



15 March 2022

Ministry of Business, Innovation, and Employment (MBIE)
PO Box 1473,
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Antarctica New Zealand: Submission on Te Ara Paerangi – Future Pathways Green Paper

Introduction

This submission reflects the views of Antarctica New Zealand as the host of a major MBIE-funded Strategic Science Investment Fund (SSIF) – the Antarctic Science Platform. Antarctica New Zealand thanks the Ministry of Business, Innovation, and Employment (MBIE) for the opportunity to make a submission on Te Ara Paerangi - Future Pathways Green Paper ('the Green paper').

Herein, Antarctica New Zealand provides a Crown agency perspective on aspects of the future of Aotearoa's Research Science and Innovation system with respect to the SSIF funding environment. We focus on current successes, opportunities and challenges that together have the potential to inform decisions regarding the future of the Research Science Innovation (RSI) system in Aotearoa.

For further information, please contact Sarah Williamson, Chief Executive, Antarctica New Zealand [Privacy - 9\(2\)\(a\)](#)

Brief Background to Antarctica New Zealand

Antarctica New Zealand is the government agency responsible for carrying out Aotearoa's activities in Antarctica supporting world leading science and environmental protection. The organisation is dedicated to ensuring Antarctica's environment continues to be protected, that scientists are supported to find the answers to complex scientific questions, and science outcomes are effectively communicated to policy makers and the public. With more than 60 years' experience working in Antarctica, New Zealand is recognised as a leader in the international treaty system, and has a strong commitment to the natural environment. Demystifying science through strong outreach and education is an essential part of Antarctica New Zealand's mandate.

Antarctica New Zealand maintains Scott Base as New Zealand's scientific and logistical hub on the Antarctic continent. In addition to supporting the physical infrastructure, Antarctica New Zealand supports the complex logistical supply chain required to successfully maintain a year-round presence in Antarctica, and support science throughout the Ross Sea sector of Antarctica and beyond. In support of science, Antarctica New Zealand maintains key strategic relationships with a number of domestic (e.g., New Zealand Defence Force) and international (e.g., US, Italian, Korean, German, Australian, Chinese Antarctic programme) partners.

Antarctica New Zealand works closely with science funders to support high quality scientific research, ensuring research is aligned with the Government's Antarctic and Southern Ocean Science Directions and Priorities. Part of Antarctica New Zealand's strategic leadership in Antarctic and Southern Ocean science includes hosting and implementing the Antarctic Science Platform, a \$49M MBIE SSIF investment over seven years. The goals of the platform are to improve scientific understanding of pressing issues such as climate change and ecosystem resilience, safeguard the strategic benefits of New Zealand's scientific activity in Antarctica, and optimise the value and impact of Antarctic science and Antarctic-related expenditure.

As host of a major SSIF, the Antarctica Science Platform (ASP), Antarctica New Zealand makes the following observations for consideration with reference to the Green paper:



1. Long-term Stability of Funding:

Inception of the Antarctic Science Platform brought with it a level of resource stability previously unseen in New Zealand's Antarctic and Southern Ocean research programme. The decision to implement long-term stable funding has produced a number of key benefits to New Zealand Antarctic research, including:

- a. Reduced direct and unproductive competition among researchers, and a marked increase in multi-institutional, transdisciplinary research outcomes.
- b. Development of research projects and programmes with the scale, scope and resource necessary to fully answer high priority scientific questions.
- c. Enabling Antarctica New Zealand to develop a long-term strategic plan that effectively aligns science needs with logistical support in a severely resource-constrained operating environment.

The short- and long-term benefits of this funding approach are clear, and Antarctica New Zealand strongly encourages development of an RSI model in which dedicated funding streams support high priority collaborative research. Such dedicated funding needs to be balanced by a pool of contestable funding through which 'blue-skies' high-risk high-reward science can be effectively funded and supported.

While this model affords a high degree of certainty for science funding, it has the potential to significantly reduce flexibility in the system with respect to new avenues of research. Antarctica New Zealand encourages MBIE to consider investment strategies that enable opportunities for SSIFs to pivot their science directions and priorities should more, or new, information become available or unforeseen circumstances (e.g. resource limitations) prevent realisation of objectives.

