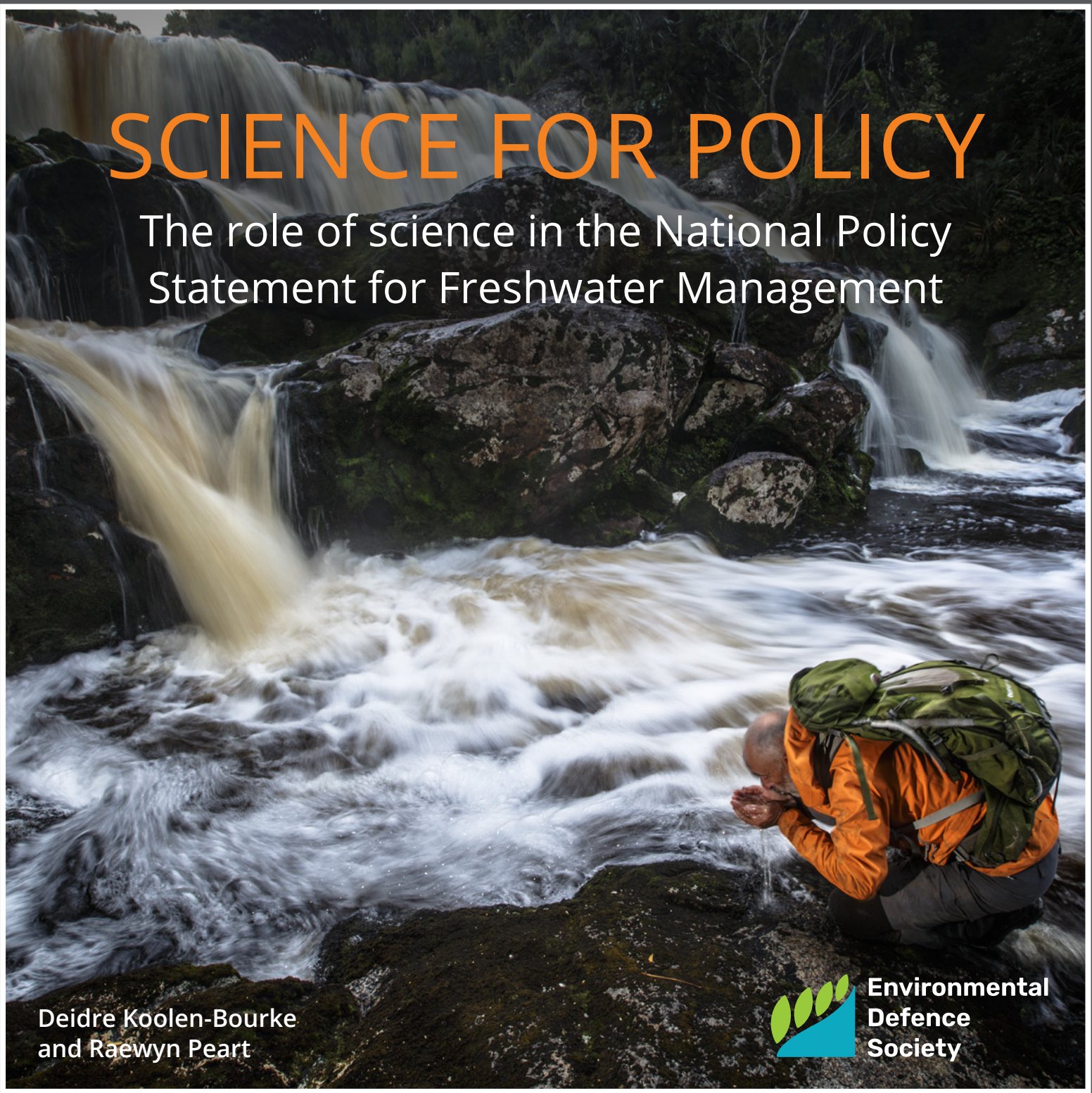

SCIENCE FOR POLICY

The role of science in the National Policy Statement for Freshwater Management

Deidre Koolen-Bourke
and Raewyn Peart

Environmental
Defence
Society

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DIN	Dissolved Inorganic Nitrogen
DOC	Department of Conservation
DRP	Dissolved Reactive Phosphorus
EDS	Environmental Defence Society
LAWF	Land and Water Forum
MBIE	Ministry of Business, Innovation and Employment
MCI	Macroinvertebrate Community Index
MfE	Ministry for the Environment
MPI	Ministry for Primary Industries
NIWA	National Institute of Water and Atmospheric Research
NOF	National Objectives Framework
NPS-FM	National Policy Statement for Freshwater Management
RMA	Resource Management Act 1991
STAG	Science and Technical Advisory Group

