation processes for:

- monitoring on-going performance of research programmes and related activities, including against measureable KPIs

- monitoring progress towards the outputs and outcomes in the pathway to impact
- reporting on VM outcomes
- reporting to the governance structure
- reporting and feedback to Challenge members and co-funders
- reporting to MBIE
- assessing the overall performance of the Challenge activities to achieve Challenge outcomes, including value for money.

List the KPIs that you intend to use, including measures and go/no go points. KPIs should as far as possible reflect the following principles:

a) be capable of independently verifiable measurement and assessment

b) enable monitoring and evaluation of how well the Challenge is performing in relation to meeting its objective and outcomes

c) focus on the material factors likely to determine success by identifying a credible pathway to achieving the Challenge objective and outcomes and impact

d) be of a nature that reflects the significance of the Crown funding and responsibility for financial management over the term of the relevant Challenge Programme Agreement.

MBIE intends to measure and evaluate the impact of each Challenge and may request access to evaluation information that you hold. Outline the process that you will use to measure and evaluate the impact of your research.

Part 2 Research Plan - detailed description of initial work programme

Part 1 describes your overall approach and arrangements over ten years. In Part 2 provide detailed information on your proposed research programmes and related activities for the first five years.

Research programmes: A research programme involves different activities, trials, and experiments aimed at gaining understanding and answering research questions. List and describe in detail your proposed research programmes for the first five years. Provide sufficient information about each research programme to enable the quality of the overall plan to be assessed and to give confidence that the work can be implemented. This information should include (but is not limited to):

- purpose and approach of each research programme
- who will undertake each research programme (research providers, principal researchers, research team size/skill mix, and international collaborators)
- start and end dates of each research programme and cost per annum
- how the various research programmes fit with each other in a coherent manner (important interdependencies) and fit within the broad 10-year research plan
- research outputs, eg what knowledge will change, what new technologies or materials or products could be developed, what new information will be generated, how research outputs will be communicated and to whom
- impact in terms of advancing knowledge and contributing to achieving the Challenge objective and outcomes
- how the research in each research programme builds on and contributes to other research in New Zealand or internationally that contributes to the Challenge
- how the research builds on existing capabilities and the competencies of the key organisations and researchers and infrastructure
- how the research gives effect to the VM policy
- how new ideas, approaches, technologies, and higher-risk research will form part of each research programme

- elements of the work programme that will be subject to a specific contestable funding allocation process
- alternative avenues of investigation in pursuit of Challenge outcomes if the proposed research does not yield the intended results
- subcontractors for significant items of work and information on your IP arrangements with subcontractors.

Business Plan

Provide a Business Plan that outlines your governance, management, and financial arrangements. Your Business Plan must include the following information.

Governance arrangements

Each Challenge must have a strong and competent governance structure that oversees strategic direction and delivery of the research work programme and the relationship between parties involved in the Challenge. Outline the nature and structure of your proposed governance arrangements, ie form, participants/members/shareholders, and members of the board or equivalent governance body.

Explain how you will give effect to the objectives of the Vision Mātauranga (VM) policy. This may include, for example, involving Māori organisations or individuals in the governance of your proposal or in an advisory role, if relevant.

Provide a copy of the governance agreement(s) between Challenge members if finalised by the time you submit your proposal (this is in addition to the 50-page limit) or, if not, an outline of the proposed arrangements and your plan/timeline for finalisation of the agreement(s). The agreement(s) may include the following:

- role and responsibilities of the governance structure
- provisions for Challenge members to leave
- how new members can join
- how resources will be allocated (and reallocated during the life of the Challenge if members change)
- how conflicts of interest and disputes between Challenge members will be managed
- provision for changes to the governance agreement(s) and termination.

Provide information on external groups that you intend to establish, for example to provide advice.

Management arrangements

Appropriate management arrangements need to be in place to enable multiple researchers, research organisations, and end users to work together to achieve Challenge outcomes. Provide information on:

- proposed management arrangements and resources (people involved in the management team and their skills and experience)
- project management processes used to co-ordinate multiple research providers, reporting timelines, and performance monitoring
- how research direction, results, and information will be shared between researchers
- a communication and engagement strategy to enable the Challenge to maximise impact with end users and the wider community
- the process for stopping/starting/stage-gating/scaling and prioritising research and funding

- risk management plan.

Financial management

Provide sufficient evidence to demonstrate the financial stability of the research organisations in the Challenge.

Appropriate financial management systems need to be in place to manage the Challenge. Outline processes, resourcing, and capability for financial management, reporting, audit, and oversight. Show the following per annum in sufficient detail:

- income sought from MBIE
- income/co-funding expected from other sources
- cash flow
- expenditure broken down into the following cost categories:
    - direct research costs (personnel, subcontracting, and other operating costs)
    - governance and management costs
    - costs of related activities, eg communication, engagement, skills development
    - overheads (eg rent)
    - other costs (describe).

Co-funding: You are strongly encouraged to seek co-funding from external partners for your research programme. Outline the efforts that you have made and will continue to make during the life of the Challenge to secure co-funding from other sources (including from overseas sources) and plans to leverage private sector investment.

Outline the sources of your co-funding, their nature (cash or in kind), and status (eg confirmed, letter of intent, under negotiation etc).

Assessment process

Step 1 Assessment by independent assessment panel

MBIE will provide your proposal to an independent assessment panel that it will appoint for each Challenge. The panel will assess proposals against the criteria in the *Criteria for proposals for National Science Challenges Funding* notice in the *New Zealand Gazette*. The panel will include experts in the relevant area of science (including international experts), Vision Mātauranga, governance, management, and financial arrangements, delivery and assessment of research outcomes, and assessment of economic and financial impact. To aid its assessment, the panel may ask for information from MBIE or from other sources.

MBIE will publish on its website the names of assessment panel members before proposals are due. When submitting your proposal through the MBIE Portal you will have the opportunity to identify any potential conflicts of interest.

At this stage MBIE reserves the right to carry out due diligence on any Challenge member if MBIE considers this necessary to confirm the financial stability of a Challenge member or any other matter material to a proposal.

Step 2 Science Board decision-making

Once the assessment panel has assessed proposals, MBIE will provide to the Science Board information from the assessment process on each proposal and any other relevant information required under the criteria for assessing proposals or that the Science Board may request.

The Science Board will make decisions on proposals for funding against the criteria in the *Gazette* notice. The Science Board may:

- approve your proposal
- decline your proposal
- set pre-contractual conditions
- set special conditions in addition to the general terms and conditions set out in the NSCIC template or vary those terms and conditions
- set terms and conditions that reflect the approved governance, management, and financial arrangements
- vary the proposed duration by setting a different term to that proposed or by stage-gating the investment i.e. by requiring certain conditions to be met at a point in the term of funding
- vary the funding allocated from that proposed, such as by funding only some themes, a reduced number of research programmes, or by providing a reduced amount of total funding.

The Science Board may decide to fund one proposal only per Challenge. The Science Board may choose to fund no proposal. If the Science Board decides not to fund any proposal, it may ask applicants to revise and resubmit their proposal.

Contracting

If the Science Board approves your proposal, MBIE will enter into an investment contract with you in line with the Science Board's decision and the terms and conditions of funding set by the Science Board. MBIE will use a National Science Challenge Investment Contract (NSCIC) template (on the MBIE website) and will customise it for each Challenge to reflect governance arrangements. By submitting a proposal, you are agreeing to adhere to the terms and conditions of the NSCIC, if the Science Board approves your proposal for funding. In addition, you agree to adhere to those terms and conditions set by the Science Board that incorporate the approved governance, management, and financial arrangements and contracting entity.

If the Science Board approves your proposal for funding the process will be as follows.

