Address to the NZ Hydrological Society | NZ Rivers Group Joint Conference 2026

17 November 2026

Ripple Effects: Retaining technical and science capability during sweeping reforms

Opening

Tēnā koutou katoa. Thank you for inviting me here today.

This is not the first time the Hydrological Society has brought its conference to Nelson. Those of you who were here in 2012 will remember a region still cleaning up after the December 2011 storm. Tākaka had recorded nearly 400 millimetres of rain in a single day – but the region has now seen worse. Civil Defence described last year's July flood as the worst in almost 150 years, coming just weeks after a flood in June.[1] The Motueka River reached a mark last set in 1877 and the Tasman District Council's recovery bill alone is put at close to $50 million.[2]

Floods show us, more brutally than any report can, the power water has over communities and the environment. Climate change is loading the dice. But how badly a flood hurts depends just as much on where – and how – we've built. Those choices can leave a long legacy.

Much of your work, though, is on the parts of water nobody photographs, the ones the TV cameras don't turn up for. People notice floods, low rivers and watering restrictions, and many soon forget them. They don't see nitrate from decades ago still moving through an aquifer, a riverbed slowly rising between its stopbanks, or a flow record that stops when a gauge is switched off.

Yet it is often these less visible changes that shape the decisions we make and the outcomes we live with for decades. What we know, and what we don't know at the time decisions are made, can have consequences that unfold over generations. It is the records and datasets that hydrologists and river managers have built, as well as the institutional knowledge you represent, that everyone relies on as crises unfold.

As I speak, it isn't yet clear exactly who will be making the next round of decisions about science funding and local government. That makes this a good time to be clear about what's at stake, whoever ends up holding the pen.

Who I am, and who I'm not

For those who don't know my role, a word on what I am and what I'm not. The Parliamentary Commissioner for the Environment is an Officer of Parliament, set up under the Environment Act 1986. I don't answer to a minister. I serve Parliament in its entirety, and I'm wholly independent of the government of the day.

[1] https://www.rnz.co.nz/news/weather/566051/be-super-careful-authorities-warn-of-unstable-ground-hidden-hazards-following-nelson-tasman-floods
[2] https://www.rnz.co.nz/news/emergencies/582803/tasman-floods-recovery-expected-to-cost-50m-take-two-years

My job is to provide independent advice that improves the quality of the environment. I investigate how well the environment is being managed, and I comment on policy and legislation. I don't make policy, and governments are free to ignore my recommendations.

One part of my work matters particularly for our conversation today. Under the Act, I can review the system of agencies and processes we use to manage the environment. Research, monitoring and the people involved in these activities are part of that system. In my view, they are the foundation of it.

Ripples, lag times and simultaneous reforms

I'm conscious that I'm talking to people who understand ripples far better than I do. You know that a pulse of rain in the headwaters doesn't arrive at the river mouth unchanged. It is delayed, it is attenuated, it may be harvested; and by the time it appears downstream people may have little idea what has gone on upstream.

Policy behaves the same way. A funding decision taken in Wellington this year may show up as a gap in a monitoring record in 2032. A boundary drawn on a map for reasons of administrative tidiness may show up as an argument about who pays for a stopbank in 2040. By then, not many people may connect the effect to the cause.

Right now, a lot of rain is falling in the headwaters at once. In the space of about three years, we have had:

- a wholesale reorganisation of the science system, with new funding priorities that move money away from the environment
- an upheaval of the resource management system with the enactment of the Planning Act and the Natural Environment Act
- a push to abolish regional councils and form unitary authorities, and
- a reorganisation of drinking water, wastewater and stormwater services under Local Water Done Well.

Each of these reforms appears to have been developed in isolation. I am concerned about what happens when these reforms meet at their confluence, and – most importantly – what happens to the people with technical and scientific skills, their institutional knowledge and the experience they bring to practice? What happens to continuity and guardianship across the wider system if we start border-dyking or, worse, draining the skill base on which our economy and environment rely?

So, I want to follow water from the top of the policy catchment to the bottom. First, upstream: what is happening to the funding of environmental science. Second, mid-catchment: what are the impacts on people – on our already thin scientific and technological capabilities. Third, downstream: what local government reform could do to that capability and to catchment management itself. And finally, I would like to give you my thoughts about what should be done.

Upstream: the funding of environmental science

Let me start at the top of the catchment.

