Kia ora

I would like to make a submission on Te Ara Paerangi via the attached document. I hope my thoughts are in a form you can work with and are useful. I tried to fill out the online submission form, but realised I found it much easier to put something together in a more free-form manner organised by the sections defined in the report. In some cases this was because I struggled with what seemed to me like indecipherable jargon, in others because I felt I didn't have answers to the questions but had thoughts I wished to express in the general subject area! I have restricted myself to the sections I feel I can best make useful comment on. I put here my answers to the opening questions on the form, in case they are useful to you:

- My name is Confidentiality - 9(2)(ba)(i)
- My email is Privacy - 9(2)(a)
- I do not want my name and contact information published with my submission (I suffer from career precarity and sometimes have controversial opinions!) I understand my submission may need to be released by law
- MBIE can contact me in relation to my submission (I would be delighted to be contacted!)
- I am submitting as an individual
- I am not currently working as a researcher (but I do have a PhD and research experience – so not sure how you define me!) I work in research support.
- I am Privacy - 9(2)(a)
- I am
- I work in Privacy - 9(2)(a)
- I am Privacy - 9(2)(a)
- I work for a CRI (as will be obvious from the email!)
- I do not work for a Māori-led organisation
- The discipline of biological sciences is most relevant to my work
- There is some Mātauranga Māori in my work, but it is not the main science knowledge

I would like to commend MBIE on providing so many ways for people to make submissions on Te Ara Paerangi. I have enjoyed completing the workforce survey, have attended numerous online workshops, have contributed to submissions being prepared by my institute, and am pleased to have the opportunity to make a personal submission in a straightforward way. I hope you receive lots of useful submissions and look forward to seeing the outcome of MBIE's considerations.

Ngā mihi

Confidentiality - 9(2)(ba)(i)

1. Research Priorities

My own background is in what can be loosely termed environmental research (ecology/microbiology.) I do not feel well-placed to comment on priorities for research in other areas, but would like to comment on my area of expertise. For the setting and administration of environmental research priorities, I am supportive of the recommendations made by Simon Upton in the 2020 report 'A review of the funding and prioritisation of environmental research in New Zealand' – namely the formation of an independent Environmental Research Council, to define priorities/goals and administer funds. I note this report suggests much longer time horizons (7-15 years) than the five years mentioned in Te Ara Paerangi. For environmental research, longer is better –

the major environmental challenges society faces today are likely to be the same in ten years as what they are in five.

Given the speed at which technology changes, and the debates within the scientific community about which technologies are most valuable, I would not suggest technologies would be a suitable focus for a priority. I suspect the use of either a 'problem' or a 'research area' would lead to similar outcomes, but it would be better not to mix different types of focus, as that could lead to confusion and more of the fragmentation we should be reducing. With either type, researchers will make their subject/research interests 'fit'. For example, if I studied the ability of microorganisms to transform pollutants in soil, I could fit my work under either 'pollution', or 'soil science.' What is more important is clear links between research activities, priorities, and funding, minimising the hoops researchers must jump through to undertake the research we need to address environmental problems, and reducing the fragmentation of research on similar/identical topics across programmes and institutions.

The scope should be determined in part by the allocation of funding. If the bulk of science funding is to go to the priorities, they must be broad in scope (for example 'soil science' as opposed to 'microbial activities in soil.') Otherwise, the priorities would become too numerous and complex to administer. Practising researchers are best placed to work at a level of finer detail and more narrow scope – they are closest to the problems we need research to address, and best know what is possible. They should be empowered to dictate how priorities are addressed.

3. Funding

I am struggling with the question 'how should we determine what constitutes a core function and how should core functions be funded', and the green paper itself acknowledges the challenges here. However, this suggestion is logical to me: that a researcher is only hired if money is available to enable them to carry out their research – their activities are not reliant on being awarded funds through either externally or internally competitive processes. They are hired because they have skills that can be applied to address a research priority. Those research priorities would be funded, and that funding would in turn be available to researchers. Suggestions made by both Te Pae Kahurangi and the report referenced above in section 1 are relevant here (as acknowledged in the green paper) and I do not feel I can improve upon them.

I have been associated with a CRI as a student, a researcher, and now as a project manager, for around ten years. I have also undertaken post-doctoral research overseas in a US government research institute, in a department where almost all funding had to be obtained through competitive grant processes. I have seen the huge amount of time, both taxpayer funded and personal, that goes into writing grant applications. The current fractured, uncertain funding that CRIs rely on leads to instability for both researchers and the institutions. This grant writing time-suck and personal/institutional instability takes a hefty toll on productivity and on the well-being of those that work in the institutions. I have also heard researchers express resentment that a proportion of their grant money should go to overheads – and that they feel this proportion is "too high". This is tied in with comment that there are "too many non-scientists now working in CRIs." To some extent I think this second complaint reflects a naivete about the complexity of the landscape science now operates in, but it is demoralising to those of us who are research support staff. Finally, I have witnessed examples where planning that should be about the best way to address a research question or environmental problem to benefit New Zealand has, as its first consideration, maximising the income for the CRI, which in turn generates unhealthy competition between CRIs. A base grant may not solve all the problems in the current science system, but I don't think it will make anything worse and is worth a try!