1. The Challenge Contractor and MBIE will sign an NSCIC that reflects the Science Board's terms of funding. That contract contains:
   a. the standard terms and conditions on which the Science Board has agreed to provide funding. The contract provides that the terms and conditions will apply each time the Science Board approves a proposal for funding for a new Challenge Programme
   b. an appendix containing a template Challenge Programme Agreement
   c. template schedules for each Challenge Programme Agreement. These are not populated in the NSCIC itself as the Challenge Programme Agreement appended to that contract is only a template.
2. The Challenge Contractor and MBIE will also sign a Challenge Programme Agreement that contains:
   a. a two-page cover sheet to be signed, which acknowledges that the parties have entered into an NSCIC and that the terms set out in that contract apply in respect of the Challenge Programme Agreement
   b. schedules that set out the details of the Challenge Programme. The content of those schedules will be extracted directly from information that you provide in your proposal, in particular in Part 2 of the Research Plan.
3. The Challenge Contractor and the Challenge members will comply with the terms stipulated by the Science Board which may include adopting all constitutional documents and executing a collaboration agreement as applicable or such other contracts to give effect to the Challenge Contractor's governance, management, and financial arrangements.

Where the Challenge collaboration, or some or all of its members, have existing contractual arrangements with MBIE or existing collaborative structures relevant to the Challenge, it may be appropriate to build on these existing arrangements. You may set out in the proposal how you could build on these existing arrangements. Any such proposal must at a minimum include the terms of the NSCIC template. The Science Board will set the terms and conditions of funding as part of its funding decision.

Period of funding

The Challenge Programme Agreement(s) will cover funding for the first five years. At its discretion, the Science Board may choose to fund you for a period that is shorter or longer than this period.

Toward the end of this first funding period, the Science Board will ask Challenge collaborations to submit a further detailed work programme for the next five years. The Science Board will make a further funding decision for up to five more years based on the new detailed work programme and demonstrated measurable performance in achieving the Challenge objective and outcomes. Performance is subject to monitoring and review and MBIE may undertake a review in the first five years. Depending on the review outcomes, the Science Board may decide not to renew funding for the next five years.

Description of Challenges

NSC funding is available for research, science, or technology or related activities to achieve the following objective and outcomes for each Challenge.

Your proposal must state how you intend to meet the Challenge objective and all outcomes. If you consider that you can better meet the Challenge objective with different theme(s) and/or outcome(s), you should propose this in your proposal and provide a reason.

The Science Board will decide whether your proposed change will better enable the Challenge objective and outcomes to be met.

Ageing Well
Kia eke kairangi ki te taikaumātuatanga

Objective

Harness science to sustain health and wellbeing into the later years of life

Themes

Theme 1 Maintaining brain health

Outcome sought: The number of older people requiring residential care due to cognitive and other neurodegenerative deficits, including those resulting from strokes, is reduced.

Research topics may include, but are not limited to the following:

- mechanisms of brain health and disease, such as
  - understanding, preventing, and treating Alzheimer's disease
  - genetic predisposition to dementia and the mechanisms through which protein plaques are deposited in the brain, and the means to mediate or reverse this process
- protecting acuity and memory in the ageing brain, such as
  - understanding how memories are stored and preserved
  - developing new tools to predict and assess memory loss
  - developing interventions and treatments to preserve and prolong memory recall
- impact of habits, nutrition, and lifestyle, including addictions
- everyday activities, rongoā Māori approaches, and interventions that work for different population groups, to protect against declining brain and mental health
- health service delivery and innovation, such as
  - personalised medicine and new, more integrated and better coordinated models of care that cater for multiple and complex conditions in the ageing population
  - developing effective screening and intervention tools
  - effective rehabilitation and recovery to diminish the negative impact of neurological and mental health conditions
- environments and communities that support older people with reduced mental function.

Theme 2 Dealing with physical frailty

Outcome sought: Older people maintain more independent mobility later in life with reduced osteoarthritis and fracture rates, reduced hospital re-admissions, and increased physical activity.

Research topics may include, but are not limited to the following:

- understanding bone biology and strengthening the skeleton to prevent osteoporosis, avoidable fractures, and degeneration of the joints, with a focus on maintaining mobility in later life
- impact of habits, nutrition, and lifestyle on physical activity levels, frailty, and falls
- successful strategies and treatments (such as exercise, rongoā, mirimiri, and other Maori practices) that work to increase balance, strengthen bone and muscle mass, and slow, stop, or reverse physical decline for different population groups
- methodologies for early detection of those at risk
- how to minimise the incidence and negative impacts of falls
- reducing disabling environments through the use of assisted living technologies and design of products, homes, urban environments, and transport systems
- health service delivery and innovation
- effective rehabilitation and recovery from strokes and falls, particularly novel methods.

Theme 3 Enhancing the role of older people in society

Outcome sought: Older people have increased engagement and a sense that their roles and contributions are valued and supported within their culture and communities.

Research topics may include, but are not limited to the following:

- ability of society to support, and benefit from, an ageing population
- differing expectations, aspirations, and experiences of ageing - between communities, cultures, generations, and circumstances (for example, for transnational families), and public policy implications
- living arrangements, care and support approaches and options, such as
  - costs and benefits of intensive rehabilitation to return people to their own homes with support compared with long-term rest home care
  - experiences of three or four generations in one home
  - the value of friendship and family support
  - ability to identify with and practice one's own culture
  - novel approaches that cater to a large increase in the elderly population
- interventions and everyday activities that increase quality of life, reducing loneliness, isolation, and health risks associated with retirement
- understanding the link between retirement age and life expectancy, with a view to identifying why working longer is associated with living longer
- opportunities for older people to contribute, including participation in the labour market and voluntary sector
- innovation in service delivery, including older people developing and delivering new services
- how communities (for example, iwi/Māori or Whānau ora collectives) can support their older people leading meaningful lives
- changing intergenerational relationships - obligations, reciprocities, solidarity, ability to communicate
- causes, effects, and prevention of elder abuse and neglect.

Further notes and definitions

- Where possible, research should involve older people, reflect their views, and include results that are accessible to older people as well as service providers.
- Where research topics have synergies with other Challenges, on-going liaison between the Challenges is expected.

Out of scope

- Research that is a better fit with other funding mechanisms such as from the Health Research Council or through MBIE's High-Value Manufacturing and Services Research Fund, for instance development of specific drugs or health-related technologies.

A Better Start
E tipu e rea

Objective

Improve the potential of young New Zealanders to have a healthy and successful life

Themes

Theme 1 Maternal health, pregnancy, and early childhood

Outcome sought: New and existing knowledge is used to understand embryonic, perinatal, infant, and child development and the intrinsic and extrinsic factors that impact upon the developmental* processes to determine future overall wellbeing to inform evidence-based interventions.

*'Developmental' is intended to be inclusive, including neurological, social, physical, psychological, cognitive etc.

Research topics may include, but are not limited to the following:

- protective factors and facilitators of maternal health and infant wellbeing for mothers and children from low SES (socioeconomic status) environments to ensure better outcomes for children at 5 years of age
- barriers to better health outcomes for mothers
- linkages between mother and child nutrition
- postnatal care and support provided to mothers in their first 3-5 days
- links between antenatal and post-natal care and possible interventions that support mothers through maternity phases
- role of positive early parent-child interactions in helping build resilience in young children at risk and facilitating areas of child development
- a system of intervention that would change the overall health (including mental health) trajectory of babies and toddlers most at risk of adverse outcomes in childhood
- better techniques for diagnosing and treating pervasive developmental disorders in children, ultimately leading to prevention and cure
- role of early childhood education system in community building.

Theme 2 Successful transition into healthy adulthood

Outcome sought: Our understanding of human behaviour is enhanced using new and existing knowledge, including the links between the relevant genes and the physical and socio-economic environment, allowing the development of interventions to manage risk, improve health and educational outcomes, and promote resilience in our population.