New Zealand has had to build significant capability in environmental and agricultural research. This has not been a choice or a ‘nice-to-have’, it has been a matter of survival in a geologically unstable, dynamic setting with an island ecology that lacks a guidebook. You can import a great deal of science and recruit international expertise, but you can't import a deep understanding of the Moutere gravels or the Waimea Plains aquifers, for example. Place-specific knowledge needs to be nurtured locally, and it takes decades. I suspect we've become a little complacent about the value of our institutional knowledge.

The science reforms that began under the 2020 Government are well underway. The Prime Minister's Science, Innovation and Technology Advisory Council has set overarching priorities, and the Government has developed its Science Investment Plan for 2026–2036 around four pillars. Last month, the Ministry of Business, Innovation and Employment (MBIE) released the Pillar Investment Plans, which set out how money will flow for the next five years. The Government has established Research Funding New Zealand, which will make some substantial funding decisions.

Having a clear statement from the Government on its research priorities is welcome. Priorities had been lost in an absurdly competitive system. With clarity comes a consequence. At the level of the Pillar Investment Plans, we will be able to see what the money is targeting, and that transparency should in turn lead to better scrutiny. I welcome that and will be ensuring that good questions are asked about the quality and quantity of our environmental research outlays.

What a government spends on research to support industries and start-ups is not my responsibility. There is a genuine debate about the way and the extent to which public money should subsidise private activity in the pursuit of economic growth. But I am very clear that the case for taxpayer dollars being spent on environmental research is both practically – and philosophically – beyond question. Understanding the biophysical processes of the country we inhabit is foundational to the economy and to the safety and wellbeing of communities everywhere. There isn't a 'business' out there that owns the air, water and ecosystems on which we depend. But there are plenty of businesses that depend on them.

When we look at what is planned for public-good environmental research in the years ahead, the outlook is bleak. Baseline funding for the Environmental Sustainability and Resilience pillar is programmed to be cut by 27.5% over the next four years.[3] The projected cut is in nominal terms so inflation will make the value of what's left even less. Meanwhile, the Technology for Prosperity pillar is set to increase by 52%. The total quantum of science funding hasn't been reduced. What we have is a zero-sum game in which the Technology for Prosperity pillar is being funded at the expense of the other pillars.

There has been some suggestion that the Technology for Prosperity pillar will contribute to all outcomes including the environment. I'm sure that will be the case to some extent, and this could be of benefit to your work as hydrology operates at the intersection of technology and the environment. A glance at your conference programme confirms that. There are papers being discussed at this conference on machine learning to predict streamflow in ungauged catchments, GPU-accelerated groundwater models, deep learning on SkyTEM data and AI to optimise monitoring networks.

But every one of those tools depends, to some degree, on something older and less glamorous: observation. A machine-learning model that predicts flow in an ungauged catchment learned what it knows from catchments that *were* gauged by someone, for decades. Critically, models still rely on observations for calibration, validation and improvement. Technology multiplies the value of good observations and can, in some cases, reduce the amount of data needed. But it can't replace them.

Perhaps more importantly, all the information in the world – whether machine or human-generated – is just that: information. We need people who can interrogate and interpret data, evaluate information and ask probing questions.

Environmental research isn't a nice-to-have. It is almost entirely defensive. We undertake it because there is much about the environment we inhabit that we still don't understand. What you don't know *can* hurt you. Unexpected environmental challenges can be expensive. We need people who understand environmental systems and can guide us on how to react when they surprise us.

[3] Including funding allocated by Research Funding New Zealand and MBIE.

What does a cut of around a quarter mean in practice? Most research funding pays for people, so a smaller budget will mean fewer publicly funded environmental scientists. It's too early to say which areas will shrink. Some people will move overseas, some into other fields, and some positions simply won't be refilled when people retire. None of that will be announced. It will show up gradually, in projects not started and expertise not replaced. The way ripples do – later and somewhere else. Research teams are far quicker to lose than to rebuild. Expertise that took a decade or more to grow can disappear in a single funding round.

That's why I'm tracking where the money goes. I intend to report on where public research funds have been moved and what that means for our ability to manage the environmental challenges ahead.

Mid-catchment: the impacts on people

This brings me to the people in the middle – those who turn raw data and model outputs into intelligible expert evidence that decision-makers at all levels can use.

I have attempted to estimate science funding and full-time equivalent environmental research staff allocations against my six enduring environmental outcomes. The analysis covers public research organisations, universities and private providers that received MBIE funding for particular research initiatives. Preliminary analysis of data by my office shows that MBIE science funding supported approximately 586 full-time equivalent environmental research staff in 2024/25. That number appears to have dropped from 1,134 in 2022/23.[4]

In parallel, the three main public research organisations (Bioeconomy Science Institute, Earth Sciences New Zealand and Public Health and Forensic Science Institute), tell me that they collectively funded approximately 2,400 full-time equivalents in science-related roles in 2024/25. This total includes public and commercially funded staff. Most of this capability is highly skilled and highly mobile.

