Submission to the second phase of the Science System Advisory Group consultation process.

To: Science System Advisory Group (SSAG)
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Submitter details

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Parliamentary Commissioner for the Environment

The Parliamentary Commissioner for the Environment was established under the Environment Act 1986. As an independent Officer of Parliament, the Commissioner has broad powers to investigate environmental concerns and is wholly independent of the government of the day. The current Parliamentary Commissioner for the Environment is Simon Upton.

Key Points

1. Environmental research priorities should be based on the six enduring environmental outcomes published in my 2022 report, *Environmental reporting, research and investment: Do we know if we're making a difference?* The efforts of the National Science Challenges that ended in June 2024 provide useful insights, but research priorities must be continuously updated and integrated into long-term strategies.

2. A shift is needed toward stable, long-term funding – at least for environmental research – which supports strategic research priorities rather than the current, short-term competitive science funding system.

3. The proposed Prime Minister's Science, Technology, and Innovation Advisory Council (PMSTIAC) must ensure that environmental research expertise is properly represented in the group and is able to inform research priorities.

4. Integrating environmental information is necessary for better decision making. Environmental data collection and accessibility must be improved to support science-based policymaking and resource management.

5. Current information is fragmented across agencies, and better integration through a federated system would address this issue.

Introduction

This submission focuses on environmental research and science in its broadest sense, consistent with the remit of my office. My longstanding interest in the research system – particularly its environmental component – is driven by a conviction that there is some research of a public good nature that will only be sustained through public funding. It is a core responsibility of governments. My view is that environmental research is the absolute bedrock and foundation of environmental management. Without it, we do not know whether our decisions are sound ones or whether what we are doing is making a difference. The success of our environmental research is of real economic and social moment. That is particularly so given the biological nature of many of our industries.

This is a short submission that must be read in conjunction with the many reports released and consultations I have engaged in since taking up this office. I have addressed the complex issues surrounding research prioritisation and funding on a number of occasions. In particular, I published, *A review of the funding and prioritisation of environmental research in New Zealand* in November 2020. The findings and recommendations of this report remain completely relevant to this consultation as they directly address core questions on science funding and prioritisation.[1]

I also contributed to the Te Ara Paerangi – Future Pathways consultation in March 2022, following workshops and reports in 2021, and I contributed to the first consultation phase of this science reorganisation process, detailing my stance on many of the questions now posed in this second phase.[2]

This submission reiterates key points from my previous work. Like many people, I suspect, I am growing fatigued with consultation which goes around the same issues. The problems, at least for environmental research, are not so terribly complicated. I make no apologies for repeating much of what I have already said. Nevertheless, I strongly encourage the members of the Science System Advisory Group (SSAG) to read the material I have published on environmental science funding and prioritisation. No-one else has examined the issue in recent times in so much detail.

[1] https://pce.parliament.nz/publications/environmental-research-funding-review/
[2] https://pce.parliament.nz/publications/submission-on-te-ara-paerangi-future-pathways-green-paper/

Prioritisation of science

This section generally relates to the first series of questions from the consultation document under the heading: "*In what areas must New Zealand have or develop in-depth research-based expertise over the next two decades?*".

The Government has justified its reorganisation and prioritisation of the science system almost exclusively in terms of the need to drive economic growth and increase the commercialisation of research output. These are laudable goals, but this framing ignores the need for science that helps us manage risks to the economy, environment and society.[3] For example, little is said about the natural environment and the interconnections between the escalating threats of climate change, biodiversity loss, and pollution which are already jeopardising our prospects for growth. These must ultimately be addressed at a planetary level and New Zealand must play its part. But to the extent that the world fails to make an adequate response to these problems, we will not be able to avoid the consequences. We have no choice but to interest ourselves in the pressures we place on our environment and the consequences global level pressures will impose on us. We may have a choice about the former – we have none about the latter.

The SSAG recognises that science prioritisation occurs at many levels of the science system. Identifying top level science priorities has been attempted many times.