Research topics may include, but are not limited to the following:

- behaviours that can be taught in pre-schools, schools, and kura kaupapa Māori that encourage engaged and healthy adults
- understanding how key factors shape early development and impact on life-time social, educational, economic, behavioural, and mental health outcomes
- understanding how adverse cognitive, psychological, and behavioural outcomes are transmitted across generations and develop interventions that maximise protection and minimise risk
- determining risk factors, antecedents, and mediators of anti-social behaviour and mental health issues and developing opportunities for intervention
- determinants of resilient children
- developing interventions that will increase resiliency in the nation's youth, including research on

key early-life transition

- developing better techniques for diagnosing and treating developmental disorders in young adults, ultimately leading to prevention and cure
- understanding the drivers and developing interventions to ensure healthy adults with a focus on teen pregnancy, youth suicide, and poor nutrition
- understanding cultural differences in protection from and risk for adverse mental, behavioural, educational, and social outcomes for Māori and Pacific people and other cultures and developing culturally appropriate interventions
- impact of health promotion in schools on adult/youth decision-making
- developing early interventions aimed at setting healthy habits for life for children and their families.

Theme 3 Education, living in the digital world

Outcome sought: New and existing knowledge is used to understand the different world in which our children are growing up, and our parenting, educational, and employment practices are adapted to optimise health, wellbeing, and productivity.

The possibilities offered by digital technologies are built on to create a more interactive learning experience for our children, instil a fascination for science and enhance learning and development.

Research topics may include, but are not limited to the following:

- understanding under what conditions access and engagement with digital technologies for learning improve
- understanding the risks and benefits of exposure to the digital world on child development
- applying digital technologies to enhance community engagement
- investigating the role of education as an intervention mechanism to improve the wellbeing of children and young people across all domains
- exploring the role of digital technology to benefit health and wellbeing, including outcomes sought under Themes 1 and 2.

Further notes and definitions

- Where research topics have synergies with other Challenges, on-going liaison between the Challenges is expected.

Healthier Lives
He oranga hauora

Objective

Reduce the burden of major New Zealand health problems

Themes

Theme 1 Prevention

Outcome sought: Disease in New Zealanders is prevented and reduced through high-quality scientific evidence indicating which health interventions should be effective for equitable outcomes.

This may include, but is not limited to research contributing to:

- innovative interventions successfully delivered through new technologies to young adults to establish healthy lifestyles
- preventing or slowing of progression from pre-diabetes to diabetes, especially for Māori, Pacific, and other high-risk populations
- improved cardiovascular disease risk assessment and subsequent prevention and treatment
- more equitable uptake of screening to prevent diabetes, cancer, and cardiovascular disease (eg by equity parameter such as ethnicity, deprivation, disability, geographic, rural).

Research topics may include, but are not limited to:

- social media, internet, and other new technology-based delivery of healthy lifestyle interventions to young adults and their use more generally as research tools
- effectiveness of interventions for prevention of progression from pre-diabetes to diabetes in a New Zealand context
- new approaches to cardiovascular, cancer, and diabetes risk assessment and prediction (eg improved risk assessment, biomarkers, clinical management of risk factors, and health literacy) to improve prevention in primary care and community settings
- evaluation of how preventive interventions among individuals (including risk stratification) and families may vary depending on community and national-level factors (eg built environment, food environment)
- evaluation of new methodologies to identify people at higher risk of disease allowing more targeted screening
- kaupapa Māori research to increase understanding of effective prevention strategies.

Theme 2 Innovation in health delivery, diagnostics, and therapies – 'the right treatment for the right patient'

Outcome sought: The diagnosis and treatment of obesity, diabetes, cancer, and cardiovascular disease are improved to reduce their negative impacts on New Zealanders for equitable outcomes.

This may include, but is not limited to, research contributing to:

- reduction in the health burden associated with obesity, and its impact on diabetes, cardiovascular disease, and cancer, through a greater understanding of processes common to these disorders
- refinement of diagnosis and prognosis (including better biomarkers, diagnostic, and prognostic tests) allowing treatments to be tailored to individual cardiovascular disease, diabetes, and cancer patients
- reduction in morbidity and mortality in cardiovascular disease, diabetes, and cancer patients through novel treatments, innovative clinical care pathways, and improved long-term management of patients living with cancer, cardiovascular disease, or strokes
- reduction in inequalities in cancer, diabetes, and cardiovascular disease in healthcare in New Zealand.

Research topics may include, but are not limited to:

- research into pathological processes at the level of gene, cell, tissue, or individual common to obesity, diabetes, cardiovascular disease, and cancer
- identification of new indicators (such as biomarkers, imaging, or health IT) to improve risk stratification and to tailor treatments for individual patients
- research into drug discovery and development, new interventions, technologies or devices, or research into the efficacy (or adverse effects) of existing treatments for diabetes, cancer and cardiovascular disease (including stroke), in New Zealand's unique population groups
- better long-term management of patients with diabetes, cancer, and cardiovascular disease (including stroke) tailored for New Zealand's unique population groups, incorporating mātauranga Māori and policies such as Whānau ora as appropriate
- kaupapa Māori research aimed at understanding common links between these diseases.

Theme 3 Population/cultural/social factors

Outcome sought: Emotional, behavioural, cultural, social, educational, and economic considerations specific to New Zealand have underpinned the science thinking of the two themes above, resulting in equitable approaches to reducing the burden of major New Zealand health problems.

This may include, but is not limited to, research contributing to:

- understanding the impacts of the research undertaken on equity in healthcare, including access and quality received
- development of a national collaborative research programme that enables biological samples and data from trials and clinical studies to be used nationally
- Māori approaches and solutions.

Research topics may include, but are not limited to:

- evaluation of the cost-effectiveness, quality and safety of proposed interventions
- research into the role of socio-economic status in cancer and cardiovascular disease inequalities in healthcare in New Zealand
- evaluation of pilot projects of protocols for the development of national collaborative networks
- where possible, identification of outcomes from this research that can benefit the New Zealand economy.

Further notes and definitions

- Health is defined (using the World Health Organisation definition) as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity'.
- A wellness model of health, rather than an individualistic deficit model, is encouraged.
- It is expected that the Challenge will include highly innovative research and new ways of thinking to address inequality.
- Where research topics have synergies with other Challenges (for example in the potential research topic of innovative technology-based interventions for young adults), on-going liaison between the Challenges is expected.
- These themes are neutral on the relativity of our major non-communicable health problems. However, the Ministry of Health advises that it expects obesity (high BMI) to be the leading risk factor cause of health loss by 2016.
- This Challenge has the societal goal of ensuring a long and healthy life for all New Zealanders and improved health and economic benefits for New Zealand. The peak panel report notes the economic burden to New Zealand of treatment costs and premature deaths from our major health problems. Alleviating this burden is key to achieving economic benefits.

New Zealand's Biological Heritage
Ngā koiora tuku iho

Objective

Protect and manage our biodiversity, improve our biosecurity, and enhance our resilience to harmful organisms

Context

New Zealand's biodiversity is a unique combination of high levels of endemism (species known only in New Zealand) and an economy strongly based on the use of exotic species. Both indigenous and introduced biodiversity are important, yet our current understanding of the implications of biodiversity change and loss and biosecurity threats is still very limited and fragmented.

Outcome benefits to New Zealand of this Challenge are likely to be achieved through the following:

- **Science goal:** to support evidence-based decisions on biodiversity and biosecurity management, for protecting and enhancing natural and production environments and the provision of ecosystem services, by resolving interactions and interdependencies of biodiversity and the impacts of invasive organisms.
- **Social goal:** biodiversity in our natural and production environments is protected and managed across a range of scales for wide environmental, economic, cultural, and societal benefits, and management systems involve appropriate technologies and policies.
- **Vision Mātauranga goal:** to support the integration and recognition of mātauranga Māori and kaitiakitanga in the management of our natural biodiversity and biosecurity threats.

In achieving its Objective, the Challenge is likely to engage in the following activities:

- keeping New Zealanders, the plants and animals we value, and our unique natural environment, safe and secure from damaging pests and disease
- maintaining and restoring our natural heritage, particularly through technology, techniques, and processes to improve natural heritage management
- enhancing the protection of New Zealand's pest-free environments to retain competitive advantage
- improving preparedness to respond to pest and disease incursions.

Such activities will lead to key impacts and actions, examples of which are listed under each Theme below along with research topics.

As this Challenge covers a complex area, applicants in their Research Plan should identify and focus on areas that they consider are critical without which the Objective and outcomes are unlikely to be achieved. The research topics and areas of focus mentioned below are not prescriptive but are provided to help describe the scope of the Challenge.