Human capability to generate expert evidence also exists at central and regional government levels. For central government, a rough estimate suggests that the Ministry for Primary Industries has approximately 440 science staff while the Ministry for Cities, Environment, Regions and Transport, the Department of Conservation and the Environmental Protection Authority collectively employ approximately 170 staff in science roles and another 300 in science-related roles. There will be more in other agencies such as Land Information New Zealand.

As for regional government, according to Te Uru Kahika's estimates, over 2,000 full-time equivalent staff are currently employed by the regional councils and unitary authorities in data, science and operational roles, including approximately 940 full-time equivalents in dedicated science and data roles. These estimates have some uncertainty due to differences in definitions.

Totalling the staff numbers doesn't tell us whether the right skills are in the right places, or how much rests on a handful of individuals. For that, it helps to listen to the people doing the work.

In 2024, I reviewed the use of freshwater models used by regional councils and unitary authorities.[5] Some of you here today may have contributed to that work. We found at least 75 biophysical freshwater models being used by regional councils and unitary authorities in regulatory settings. There were 19 different models used to estimate nutrient loads in rivers and streams, and 13 for sediment. That's just too many, even for a country with our diversity of catchments.

---

[4] These figures represent a conservative estimate based on preliminary analysis carried out by my office using data requested from MBIE. Figures should be interpreted with caution due to data collection limitations. Further, there is a discrepancy between the definition of environmental research used to compile these figures and the definition MBIE uses in administering New Zealand's science funding system.

[5] PCE, 2024. A review of freshwater models used to support the regulation and management of water in New Zealand. https://pce.parliament.nz/publications/a-review-of-freshwater-models-used-to-support-the-regulation-and-management-of-water/

When we surveyed council staff, they told us two things. There's a shortage of freshwater scientists, and there's a significant lack of in-house modelling skills. Where councils lack those skills, they contract the work out. But not every council can afford to – those that can't, fall back on whatever observations they have, and those can be sparse. Decisions made on sparse data can lead to suboptimal outcomes – be that for those who are regulated or for the environment.

The most striking thing we found was how often a model depended on a single person. Inside a council, it's often one staff member. Outside, it's often a consultant whose model is built and maintained by one person.

That creates real risks. Only one person truly understands how the model works, how its underlying assumptions have been incorporated, and how it has been configured. When that person leaves, the next person risks inheriting a black box, especially if documentation is thin and there's no succession plan. In those situations, the inputs, the scenarios already run and the limitations have all walked out the door. The model then risks dying on a shelf.

This isn't hypothetical and applies to more than just the development and management of models. Last December, the Auditor-General reported on how two councils, Waikato Regional Council and Tasman District Council, plan their flood protection.[6] Waikato inspects all its stopbanks, pumps and floodgates every year, records what it finds in an asset management system, and has a manual that sets out how often each type of asset must be checked. The council generally has good-quality asset information.

In Tasman, the Auditor-General found that planning and financial forecasts rested largely on staff knowledge and historic spending. The council did not systematically collect or store asset information, although it has since begun a comprehensive overhaul of its asset information, accelerated by the June and July 2025 floods. While the Auditor-General's report focused on only two councils, the shortcomings of New Zealand's environmental information are not confined to two councils or just to stopbanks.

Groundwater exemplifies what a poor understanding of a system can cost. In Havelock North in 2016, some 5,500 people fell ill and four died. The government inquiry found the regional council's knowledge of the aquifer and its contamination risks fell below required standards.[7]

So here is the uncomfortable picture. We have a small pool of expertise, in some places only one person deep, spread across 16 regional and unitary councils, research institutes, universities and consultancies. Now imagine spreading it further. Which brings me downstream to local government.

Downstream: local government reform and the catchment

A year ago, the Government proposed replacing regional councillors with mayoral boards. In May, it changed tack and offered councils a 'Head Start', the opportunity to put forward their own proposals for new unitary authorities – or have a structure imposed. Eighteen proposals were put forward in the short timeframe allowed. In September, the Government decided it needed more time and deferred its reform decision until after the General Election. The uncertainty and pressure have been a heavy burden for many small councils.