I note the distinction in the green paper between money going to priorities, versus money going to institutions for researcher salaries. Ideally research organisations should have, as their main focus, addressing the priorities. Researchers in turn should be tasked with doing this and be paid to do this. They should not have to compete with each other in order to raise the funds to do the job they were hired to do. Money for priorities and money

for researchers should not, therefore, be considered in isolation. A system needs to be designed that maximises the ability of researchers, and the institutions they work in, to address the priorities, whether money is channelled through whatever entity that administers the priorities, or the research institutes. Given the work is done by the institutes, and managers here are much closer to the researchers, it probably makes more sense that the base grant to the institutes is maximised, over the research priorities, otherwise one simply returns to a state of unhealthy competition.

An advantage of a base grant that I do not see mentioned in Te Ara Paerangi is that it could shorten the time between project development and execution, leading to efficiencies and aiding relationship management. Over a year passed between programme planning and the finalisation of subcontracts (and therefore work starting) on the MBIE Endeavour research programme I help to manage. This kind of lag time, combined with uncertainty of funding success, makes it very challenging to build and maintain relationships with stakeholders and iwi. During this time, the wider landscape also changed – technologies moved on, research approaches developed, and staff movements meant contract variations were needed due to changes in personnel. Considerable re-working then needs to be done before the programme can be executed. The anticipation of this also means proposals are necessarily vague, making it difficult for stakeholders and researchers to know exactly what will take place if the research goes ahead.

Finally, a base grant would ideally reduce the inflated promises researchers are encouraged to make by the current highly competitive grants-based system, and provide more opportunity for applied research that doesn't have to be 'cutting edge.' The requirement for programmes to downplay risk and 'promise the world' leads to disillusionment among stakeholders when the research does not deliver what they expected – especially when they were hoping for applied solutions that are not forthcoming. I frequently see lofty language used in proposals and on websites that gives little concrete information away. When one digs down to see what is actually being done, it is often less than what one would have thought – but all that could ever be achieved with the funding available. A more honest landscape would set realistic expectations, reduce pressure on researchers to submit exaggerated proposals and reports to funders, lead to a clearer picture of what is going on with environmental research, and result in better relationships all around. It would also reduce the pressure on environmental/public good research to show 'commercial value' in order to be funded.

6. Institutions

Issues with the CRIs, as acknowledged in Te Ara Paerangi, were well-covered in Te Pae Kahurangi and I have seen examples of most of them in my workplace. The tensions and problems created by the company model are also acknowledged in Te Ara Paerangi, so I do not feel the need to expand upon these. I agree with the suggestion for fewer and larger institutions. The main point I would like to state in this area is: from the perspective of delivering research in the area of ecology and environmental/conservation science, I cannot see any benefit to retaining separate CRIs. Ultimately, we are all 'government science' with a bit of commercial revenue on the side. There would be fewer 'barriers to collaboration' if there were not separate CRIs. There would be no 'unhealthy' competition between CRIs. There would be no concerns about staff having different opportunities for development and varying income levels at different institutes. There would be no struggles for a coordinated approach for large property and capital investments. Government science would be more strongly encouraged to take a national view, while researchers and support staff could more easily pursue a variety of opportunities.

In terms of achieving impact, from the perspective of environmental science, if one wants to achieve impact, one needs to fund operational research. Stakeholders and end-users need to be co-designers of the research. There needs to be funds available and ring-fenced for the transfer of knowledge to lead to implementation of results.

Currently, the scientific culture and the way funding is awarded values publications above application ('impact'), even in environmental science. This is reflected in the level of excitement among staff and from management

when papers are published, and in the career progression of individuals. One sees it at award ceremonies and in CRI newsletters. The glorification of publication starts right back at university level. Typically, journal publications are used as information sources for lectures and encouraged as examples for exams. It is rare that one is given an example of an operational change resulting from research for study purposes. Publications from a PhD are generally essential if one is to be employed in a post-doctoral contract or permanent research position. The elevation of publication over application is an international phenomenon and given the extent it permeates throughout research culture, this phenomenon likely to be very difficult to change. Nevertheless, some scientists remain personally motivated to work in applied science and in close collaboration with stakeholders. Funding mechanisms and institutional rewards and structures should be leveraged to support them as fully as possible.