Alignment with government policy, legislation, and initiatives includes but is not limited to the following:

- New Zealand Biodiversity Strategy (refer www.biodiversity.govt.nz)
- Biosecurity Science Strategy for New Zealand (refer www.biodiversity.govt.nz)
- Business Growth Agenda
- Māori agribusiness.

Themes

Theme 1 Discovery and characterisation

Outcome sought: New Zealand's indigenous and introduced biodiversity are sufficiently understood across a range of scales and knowledge systems to inform the design of a world-leading system for prioritising biosecurity and biodiversity management.

Research topics may include but are not limited to the following:

- develop an informatics infrastructure that enables data sharing at a range of scales*
- systematically prioritise and fill gaps in our knowledge of New Zealand's indigenous and introduced biota
- quantify, understand, and fill gaps in our knowledge of threats to biodiversity
- develop tools that provide rapid and authoritative description and identification of New Zealand's priority organisms.

* 'Scales' in this theme refers to both geographic scales and species, gene, and ecosystem levels.

Theme 2 Interdependencies, functions, ecosystems, and resilience

Outcome sought: Management for resilience of our indigenous and introduced ecosystems is supported by understanding the linkages between biodiversity, evolution, ecosystem function and services, mātauranga Māori, and environmental and economic pressures.

Research topics may include, but are not limited to the following:

- develop appropriate threat and risk assessment methodologies (including those based on mātauranga Māori) for the full range of biodiversity, including production and urban biodiversity
- develop tools that assist decision-makers to make transparent trade-offs to resolve competing demands for the sustainable use of biodiversity
- develop management methodologies for biosecurity risks based on exploiting an understanding of the pathway from incursion to establishment, identifying the best point of intervention, and understanding the ecological effects of pests and pest control
- develop new techniques to understand key ecological interactions that enable the effective application of biodiversity and biosecurity methodologies.

Theme 3 Mitigation and restoration

Outcome sought: New Zealand has diverse and vibrant indigenous and introduced ecosystems across a range of scales. Responses to economic and environmental drivers (threats and risks) are balanced to support kaitiakitanga to ensure long-term sustainability.

Research topics may include, but are not limited to developing the following:

- biodiversity management processes that are accepted by society
- innovative and cost-effective solutions to pest, weed, and disease management that will enhance the resilience of our primary production systems and indigenous ecosystems
- innovative technologies and tools that will produce a substantial improvement in the

maintenance, recovery, and restoration of species and their ecosystems

- restoration programmes, including those undertaken by communities, industries, primary producers, and resource consent recipients, that are based on a sound understanding of ecosystem function and the science of ecosystem recovery

- methodologies that can actively explore, characterise, or compare threats and risks

- methodologies or tools that provide better synergies between management and kaitiakitanga needs.

Theme 4 Detection, measurement, and assessment

Outcome sought: New Zealand has quantitative and qualitative measurement and assessment tools integrated across the biosecurity and biodiversity domains and consistent with international best practice/standards, to enable the understanding, monitoring, and evaluation of status and trends of biodiversity and the impacts of invasive organisms.

This Theme underpins the research under Themes 1, 2, and 3.

Research topics may include, but are not limited to the following:

- develop tools, methodologies and knowledge that enable policy and management decision-making processes to consider trends in biodiversity and invasive organisms

- develop quality biodiversity and biosecurity information across a range of scales based on a sound and secure data management system

- understand ecosystem services so that they can be considered in economic policy and management

- develop cost-effective, ecologically sound, and socially acceptable surveillance, monitoring, eradication, and control technologies for biosecurity and biodiversity management

- develop a range of innovative tools and technologies for the rapid detection, measurement, and assessment of priority biodiversity and biosecurity risks.

Theme 5 Social partnerships and licence

Outcome sought*:* Social partnerships with motivated and enabled citizens, scientists, kaitiaki and decision-makers are built, providing the basis for a social licence* to apply new management methodologies, tools, technologies, and solutions.

This Theme recognises the importance of societal partnerships in achieving the outcomes under Themes 1, 2, and 3.

Research topics may include but are not limited to activities that enable the goals below. These goals may also be supported by research developed under the other Themes:

- society appreciates the full value of biodiversity and accepts biodiversity management processes

- credible citizen science** is accepted and used to understand the risks from invasive organisms to biodiversity and in monitoring the state of natural and productive ecosystems

- technologies enable society to be the 'eyes and ears' supporting systems for biosecurity and

biodiversity management

- the social licence and implementation processes for new technologies are founded on social science, including better understanding of mātauranga Māori, and New Zealanders both contribute to and benefit from how society interacts with biosecurity and biodiversity issues.

* 'Social licence' refers to the perspectives and viewpoints of individuals, communities, and businesses being considered.

** 'Citizen science', also known as crowd science or crowd-sourced science, is scientific research conducted in whole or in part by amateur or non-professional scientists.

Further notes

It is likely that a high degree of technological innovation will be required to achieve the outcomes of this Challenge, involving bringing in new (to this topic) disciplines such as engineering.

Themes 1, 2 and 3 are the core research Themes. Themes 4 and 5 underpin and enable delivery of outcomes under Themes 1, 2 and 3.

Biodiversity is the biological diversity of organisms, in terms of genes, species, and ecosystems, present in our terrestrial and aquatic (freshwater) environments. It covers both indigenous and introduced biota. Biosecurity is the detection, prevention, and management of threats to our biodiversity caused by unwanted, invasive organisms. Where appropriate, research should include the full range of biodiversity and biosecurity. An example of such research might be information systems.

In scope

Biodiversity/biosecurity of plants and animals in terrestrial and freshwater environments

Out of scope

The marine estate is out of scope. The marine estate is covered under the Sustainable Seas Challenge.

Our Land and Water
Toitū te whenua, toiora te wai

Objective

Enhance primary sector production and productivity while maintaining and improving our land and water quality for future generations

Context

Outcome benefits to New Zealand of this Challenge are likely to be achieved through the following:

- **Science goal:** to grow productivity in high-value food and other products from the primary sector using new tools, technologies, plants, and animals. This includes harnessing and developing smart technologies in precision agriculture, plant and animal genetics, bio- and agri-technology, information and decision-making tools, and systems modelling throughout the primary product supply chain.
- **Social goal:** primary sector growth addresses broad social and cultural demands (including Māori aspirations), while meeting trade and consumer demands on energy use, environment, food safety, and food security.
- **Economic goal:** understanding how to access the potential for economic growth, within environmental limits and while maintaining and improving ecosystem-services.
- **Vision Mātauranga goal:** to increase productivity in the Māori primary sector balancing economic growth with the exercise of kaitiakitanga.

In achieving its Objective, the Challenge is likely to engage in the following activities:

- promote growth through increased production from the same productive area while meeting the challenges of climate change and increasing pressure on resources, and developing new understanding of system limits (environmental, social, economic) that will assist to maintain and improve land and water quality and ensure the sustainability of our environment and production methods
- ensure we have environmentally and socially sustainable production systems, while addressing the increasing nutritional requirements of national and international consumers
- sustain growth in productivity by revolutionising New Zealand primary production.

Such activities will lead to key impacts and actions, examples of which are listed under each theme below along with research topics.

As this Challenge covers a large and complex area, applicants in their Research Plan should identify and focus on areas that they consider are critical without which the Challenge objective and outcomes are unlikely to be achieved. The research topics and areas of focus mentioned below are not prescriptive but are provided to help describe the scope of the Challenge.

Alignment with government policy, legislation, and initiatives includes but is not limited to the following:

- Business Growth Agenda
- Freshwater reform 2013 and beyond
- Rural water management
- Māori agribusiness.

Themes

Theme 1 Defining and meeting social values

Outcome sought: Society has confidence in New Zealand's primary production systems because they meet the social, environmental, cultural, Māori, and economic requirements of New Zealanders and their markets, including maintenance and improvement of their land and water quality.