Māori terms and phrases

Kaitiakitanga – guardianship

Kaitiaki – a person or group that acts as a carer, guardian, protector and conserver

Kaupapa – principle or policy

Mahi – work

Manaakitanga – generosity and care for others

Mana – prestige, authority

Mana whakahaere – the power, authority and obligations or mandate of tangata whenua to govern and make decisions

Mātauranga Māori – Māori knowledge ecosystem underpinned by kaupapa and tikanga Māori

Mauri – life essence

Taonga – treasure

Te ao Māori – a Māori worldview

Te taiao – the environment

Tikanga – the customary system of values and practices developed over time and which continue to evolve

Tino rangatiratanga – sovereignty, autonomy, control, self-determination and independence

Whakapapa – connection, lineage or genealogy between people and the natural world

"New Zealand's prosperity depends on a healthy and well-functioning environment. Environmental science that helps maintain our environment can deliver significant improvements to our quality of life and well-being... We must manage this inheritance sustainably. Effective policy, informed by excellent research, is key to tackling this challenging task."

National statement of science investment 2015 – 2025, MBIE[1]

"The world is moving at unprecedented speed... these changes are accompanied by wicked problems and unexpected effects, as well as potential benefits. It all represents a huge pressure on policy and politics to deliver fast and resolve complex problems. The time is short and stakes are high. Evidence, and in particular sound scientific evidence, is badly needed to inform policymaking. Science is however not fully ready. It is struggling to cope with the change. It is too entrenched in thematic silos... and very often alienated from society."

Vladimír Šucha, 2020

Director General, Joint Research Centre of the European Commission (2014 - 2019)[2]

"[A]ddressing this issue of the relationship between science and knowledge on one hand, and policy formation and implementation on the other [is] of critical importance in this increasingly complex and interconnected world. The challenges are multiple: to identify what research and information is needed, to identify appropriate sources of such knowledge, to interpret the validity, quality and relevance of the knowledge obtained, and to understand how that knowledge can improve consideration of policy options and policy formation while being cognisant of the changing nature of science and the increasingly complex interaction between science and policy formation. These issues confront all sectors of the public service."

Sir Peter Gluckman, Chief Science Advisor to the Prime Minister, 2011

Towards better use of evidence in policy formation: A discussion paper

"It reminds us all about the central role that science and scientific evidence plays in identifying the root-cause of societal issues and sustainable and adaptive policy solutions. The COVID-19 pandemic has reasserted the central role of science, scientific knowledge and research in protecting humankind from health threats."

Dr Hans Henri P Kluge, Regional Director, WHO Regional Office for Europe

Drawing light from the pandemic: A new strategy for health and sustainable development[3]

"Research and science that enable us to understand the way our physical environment works and how it is changing provide vital information that can inform decisions made by government policy-makers."

Parliamentary Commissioner for the Environment, 2020

A review of the funding and prioritisation of environmental research in New Zealand

1 Ministry of Business, Innovation and Employment, 2015, 44

2 Šucha and Sienkiewicz, 2020, xiii

3 McKee, 2021, vii

Executive Summary

1 Project Overview

The project

The Environmental Defence Society's 'Better Linking Science to Policy' Project commenced in April 2021. Its objective is to explore the dynamics operating at the crucial science-policy interface through a case study of the development of the National Policy Statement for Freshwater Management (NPS-FM) 2020. The work was funded as part of the Our Land and Water National Science Challenge, through Challenge contractor AgResearch.

