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Submission : Te Ara Paerangi - Future Pathways

This submission is made on behalf of the membership of the New Zealand Marine Sciences Society (NZMSS) - Te Hunga Mātai Moana o Aotearoa. It is made in good faith in my role as President of the NZMSS and in accordance with the Code of Ethics and Rules of the Royal Society of New Zealand. The submission is based on member input obtained through an anonymous survey and discussions within an informal committee, which included marine scientists (ranging from students to senior scientists/managers) representing local and national government, independent research organisations, universities and private consulting firms. Due to the anonymous nature of our survey, we are not sure how well our submission represents the views of Māori marine scientists, but input was provided by at least one Māori researcher who is actively creating space for mātauranga Māori and Māori scientists within the marine science sector.

NZMSS is a professional society affiliated to the Royal Society of New Zealand - Te Apārangi. NZMSS has approximately 470 members. We are a non-profit organisation that provides access to, and within, the marine science community, and we identify emerging issues through annual conferences, annual reviews, a listserv and a website www.nzmss.org.nz. NZMSS membership covers all aspects of scientific interest in the marine environment and extends to the uptake of science in marine policy, resource management, the environment and the marine business sector. We speak for members of the society, and we engage with other scientific societies as appropriate.

In general, NZMSS supports many of the suggestions laid out in the Te Ara Paerangi Future Pathways Green Paper. However, we believe the Aotearoa New Zealand science system is severely underfunded and that many of the issues within the system will only be resolved by providing funding that is in line with other OECD countries. Our substantive submission, including key recommendations, is attached.

Please contact me at the email address provided below for any further information regarding this submission.

A handwritten signature in purple ink that reads 'Kathy Walls'.

Kathy Walls

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Research priorities

1. *What principles could be used to determine the scope and focus of research priorities?*

NZMSS agrees that national priorities should be set. This would ensure areas of national importance are funded and make the funding process more efficient by providing transparency on where the government intends to allocate resources. However, we also suggest a separate process to set regional priorities its own pool of funding. Regional priorities would avoid a one-size-fits all approach and align with a te ao Māori view, which is often highly place-based. Having separate funding for regional priorities would avoid national funding being commandeered by projects that are low priority for most New Zealanders. For example, the impacts of a potential volcanic eruption in Taranaki took up most of the environmental funding portfolio in 2019.

Research priorities should meet societal needs and focus on problems, threats and opportunities. They could be set based on environmental priorities, Te Tiriti o Waitangi or on economic significance. They should not be focused on a specific field of research as this may constrain interdisciplinary research and the development of new research fields. Care should be taken not to pigeonhole research into categories. For example, although the National Science Challenges (NSC) tried to move away from a single science focus, the funding separated freshwater and land-based research (Our Land Our Water) from ocean research (Sustainable Seas), despite these two areas being intrinsically linked.

Maintaining investment in natural history/ecology datasets (inclusive of mātauranga Māori) and long-term monitoring to detect change should be given national priority status as uncertainty arising from lack of empirical data on species, habitats and ecosystems is often a barrier to effective decision-making in Aotearoa New Zealand. Other key priorities in the marine science realm include effective protection and restoration of marine biodiversity, mitigation of land-based impacts on the coastal environment, climate change (impacts, mitigation, adaptation) and sustainability of natural resources.

2. *What principles should guide a national research Priority-setting process, and how can the process best give effect to Te Tiriti?*

The principles of kaitiakitanga (active guardianship), whanaungatanga (meaningful engagement and relationships, including species and spaces), kotahitanga (unity, working together), and rangatiratanga (authority and self-determination) should be embedded into the priority setting process to give effect to Te Tiriti. All research associated with the sciences and the natural world should include mandatory equitable representation of Māori. There is a plethora of research (national and international) that highlight the benefits of Indigenous worldviews, quantitative methods, restorative actions and strategic decision-making for increased biodiversity across the globe. Providing real space for mātauranga Māori to participate and contribute to the national

conversation of priority-setting processes can only occur if Māori are equitably and meaningfully resourced and represented. Māori-led spaces give effect to Te Tiriti o Waitangi.