2. Pathways to Impact:

In designing large-scale strategic investments, it is clear that science outcomes need to be co-designed with key stakeholders and end-users. Collaborative development of impact statements during formation of the ASP galvanised the Antarctic and Southern Ocean science community toward clear and achievable objectives. In contrast, this process had minimal involvement from those outside the science community. In turn, this has the potential to severely limit the direct applicability and broader societal- and policy-relevance of funded research.

To mitigate this issue, the ASP has convened a Science-to-Policy Expert working group consisting of both scientists and policy-makers as a means to drive uptake of research outputs. Cross fertilisation of ideas between these groups is crucial to successful knowledge transfer, but this relationship and collaborative co-design of science programmes needs to be built into the design and implementation phases. This process also needs appropriate resources to ensure clear pathways to successful translation of science into policy-relevant impacts.

3. Hosting, Governance and Leadership Structure:

There are clear benefits to hosting SSIFs within an already existing entity. This approach means that SSIF platforms such as the ASP do not need to use valuable time, and resources reinventing support structures, entity policies and frameworks. One of the biggest challenges faced by Antarctica New Zealand in hosting the ASP is the potential for mis-alignment in host versus SSIF strategic objectives. Where conflict arises, clearly defined governance structures are crucial to ensuring success. It is imperative, as with any governance structure, that there is equal balance on removing obstacles to science delivery, and charting the path through strategic long-term challenges to success. Thought needs to be given to how future platform governance and management structure formally engages with the host entity's structure. Care needs to be taken to ensure that the members of the governance structure are widely representative of stakeholders, with a balance of research and non-research expertise.



4. Funding for Infrastructure:

Lack of clear pathway to support capital expenditure is a key issue that inhibits technological innovations - particularly relevant if Aotearoa is to lead the way in studying remote and difficult to access, yet scientifically important areas such as Antarctica and the Southern Ocean. A fit-for-purpose RSI system must include a mechanism(s) by which to take full advantage of developing technologies, and enabling researchers to acquire the right tools to answer key scientific questions.

5. Importance of Cohorts of Early Career Researchers:

The majority of ASP funding was contracted in 2018 following directly on from development of key impact statements. The major benefit of this approach is that it allowed effective recruitment of a cohort of ECRs (graduate students and postdoctoral scholars). One key limitation of this approach is it has the potential to minimize the involvement of ECRs who graduate/enter the RSI system after 2018, and therefore results in a 'lost generation' of Antarctic and Southern Ocean researchers who are shut out of the major source of funding in this area. Antarctica New Zealand encourages additional flexibility in major research programmes to offer multiple opportunities for ECRs to be engaged with SSIF platforms throughout their entire duration in order that research coherence is maintained through time.

6. Measures of Success:

A redesigned RSI system requires a broad range of metrics to assess the merit of scientific research outcomes as well as the significance of broader impacts. Currently MBIE's assessment model relies heavily on a small number of narrow predictors of success - dominantly the number of papers published and papers published / research dollars invested. Establishing an array of key metrics is clearly a difficult task, but it is necessary to accurately assess the broader impact of research such as that conducted by the ASP. Antarctica New Zealand encourages MBIE to engage with both the scientific and policy-making community to produce a range of metrics that move beyond scientific publication as the sole source of success.

7. Cyberinfrastructure:

By comparison with other nations involved in Antarctic and Southern Ocean research, it is Antarctica New Zealand's view that Aotearoa lacks a coordinated approach to the systematic storage, archiving and access to data. As a signatory to the Antarctic Treaty, New Zealand's Antarctic research programme is required to make all data openly and freely available. Yet, within the broader New Zealand context, this work is poorly resourced, and risks loss of key long-term datasets that form the basis of our scientific understanding of Antarctica and the Southern Ocean. Antarctica New Zealand therefore recommends that a refreshed RSI system contains a significant focus on improving the digital landscape with particular reference to the FAIR principles (Findability, Accessibility, Interoperability, and Reuse).

Of equal concern is access to supercomputing capabilities in Aotearoa. In order to fully comprehend the role of Antarctica and the Southern Ocean in the global climate system, it is necessary to construct detailed models and simulations. From a SSIF host perspective, Antarctica New Zealand believes that there is an urgent need to better coordinate, and improve access to existing high-performance computing as well as provide the necessary resources to develop the next generation of facilities.

Ngā mihi,

A handwritten signature in black ink, appearing to read "Sarah Williamson".

Sarah Williamson
Chief Executive