The project investigated the role of science in the policy-making process. in order to deepen understanding of the science-policy interface and the ways in which the scientific basis underpinning policy might be strengthened to better support good environmental decision-making.

A core strand of the project focused on the relationship between contemporary science and mātauranga Māori, the latter being an important knowledge input into modern evidence-based policy processes. We investigated potential synergies between mātauranga Māori and science, particularly those aspects of the ecological sciences which take a holistic systems-based approach. We also sought to identify some of the tensions between the two knowledge systems.

An inquiry-based method of investigation was employed for the study. The project began with a broad review of the international and national literature as well as government documents. We also investigated the approach taken in countries showing the most success in *improving* water quality in contexts most approximate to Aotearoa New Zealand. The research then focused more closely on the NPS-FM 2020 itself, reviewing all the available documents (including meeting minutes, reports and regulatory impact assessments), and undertaking a series of in-depth interviews (35 in total) with policy-makers, members of various advisory groups, and other consultants and scientists involved in the development of the policy. We also took a deep dive into several specific areas including the application of the NPS-FM to wetlands, incorporation of a macroinvertebrate index (MCI) attribute in the national objectives framework (NOF), and the proposed dissolved inorganic nitrogen (DIN) attribute (which did not make it into the NOF).

Freshwater policy

Freshwater policy is a quintessential example of a 'wicked' policy problem. Over the last forty or so years, a series of reports has documented the declining state of freshwater quality in Aotearoa New Zealand. In particular, the problem of diffuse pollution from land entering waterways has been noted. Despite this, and clear mechanisms under the Resource Management Act 1991 (RMA) to generate a framework of national policy and standards for freshwater quality, government has struggled to develop such a framework.

The country's first NPS-FM was introduced in 2011 and was further refined in 2014 and 2017. But freshwater policy and regulation remained controversial, and a matter of constant political debate, with degradation of freshwater bodies continuing. This led to the NPS-FM 2020, which is the most recent incarnation of the freshwater policy process and which is the focus of this project.

Te Mana o te Wai is a concept that was introduced into the NPS-FM in 2014. It provides an overarching framework for the protection and management of water centred around the vital importance and well-being of the water itself, and the connection between that well-being and that of people and the environment. In the 2020 iteration of the NPS-FM Te Mana o te Wai elaborated a hierarchy of obligations that prioritised the health and well-being of water first, then the health needs of people, and thirdly the ability of people and communities to provide for their social, economic and cultural well-being. Te Mana o te Wai provides a distinctly indigenous lens to freshwater policy in Aotearoa New Zealand, bringing together mātauranga Māori and science in the policy process. This has enabled a closer examination of the interface between these two bodies of knowledge.

2 Exploring the policy process

Role of science in policy processes

There is a range of different tasks involved in the policy-making process to which science can be applied. *How* science is applied, and how policy tasks are framed, is impacted by a range of practical and political considerations. The policy process is not always linear; progress and regress, and adjustments and review of settings, may occur at multiple points.

Such an iterative approach requires much from scientists. It requires skills in science communication, an ability to translate and apply science to policy needs, and knowledge brokering. In addition, scientists need to be aware of their own potential biases and the boundaries between the scientific and political spheres. Such boundaries are often unclear and can be more complex to determine than is widely appreciated.

Some view science and policy as two discrete and separate spheres (termed 'two communities logic'), with the role of officials being to 'bridge the gap' by translating science into policy. The "production of scientific facts is seen as a value free process. Interactions between science and policy are seen as linear and one-dimensional". A significant degree of 'two communities' thinking is evident in the approach adopted for the development of the NPS-FM 2020 (see below). However, this approach has been criticised, including for being unrealistic in practice.

An alternative approach is to adopt a 'transactional model', where scientific knowledge is permitted to actively intermingle with political judgments through a more iterative and dynamic process of interactions. This is often referred to as "joint knowledge production" or a "co-production". Rather than maintaining strict separation between the two, the vision is of science and policy being produced simultaneously and interactively through the policy development process. This type of relationship was more evident in the policy workstreams for earlier iterations of the NPS-FM.