Research topics may include, but are not limited to the following topics of relevance to society and consumers:

- define and measure Māori, social, cultural, environmental, and economic values of land and water
- use knowledge of ecosystem services to inform tools for integrating across environmental, social, cultural, and economic measures
- define, enhance, and promote the uniqueness of New Zealand's systems that underpin traceability, and give competitive advantage
- quantify the drivers and develop transparent systems and processes, at multiple scales, that inform policy-makers, enable landowners to adopt resilient land use practices, and enable community-based decision-making and engagement
- improve understanding of social acceptability of existing, new, and future technologies and management practices used in the food and fibre value chains (social licence to operate).

Key impacts and actions could include:

- knowledge that supports effective collaboration (involving national and local government, Māori, resource users, and New Zealand's communities) in the national and local decision-making processes to address risk, reduce potential for conflict, and achieve wider understanding and acceptance of decisions
- designing and developing alternative planning processes for land and water resources (including collaborative processes and knowledge development), management, and governance, recognising the different demands on those who participate (councils, Māori, community, stakeholders)
- coordinated and robust risk assessment, management, and mitigation procedures
- facilitating end-user uptake of new knowledge, technologies, management practices, and requirements from collective decision-making
- facilitating uptake of quality assurance processes, including auditing strategies, eg for consumer preferences around provenance, ethical practices around animal welfare, human resource management, and good land and water management
- new economic and environmental opportunities acceptable to Māori, society, community, and landowners for improving land and water management.

Theme 2 Optimising primary sector supply chains

Outcome sought: Technical barriers and other barriers are identified and overcome (if science can address these), and product performance requirements are met to optimise value to New Zealand's primary producers and processors and consumers.

Research topics may include, but are not limited to the following:

- modelling to optimise future New Zealand food production and food security within the bounds of economic, environmental, and social constraints
- develop resource use efficient systems that maximise value ($) across multiple scales – this includes an assessment of current and new management practices for:

    - land (including inputs like fertiliser) and water (including irrigation)
    - resource use efficiency
    - resistance to unforeseen events (eg drought, floods), and
    - fit with known land and water resource capacity and capability
- processing technologies that add value to primary products to achieve greater export returns and value, meeting consumer/market preferences to enhance understanding by small, medium, and large firms of the potential of these technologies affecting sectors and individual companies
- identify threats to and opportunities for New Zealand food security and options for mitigation (including factors such as traceability, quality, environmental compliance etc)
- identify how to add value through understanding consumer behaviour in key target markets and maximise returns from the value chain by ensuring that information flows along the value chain are transparent and understood and the reward/incentive structure is clear and equally allocated
- identify and mitigate potential and existing barriers to increase export market access.

Note: International food safety issues are increasingly impacting on production practices. This research will enable more foresight and prediction in this area.

Key impacts and actions could include:

- consumer preferences and demand in different market segments (including environmental/sustainability claims) and the value of the New Zealand brand are identified, understood, effectively communicated, and used
- smart technologies for logistics, supply chain management, and energy use to meet trade and consumer needs (ie environmental and other management systems)
- appropriate data, informatics, and tools, eg for provenance and food safety technologies including traceability (note links to the High-Value Nutrition Challenge)
- food safety technologies with traceability, market assurance schemes, and/or regulation to ensure that products are compliant and allow industry to respond quickly to market needs
- firms/sectors better understand cultural acceptance and its relevance to consumer purchasing decisions
- smart food and fibre processing technologies that optimise product attributes (such as flavour, texture, functional-health) desired by customers in export markets
- value chains are fully integrated with common understanding and metrics to derive optimum economic, environmental, social, cultural, and Māori value for land and water systems.

Theme 3 Land and water management

Outcome sought: The functions and environmental limits of land and water systems are sufficiently understood and defined within societal, cultural, Māori, and economic values, rights, and interests and incorporated into sustainable production systems.

Research topics may include but are not limited to the following:

- identify and resolve gaps in the information available on good management practice, including collaborative processes across land and water resources and scales to enact step-change in management in key areas, and develop and roll out sector specific toolkits
- understanding how to minimise the impact of land-based primary sector production on fresh water quality, quantity, and availability, including nutrient management covering pollutants, contaminants, and sediments
- providing the knowledge base and tools (including mātauranga Māori) to determine integrated objectives and evidence to set freshwater limits – these limits should recognise and provide for the impact on the capacity and resilience of land and water resources (and their wider

ecosystems services)

- identify the minimum state for ecosystem and human health (for secondary contact) of all water bodies, to help with identifying resilience, tipping points, and thresholds and in proposing national bottom lines including impacts and interconnectivity of surface and groundwater
- develop smart approaches to the collection, management, interpretation, communication, and open-access distribution of research data, addressing the need for underpinning databases, eg soils, water quality etc.

Key impacts and actions could include:

- new-generation decision processes include tools to manage the use of land, water, plants, animals, and fertilisers
- economic benefits and efficiencies of freshwater use are maximised
- government priorities and science needs are informed to support regulatory decision-making on land and water quality/ecosystem services across multiple scales (from farm paddock to local, regional, national, and international)
- mātauranga Māori and Māori aspirations in freshwater management are considered
- an evidence base is provided to help resolve longer-term issues such as permit duration, tools to support alternative resource allocation methods, alternative mechanisms for facilitating permit transfers and trade, and tools for ensuring efficient freshwater use.

Theme 4 Adaptable, responsive, and resilient land-based primary production systems

Outcome sought: Sustainable productive capacity and profitability are ensured by developing and adopting tools, technologies, and systems that support a flexible and responsive primary industry.

Research topics may include, but are not limited to:

- understanding multiple stressors and the interactions between stressors, thresholds, and resilience of soil, water, and productive systems (plant and animal genetics) required to inform resource availability and impacts on land and water quality.
- developing and adopting technologies systems, and models to grow profit ($/kg or $/ha returns) within environmental and social limits, eg precision agriculture, alternative production systems, robotics, sensing, and remote technologies.
- developing proof-of-concept understanding on the benefits of new or emerging species of plants and animals to increase the robustness and resilience of the primary sector.

Key impacts and actions could include:

- sustaining growth in productivity within present and future resource availability and resilience to unforeseen events, for example by harnessing cross-cutting technologies from information technology, new materials, nanotechnology, advances in genetics, big data analysis including smart and precision, sensing and remote technologies, and systems modelling at various scales
- a framework for assessing overall benefits of land use for Māori, communities, and the primary sector and facilitating the use of common metrics and the development of ownership/governance structures that support, shape/influence future systems of landowner activity.

Out of scope

- biodiversity and biosecurity threats that sit in the New Zealand's Biological Heritage Challenge
- foods for health manufacturing and biomarkers for health that sit in the High-Value Nutrition Challenge

Sustainable Seas
Ko ngā moana whakauka

Objective

Enhance utilisation of our marine resources within environmental and biological constraints

Context

Outcome benefits to New Zealand of this Challenge are likely to be achieved through the following:

Science goal: To expand the knowledge base of our coastal and oceanic biological and physical resources to better define the ecosystems and understand the role of environmental and human-derived changes in the management of marine resources, and to determine the potential of oceanic geo-resources, within environmental and biological constraints.

Social goal: To ensure that decisions on the regulation, management, and exploitation of marine and coastal resources have a sound foundation in knowledge on the roles and distribution of biodiversity within the context of a rapidly changing environment and competing human uses.

Economic goal: To understand how to access the potential for economic growth from marine resources.

Vision Mātauranga goal: To ensure that Māori are able to manage their customary and commercial fisheries, conservation, and environmental management needs within the context of a rapidly changing environment and competing human uses.

Alignment with government policy, legislation, and initiatives includes but is not limited to the following:

- The National Marine Research Strategy (NMRS) is being drafted by the Ministry for Primary Industries on behalf of the Natural Resources Sector. The NMRS has a shared vision of the marine research required in New Zealand over the next twenty years to guide and inform the development of New Zealand's marine economy, safeguard the marine environment for future generations, and co-ordinate marine research effort across the country as we increasingly look to the sea for food, energy, minerals, and other resources.
- Business Growth Agenda – Building Natural Resources
- making the most of our abundant energy and minerals potential, which aims to encourage environmentally responsible development and efficient use of the country's diverse energy resources
- realising greater value from our marine and aquaculture resources – this initiative aims to make the most of opportunities for New Zealand to gain greater value from its extensive marine and aquaculture resources
- New Zealand Biodiversity Strategy
- marine protected areas legislation
- Exclusive Economic Zone legislation
- environmental reporting
- international obligations.