It is critical that scientists and experts (the people doing the research) are involved in setting research priorities but the process needs to ensure that priorities do not reflect the research agenda of organisations or individuals. Research priorities should be set through a bottom-up process involving individuals from a wide range of sectors (e.g., hapū/iwi, scientists/experts from both Crown Research Institutes (CRIs) and independent research institutes, resource managers, end users, government representatives). Having wide representation will ensure that priorities are set based on the needs of Aotearoa New Zealand, rather than the interests of a single research institute or an individual.

Some long-term research priorities will need to be set to enable stability, but the system needs to be flexible enough to change in response to changing contexts. Adequate and flexible funding also needs to be set aside for emerging areas of concern (e.g., research to guide limit setting for estuaries under the National Policy Statement for Freshwater Management) and this should be accessible at short notice (e.g., smaller pots of money that are available each year). It will be important to retain separate funding mechanisms that allow for innovative new ideas that are not aligned to research priorities (e.g., MBIE Endeavour and Marsden).

3. How should the strategy for each national research Priority be set and how do we operationalise them?

Long-term funding (> 5 years) should be available to provide stability and reduce the costs that research organisations face when re-bidding for research funding. Short-term funding is also not conducive to developing enduring and meaningful relationships with iwi/hapū. Proposals should go through a two-step process (e.g., similar to that used for Smart Ideas) with a shorter initial review followed by a more detailed proposal. Although it is important that funds are allocated by people who understand research needs (e.g., scientists/researchers/experts), it will be important for these decisions to be made by representatives from a broad range of sectors so that the decision-makers are not allocating funds to themselves (as has occurred in some of the NSCs). Funding for national priorities could be tagged to collaboration so that the best team is assembled for the proposal regardless of organisational constructs and constraints. Although this was the intention of the NSCs, there is still a sense that the process did not result in fair outcomes for all participating organisations.

Te Tiriti, mātauranga Māori, and Māori aspirations

Firstly, NZMSS wishes to highlight that it is difficult for us to speak on behalf of Māori because they are underrepresented in the marine science research community and within our Society. Unfortunately, this is a standard occurrence across all the sciences, and it needs to change. To support that change, a strategic action-oriented approach to ending systemic and institutionalised racism and barriers to science access for Māori are required. That approach includes greater representation of mātauranga Māori pathways and Māori scientists/experts at all levels and stages of science education and research

(especially in universities and CRIs), policy development, publications, funding and decision-making. This means that our current structures and practices must undergo transformational change.

As a Society, we recognise the urgent need for inclusion of mātauranga Māori, kaitiaki and Māori scientists within this research sector. Our Society supports action-oriented initiatives to increase Māori capacity and capability across Aotearoa New Zealand.

1. *How should we engage with Māori and Treaty Partners?*

Non-Māori researchers, scientists and leaders must take responsibility as Tiriti partners to engage in culturally appropriate co-development and engagement with Māori. This requires normalising reciprocal, connected relationships of working together, as equitable partners to co-develop and co-implement research that is useful, accessible and assists decision-making for the benefit of our wider communities and Aotearoa New Zealand, for the long term. We need to re-image the engagement space as positive, co-developed (and mandatory) approaches to research with new terminology, principles and policies across all agencies.

Individual iwi/hapū/rūnanga do not have the resources to engage with researchers in a meaningful way. The current requirement to engage with local iwi/hapū leads to short, one-sided interactions with local representatives without much benefit for the Māori community. Seed funding for both researchers and Māori communities would enable the establishment of enduring, meaningful relationships and facilitate true co-development of research proposals prior to a research project being funded. Engagement should happen on equal meeting grounds and between appropriate partners.

Separate funding should also be directly allocated to iwi/hapū/rūnanga to develop their capabilities and create capacity to co-develop proposals, contribute to research and have a seat at the table. Being Māori does not necessarily mean one is an expert in the culture and associated politics and mentoring and training may be required. Capability development is also necessary for scientists and early career researchers (ECRs) to learn how to effectively engage with Māori to meet their obligations under Te Tiriti, rather than relying on Māori researchers to fulfil liaison roles. This should be happening within the tertiary education system as well as within research institutes (e.g., for international scientists and mid to late career scientists).