Developing the NPS-FM 2020

The policy development process for the 2020 iteration of the NPS-FW was marked by a change in approach at the political level. The government's *Essential freshwater* work programme was launched in 2018 and three new bodies were established as part of the programme (to sit alongside a pre-existing regional council sector subgroup): the Freshwater Leaders Group, Te Kāhui Wai Māori, and the Science and Technical Advisory Group (STAG).

Collectively these groups were designed to strengthen the scientific, cultural, social and stakeholder inputs into the government's freshwater policy development process. The terms of reference for the groups required them to produce independent reports setting out their findings and advice. For connectivity purposes, each group had at least one member drawn from each of the other groups.

The two core government agencies involved in the NPS-FM 2020 process were the Ministry for the Environment (MfE) and the Ministry for Primary Industries (MPI), with sign-off for policy proposals required from both the Minister for the Environment and Minister of Agriculture. MfE took the lead in running the policy process and interfacing with the advisory groups. The Department of Conservation (DOC) had less involvement and did not interact directly with the groups.

The development of the NPS-FM 2020 was undertaken within the framework of the RMA. That Act provides the Minister for the Environment with two procedural options for the development of national policy statements: establishing a Board of Inquiry to hear submissions and provide recommendations to the Minister, or developing a more bespoke process. A Board of Inquiry was established for the initial 2011 iteration of the NPS-FM, whereas the alternative policy process was employed to develop the 2014, 2017 and 2020 revisions.

NPS-FM 2020 development was also undertaken within the basic framework already set by the NPS 2014 (as amended in 2017), which in practice constrained the approach. The earlier document included Te Mana o te Wai and the NOF.

In developing policy, government agencies are required to prepare regulatory impact assessments. These provide a high level summary of the problem being addressed, the options and their associated costs and benefits, the consultation undertaken, and proposed arrangements for implementation and review. The requirements for their preparation incorporate the government's latest statement on regulatory practice: *Government expectations for good regulatory practice.*

Two regulatory impact assessments are normally developed for any regulatory instrument. First, an interim assessment is prepared prior to formal public consultation. This sets out the proposals developed by officials and a preliminary analysis of their likely costs and benefits. If approved by Cabinet, a discussion document is released, and the proposals opened up for broader public consultation, input and refinement. Following public consultation and further engagements with stakeholders, a final regulatory impact assessment is produced. In addition, the RMA requires a "section 32" report, which examines whether proposals are "the most appropriate" way of achieving the purpose of the Act.

3 The process for science inputs

The role and operation of the STAG

The STAG brought together a group of scientists who were diverse in terms of individual fields of study, institutional backgrounds and experience of the policy process. The main task of the STAG was to review the science underpinning the NOF, and specific attributes within it, in order to meet the policy needs of government officials. This meant that the group was not engaged to develop its own ideas for water quality attributes or policy responses to problems.

Although there was some flexibility in the process, officials provided a set work programme and agenda for the STAG, tabling topics for discussion and requesting specific advice as needed. The officials made a concerted effort to keep policy matters out of the group so the STAG could focus purely on the science. This approach is very much in line with 'two communities' logic and highlights the strategic decision to maintain a separation between matters of science and matters of policy.

After the STAG produced a report on the matters canvassed a public submissions process was undertaken. The STAG reports were made public (along with those from other advisory groups) and this was highly valuable for those wishing to make submissions. As a result of matters raised in public submissions, officials returned to the STAG seeking more information on a range of issues and posing a number of further questions. The STAG subsequently issued a second report, in April 2020.

The work of the STAG was highly directed by MfE. This provided focus and time efficiencies but prevented innovation and a truly 'science driven' approach. STAG members thought that more structure, advance notice, information and context around the matters they were asked to consider was needed to support their science work. Provision of the criteria required for policy would also have been valuable. This would have deepened understanding of the policy needs and so 'the fit' and effectiveness of the science inputs.

There was a call, from most STAG members, for increased science inputs into the policy process at the front end (policy design) and end point (refinement and translation into policy) to enable a more integrated, science-informed process and policy. The approach adopted in relation to Aotearoa New Zealand's COVID-19 response (although not without its own issues) was cited as an example of a more integrated and science-informed approach. Greater openness between officials and the STAG would also have helped build more trust in the process and deepen STAG members' understanding of the policy needs.