Themes

Theme 1 Characterising our ocean

Outcome sought: An integrated temporal and spatial baseline of biological and physical resources, as well as human activities, is established. This provides a basis for understanding the dynamics, sensitivities and resilience of ocean and coastal systems.

Research topics may include, but are not limited to the following:

- enhance knowledge of the marine estate to support broad societal aspirations (including mātauranga Māori) and healthy and sustainable coastal and oceanic ecosystems
- enhance knowledge of the ocean's physical, biological, and geological/geochemical characteristics, including their integration
- characterise resources and their distribution in our oceans
- understand biophysical change through long-term monitoring
- improve understanding of coastal and oceanic habitats to enable the extraction of resources white protecting sensitive or vulnerable habitats
- develop new technologies to increase the rate of biological discovery, identification, and description
- develop (or adopt and adapt) smart approaches to the collection, management, interpretation and open-access distribution of new research data.

Key impacts and actions could include:

- an ecosystem-based approach to enhancing the value of New Zealand's marine estate (for example the Convention on Biodiversity (CBD) Ecosystem Approach - refer www.cbd.int/ecosystem/)
- a widened range of whole-of-ecosystem baseline observations, including temporal and spatial interactions and connectivity and including an improved understanding of the sea bed (benthos), its ecology, and the underlying resources
- patterns and variability in ecosystem functioning, dynamics, and interrelationships.

Theme 2 Understanding the dynamics and sensitivities of ocean and coastal systems

Outcome sought: The interconnectedness between ocean systems, including human activities, is understood to enable adaptation and mitigation of impacts of change.

Research topics may include, but are not limited to the following:

- improving the evidence base for resource (biological and physical) management through the development of improved models which incorporate resilience
- measuring and understanding the cumulative impacts of anthropogenic stressors, competing industrial, societal, and Māori uses of New Zealand's oceans and coastal marine environment
- understanding land use and catchment use change and the impacts on coastal ecosystems to enhance the evidence base for improved coastal management
- understanding the land-water continuum in the context of increased economic, social, Māori, and cultural use of coastal waters

Key impacts and actions could include:

- knowledge, systems, and activities that improve biosecurity (surveillance, prevention and response), safeguard biodiversity, and minimise pollution to reduce risks to our marine

ecosystem that impact economic, Māori, and social uses and values of coastal marine environment and oceans

- environmental, social, economic, and cultural needs and values are maintained or improved
- an ecosystem-based approach.

Theme 3 Towards effective integrated management of oceans and coasts considering environmental, societal, cultural, Māori, and economic concerns

Outcome sought: The evidence base to inform and develop management and policy frameworks is enhanced to optimise the sustainable use and resilience of coastal and ocean resources within societal, cultural, Māori and economic values, rights, and interests.

Research topics may include, but are not limited to the following:

- develop new high-value food products and processes using marine resources (eg fish, shellfish, and algae)
- develop high-value non-food goods and services utilising marine resources
- develop new technologies to mitigate risks and threats to our marine environment and resources, eg incursions and food safety
- improving the evidence to support the management of and decision-making processes for marine resources (biological and geological) through an integrated approach, incorporating societal, cultural, and Māori values with environmental baselines
- developing systems and processes to inform the improved stewardship of marine ecosystems and sustainable utilisation of resources including the integrity of mahinga kai
- developing the evidence base and models to optimise growth of the marine economy
- developing mechanisms to support the social, cultural, Māori, environmental, and international (market access and brand) licence to operate

Research should be based on an ecosystem goods and services approach that incorporates:

- potential to grow the economy
- threats/impediments to the growth of economic activities, and
- integrated cumulative effects.

Key impacts and actions could include:

- enabling effective mitigation and/or adaptation to environmental change, including people-induced change
- improved stewardship and ~~s~~ustainability in the marine context: restoration, protection, and enhancement of the mauri of the oceans and its resources, integrating the management and regulatory tools for marine industries to meet cultural, Māori, economic, and conservation goals within the context of a dynamic system
- informed future direction for marine products and services
- informed understanding of the social, cultural, and economic debate for management of the marine and coastal ecosystem and aquaculture developments, and conservation goals.

Further notes

Out of scope

- quantifying economic resources, eg fishery stock assessments, hydrocarbons, and minerals (as these are already extensively undertaken by sector stakeholders with whom the Challenge with need to work in partnership), unless specific survey work directly contributes to the Challenge objective and outcomes
- Antarctic oceans (unless associated with an economic resource) – this is covered in the Deep South Challenge
- land-based freshwater aquaculture.

Glossary

- Ecosystem-based approach – see CBD ref above
- Marine estate - New Zealand's marine estate refers to the ocean and seafloor extending from the coastal margin to the outer boundaries of New Zealand's Exclusive Economic Zone and Extended Continental Shelf and including the Ross Sea, which contains natural resources that New Zealand is entitled to use and over which it has obligations of stewardship and care on behalf of future generations.

Science for Technological Innovation
Kia kotahi mai – te ao pūtaiao me te ao hangarau

Objective

Enhance the capacity of New Zealand to use physical and engineering sciences for economic growth

Context

A strong and diverse economy is important for all New Zealanders. Increasing innovation and the development and commercialisation of new products is crucial for improving the international competitiveness of New Zealand firms and increasing economic growth. In the context of global competition, it is innovative Kiwi firms that are successfully competing and growing.

The high-tech sector is important to New Zealand as it increases the country's productivity and has the potential to propel New Zealand's export diversification. The focus of this Challenge is to accelerate innovation in New Zealand's new and emerging industries, which are more prevalent in other OECD nations and increasingly underpin their higher productivity and incomes per capita.

New Zealand's economy is rapidly transforming as sectors such as information technology (IT) and high-technology manufacturing are generating growth, boosting export returns, and developing new export markets. IT services, in particular, are generating significant innovation, attracting investment in established firms and start-ups, and creating wealth and high-skilled employment opportunities for New Zealanders. While our traditional primary sector products and markets are and will remain very important, it's vital that all sectors of our economy operate successfully. New Zealand needs all industry sectors to operate at their peak potential to meet the goals of the Business Growth Agenda.

The overarching goal for this Challenge is to provide New Zealand with the advanced scientific, engineering, mathematical, and ICT expertise required to support the knowledge-based manufacturing and service industries that will drive improvement in New Zealand's economic wellbeing.

Themes

Theme 1 Materials, manufacturing, and design

Outcome sought: A wide range of new or enhanced materials and technological processes are developed that enable industry to advance new or enhanced products, services, and processes.

Theme 2 Sensors, robotics, and automation

Outcome sought: A wide range of new or enhanced sensors and sensing technologies are developed and implemented in a variety of new or enhanced products or applications. Robotics and automation are applied to a wide range of applications to reduce costs, improve efficiencies, enhance safety in environments dangerous to humans, and undertake tasks not otherwise economically viable.

Theme 3 IT, data analytics, and modelling

Outcome sought: A wide range of new or enhanced hardware components and systems and software applications are developed that enable industry to incorporate them into new or enhanced products and services.

Research topics across all three themes may include, but are not limited to the following:

- developing new medical technologies that improve health outcomes for New Zealanders, reduce healthcare costs, and generate export earnings

- innovative technologies (systems and processes) that improve yields in our primary industries (meat, dairy, forestry, fisheries and horticulture) and manufacturing industries
- developing novel materials made from sustainable sources and new monitoring technologies that support sustainably productive agricultural environments
- developing new products and services created by transforming materials and/or automating production, and improved efficiencies in production from new engineering tools or processes
- developing innovative software embedded in manufactured products and underpinning applications and services that support New Zealand's knowledge-based economy
- developing new sensing and actuator technologies and new forms of embedded processing using autonomous or wireless power supplies that will enable distributed deployment in unstructured indoor and remote outdoor environments
- integration of mātauranga Māori with physical and engineering sciences offering transformative knowledge that delivers innovative solutions relevant to Māori.