I addressed the complex issues of developing an environmental research strategy in my first submission to the SSAG and recommended that an [environmental] strategy, "should be high-level and address the key challenges that for the time being demand attention". A strong starting point for framing environmental research priorities remains the six enduring environmental outcomes I proposed in my 2022 report:[4]

1. improving the land and freshwater of Aotearoa, including sustainable management of resources
2. improving the biodiversity and ecosystem functioning and resilience of Aotearoa
3. improving the coastal and marine environment of Aotearoa, including sustainable management of resources
4. reducing greenhouse gas emissions and adapting to climate change
5. reducing pollution and waste

[3] I elaborated on the offense versus risk management aspects of the science system in my 2024 submission to the SSAG. https://pce.parliament.nz/publications/submission-to-science-system-advisory-group/
[4] https://pce.parliament.nz/publications/submission-to-science-system-advisory-group/ and https://pce.parliament.nz/publications/environmental-reporting-research-and-investment/ *p. 61*.

6. improving the efficiency and effectiveness of institutions designed to manage human interventions in the environment.

New Zealand has no shortage of talented scientists capable of identifying the most pressing research priorities beneath these headings. They must be heard. One way to do that is to go back to the creation of the National Science Challenges (NSC) in 2012, which followed yet another public consultation on science priorities. That process asked for public input on the priorities. Interestingly, eight of the eleven challenges touched on the environment, broadly defined.[5] The public doesn't seem to have trouble understanding why we do environmental research.

The Challenges collectively received approximately $640 million over just under ten years. Frustratingly, no questions were asked after their closure on 30 June 2024 about what research priorities emerged from that work and what the next funding phase should focus on. The opportunity was missed.

Recognising this gap, I convened a workshop in August 2024 with the leaders of these eight environmentally focused NSCs. Their priorities aligned with existing challenges and the need to address the escalating environmental threats I listed above. They included:

1. understanding how multiple environmental and anthropogenic stressors – including, climate change – interact at a variety of scales to influence ecosystem functioning; such knowledge is needed to develop and implement systems and procedures for reversing the decline of biodiversity and restoring our ecosystems
2. addressing the adverse environmental effects of land use and land use change, including climate research resilience, and redesigning agrifood systems to enhance resilience and human health toward sustainable land and water management and improving the quality of our freshwater resource
3. enhancing our understanding of ocean health and developing ways to reverse its degradation including an ecosystem-based approach to the management of the marine environment and how fishing could be integrated into this approach
4. making better preparations for the consequences of climate change, and the likely increase in frequency and severity of weather events, including through

[5] The environmentally focused Challenges are: Sustainable Seas; Biological Heritage; Resilience to Nature's Challenge; Our land and water; Deep South; and in a lesser way, Building Better Homes, Towns and Cities; Healthier Lives; and Science for Technological Innovation.

robust and inclusive climate modelling to identify key elements of our economy and society that are at risk

5. addressing resource productivity and the costs that waste imposes on the economy

A common theme across all the challenges was that the science needed going forward did not *all* have to be ground-breaking or innovative. There was a strong view that of equal importance was the provision of sufficiently granular monitoring and understanding of local environments to enable communities to understand the challenges they face, and modelling to allow them to make informed decisions.

One thing is clear to me: innovation, in and of itself, is no panacea. A proposed solution will not succeed simply by virtue of being innovative. Solutions or strategies to deal with environmental problems have to grow out of evidence based on long-term observations and a robust scientific approach.

The need for better understanding the functions, behaviour and development of our natural environment won't wane. We need to understand how the land, air and ocean that surround us are responding to the multifaceted anthropogenic pressures they are subjected to. Only then can we mitigate, plan and adapt to the adverse effects we are responsible for.

In my 2020 report, I identified 13 environmental strategies, roadmaps and plans developed between 2010 and 2020. Most remain aspirational. Unless they are supported by carefully developed and targeted implementation plans attached to funding, they will swiftly end up in a bottom drawer and will, at best, be dutifully referred to in funding applications as a form of box ticking. Frankly, 13 strategies over a decade represents a monumental failure of strategic planning. The issues at the end of the decade were, unsurprisingly, largely the same as they were at its beginning. What was needed was a serious process for seeing the ongoing environmental challenges we face transformed into research strategies that are living, implementation documents that are focused on throwing up solutions or at least better ways of managing the challenges.

The role of the PMSTIAC

The SSAG proposed a core role for a Prime Minister's Science, Technology and Innovation Advisory Council (PMSTIAC) in identifying research and science priorities.