There were some notable gaps in the expertise on the STAG and scope of work. The primary areas identified were biosecurity and biodiversity, science for implementation and land-use change, and public health expertise. These potentially impacted the practical application and effectiveness of the resulting policy.

Boundary between science and policy

There was a direction that the STAG not consider the economic implications of freshwater quality measures. This assisted the group to focus on the science, and reduced consideration of political matters that might have impacted on the advice provided. In addition, the lack of requirement for consensus made more visible the diversity of views on the science and enabled the rationale for those differences to be explored. It also facilitated more nuanced understanding of the science. The requirement for the STAG to produce an independent report documenting areas of dissent and any minority opinions, and to make its meeting minutes publicly available, provided enhanced transparency and visibility of the science.

The relatively strong connectivity between STAG and MfE officials (compared to previous science workstreams in freshwater policy processes) significantly increased officials' understanding of the science and assisted with translation of the science into policy. However, the strong presence of officials at meetings brought awareness of the politics into the room, and in practice had a chilling effect on free and frank conversations. A number of STAG interviewees felt that the provision of more space and flexibility for the STAG to meet alone as a group would have been valuable.

The allocation of 'science work' between the STAG on one hand, and Ministry scientists and contractors on the other, lacked transparency and generated a degree of distrust and division. More open communication and greater connectivity between all the scientists working on the NPS-FM 2020 would have enhanced both trust and the integration of science inputs into policy.

Interviewees from the Freshwater Leaders Group and Te Kāhui Wai Māori expressed their wish for greater connection with the STAG. The model that was primarily relied on was for Ministry officials to act as a conduit between the groups. The comments from STAG members suggest that this link was not well articulated or fully understood. The lack of context and rationale behind requests from officials to the STAG was one factor that served to undermine trust and transparency at this interface.

Science is a social process

The views and approach of STAG members who participated in the policy process varied, being influenced by a wide range of factors including previous experience of the policy process, the institutional setting (eg Crown Research Institute, university, contractor/private consultant), institutional culture, professional relationships, history and field of study. Those with previous experience working on the NPS-FM with MfE had

a broader understanding of the policy needs of officials as well as the political context. They also had closer relationships with Ministry staff and more trust in the process than newer members.

Differences in approach created tensions and 'camps' within the STAG, which were variously expressed as 'reductionist vs holistic', 'academic vs practitioner' and 'advocate vs purist'. Political complexities also existed between some STAG members, arising from them either defending or criticising previous NPS-FM settings in the media or at the Waitangi Tribunal.

Diversity within the STAG created tensions, but professionalism, common ground as scientists and the development of a practical and strongly evidence-driven approach in response to disagreement, were factors that assisted the group to navigate these. The diversity of perspectives served to deepen understanding of the variation in views and the basis for them. This strengthened the process and the science. The value of having an experienced Chair was underscored.

Despite the boundaries erected, political considerations impacted on the advice of the STAG. STAG members were aware of an implementation gap in the science and were cognisant that a decision to set, or not set, a national standard could (1) remove local flexibility to respond to natural variation, (2) leave important matters to regional councils (where there were concerns about the robustness of science capacity and a more politicised process), and (3) result in a de facto 'pollute up to this point' standard. By dipping into the realm of policy, the STAG was able to address the last of these three concerns. It did so by recommending that councils must at least "maintain" attributes at their current state. This indicates that a range of procedural and practical implications clearly informed work and advice in this area.

Impact of external interests

A concern raised by interviewees across all policy workstreams was that conflicts of interest were dealt with in too perfunctory a manner. There was no real investigation of members' external interests or active management of interests that were declared. Many scientist interviewees also raised concerns over pressures operating within the broader system to 'silence the science', from contractual confidentiality, sector/stakeholder influence, and the impacts on funding and careers of those speaking out on controversial matters.

A significant point of difference with previous freshwater policy processes, and positive aspect of the policy work for the NPS-FM 2020, was that the process was far more inclusive, notably by including members who had been critical of previous freshwater policy ('freshwater advocates'). The Minister's request to see all advice, including dissenting or minority views, was a further positive change. All interviewees felt these modifications increased the quality of the science and the science advice. The absence of industry/sector scientists on the STAG assisted to reduce political pressures arising within the group.