There's an irony here that I've raised previously. The new resource management Acts give regional councils core functions, including managing freshwater. The words 'regional council' are littered throughout the Acts. At the same time, the Government's intent has been to abolish them. It felt a bit like issuing a new road code while scrapping the roads themselves.

That led me to write to Minister Bishop on two occasions about the risk of fragmenting

[6] Controller and Auditor-General, 2025. How Tasman District Council and Waikato Regional Council mitigate flood risk. https://ao.parliament.nz/2025/flood-protection
[7] Government Inquiry into Havelock North Drinking Water, 2017. Report of the Havelock North Drinking Water Inquiry – Stage 1 and Stage 2. https://www.dia.govt.nz/Government-Inquiry-into-Havelock-North-Drinking-Water#Report-1

catchment management.[8] I was pleased to see that the criteria for the Head Start proposals named catchment management as a function that should be kept intact. Councils were asked to explain how they would achieve that. But asking councils to describe how catchment management would work across new boundaries is not the same as saying that catchment boundaries should take priority in an administrative context. I am clearly and unequivocally of the view that that must be the case.

You don't need me to explain why. If a catchment is split, the allocation of water or the right to pollute it in the upper reaches has impacts on users in the lower reaches. Flood management decisions made upstream, for example, can place people downstream at greater risk. And when things go wrong, there is inevitably an argument about who is at fault and who should pay.

The Australian Murray–Darling Basin is a textbook case. Splitting a basin among jurisdictions each managing it for its own interests led to poor management of floods, water abstraction and water quality. Issues resolution can create disagreement and community dissonance over who is at fault and who should pay. Often central government ends up picking up the tab.

Joint arrangements can work. Nelson and Tasman already run some shared services, including emergency management. But joint arrangements are weakest exactly where hydrology makes them the most challenging: when the benefits accrue to one party and the costs fall on another. Paying for a stopbank that protects your neighbour's town is not an easy sell to your own ratepayers.

In my view, at least four functions make no sense below the scale of a region or, at a minimum, a whole catchment. They are:

- catchment management to secure water and soil outcomes, including flood management
- biosecurity and the protection of biodiversity
- compliance and enforcement of environmental rules
- monitoring of and reporting on the state of the environment.

Fragmenting the management of catchments would be the biggest step backwards in New Zealand's environmental management in more than half a century. Now put this thinking together with my comments on capability. Fragmentation doesn't just split rivers. It divides people and communities and splinters expertise.

Take the freshwater and river management work undertaken by the regional sector. It currently relies on at least 800 full-time equivalent staff, many of whom are likely to be in the room today. This figure may well be an underestimate, as operational biodiversity and biosecurity roles are excluded from the estimate, despite often having a freshwater component.

To complicate things, many regional sector staff work across multiple domains, meaning the same person might deal with air quality, climate science and ecology. This is particularly true in smaller councils, where science and technical staff wear many hats. Staff working in monitoring and data roles also frequently work across multiple domains. These caveats suggest the estimate should be treated with caution.

Whatever the title, the Simplifying Local Government reform has created huge uncertainty for the local government sector and in particular for the environmental science and technical capability currently employed by regional councils. Unless integrated catchment management is made non-negotiable, current capabilities are at risk of being fragmented and spread even more thinly.

Let me illustrate using a hypothetical regional council. The council currently has 15 staff involved in freshwater work. Divide them among two or three local authorities and each may end up with only a handful of specialists. Some staff may leave rather than live through another round of reform, resulting in an even shallower talent pool. Furthermore, the new entities will be competing to hire from the same small pool, and all will be exposed to exactly the single-person risks I described a moment ago.

[8] https://pce.parliament.nz/publications/letters-to-minister-bishop-on-local-government-reform/

The Government's own consultation on Simplifying Local Government argued that reform would reduce competition for skilled staff. That argument only holds if the functions that need those skills are delivered at a larger scale – the region, or even the centre. Carve regions into smaller pieces and you get the opposite.

What I'd do: centralise capability, not decisions

So, what should be done? I don't have much enthusiasm for an upheaval in regional government. Any problems that exist should be able to be solved without drastic changes. I don't have a problem with unitary councils, provided they preserve catchment integrity. But fragmentation would be a disaster. Before further decisions are taken, I think we should be prepared to consider bringing at least some functions back to the centre. Not necessarily the decision-making, but data and information stewardship as well as some technical capability.

Until the late 1980s, the Crown held a substantial pool of technical expertise in agencies, such as the Ministry of Works and the Electricity Department. Many of you, or your mentors, may have trained there. Those skills were scattered to the winds as these agencies were restructured and disestablished. Regional councils were left to rebuild that capability from scratch, region by region. I had a hand in designing the system that replaced the old arrangements, and I think Sir Geoffrey Palmer and I underestimated the consequences.