I consider that it is risky to rely on a single council to advise the Government on and develop a strategy for all public science investment. Science is not monolithic. As Sir Peter Gluckman noted in the first SSAG report, science is conducted for multiple

reasons over different timeframes governed by different priorities. The task is just too broad to be tidied away by a single council.

Three options could improve a PMSTIAC's effectiveness and its capacity to nurture an environmental science sector that adds real value to society:

- establish specialist subcommittees for different areas of science to provide targeted expertise, with PMSTIAC balancing priorities for funding decisions
- ensure PMSTIAC membership is broad and evenly distributed, with two or three "eminent people who understand the environment, understand environmental research and are drawn from both within New Zealand and abroad"[6]
- a preferable and pragmatic alternative would be to establish an Environmental Research Council, as recommended in my 2020 report. New Zealand already employs this model for health research. A similar approach could be considered for other broad sectors – this is not uncommon overseas (see the UK for example).

The details of those options would have to be carefully thought through. But to pick up the Government's refrain about economic growth and broaden it, they could have a common objective of supporting economic growth and a healthy, resilient environment.

In my 2020 report I also said:

> "Central government needs to speak with one voice and it should do that through a regularly updated **environmental research strategy** led by the Ministry for the Environment. This is not a particularly radical suggestion – the bones of such a strategy were put together as recently as 2017 in the Conservation and Environment Science Roadmap."

A PMSTIAC could take over the task of coordinating a research strategy, including research prioritisation, stewardship research and research for public policy development, but it can't do that without detailed consultation with experts in environmental science and policy including those at the Ministry for the Environment and other environmentally focused departments.

[6] A repeat from my May 2024 submission to the SSAG consultation. See https://pce.parliament.nz/publications/submission-to-science-system-advisory-group/

Funding of environmental science

The reorganisation of the science system will not be cost-free. The future of science requires investment, and any resources diverted to restructuring will not be available for research. The disruption will particularly impact on personnel– scientists, technical staff, and support teams – at significant financial and human cost.

Beyond sourcing additional funds, the way science funding is allocated must change. The current contestable model prioritises competition over collaboration. While this may work for commercial and some blue skies research, it is ill-suited to public good research, which requires long-term, stable funding to address critical environmental challenges spanning decades.

I discussed the specificity of environmental research funding in section 5 of my 2020 report, aptly titled "Aligning the allocation of research funds with national environmental priorities" and in last year's submission to the SSAG (under Question set 4 heading). My views have not changed.

Funding and delivery of research is not homogeneous. Different issues evolve on different timeframes and need different funding streams. The present funding system does not allow that.

The Government is the largest investor in environmental research in New Zealand. This is unlikely to change anytime soon. Any decrease or static funding in environmental research as we have seen over the last decade or so will therefore continue to have detrimental flow-on effects on the skills and the knowledge base needed to grapple with deepening problems. The private sector won't come to the rescue when it comes to conservation research, database management or curation of collections, unless the incentives are clear. So far, they are not.

Public environmental research funding in New Zealand revolves essentially around MBIE's competitive and negotiated funds. The former have three to five year cycles; the latter usually run for seven years. A plethora of other funding streams also exist. Most – if not all of them – are short-term in focus. Even seven years is the blink of an eye in geological terms, for CO_2 generated warming, post-disaster environment recovery or plastic decomposition, let alone mineral growth. While sustainability is a transgenerational concept, it cannot be conceived at a 1000-year scale.

On the contestability of research funding, I wrote the following in my May 2024 submission to the SSAG:

> "The Government's purchase and investment function in respect of environmental research has been subjected to little scrutiny and its formal

> detachment from the Government's, and the nation's, key areas of risk management is one of the most serious shortcomings of the last decade. My 2020 report provides advice on how to remedy this situation.
>
> If the Government decides to spend most of its environmentally related money contestably, then researchers will compete to exclude one another. If the Government decides to spend that money on the basis of long-term strategic priorities and demand evidence that CRIs and their university and non-governmental partners are collaborating to leverage their combined resources, then they will behave differently."

Long-term funding is anathema to three-year-long political cycles. Politicians must demonstrate change to stay in office. The first victim of this short-term approach is environmental research. To be sure, some environmental issues need urgent attention, but they are mostly reactive rather than anticipatory, such as addressing the impact of Cyclone Gabrielle, mitigating the impact of coastal erosion or tackling river pollution.