That said, MfE officials held private meetings with sector groups ('back-stage performances') outside of the formal policy process, and this led to a loss of trust in the process by many interviewees. Historical, institutionally embedded norms of developing policy in close consultation with sector groups risk elevating and 'privileging' their influence over policy, particularly where such processes lack transparency. Interviewees also considered that these inputs undermined the role of the Freshwater Leaders Group.

Recommendations

Based on strengths

- The NPS-FM 2020 policy stream incorporated some excellent boundary work that was praised by all interviewees and assisted to elevate the clarity and visibility of the science. Features that proved valuable, and should be more widely utilised, include the requirement for an independent report from a science advisory group; public availability of meeting minutes; removal of a need for consensus; the recording of minority views; and the exclusion of economic considerations from the science work and advice.
- Independent science advisory bodies, which are 'scientist only' in composition and free from industry representation, should be more widely utilised. A diversity of membership enhances robust debate and consideration of the science. Careful selection of the Chair is also important.
- An evidence-based approach was useful for resolving disagreement and is an approach which could be further developed and incorporated into policy processes.

- High connectivity between governmental officials and science advisory groups should be fostered, to deepen officials' understanding of the science and so increase its influence on their policy advice. This improves both the science content and accuracy of the policy.

Based on weaknesses

- The 'science fit' for policy, and its practical application, was reduced through separation of work on 'science for policy' and the 'science for implementation' (which took place afterwards) and these aspects should be more tightly integrated in future processes.
- The short timeframes for policy work, impacted by the electoral cycle and reactive political environment, continues to undermine a more strategic and supported policy approach. Where timeframes are tight, greater preparation is necessary, such as pre-organisation of data access and availability. Reconsideration of the three-yearly electoral cycle could assist in association with more strategic long-term policy planning.
- More space for science inputs is needed at the front and back end of the policy process, particularly at the scope setting and final policy refinement stages.
- In order for highly controversial issues to be addressed, a high trust environment must exist to allow free and frank conversations. 'Back door performances' should be avoided. Greater transparency over MfE's engagement with sector groups, and policy inputs from them, is necessary to improve trust (including public trust) in future policy processes and ensure the integrity of policy outputs.
- Greater openness, transparency and connectivity between science advisory groups (such as the STAG) and Ministry scientists is needed to enhance trust and foster a more integrated (less oppositional) approach to the science. Greater context, advance notice of the workplan and more information on the policy needs, can also serve to strengthen science inputs.

4 Te Kāhui Wai Māori process

In previous work on the NPS-FM, the Crown had worked with Māori in a highly collaborative way. In 2007, the Iwi Leaders Group approached the Crown, seeking to work more closely in partnership to progress freshwater reform, and this led to the adoption of a co-design driven approach to NPS-FM development.

Previous iterations of the NPS-FM adopted a two-tiered model. Ministers engaged directly with the Iwi Leaders Group at the leadership and governance level, and an Iwi Advisors Group, made up of iwi and their technical advisors, engaged with officials at the more technical level. In this way, a joint work programme was established, where officials and the Iwi Advisors Group worked in close collaboration.

The Government's decision to depart from this previous co-design approach, and instead establish Te Kāhui Wai Māori as an advisory body for the NPS-FM 2020, was controversial. The original conception was for Te Kāhui Wai Māori to be a specialist group of 'advisors' to the Minister and officials that would assist with the development of options for further reform and broader engagement with Māori.

Te Kāhui Wai Māori members did not represent specific iwi/hapū, but were "appointed by the Crown" to "enable collaborative development and analysis of freshwater policy options for matters of particular relevance to Māori". Members of the group were selected for the "broad range of Māori expertise and perspectives" they brought to the table. Te Kāhui Wai Māori brought together a "broad range of Māori expertise and perspectives" to enable collaborative development and analysis of freshwater policy. Members were appointed by the Minister.