Timeline

Key steps	**Date**
MBIE Portal closes for submission of proposals.	12pm (noon) on:
Ageing Well *Kia eke kairangi ki te taikaumātuatanga*	28 April 2014
A Better Start *E tipu e rea*	29 April 2014
Healthier Lives *He oranga hauora*	30 April 2014
New Zealand's Biological Heritage *Ngā koiora tuku iho*	28 April 2014
Our Land and Water *Toitū te whenua, toiora te wai*	29 April 2014
Sustainable Seas *Ko ngā moana whakauka*	30 April 2014
Science for Technological Innovation *Kia kotahi mai – te ao pūtaiao me te ao hangarau*	30 April 2014
An independent assessment panel appointed by MBIE assesses proposals.	June/July 2014
MBIE provides to the Science Board information from the assessment process on each proposal and any other information required under the criteria for proposals. The Science Board makes funding decisions. The Science Board's decisions are announced. MBIE and the successful applicant(s) commence the contracting process. If required, the successful applicant meets pre-contractual conditions.	August/September 2014

Appendix A: Glossary

Assessment panel

The assessment panel is a panel of independent experts in the relevant area of science (including international experts), Vision Mātauranga, and governance/management/financial arrangements convened to assess proposals submitted for NSC funding.

Challenge Contractor

The Challenge Contractor is a legal entity based in New Zealand that submits a proposal for NSC funding for a specific Challenge and, if successful, will sign an NSC Investment Contract with MBIE.

Challenge members

Challenge members are the organisations or individuals with a track record in the research area of the Challenge who come together to develop a national-scale collaborative proposal for NSC funding for that specific Challenge.

Challenge Programme

The Challenge Programme is your detailed work programme for the first five years.

If your proposal is successful, your NSC Investment Contract with MBIE will contain a Challenge Programme Agreement that outlines the approved Challenge Programme that MBIE will fund you to carry out. The information for the Challenge Programme will be taken from the description of your detailed work programme for the first five years in the Research Plan in your proposal.

Governance structure

The governance structure is the body that will have responsibility to oversee the strategy development, implementation, management, and delivery of the Challenge Programme.

***New Zealand Gazette* notice**

The *New Zealand Gazette* is the Government's official newspaper. Items in the *Gazette* are *Gazette* notices. The Minister of Science and Innovation issues *Gazette* notices to, amongst other things, instruct the Science Board regarding the assessment of proposals for allocation of funding.

Science Board

The Science Board was established by the Minister of Science and Innovation under the Research, Science, and Technology Act 2010 to make funding decisions in respect of research, science, or technology or related activities.

Vision Mātauranga (VM)

MBIE's VM policy aims to unlock the science and innovation potential of Māori knowledge, resources and people for the benefit of New Zealand. It has four themes:

- indigenous innovation - contributing to economic growth through distinctive science and innovation
- taiao/environment - achieving environmental sustainability through iwi and hapu relationships with land and sea
- hauora/health - improving health and social wellbeing
- mātauranga - exploring indigenous knowledge and science and innovation

Appendix B: Further terms that apply to this RfP

1. General

The terms of this RfP are set out below. The terms and conditions are non-negotiable and do not require a response. Each applicant that submits a proposal will be deemed to have agreed to these RfP terms and conditions without reservation or variation.

2. Investigations and reliance on information

Applicants must examine this RfP and any documents referenced by this RfP and carry out all necessary investigations before submitting a proposal. If you are in doubt as to the meaning of any part of this RfP, you must set out in your proposal the interpretation and any assumptions you used.

Neither MBIE nor the Science Board will be liable (in contract or tort, including negligence, or otherwise) to anyone who relies on any information provided by or on behalf of MBIE or the Science Board in connection with this RfP.

3. Reliance by applicants

All information contained in this RfP or given to any applicant by MBIE is for the purpose of allowing that applicant to prepare its proposal. MBIE has endeavoured to ensure the integrity of such information. However, it has not been independently verified and may not be updated.

4. Reliance by MBIE

MBIE may rely upon all statements made by any applicant in its proposal and in correspondence or negotiations with MBIE or its representatives. If an applicant's proposal is approved by the Science Board, any such statements may be included within a Challenge Programme Agreement.

Each applicant must ensure all information provided to MBIE is complete and accurate. MBIE is under no obligation to check any proposal for errors, omissions, or inaccuracies. Each applicant will notify MBIE promptly upon becoming aware of any errors, omissions, or inaccuracies in its proposal or in any additional information provided by the applicant.

5. Inducements

You must not directly or indirectly provide any form of inducement or reward to any assessment panel member, officer, employee, advisor, or other representative of MBIE or any member of the Science Board in connection with this RfP process.

Business-as-usual communications (relating to funding under existing arrangements between MBIE and the applicant) will be maintained with the usual contacts. However, during the RfP process, applicants must not use business-as-usual contacts to solicit or discuss details of this RfP with any person at MBIE or its agents, including the assessment panel members.

6. Ownership and intellectual property

This RfP and any other documents supplied by MBIE to any applicant remain the property of MBIE. All copyright and other intellectual property rights in this RfP and any documentation and other information provided to any applicant or any other person by or on behalf of MBIE in connection with this RfP will remain with, and belong at all times to, MBIE or its licensors. MBIE may request the immediate return of all documents supplied and any copies made of them at any time. Applicants must comply with any such request in a timely manner.

Any proposal or information supplied by you to MBIE will become the property of MBIE and may not be returned to you. Ownership of the intellectual property rights in a proposal does not pass to MBIE. However, in submitting a proposal, each applicant grants MBIE a non-exclusive, non-transferable, perpetual licence to use, disclose, and copy its proposal for any purpose related to this RfP process.

By submitting a proposal, each applicant warrants that the provision of that information to MBIE, and the use of it by MBIE for the evaluation of its proposal and for any resulting negotiation, will not breach any third-party intellectual property rights.

7. Confidentiality

MBIE will treat your proposal as confidential, but you should be aware that MBIE is subject to the Official Information Act 1982 and may be required to release information supplied in your proposal in accordance with that Act, or as otherwise required by law.

You should also be aware that the information in your proposal will be stored by MBIE, and may be used by MBIE, a Minister, any of MBIE's advisors (including relevant third parties) or any other government agency (including any Crown entity), NZTE, and the regional business partner organisations that MBIE and NZTE work with to support growth and innovation.

8. The proposal process

You should be aware that the following rights are reserved.

- Your proposal may not be approved.
- All or any proposal(s) may be rejected.
- This RfP may be suspended or cancelled, or replaced with a new RfP, at any time.
- Any date in the RfP process may be amended or extended.
- This RfP or any associated documents may be amended.
- Any irregularities or informalities in the RfP process may be waived.
- Part of a proposal from any applicant(s) may be accepted.
- This RfP may be reissued.
- This RfP process may be suspended and/or cancelled (in whole or part) if a material or significant issue emerges during the process.
- Any information provided with a proposal may be retained or destroyed.
- Clarification may be sought from any applicant(s) in relation to any matter in connection with this RfP process.

- Any applicant(s) may be contacted, which may be to the exclusion of any other applicant(s), at any time before or after the approval (if any) of proposal(s).
- MBIE or the Science Board may reject or not consider further any documentation related to your proposal that may be received from you, unless it is specifically requested.
- This RfP process may be run in such manner as MBIE may see fit.

9. No contractual obligations created

No contract or other legal obligations arise between MBIE and/or the Science Board and any applicant out of, or in relation to, this RfP or RfP process, until a formal written contract (if any) is signed by both MBIE and the successful applicant.

This RfP does not constitute an offer by MBIE or the Science Board to provide funding or to enter into any agreement with any applicant. The request for and receipt of proposals does not imply any obligation on MBIE to contract for any funding requested in any proposal. MBIE will not be bound in any way until the National Science Challenges Investment Contract is executed.