Finally, the outcomes of such relationships should not be measured in terms of research papers or other academic values but in a form that end users and partners are able to understand and delivers value to them. This could include, for example, guidance documents, webinars, videos and press releases or a retrospective survey that rates the usefulness of a project from an iwi/hapū perspective.

2. *What are your thoughts on how to enable and protect mātauranga Māori in the research system?*

Create space for Māori to lead the mātauranga Māori research space. Position mātauranga Māori expertise and leadership across key organisations/bodies/agencies. Prioritise Māori as equitable partners in the management and implementation of science/research policies, principles, practices, tools, technologies, knowledge communication and dissemination. Build access pathways for Māori practitioners into the research and innovation sector that do not require assimilation to be successful.

3. *What are your thoughts on regionally based Māori knowledge hubs?*

We are supportive of funding that would enable iwi/hapū to develop and promote their areas of interest and capture regionalised Māori perspectives. We suggest that the government funds local iwi/hapū science officers who could be a direct contact for all local research institutes. A benefit of this role would be ensuring iwi are being partnered with projects which they believe in, which would stimulate development of meaningful and long-term relationships. There may be a role for a government funded Māori council that represents the interests of iwi/hapū on a national level. Regional hubs and national councils could enable efficient communication and provide resourcing but may be hard to achieve in practice due to iwi/hapū politics (e.g., who gets to run the hub, where it is based, who is employed etc.).

Funding

1. *How should we decide what constitutes a core function, and how do we fund them?*

We agree with the idea of having core functions with national funding. Core functions should represent capabilities of national importance, such as meteorology, biosecurity, conservation, infectious diseases, natural history collections and mātauranga Māori. Core functions should be decoupled from government priorities so that these functions are retained regardless of national research priorities.

Core funding should provide money to fund people's time, project resources and succession planning to ensure long-term viability of the core function. For example, taxonomic expertise underpins a range of nationally important priorities (e.g., biosecurity, environmental monitoring), but is at risk from lack of funding to maintain collections and train new taxonomists. Funding for core functions should be set aside before other science funding is considered. There should be a requirement for data collected via core function funding to be easily accessible by all to get the best return on investment and ensure information is not lost.

The decision on what constitutes a core function should be informed by a bottom-up process involving individuals from a wide range of sectors (e.g., scientists/experts from both CRIs and independent research institutes, resource managers, end users, government representatives, iwi/hapū). Having wide representation will ensure that core functions are set based on the needs of Aotearoa New Zealand, rather than the strengths of a research institute. Some core functions might be better managed by an umbrella organisation, with representation from research institutes with expertise in that area, rather than a single organisation.

2. Do you think a base grant funding model will improve stability and resilience for research organisations?

A base grant funding model has the potential to improve stability and resilience for research organisations, but it depends on how the funding is administered. Base grants could address some of the issues with the current funding model by providing stability to organisations, allowing them to offer more permanent employment and invest in staff development and research infrastructure. However, organisations that have base grant funding will have a competitive advantage over those without base grants, which could push out smaller organisations from the Research, Science and Innovation (RSI) sector. Careful consideration of how base grants will be administered is needed to ensure it doesn't result in unintended negative outcomes. We also need to ensure that the base grant funding is adequate and remains adequate in the future.

3. How should we go about designing and implementing such a funding model?

Given the repercussions of this large change to Aotearoa New Zealand's funding model, we suggest convening a group of researchers to comment on a more detailed proposal on how base funding would work. This group should include researchers from different organisations (e.g., CRIs, universities, independent research organisations, smaller science firms) and at different career levels.

Base grant funding should be linked to achieving outcomes that are of national benefit to Aotearoa New Zealand. These could include an obligation to provide permanent positions and or career development opportunities for ECRs, fund engagement and relationship building with iwi/hapū, and collaborate with other organisations and end users.