7. Research workforce

My comments relate mainly to early career research, even though I currently work in research support, because I feel this is an area in great need of reform. I have been interested to see comments in some of the workshops that career precarity combined with heavy workplace demands in research makes it difficult to attract and retain talent. In my experience, I have observed heavy competition for research roles and far more people being trained as PhDs than will ever attain research careers. This intense competition allows the industry to continue to offer contract roles and allows bad behaviour to persist in the workplace. People in precarious positions, and positions they know could be easily filled by others, who remain highly motivated to pursue research careers either because of their personal desires or because they are ill-qualified for other careers, are unlikely to try to effect change and speak out. People must routinely work very long hours as students and post-docs to remain competitive for their next job, with consequences for wellbeing and personal relationships. I have also observed, both in NZ and overseas, some people who are successful in raising grant money do a very poor job as supervisors and then face no disciplinary action whatsoever, because their revenue is so valuable to their institution. Students (and to a lesser extent more expensive post-doctoral scholars) are also routinely used as cheap labour on research programmes in NZ, undertaking activities that could easily be performed by technicians with permanent jobs. Given the intellectual stimulation, day-to-day flexibility, and the respect given by society to the scientific professions, I think there will always be heavy competition for research positions. The challenge then is creating a positive, productive workforce culture and supporting those who have been successful to turn out work of the highest possible level within the context of high competition for roles.

A first step would be training fewer PhDs, providing better financial support to enable a more diverse workforce, and training people with a goal to moving them more quickly into specific, permanent jobs to fill skill gaps needed to address research priorities. I acknowledge the tertiary education sector is largely outside the scope of Te Ara Paerangi, but it is impossible to address workforce issues without also addressing issues related to post graduate study. University researchers are heavily incentivised to supervise PhD students, both to bring in money and for their career progression. Researchers also tell me student labour is one of the few ways they can actually “get research done”, because this labour is cheap. As well as having observed supervisors do a poor job, I have also observed people being accepted into, and shepherded through, PhD programs when they do not have the aptitude and drive demanded by a research career. It should be much harder to enter a PhD programme, and supervisors themselves should face more scrutiny. I do not believe broadening the PhD qualification is the answer – very few jobs outside of research benefit from the employee having undertaken several years of independent research. Given how expensive it is to undertake post-graduate study, individuals who are not going to go on to research careers are much better to do a masters-level qualification only if they wish to do post-graduate study.

The scarcity of post-doctoral positions in New Zealand is often lamented by both early career researchers and by more senior people who would like to supervise post-docs, both for their personal satisfaction and to see their own research questions answered so they can publish and progress their careers. However, I do not believe the post-doctoral model serves New Zealand, or science, well. Post-doctoral opportunities should not

exceed the number of permanent jobs available, and it would be ideal if we could return to previous times where I understand it was much more common to move from a PhD straight into a permanent position. I have undertaken a post-doc in the United States and observed first-hand the trend for people to be trapped in the post-doc cycle for many years, constantly moving and disrupting their lives, earning poorly, and not necessarily being well-trained for non-research careers. In addition, post-doctoral contracts are often too short to achieve meaningful results in ecological and environmental research (for example the two years recently offered by the Whitinga Fellowships is very short, especially for those who want to do experimental research.) The requirement for people to go overseas to build networks and skills could be easily fulfilled by well-planned sabbaticals, designed to enable our workforce to address the priorities that have been identified.

In one of the workshops I attended, it was suggested that other industries commonly work on a contract basis, and perhaps the research industry could learn from them. A critical difference is that those industries are often much bigger, meaning it is much less difficult for individuals to find their next role. In addition, in both New Zealand and overseas, fellowships designed to support early-career researchers are often restricted to those below a certain age and/or who are a maximum number of stated years post-PhD. I know of no other industries that assume people who have been employed for a certain period post-qualification are no longer able to generate useful outputs and should therefore be excluded from opportunities. If grants are to be competitive, the applicants should be judged solely on the quality of their proposal and their ability to execute it.

I am confident that a base grant could mean improved conditions and expectations for the research workforce – for both research and support staff (who can also face career precarity due to grant-based funding) – especially if the government set performance expectations related to the workforce. These expectations should include money specifically dedicated for ongoing training and development for all staff members. This should include a range of activities such as conference attendance, mentoring opportunities, sabbaticals to build international partnerships, and professional training for those in support roles. Schemes that work to attract and retain researchers to establish programmes could be supported in limited number, but not at the expense of established researchers who should also be supported to continue to build and deploy their expertise. People that advocate for a re-distribution of funds from established to early-career researchers can overlook the fact that those same early-career researchers will become established one day and will continue to need support. Researchers need funds throughout their career trajectory – all ends of the career-spectrum need to thrive for research activities to succeed.