Te Kāhui Wai Māori pushed back on what it saw as an initial restricted scope of its work and directed approach. It renegotiated its terms of reference and set a new kaupapa and principles on which the relationship would be based. From a Māori and te Tiriti perspective it was important to Te Kāhui Wai Māori members that they assert their mana, recognise the role, rights and interests of iwi/hapū, bring those rights and interests back into scope, and establish a more direct relationship and line of communication with the Minister/Crown.

The new terms of reference set out the context and overarching framework to be applied to the work of Te Kāhui Wai Māori. This recognised iwi/hapū rangatiratanga, the Māori relationship to freshwater as kaitiaki, principles of balance, and the centrality of well-being and the

mauri of freshwater. A separate secretariat was established to support Te Kāhui Wai Māori in order to overcome the lack of Ministry capacity and capability in this area.

All these measures helped maintain the independence of the group and were necessary to prevent capture and co-option of Māori voices in the policy process. They also clarified that the core relationship of Te Kāhui Wai Māori was with the Minister, not Ministry officials.

The role of Te Kāhui Wai Māori was complex: it was neither an internal advisory committee nor an external and independent Treaty partner. It consisted of a mixture of iwi-centric members, stakeholders and specialists in areas such as law and freshwater science.

Benefits of adjusted terms of reference

A clear strength of Te Kāhui Wai Māori was the diversity and depth of experience, knowledge and expertise the group collectively brought together. MfE officials struggled to understand their role in relation to the group, which required a shift from a directive to supporting one. This was a new way of operating. Interviewees spoke positively of MfE's openness to change, and the genuine efforts made to facilitate the work of the group, understanding that this presented a 'steep learning curve' for many.

The new approach shone light on the knowledge gap and lack of expertise within MfE on te reo Māori, te ao Māori, mātauranga Māori and te Tiriti o Waitangi more generally. While it should not be the task of Māori to upskill Crown agencies, the changed dynamic delivered a positive and deep learning experience for Ministry officials and assisted to strengthen the relationship and understanding between Te Kāhui Wai Māori and both the Ministry and Minister.

Te Kāhui Wai Māori built its approach upon Te Mana o te Wai, a "vehicle already in place" that resonated, and which brought through the work of the previous Iwi Leaders Group. The production of an independent report, and the public availability of meeting minutes, provided additional transparency and supported the independence of the work of the group.

Key interfaces

Capacity constraints hindered full engagement of Te Kāhui Wai members with the STAG and Freshwater Leaders Group, highlighting the need for additional support to improve connectivity. Despite many synergies in approach, there was limited scope for cross fertilisation between mātauranga Māori and the science advise produced by the STAG. A number of interviewees across both groups felt that a broader science approach, which was more connected to the work of Te Kāhui Wai Māori, would have added considerable value to policy outputs.

The role of MPI in this work was unclear with it having little connectivity with the work of the advisory groups, including Te Kāhui Wai Māori. This reduced MPI's understanding of the approach adopted and increased tension within the policy cycle.

Key barriers

Historical power imbalances, and lack of partnership with iwi/hapū, mean that Māori have not adequately contributed to the design of the current policy system. Existing legal frameworks (such as the RMA) reflect the ideology and values of the Crown and operate as an inherent barrier to Māori engagement and inputs.

Systemic biases towards economic priorities, stakeholder input and private property rights restrict consideration of competing values such as balance and limits (tapu/noa/utu), guardianship (kaitiakitanga), the well-being or mauri of water, Māori rights and interests and provision for rangatiratanga.

The three-yearly electoral cycle, at both national and local government level, and high turnover of staff in government agencies, results in a constantly changing approach (and persons) that iwi/hapū must engage with. This environment undermines the ability to establish relationships of trust and foster deeper cross-cultural understanding. Māori must navigate a constantly changing political environment.

The task of incorporating te ao Māori inputs into policy is complex; knowledge translation and knowledge brokering expertise are currently under-supported. To engage, Māori need to accept existing frames, raising risks of co-option and capture of the Māori voice. Māori are highly aware of these power imbalances.

Recommendations

- More opportunity for connectivity between Māori and other working groups should be provided to cultivate a more holistic policy approach.
- Greater science support should be made available to iwi/Māori groups to support their work and bridge the gap

between science and mātauranga Māori, building on the synergies that exist between the two knowledge systems.