To reduce the ability of organisations with base grant funding to outcompete other organisations, base grant funding could cover overheads only, rather than being used to add value to research funded through competitive research funding mechanisms or commercial work. Currently, core funding and Strategic Science Investment Funding (SSIF) is used too much to serve the interests of an organisation, rather than the needs of Aotearoa New Zealand. It will be important to retain separate funding mechanisms that provide incentives to innovate and do novel science (e.g., MBIE Endeavour and Marsden). We also see a need for funding mechanisms that allow for community led research (e.g., citizen science). We support the Parliamentary Commission for the Environment's idea of having ring fenced funding for environmental work, similar to the Health Research Council.

Base grant funding should be regularly reviewed (e.g., every five years).

Institutions

1. How do we design collaborative, adaptive and agile research institutions that will serve current and future needs?

One of the problems with CRIs is that they are managed as businesses with profitability as a key measure of success. Due to the highly competitive nature of Aotearoa New Zealand's underfunded research system, this business-focused model creates an environment that does not encourage external collaboration (including with other CRIs), constraining the value of their research to Aotearoa New Zealand. The fundamental way to resolve this would be to allocate more government funding to research in Aotearoa New Zealand, in line with the proportion of Gross Domestic Product (GDP) allocated by other OECD countries. Increasing private sector investment into research and innovation could also reduce competition and create a more collaborative environment. As CRIs have a public mandate, it is desirable that alternative mechanisms are developed to hold them accountable. For example, success could be measured by the extent to which they collaborate with other organisations, rather than how profitable they are.

CRIs should be supported to pursue their core purpose and discouraged from pursuing activities that have been named in the scope of operation of other CRIs. The current free-for-all approach has negatively impacted collaboration and cooperation between CRIs, and the needless duplication of capacity has squandered resources and diminished return on science investment. For example, Aotearoa New Zealand is currently funding two agencies to produce the same weather information (NIWA and MetService).

There could be benefits to merging some CRIs, for example sharing overhead costs and a reduction in the number of middle and upper management positions. However, there may not be a huge desire from CRI staff for wholesale change and there is a limit to how large an organisation can become while remaining efficient and agile. Some of the newer areas of research (e.g., in the digital space) are neglected because they are not currently covered by a CRI mandate.

Changes to the funding system could encourage proposals that collaborate to assemble the best team. For example, evidence of collaboration could be given more weighting in funding proposal evaluations or research funding could be increased by showing evidence of collaboration. Although there are currently funding mechanisms to develop international collaborations (i.e., the Catalyst Funds) there is no funding targeted at supporting or encouraging domestic collaboration.

2. *How can institutions be designed to better support capability, skill and workforce development?*

Long-term certainty of funding, achieved via base funding grants or long-term research programmes, would help support capability, skills and workforce development because research organisations would have the confidence to offer permanent research positions. The peaks and troughs associated with the current funding system are problematic and lead to short-term contracts and lack of investment capability and skill development of the research workforce.

There needs to be more emphasis on long-term succession planning, mentoring, and promotion of staff work/life balance. This would help to retain staff, ensuring that they continue to lead major research portfolios, rather than leaving CRIs and becoming competitors. Salaries need to keep pace with inflation.

3. *How should we make decisions on large property and capital investments under a more coordinated approach?*

One of the positive things about CRIs currently, is that they have the ability to make timely decisions about capital expenditure (CAPEX) to ensure that science can stay in tune with technological advances. A larger organisation might not be quite so nimble. However, there is a need for a more coordinated approach across the CRIs to limit science and CAPEX duplication and competition. Please also refer to our responses in the Research Infrastructure section.

4. *How do we design Tiriti-enabled institutions?*

There are not enough Māori researchers in Aotearoa New Zealand's science system. All research organisations should have Māori researchers and leaders working within them to ensure that voices and views from across te ao Māori are heard. Research organisations should develop enduring and meaningful relationships with local iwi/hapū. See our responses on the Te Tiriti, mātauranga Māori, and Māori aspirations, and Research Workforce sections for solutions to increase the numbers of Māori researchers in our science system.