In my 2020 report, I discussed at length the fundamental importance of supporting collections and databases over the long term. These are critical to environmental research which requires systematic, lengthy, repetitive, and expensive data gathering, processing and interpretation. Technology and innovation are not strangers to supporting the curation of collections and maintenance of databases, but investment in databases and collections has always been a low priority. If not maintained, updated and made accessible, collections lose their appeal, are used less and then become easily targeted as low priorities for funding. The same applies to databases.

Despite the consultation document's instruction not to discuss overall R&D spending, I must highlight that New Zealand remains underfunded in research. The latest OECD data (2021) places New Zealand's gross domestic expenditure on R&D at 1.5% of GDP, well below the OECD average of 2.7%. Until this issue is properly addressed, New Zealand's ability to excel in research for economic or environmental benefit will remain severely constrained.[7]

However, this is presented and discussed, low levels of research funding from public sources are an unavoidable fact and – at least in respect of environmental research – there is little prospect that vast private resources will be unlocked. While the private sector can be expected to look after its own environmental research needs, the

[7] https://www.oecd.org/en/data/indicators/gross-domestic-spending-on-r-d.html

Crown as the owner and steward of most public environmental resources has to invest in the underpinning knowledge base on which our biological economy depends.

Environmental information and the link with RM reform

The SSAG must ensure that it has a sound understanding of the resource management reform that is currently under way and what the implications any reform of the science system may mean for it. Environmental information will be critical to the resource management paradigm shift from ex ante consenting to ex post compliance and monitoring, with an increase in permitted activities. The collection and, more importantly, integration and availability of environmental information will be one of the key elements that determines the success of the reform.

The integration of environmental information could deliver many overall benefits for NZ Inc. There is, however, an upfront cost attached. Currently, many different players within the resource management system are gathering the same information in order to make consent applications or monitor old ones. None of this information is shared. The environmental information that is held by public agencies, while technically accessible, is dispersed between many different entities and is often only available at a cost even when taxpayers have funded its collection.

Being able to easily interrogate dispersed information requires a federated architecture. The ability to integrate information from multiple sources is essential for spatial planning, which is envisioned as part of this new regime. That same integration is invaluable from a research point of view.

Going forward there will need to be a public investment to integrate environmental information from the many different sources that currently exist. There will also need to be an ongoing public investment in environmental monitoring, although the details of what and how this is collected may shift when we have a better picture of the information that already exists. The crucial point for this inquiry is that the incentives set up by the funding model for environmental research and the information it yields have to align with the goal of much smarter and swifter access to information for infrastructure development and environmental management. This doesn't happen at the moment, and some blame the contestable, profit driven motive of the Crown Research Institutes for this.

Your deliberations on this matter should include in depth conversations with officials in central and local government departments and organisations as well as, for

example, the Infrastructure Commission to ensure your thinking is joined up with theirs.[8]

Concluding comment

Environmental submissions too often sound dystopic and counter to an economic growth concept. They need not be. New Zealand has a unique opportunity to link environmental science with social and economic progress. This could take many forms like supporting businesses that prioritise sustainability and restoration, or companies with strong environmental mandates demonstrating that sustainability can be a competitive advantage. The number of private or philanthropic sector initiatives aiming to link positive environmental outcomes with economic benefits is increasing.[9] These can be for restoration, working toward a net carbon zero future or conservation. The challenge they face is as much about scaling up as it is about innovation.

Similarly, iwi, with their extensive land holdings and long-term vision, are well-positioned to lead large-scale environmental initiatives, turning local restoration efforts into nationally significant opportunities for both ecological and economic resilience. Again, they need access to environmental research outputs and information. In short, private demand for environmental knowledge is growing, not shrinking. To ignore its significance to New Zealand's overall economic future would be a huge mistake.

Rt Hon Simon Upton

Parliamentary Commissioner for the Environment
Te Kaitiaki Taiao a Te Whare Pāremata

[8] The list includes at least the Department of Conservation, Land Information New Zealand, and Stats NZ.
[9] Examples include Silver Fern Farms' Net Carbon Zero by Nature, and Fonterra and Nestlé's Net Zero Pilot Dairy Farm.

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