Individual submission on Future Pathways

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Name to be withheld if possible.

My background.

Original training in Physics and subsequently Biology. Responsible for the initial development and design of the nationally significant databases within Landcare Research. Involved in international collections data standards development, data-access and sharing through TDWG. NZ node manager for the Global Biodiversity Information System. Developer of the New Zealand Organisms Register. Initial science leader for the Informatics Team within Landcare Research. Trustee of the NZ Biodiversity Recording Network supporting the global citizen science iNaturalist platform. Amateur turned professional mycologist specialising in the systematics of mycorrhizal fungi and some plant pathogen groups.

My submission

A recognised part of our research infrastructure are the so-called Nationally Significant Collections and Databases. These resources fall into several distinct categories, and some which are mixtures of categories. The categories are: 1) repositories of captured and unchanging digital information (e.g. climate data), 2) archived material as the physical source of digital data (e.g., NVS in part), 3) repositories of digital information requiring on-going interpretation and updating (e.g. 'associated databases' of MW-LCR), 4) physical repositories of biological material (e.g. the subset of biological collections, both living and dead). These four distinct categories of resource require differing degrees of ongoing digital and physical curation to be fit for purpose. In addition, the skills necessary to maintain their value vary considerably, but most curatorial aspects do not require a high technically skilled workforce. All collections and databases provide a resource for research in various fields, and have key operation uses and cultural values. There is no 'one size fits all' approach to assessing the needs and priorities of these resources, and that I'm sure is why MBIE find it difficult to finalize any review. However, I want to focus down on the biological collections and their associated 'research'.

The collections and databases are continually discussed as though they existed in a vacuum, and the current contractual obligations make it explicit that 'collections and databases' are the focus of funding. Confidentiality - 9(2)(ba)(i) [redacted] What this viewpoint misses entirely is that these resources have little value without the associated systematics work carried out by highly trained and dedicated specialists. You cannot separate collections from systematics research. The collections provide the inputs for systematists to generate information & knowledge, and it is these outputs that have the real and lasting value. It is knowledge of our organisms, their description naming and classification that underpins operational biosecurity and conservation, and a broad spectrum of research in ecology, biotechnology and so on. The underpinning systematics work is the key infrastructure supporting these higher-level activities. To re-iterate, the 'collections and databases' themselves have little intrinsic value. The real value is the work done by systematists, based on,

what to most people, are ‘dried-up specimens in boxes’. In any review or re-organisation of activities these differences need to be recognized, and systematists supported in their work, in addition to the collections they use, and databases they generate. Currently the systematics research has no visibility and valuable skills are being eroded.

Systematics work does not fit neatly into a standard academic framework, and therefore it suffers. This is not a problem unique to New Zealand, but we are embarrassingly negligent compared with our OECD cousins. We live in a biodiversity hot-spot with rapidly increasing pressures on our environmental integrity and yet we have yet to formally describe most of species. Unknown numbers of species are probably going extinct without notice. We don’t have adequate resources to tackle that problem, and we are suffering from a sinking-lid on the limited funding we do have.

The reason that systematics does not fit a standard academic framework is the definition of research. In the traditional academic world the meaning of research goes hand-in-hand with novelty – new ideas, new explanations, new tools and technologies. The novelty in systematics work is the recognition and description of species and where they fit in the tree of life. There is no doubt that novel explanations, tools and technologies are part of systematics, viz the rapid development and endorsement of molecular phylogenetics, but that work is done to support the primary goal, and that is the discovery description and classification of life on earth. Those engaged in ‘traditional research’ do not see systematics research as equivalent, and indeed it is not. That does not mean systematics work is inferior, requiring a less skilled workforce, or less worthy of funding than traditional research.

Systematics research and traditional research are different activities, requiring different skills and resources and a different funding framework. The current dialogue in New Zealand does not recognize this significant issue. The consequence is that systematics work is uncomfortably and inappropriately squeezed into an academic framework and almost totally ignored when it comes to assessing ‘collections and databases’. We get lost in the vacuum. In the current MBIE research funding framework can never compete with traditional research applications because we can’t tick the novelty box. Moreover, we are made to feel unfair pressure from academic colleagues (and management) within the institutes. The view is that use of institutional funding to support (subsidize) systematics is undermining the organization’s ability to do ‘real’ research. We are also told the available SSIF funding must be prioritised to the ‘collections & databases’, and not our work. We are pressured into applying for external research funding to support our positions and in doing so we have to bury/hide any included systematics work or abandon it entirely. Some systematics researchers, but by no means all, are sufficiently multi-skilled they can attract funding as ‘traditional researchers’, but many are not.

The basic message is that: 1) supporting ‘collections and databases’ is not the same as supporting systematics research. 2) The latter is a priority for the support and the former just ‘tools of the trade’. 3) Systematics research is non-fungible with traditional research and requires separate recognition, funding and management. These messages should be clear from the considerable amount of work done to generate the Royal Society 2015 review “National Taxonomic Databases in New Zealand”’ and “Discovering Biodiversity: A decadal plan for taxonomy and biosystematics in Australia and New Zealand 2018–2027” from the Australian Academy of Science. Neither of these reviews has led to any significant change.

How our biological collections, databases and systematics research should be funded and managed in the future, and whether they belong together with traditional research in research institutes is an

open question. I believe there are significant synergies we have gained from close alliance with traditional researchers, and those synergies would be much harder to generate when systematics is separated in a museum-like model. However, it is clear the current institutional arrangement is not working. The current arrangement and funding levels are generating unsustainable friction, division, and the on-going erosion of a valuable work-force continues.