5. *How do we better support knowledge exchange and impact generation? What should be the role of research institutions in transferring knowledge into operational environments and technologies?*

Although we believe there is a role for blue skies research, there is currently too much focus on science excellence in the funding system. Applied science and mātauranga Māori-led science appears to be undervalued and is often not novel enough to fit within current funding mechanisms (e.g., MBIE Endeavour, Smart Ideas), despite a national need for the research (e.g., the science needed to support the establishment of environmental limits to help councils fulfil obligations under the National Policy Statement for Freshwater Management). Research funding should be more tightly tied to track record, impact, innovation and implementation. At the moment, researchers are asked to outline their pathway to impact in research proposals but very rarely does the funder follow up to see whether this was delivered on.

Non-academic outputs should be valued. We need to move away from peer-reviewed scientific articles as a measure of success and embrace measures of success that are culturally appropriate and accessible and reflect end user needs (e.g., hapū/iwi, community, industry, regulators) impact and uptake. At present, researchers feel that they cannot share their knowledge with the people who need it (e.g., hapū/iwi, councils, communities) because they are overcommitted and are required to charge that user for their time.

Research workforce

NZMSS agrees with the problems that have been identified in the Green paper's research workforce section. In particular, we agree that the RSI sector needs to move away from fixed-term contracts

and increase the number and stability of early career pathways, including technicians, under- and postgraduates. These new pathways need to be equally accessible to women, Māori, Pacific people, people with disabilities, and members of LGBTQI+ communities, as well as international ECRs that are often disadvantaged through visa requirements.

It would be beneficial to increase mobility within and beyond the RSI sector by promoting secondments/internships/sabbaticals and reducing barriers to movement between academic and non-academic positions. Non-academic outcomes (e.g., community impact) should be valued as appropriate outcomes so that ECRs consider such cross- and multidisciplinary work opportunities for their individual career development.

1. *How should we include workforce considerations in the design of national research Priorities?*

Research priorities need to be designed with a long-term view that would allow institutions to plan their investment regarding resources and capability development. This would provide job stability and create clearer career progression pathways, thereby encouraging research as a career choice. Funding for research priorities could also be earmarked to improve workforce outcomes. For example, by adding a weighting to research bids that include mātauranga Māori researchers; kaitiaki; ECRs and ECR capacity building. There could be a requirement for national research priority funding to be co-led by a senior researchers (inclusive of mātauranga Māori) and an ECR, to help develop the leadership skills of ECRs.

Training that aligns with research priorities should be tied into postgraduate education. Collaborative dual-knowledge training programmes that result in co-supervision between universities and other institutes or governmental departments (including overseas) are likely to lead to more multidisciplinary thinking and create networks that could lead to employment opportunities for students. In order to host such programmes, the university and the other institutions involved both need to receive funding. Having a clear vision about one's individual career pathway and more secure opportunities (e.g., in the form of employment after graduation), could help to encourage the choice to collaborate early. Such a system needs to be flexible enough to support the needs of researchers that are supporting families or managing health problems.

2. *What impact would a base grant have on the research workforce?*

The outcome of base grants on the research workforce will depend on their implementation. Base grants have the potential to reduce the occurrence of repeat, fixed term contracts in the RSI system, thereby improving workforce outcomes, particularly for ECRs. Stability in the work environment is key to attract more diversity, specifically women, Māori, Pasifika, or other communities that are more family orientated and for whom a science career is therefore often unattractive. ECR career pathways such as the Foundation for Research Science and Technology post-docs of the 1990s/early 2000s have never been replaced and the Rutherford and Marsden Fast Starts are limited both in terms of the number funded and the amount of funding awarded. Sufficient replacement for such funding needs to be created again.