Neither MBIE nor the Science Board make any representations nor give any warranties in this RfP.

Any verbal communications made during the RfP process will not be binding on MBIE or the Science Board and are subject to the terms of this RfP.

10. No process contract

Despite any other provision in this RfP or any other document relating to this RfP, the issue of this RfP does not legally oblige or otherwise commit MBIE and/or the Science Board to proceed with or follow the process outlined in this RfP or to assess any particular applicant's proposal or enter into any negotiations or contractual arrangements with any applicant.

For the avoidance of doubt, this RfP process does not give rise to a process contract.

11. Exclusion of liability

Neither MBIE, the Science Board, nor any assessment panel members, officers, employees, advisers or other representatives will be liable (in contract or tort, including negligence, or otherwise) for any direct or indirect damage, expense, loss or cost (including legal costs) incurred or suffered by any applicant, its affiliates or other person in connection with this RfP process, including without limitation:

a) the assessment process

b) the preparation of any proposal

c) any investigations of or by any applicant, its affiliates, and Challenge members

d) concluding any contract

e) the acceptance or rejection of any proposal

f) the suspension or cancellation of the process contemplated in this RfP

g) any information given or not given to any applicant, its affiliates, and Challenge members.

By participating in this RfP process, each applicant waives any rights that it may have to make any claim against MBIE and/or the Science Board. To the extent that legal relations between MBIE and/or the Science Board and any applicant cannot be excluded as a matter of law, the liability of MBIE and/or the Science Board is limited to $1.

Nothing contained or implied in or arising out of this RfP or any other communications to any applicant shall be construed as legal, financial, or other advice of any kind.

12. Costs and expenses

MBIE is not responsible for any costs or expenses incurred by you in the preparation of a proposal.

13. Governing law and jurisdiction

This RfP will be construed according to, and governed by, New Zealand law and you agree to submit to the exclusive jurisdiction of New Zealand courts in any dispute concerning this RfP or any proposal.

14. Public statements

MBIE may make public the following information:

- the name of any applicant
- the title of the Challenge proposal
- the public statement
- the total amount of funding
- the period of time for which funding has been approved.

Applicants are requested not to release any media statement or other information relating to the process outlined in this RfP and the submission or approval of any proposal in any public medium without providing sufficient advance notice to MBIE.

Appendix C: How to use the MBIE Portal

Using the MBIE Portal

The proposal process consists of three stages:

1 registering in the MBIE Portal

2 preparing your proposal

3 submitting your proposal via the MBIE Portal.

1. Registering in the MBIE Portal

The MBIE Portal is a secure, online space where you apply for funding. If the Challenge Contractor has not applied for MBIE funding through the MBIE Portal before, you need to register and receive a username and password and instructions for registration by return email. To register please contact your research office in the first instance (if your organisation has a research office) or e-mail contactNSC@mbie.govt.nz and provide the following information:

- name of the Challenge Contractor
- name of contact person
- phone number, postal and physical address, e-mail address

If you have technical problems or questions about the Portal, please e-mail contactNSC@mbie.govt.nz or phone our support staff on 0800 693 778 who are available Monday to Friday, from 8.30am to 4.30pm.

2. Preparing your proposal

To submit a proposal, you must provide certain information. You must ensure that it is accurate and complete. We recommend that you familiarise yourself with the Portal and the information you need to provide, before starting your proposal.

3. Submitting your proposal

When you have completed all sections you can print and submit your proposal in the 'Print and manage' section. Other options for actions in the 'Available actions' section depend on your role and on the status of your proposal. The actions are:

- Print/preview this proposal
- Submit to MBIE: submits the completed proposal.
- Manage users for this proposal: super users can manage access to a proposal by other users in their organisation. Super users have full access to any proposal from their organisation. Other users can be assigned different levels of access such as view or edit. Users who create a new proposal will automatically be assigned edit access.

Tips to help you complete your proposal in the MBIE Portal

Once you have familiarised yourself with the information you need to provide, log into the MBIE Portal to enter your proposal information.

Icons and help text

Coloured icons beside each section of the proposal form indicate your progress.

 You have not started and saved the section yet, or validation of the section was unsuccessful

 You have started and saved progress in the section

 Validation of the section was successful

- The  icon is a link to 'help text'.
- A red asterisk * indicates a compulsory section that must be completed before you save that section. You will receive an error message if you do not do so.
- A black asterisk * indicates a compulsory section that must be completed before you submit your proposal. Unlike sections marked with a red asterisk, you can leave these sections without entering any data and return to them later, before submitting your proposal.

The Portal also features 'help text' guidelines throughout the proposal process.

Text boxes

You will be required to enter information into a text box in some sections. Many text boxes contain character limits that are stated in each section. To help you, a character count is displayed. You cannot add pictures, tables, or graphs to the text boxes, but can attach these in the upload section in the proposal form.

Submitting content through the MBIE Portal

The following shows, for your reference, the information that you will need to provide in your proposal through the MBIE Portal.

Application summary
Enter your total funding requested for the duration of the Challenge, the title of your proposal, start and end dates, and the Challenge to which you are applying for funding.

Contact details
Enter the name and details of a person who can be contacted about your proposal.

Executive and public summaries
Enter your executive and public summaries. The limit for each summary is 2,500 characters. MBIE will use your public summary for its communication to the public.

Research Plan
Upload the documents that make up your Research Plan. Head up the document(s) that make up this part of your proposal as 'Research Plan'. Do not upload CVs here – see below. These documents must not be in PDF format (MBIE will need to cut and paste content for assessment and contracting purposes).

Business Plan
Upload the documents that make up your Business Plan. Head up the document(s) that make up this part of your proposal as 'Business Plan'. Do not upload CVs here – see below. These documents must not be in PDF format (MBIE will need to cut and paste content for assessment and contracting purposes).

General note about formatting of uploaded documents

- Include upfront a contents page or a list of contents.
- If providing information that prints out on page sizes other than A4 (for example on A3), please upload these pages as separate documents and note in the header the page size that will need to be used. This is to ensure that we do not miss information if, by default, we print these pages on A4.
- There is a limit of 50 pages for the Research and Business Plans combined. The only permitted information beyond this page limit are the CVs of key personnel, references, and copies of the IP management agreement and governance agreement(s) between Challenge members.
- To avoid large file sizes, please refrain from complex formatting or use of a large number of pictures or diagrams.

CVs
Upload the CVs of your key personnel.

Profiling
Enter profiling data on your proposal under the categories provided.

Conflicts of interest
Identify any individuals that may have a conflict of interest with your proposal. Include any Science Board member, assessment panel member, or MBIE staff member.

Formal declaration
Agree to the declaration.

Appendix D: How this RfP differs from the Tranche 1 RfP

This RfP is substantially the same as the RfP issued in October 2013 for the Tranche 1 Challenges. For those who are familiar with the Tranche 1 RfP here is a list of the main changes in this RfP compared with the Tranche 1 RfP (besides minor wording or grammatical changes). This is provided as a guide only and should not be relied upon.

Funding amounts
A clearer explanation of funding is provided. Much of this information has already been published on the MBIE website in the Q&A section on the Tranche 1 RfP.

What information is required?
The 50-page limit excludes references.

You may modify the CV template for non-scientific key personnel (eg management personnel), but do not go over the stated page limit.

1.2 Research landscape (national and international)
Addition of a new section: 'Step up from existing research activity'.

Under **Fit with sector and research strategies**: inclusion of Māori development strategies.

1.4 Research portfolio and quality
You are encouraged to seek independent review of the quality of your proposed research programmes before you submit your proposal. Outline the process that you will use to review the research programmes outlined in your proposal.

1.5 Vision Mātauranga (VM)
Additional wording is provided on outcomes relevant to VM, integration of Māori knowledge and perspectives into the Challenge, and identification of research with potential to deliver VM outcomes.

1.8 IP management
Inclusion of IP associated with mātauranga Māori or Māori knowledge under IP management.

Submitting content through the MBIE Portal
Addition of general note about formatting of uploaded documents.

New separate section created for the uploading of CVs.