We shouldn't make the same mistake twice. Before the country redraws local government, it should decide which functions and capabilities need critical mass: by which I mean enough skilled people in one place to check each other's work, train the next generation, and keep going when colleagues move on. Those functions should be organised regionally or nationally, so that they aren't split up or hollowed out whenever boundaries, budgets or priorities change. I've called for centralisation of technical skills in several of my earlier reports.

Firstly, in my review of freshwater models, I called for a national freshwater modelling support centre.[9] Its job would be to coordinate expertise nationally: help councils choose appropriate models, review them, document them and keep them alive when the person who built them moves on. To be clear, I'm not suggesting we centralise water management decisions. Those decisions are best made in regions and catchments by the communities and mana whenua who understand them. But a devolved system works far better when it can lean on shared expertise.

Secondly, in my report on environmental information released earlier this year, I recommended that the Environmental Protection Authority (EPA) be given a broader mandate to coordinate and lead our environmental information system.[10] The EPA is a competent technical agency that has ended up looking after an eclectic bundle of tasks governments wanted to park somewhere. It's time we stopped being nervous about the 'E' in its name and let it do what EPAs do in most countries.

Why do I recommend the EPA rather than a ministry or a research institute? Because a critical mass of highly qualified people needs a home. A policy ministry isn't that home. It is the job of ministers to make policy. As a result, policy ministries tend to have revolving doors as policy agendas change. Research institutes are different again, being divorced from the practical consequences of regulatory implementation. Ultimately, we use environmental information to manage the environment. That requires a measure of independence. Once policies are made, their implementation and evaluation should be at arm's length from the machinations of the policy world.

[9] PCE, 2024. A review of freshwater models used to support the regulation and management of water in New Zealand. https://pce.parliament.nz/publications/a-review-of-freshwater-models-used-to-support-the-regulation-and-management-of-water/

[10] PCE, 2026. Unlocking New Zealand's environmental information. https://pce.parliament.nz/publications/unlocking-new-zealands-environmental-information/

Thirdly, I've argued for a federated environmental information system.[11] That means shared standards, protocols and governance that let data held by many organisations be found and used together, without anyone having to hand over ownership. It will require national leadership to achieve that.

This matters for the national datasets the hydrological science community has built, often on the smell of an oily rag. Too many datasets are stitched together from short-term project funding, held by one institute or one person, and with no governance beyond goodwill. Environmental data of this kind are a part of our national infrastructure. We should treat them as such, every bit as seriously as we treat pipes and roads. I am cautiously hopeful that at least this message has been heard in the context of current resource management reforms.

None of this is a rejection of local knowledge. Every catchment is different, and the people closest to them should decide how best to meet the outcomes set for them. What I'm arguing is that the expertise those people rely on is too scarce to be divided any further.

Closing

Several nationally significant reforms are running at once. Each was designed with its own purpose, and none was designed with the others in mind. Together they will shape our ability to understand our water and to manage it at a catchment scale – which has been one of the genuine strengths of New Zealand's environmental management for decades.

If we are to avoid a fatal weakening of our ability to manage what the environment can throw at us, your responses to the following questions matter:

- If you are the one person who understands a model or a record, who is your successor? Documentation is unglamorous. It is also the cheapest insurance this sector can buy.
- Can you make a compelling case for the importance of your work? Can you make that case in economic terms? The argument for monitoring and modelling is ultimately an argument about avoided costs: the flood that doesn't overtop, the aquifer that isn't contaminated, the allocation decision that doesn't end up in court.
- When councils draw up their amalgamation or other plans, who will represent the waterways? The people best placed to answer that question are in this room. Don't wait to be asked.
- Finally, what can your societies say together that no individual employee, policy advisor or politician can? Sixty-five years of the Hydrological Society is a lot of institutional memory. Use it.

Your conference theme asks us to understand the impacts of today's decisions in a changing environment. You know better than anyone that the ripples of a decision reach the shore long after the stone has been thrown – maybe even after the thrower has left. The decisions being made about science funding and local government in the immediate future will be felt in your records and your rivers for decades.

The people who will notice first are the people who are watching the water. That's you. I hope you'll keep watching and keep telling decision-makers and communities what you see.

Thank you. I'm happy to take questions.

[11] PCE, 2025. A federated system to improve environmental information. https://pce.parliament.nz/publications/letter-and-note-a-federated-system-to-improve-environmental-information/