

Attn: Future Pathways Policy Team
Ministry of Business, Innovation & Employment
PO Box 1473, Wellington 6140

Submission on Te Ara Paerangi Future Pathways Green Paper 2021

Species Aotearoa is a representative group of scientists from institutes holding natural history collections and conducting systematic and taxonomic research. It was established following the Royal Society Te Apārangi's review of taxonomic collections with the aims of:

- providing an interface between the taxonomy and systematics community and key end-users – nationally and globally,
- coordinating and developing the responses for Aotearoa to the goals outlined in the [National Taxonomic Collections in New Zealand \(2015\)](#) and [Decadal Plan \(2018\)](#),
- working with the sector and stakeholders to show the importance of taxonomy and biosystematics and its relevance to science, society, government and industry.

Species Aotearoa was formed to represent the different institutions that hold collections, as well as spanning organismal expertise. It is composed of members who were nominated by fellow systematists and collection managers in New Zealand, as well as members of Te Tira Whakamātaki Māori Biosecurity Network.

For ease of use, we have arranged our responses using the relevant themes of the Green Paper. We have also included background information on why and how we were created. A summary of key considerations and recommendations is presented at the end of this document.

1. Background on Species Aotearoa

Species Aotearoa is an outcome of the Royal Society Te Apārangi report released in December 2015 on New Zealand's taxonomic collections.

The Royal Society had convened an Expert Advice Panel in 2015 in response to concern about the state of the New Zealand systematics, taxonomic collections sector. The subsequent review considered:

- 29 collections housed in 20 institutions;
- Museums, Crown Research Institutes (CRIs), Cawthron Institute and Universities; and
- Over 12 million specimen lots of vertebrates, invertebrates, plants, fungi, micro-organisms & fossils.

The review panel articulated the issues and challenges facing New Zealand taxonomic collections as well as providing the value proposition with numerous case studies about the value and impact of systematics, taxonomic collections and associated databases. The report articulated the societal benefits across multiple government agencies, summarized here:



The report concluded that:

- Taxonomic knowledge underpins New Zealand's economic, environmental, social, and cultural fabric
- Legislative requirements and policy initiatives committed to by the Government require taxonomy
- Taxonomic knowledge provides the credible scientific basis for delivery of key public services, and underpins operations in a number of government agencies
- Taxonomy, the collections and databases and associated activities, are largely invisible to the final beneficiaries
- Inadequate and overall declining support; fragmented, unstable funding
- Continuing declines in investment are limiting ability of institutions to respond to existing demands
- Not obtaining full benefits from existing collections nor availing ourselves of new opportunities and techniques
- Not obtaining full benefits of highly trained experts (59% of publicly funded taxonomists are supported to spend 10% or less of their time on research).
- Involvement of iwi Māori and scholars of Mātauranga Māori in care, development and use of collections is minimal at present
- Not meeting international obligations with respect to mobilisation of data and information sharing
- Not leveraging additional opportunities that international community provides
- No national strategy and policy to support collections' infrastructure or to identify national/stakeholder requirements
- Disconnect between funding and delivery of services
- No clear point of stewardship within or outside government
- Legal protection is uneven; Protected Objects Act needs updating
- Demands increasing in New Zealand and overseas
- Risk of unintentional consequences with combination of: eroding support; lack of formal protection; and reliance on individual organisations' prioritisation processes.

- Without long term stewardship: loss of value of previous investment; loss of access to material and data; reduction in quality of specimens; reduction in quantity and rate of taxonomic research; and loss of training and succession opportunities.

As a result of the Panel's recommendations a meeting of the Chief Executives and Leaders representing the 13 institutes that hold the majority of NZ's natural history collections was held in March 2017 to discuss the review and address the recommendations from the review. The meeting participants were all in agreement on the importance of the review and the need for formation of a group to increase collaboration among the national taxonomic collections. Species Aotearoa was established with membership drawn from different biosystematics agencies to represent the national biosystematics research and taxonomic collections communities.

Species Aotearoa was tasked with developing joint agency proposals to government, and a range of short-term and long-term strategies and actions designed to remove impediments and build enduring national systematics and taxonomic collections capability. The intention was that Species Aotearoa would:

- Identify and confirm existing collaborative efforts across taxonomic collection institutes and their relative success.
- Develop strategies to improve the scale and scope of shared resource initiatives among existing institutes.
- Develop action plans, to meet national needs for systematics research, including training and infrastructure.
- Identify and coordinate opportunities to increase collaborations across the biosystematics sector.
- Identify opportunities for increased coordination and sharing of intellectual property and data among the institutions that will enhance New Zealand's taxonomic collection use nationally and internationally.
- Communicate the value of systematics research, teaching and taxonomic collections.
- Develop joint agency proposals to government.
- Incorporate activities to complement national and international biodiversity and systematics initiatives.

One of the first actions of Species Aotearoa was to participate in the joint Australian New Zealand initiative "Discovering Biodiversity – a decadal plan for taxonomy and biosystematics in Australia and New Zealand 2018-2027".

2. Research Priorities

2.1 A balance of research direction is needed.

There is a need for investigator-led research, which pushes the boundaries and creates new pathways of future investment and there are many large-scale projects/questions that require large groups of people from many institutions to research and solve. The balance of these two approaches is critical to the success of the new system.