However, simply allocating base grants to organisations will not necessarily achieve the desired outcomes, particularly if insufficient funding is provided or the money is used to support pay rises for executives and boards. Rather than allocate the base grant funding to established scientists/managers, it could come with an obligation to retain/develop/train mātauranga Māori researchers and ECRs and create leadership opportunities. This could help incentivise the development of Māori and ECRs instead of resourcing PhDs and post-docs that have lower overheads. An evaluation system might be required to ensure institutions create permanent positions (including dedicated funding for Māori/Pasifika positions at leadership levels), support career progression, avoid repeat fixed-term contracts, resource relationship building between science sector and Māori/Pasifika communities. For example, a proportion of funding could be allocated to 10% of mātauranga Māori researchers and ECRs within an organisation to spend half their time exploring their own research avenues (but aligned to government research priorities). Organisations receiving base grant funding should be monitored and evaluated according to metrics that improve research workforce outcomes (e.g., career progression, diversity metrics, improvement of pathways for under-represented socio-economic groups).

Finally, if base grant funding is only allocated to large established research organisations, it could result in reduced diversity and employment opportunities. The needs of researchers outside of large organisations (e.g., consultancies, non-governmental organisations, Māori organisations) need to be considered as well.

3. *How do we design new funding mechanisms that strongly focus on workforce outcomes?*

The current Aotearoa New Zealand post-doc model is not functioning well. There are too few fellowships available and the ones that do exist, such as Rutherford and Marsden Fast Starts, only fund part of the ECRs time due to large institutional overheads. Often there is no clear pathway from a post-doc position to a permanent position which leads to cycles of fixed-term contracts. Other funding opportunities, such as Smart Ideas, have direct competition with senior scientists and without the help of a mentor, it is nearly not achievable to succeed. There should be separate funding mechanisms available only to ECRs to help them transition from PhD/post-doc to leading their own research programmes. Fellowships and ECRs funding opportunities need to be extended and appropriately adjusted to be inclusive to women, Māori, Pacific peoples, people with disabilities, and members of LGBTQI+ communities, but also international ECRs that are often disadvantaged through visa requirements.

There is a general sense that scientists working in CRIs and independent research organisations are underpaid. These scientists could be retained within the RSI system by providing better pay, healthcare and superannuation packages and providing opportunities to undertake non-commercial research. Senior researchers leaving the RSI system due to lack of work life balance or low pay has led to a lack of mentorship, particularly for ECRs, mid-career scientists or scientists returning after maternity leave.

Performance measures need to move away from a focus on academic research papers to measures that better encapsulate the value of the research to Aotearoa New Zealand, Māori, and local communities. Publication-based models create barriers to workforce diversity and workforce mobility between different parts of the sector. Using broader metrics would enable research

institutes to invest in relationship building, wider training, and applied science. Such metrics need to be adjusted so they do not disadvantage part-time workers, women, researchers from low-income and single-parent households, and Māori, Pasifika and immigrant researchers who have wider care responsibilities within their communities.

Internships, placements, and summer scholarships for ECRs or students would create opportunities for emerging researchers to gain experience in research institutions, government, and industry, and promoting integration across different parts of the RSI sector or could open pathways in a different sector. To enforce equity in such workforce outcomes, internships must be funded and sufficiently flexible for part-time researchers.

Funding needs to be long-term and sufficient to enable a scientist to focus on one or two research projects. Adequate FTE needs to be provided to allow for project management as well as community and iwi engagement.

Research infrastructure

1. How do we support sustainable, efficient and enabling investment in research infrastructure?

We agree that the factors listed in the Te Ara Paerangi Future Pathways Green Paper (pg 77) are all important to take into consideration when deciding whether and how infrastructure funding should be included in a base grant. In particular, efficiency and the potential to make better use of capital by coordinating and sharing research infrastructure rather than duplicating investment should be a key factor for a country that underinvests in research, as is the case in Aotearoa New Zealand. The scale or long-term nature of investment required and whether it is beyond the reach of an individual organisation is also important, as this currently constrains research infrastructure investment in Aotearoa New Zealand. Base grant funding should prioritise research infrastructure that is of strategic importance, taking into account the Government's research priorities and core government research functions, and be of benefit to multiple users. The government needs to listen to the research sector when deciding how to invest in research infrastructure.

