Taxonomic research, collections and associated databases – and the changing science scene in New Zealand

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The past two years have seen very important developments in the New Zealand science system. In particular, in this period we have seen the establishment of the National Science Challenges, the launch of the National Statement of Science Investment (NSSI), the reconfiguration of the Ministry of Business, Innovation and Employment (MBIE) contestable research funds (now the Endeavour and Smart Ideas funds), and most recently the establishment in the 2016 Budget of the Strategic Science Investment Fund (SSIF). At present consultation is under way on 'roadmaps' for conservation and environmental science, for the primary sector, and for biosecurity, recognising the need for sound science to underpin policy and decision-making.

In 2015 the Royal Society of New Zealand convened a panel to investigate the state of taxonomy and taxonomic collections in New Zealand, releasing a report of its findings in December 2015.[1]

When the Department of Scientific and Industrial Research (DSIR) was dis-established and Crown Research Institutes (CRIs) created, a number of collections and databases were assigned the status of being 'nationally significant' (NSCD). Although there are NSCDs that are taxonomically focused (housed in Landcare, NIWA, GNS, SCION), only about half of all taxonomically important collections are within the care of CRIs, with the remaining collections residing primarily in museums, particularly the Museum of New Zealand Te Papa Tongarewa (funded by the Ministry of Culture & Heritage) and major metropolitan museums (funded by rate payers), as well as smaller collections in some universities (funded through departmental funds or Performance-Based Research Funds (PBRF)). In addition a small live collection of microalgae is maintained at the Cawthron Institute for taxonomic and other purposes, and is recognised as nationally significant by MBIE.

At the level of individual organisations there are examples of where the science needs of end-users have been identified through consultative processes and where priority setting and engagement is very well embedded in research and resource planning. Despite the complexity of different funding streams, the taxonomy and collections sector is very clearly defined and there is a very high degree of collegiality across this science community. The Royal Society report highlighted the major issues facing the sector, especially the lack of strategic alignment between the funding of services and their delivery (refer to page 47 of the report). The Panel was convinced that a system-wide approach was needed to get better value from the current system and to develop strategic approaches to new investment.

MBIE states the Government's vision for the science system for 2025 is '*a highly dynamic science system that enriches New Zealand, making a more visible, measurable contribution to our productivity and wellbeing through excellent science*'. The establishment of the SSIF appears to align very well with the conclusions of the Royal Society panel. From the MBIE website we are told: '*The SSIF will support underpinning research programmes and infrastructure of enduring importance to New Zealand*', attributes that have been acknowledged by research providers and end-users about the taxonomy, collections and databases. However, there has been no indication that the evidence-based conclusions of the Royal Society report are being incorporated into the decisions that are shaping our future science system.

The Royal Society report provides many examples of the reliance of a number of sectors on the expertise and data within the taxonomy and collections community – ranging from export assurance, human health, biosecurity and environmental protection. The important contributions of the non-CRI sector, particularly the museums, apparently remains invisible to decision makers, yet within the CRI collections there are no vertebrate reference collections and only about one-half of all plant collections. In addition, the university sector provides critical collections (e.g. Lincoln University entomology, Otago

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[1] Nelson, W.A.; Breitwieser, I.; Fordyce, E.; Bradford-Grieve, J.; Penman, D.; Roskruge, N.; Trnski, T.; Waugh, S.; Webb, C.J. 2015. *National Taxonomic Collections in New Zealand.* Royal Society of New Zealand. 63 pp. + Appendices (66 pp.) ISBN 978-1-877317-12-5 www.royalsociety.org.nz/national-taxonomic-collections-in-new-zealand

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University herbarium) in parts of the country that do not have a CRI branch nearby. Having a distributed network of taxonomic collections for reference purposes is recognised as a key strength in our current system. However, the value and support for this network is not able to be realised, as there is no coordination or recognition of the cross-institutional linkages that would enable more effective outcomes.

The Royal Society Panel identified the corrosion of capability, and the fragility of our knowledge base, the prolonged period of disinvestment, and the consequent risks to New Zealand with regard to our ability to respond to biosecurity crises, to effectively manage species, habitats and ecosystems across terrestrial, aquatic and marine domains, and to contribute to a range of economic outcomes.

At this time when policy is being developed to address the long-term needs of New Zealand and how science can inform government decision making, it is unclear why the opportunities to tackle critical issues in the taxonomy and collections sector, particularly in relation to coordination, strategic alignment and funding, are not being addressed with urgency.

One advantage of working within New Zealand is the scale of our systems – it is possible to get all the key players around a table to work collectively for the national interest. The taxonomy and collections sector, although widely distributed institutionally and geographically, offers a critical platform of underpinning expertise and resources. The recognition of the need to support infrastructure, and the development of the SSIF, provide the opportunity to develop both a coordination model and a tailored approach to investment that recognises the nature of the activities of the taxonomic collections sector, and the time frames over which this work occurs.