2.2 Acknowledging longer term research horizons.

There is a need for long-term research projects, which have multidecade horizons. Many of the current research priorities indicate only new, innovative research, even excluding 'business as usual' research areas. Often current priorities force research requirements, such as long-term monitoring and data collection maintenance, to be

cut to meet budgets without taking into account the loss of possible long-term studies that are critical to most environmental studies.

3. Te Tiriti, Mātauranga Māori and Māori Aspirations

The Tiriti partner needs to be driving the reforms in the system to make them meet the needs of iwi Māori. The current science system does not effectively advance Tiriti partnerships and there are significant issues about building capability and training for Māori, and recognition of Mātauranga Maori throughout the system. The current fragmentation of the funding system and the lack of underpinning support works against the long-term relationships that are essential.

4. Funding

Species Aotearoa has been in existence since 2017 without any separate governmental support. We have been successful as a collective voice for taxonomic collections in reviewing and creating documents but have struggled to create any coordination efforts for the management of collections or systematics research. Focused governmental support is needed for Species Aotearoa to address the issues raised in the Royal Society Te Apārangi report on New Zealand's taxonomic collections.

5. Institutions

Our response to the section on institutions focuses on the importance of our collective relationships to ensure that we continue to be collaborative and helpful to each other. Species Aotearoa consists of all types of organisations involved in taxonomic collections and systematics. Some of us represent organisations outside the direct remit of MBIE but are nonetheless devoted to research and infrastructure support for research. What we would like to see happen in the future is that:

- Institutions are rewarded for collaboration to help reduce the competitive model
- Multi-institutional facilities are developed to share infrastructure and personnel costs for long-term goals
- Research organisations become more open to communities wanting to be heard and requiring information

6. Workforce

The employment opportunities for the taxonomic community have been very limited over the past two decades, and many current researchers are either approaching or past retirement age. To help fill this significant impending gap in critical expertise, funding is needed to support training, such as internships, scholarships and fellowships, to attract high-calibre researchers into New Zealand taxonomy and collection management.

7. Infrastructure

7.1 Taxonomic collections are essential to many environmental research projects.

Infrastructure capability needed to support the storage of collections is currently funded either by internal funds from research organisations or large scale business cases to Treasury, which are often standalone requests. Each research organisation has different ways of dealing with collections expenditure, and variously relies on central or local government funding, or grants which have variously suffered as funding priorities shift. This model leads to inefficiencies, degradation or even possible loss of collections. A strategic, long-term strategy for taxonomic collections along with infrastructure funding from all institutions is needed to reduce our current inefficiencies in storage and maintenance of Aotearoa's taxonomic collections.

7.2 *A way forward for taxonomic collections and biosystematics infrastructure.*

Aotearoa's taxonomic collections have been spread across the country to reduce the risk from natural disasters and to represent the regions that they are located in. This has worked well, however some consolidation, if appropriately resourced, could increase overall efficiencies and collaboration between research organisations. A good model to work towards would be to have jointly operated facilities for all of Aotearoa's taxonomic collections located in, say, Auckland, Wellington, Canterbury and Otago regions. This would help create better centres of mass for collection management and research on collections. The centres could also better collaborate with common biosystematics infrastructure and format. These regional biodiversity centres would form the backbone of a nationally distributed collection of biodiversity specimens and information to support all stakeholders and end-users.

8. Summary

Species Aotearoa recommends that the following principles should underpin the management and investment in the taxonomic infrastructure of New Zealand. These recommendations closely follow the Royal Society Te Apārangi report released in December 2015 on New Zealand's taxonomic collections.

System performance

1. New Zealand should have a decentralised and geographically spread network of national taxonomic collections facilities that enables integrated and close collaborative links with end-users.
2. New Zealand's taxonomic collections should be located near establishments that have clear commitment to stewardship to ensure long-term protection and ongoing curation.
3. New Zealand's taxonomic collections should be accessible for the benefit of New Zealand, reflecting their use across multiple public-benefit domains, while also meeting collection standards, policies, and protocols. Where charges to access the physical collections are made (such as for specific access, or under commercial contract to specialist users and service providers), this should not limit access by others.
4. Government resource for Species Aotearoa, which would enable coordination and oversight of New Zealand's taxonomic collections by collection holders, to improve practices relating to standards, taxonomic research, training, biodiversity information systems, and to provide a source of advice to government and stakeholders.
5. A single point of responsibility within government is established to coordinate a coherent approach to policy and investment in the biological collections' infrastructure. This would also provide a channel for interaction and information exchange between the Government and collection holders.
6. Strong protection is provided for the collections that form part of our national biological collections' infrastructure.

Investment

1. The evidence and findings of this review are incorporated into the 2015 review of Core Purpose Funding for CRIs, reflecting the significance of the CRIs in managing these collections.
2. Government urgently address the immediate investment needs of the national taxonomic collections and research staff so that critical taxonomic expertise is restored, and that services and quality are not put at further risk.

3. Government adopt a strategic and more tailored approach to investment based on a set of principles set out in this report, which would provide greater certainty for collection holders in planning for both short- and long-term demands.
4. Substantial new investment is made to meet the growing demands on the taxonomic collections. This should address: i) the large backlog of curation and digitisation of existing collections' information; and ii) application of new technologies (e.g. for specimen and data analysis, integration and mobilisation of data, and development of appropriate informatics tools).
5. New investment is made to support training, such as internships, scholarships and fellowships, to attract high-calibre researchers into New Zealand taxonomy and collection management, and to ensure New Zealand has a strong and expert taxonomic workforce.

I would be happy to be contacted regarding this submission and can provide additional information on request.

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