A key area where focused investment in research infrastructure would deliver more value for Aotearoa New Zealanders is the development of scientific databases that centralise scientific data in a consistent format and are accessible to all. Creation of such databases would greatly increase the value of historic and new data by allowing it to be used for a range of purposes beyond its original intent. For example, in the marine realm, the creation of a centralised database to house estuary monitoring data would aid the development of national guidelines for estuary health, enable estuary managers to assess their estuaries in the context of Aotearoa New Zealand and facilitate national-scale research. Estuary monitoring data collected over the last 20 years was compiled by an MBIE-funded research programme and has been used for a wide range of purposes, including the creation of new estuary monitoring tools, the development of a seafloor classification for Aotearoa New Zealand and research exploring the drivers of changes in estuary health. However, when this research programme ceased so too did the maintenance of the dataset. National funding is required to create a database that is continuously updated as new monitoring data becomes available. Although coastal managers from regional and unitary authorities are supportive of this initiative, they are struggling to identify and secure appropriate funding. Numerous other marine examples

exist where centralised databases would deliver benefits for all of Aotearoa New Zealand, including bathymetry data, seafloor habitat data, ocean survey data, environmental DNA sequencing data and blue carbon data. These data underpin the research that Aotearoa New Zealand needs to ensure sustainable use of its marine environment and research programmes should be leveraging these data, not collating them.

Investment in research infrastructure is also needed for strategically important infrastructure that supports high excellence and high impact research and is useful to multiple users. An example of this is the RV Tangaroa, Aotearoa New Zealand's only ice strengthened and dynamically positioned deep-water research vessel. Loss of such a vessel would have a huge impact on marine science research in Aotearoa New Zealand, yet every few years NIWA says it is going to have to decommission the vessel because they cannot afford the operation and maintenance costs. A base grant or national infrastructure fund could be used to support the continued use of the Tangaroa, but provisions should be made to ensure this does not strategically favour NIWA and that all research institutions have equal access to the vessel.

Research infrastructure is often purchased by organisations using government-funding as part of research programmes. Once the research programme ends, this research infrastructure becomes owned by the research organisation and is not usually accessible by other research groups, despite it being paid for by New Zealanders. There could be a requirement to list and provide access to all research infrastructure purchased under a government-funded research programme on a register of scientific resources. This register would foster equipment sharing, reduce the redundancy of expensive equipment and enable researchers to access the most up to date technology.

Rather than infrastructure being managed by a single organisation, nationally important research infrastructure (e.g., taxonomic collections, stable isotope laboratories) could be managed by umbrella organisations, consisting of representatives from research institutes that use the infrastructure. The government could contribute annual funding to the umbrella organisation (either directly or through base grants) to support the maintenance of the infrastructure as well as apprenticeships and secondments for ECRs.

All investments in research infrastructure should have environmental considerations and costs evaluated and quantified over the life of the investment to ensure minimal environmental impacts.

Other comments

It is likely that there will be significant changes to many parts of the current RSI sectors, as highlighted in this Green Paper. NZMSS considers it imperative that a monitoring and evaluation framework is put in place to understand the impacts of any changes and whether there are unforeseen negative consequences resulting from the changes. There should be plans in place to enable necessary changes to be made in a timely way, rather than waiting decades for the next review.

Key recommendations

- Aotearoa New Zealand should increase its investment in research, science and innovation in line with other OECD nations.
- Decisions on research priorities and core functions should be made using a bottom-up process involving individuals from a wide range of sectors.
- Long-term research funding is required for stability, but the system needs to be flexible enough to change in response to changing contexts.
- Funding should incentivise collaboration across research organisations and the development of ECRs and Māori researchers.
- Processes should be designed to encourage greater representation of Māori scientists/experts.
- Base grant funding should be linked to achieving outcomes that are of national benefit to Aotearoa New Zealand.
- Targeted funding mechanisms are required for ECRs to help them transition from PhD/post-doc to leading research programmes.
- Remuneration needs to keep pace with inflation and there needs to be more emphasis on long-term succession planning, mentoring, and promotion of staff work/life balance.
- Performance measures need to move away from a focus on academic research papers to measures that better encapsulate the value of the research to Aotearoa New Zealand, Māori and local communities.