- Involvement of more Māori scientists within science advisory groups (such as the STAG) would be valuable but there is a need to address capacity issues and provide resourcing for this.
- Terms of reference for Māori advisory groups should be developed in partnership rather than being set by the Crown.
- The approach of Te Kāhui Wai Māori should be built upon. It laid important groundwork for a less bounded and culturally constrained approach to freshwater protection. It also deepened the level of understanding of Māori worldviews and concepts in other groups involved in the policy process.
- The approach did, however, create political tensions between the Crown and iwi/hapū. Use of this approach should therefore be applied with caution and in greater consultation and direct partnership with iwi/hapū. There is a need to collectively explore and innovate more in this space.

5 Exploring the policy outputs

The regulatory process

At the start of the NPS-FM policy process a decision was made to work within the existing regulatory framework, and make adjustments to the NPS-FM and NOF framework, rather than pursue more significant change. In order to proceed at pace, many important matters were excluded from consideration, including freshwater allocation, Māori rights and interests in freshwater and drinking water regulation. This was seen as necessary to complete the work within the three-year election/policy window. This highlights how timeframes limit the scope of reforms and what is possible.

The current statement of *Government expectations for good regulatory practice* continues to provide a strong economic focus, requiring a 'particularly strong case' to be made where a proposal has costs attached or impacts business, private property rights or market competition. This focuses the regulatory impact assessment process on considering the impact of reform on 'regulated parties', with no reference to the broader public good or interest. There is no recognition of environmental concerns or sustainability to balance this bias towards economic considerations, and although an evidence-based approach is referenced, there is no supporting detail or guidance as to how this is to be applied. The impact assessment requirements set by Cabinet at the time the NPS-FM 2020 was being developed align with this direction, encouraging a 'collaborative approach' to regulation and close engagement with stakeholders throughout, including during scoping stages. This means that officials 'sense check' options and ideas closely with sector groups to seek consensus.

There was a move away from a more collaborative approach, towards a more directed one, for the NPS-FM 2020. This was in order to progress more substantive freshwater reform than had previously been possible. However, tension is evident between that altered approach and the regulatory direction towards sector collaboration, which continued to influence the regulatory impact assessment process. Concern to obtain sector consensus likely exerts a chilling effect on reform when measures are opposed by the sector facing regulation.

Situated at the start and end of the policy process, regulatory impact assessments are a gatekeeping device, determining what proposals go forward for public consultation and informing the decision-making process and final approval. The Ministry officials we interviewed considered that the regulatory impact assessment process undermined environmental protection and their policy goals for the NPS-FM 2020, unreasonably elevating the evidentiary burden to justify reform.

A range of additional levers operated to prioritise sector interests and concerns, including the application of the *Rural proofing* policy which aims to ensure that "when policy makers sit down to design the rules they take into account the unique factors that affect rural communities such as low populations, isolation and reliance on the primary sector for employment". The policy must be applied within regulatory impact assessments meaning that a 'rural lens' was applied throughout the NPS-FM 2020 process.

Positive levers supporting environmental protection also existed. Reference to evidence-informed decision-making in regulatory direction facilitated the application of environmental data and state of the environment reporting. The reports and findings of bodies such as the Parliamentary Commissioner for the Environment were influential, providing a strong voice for the environment. However, difficulties in accurately valuing environmental harms and benefits persist and these continue to undermine their influence in cost-benefit analysis.

Our review of the regulatory impact assessments and quality assurance checks undertaken for the NPS-FM 2020 revealed an interesting thing: the options scoring most highly against the criteria set did not always prevail. This undermines the utility and purpose of setting such criteria in the first place and represents a departure from the evidence-based approach set out in the regulatory direction.

The section 32 analysis required under the RMA constitutes a further economic-focused lever that requires more economically efficient options to be preferred. The cumulative impact of the various economically focused regulatory directions likely operates as a barrier to environmental reforms that have costs associated with them.

Findings on the policy outputs

The incorporation of Te Mana o te Wai and the hierarchy it sets, and the direction for regional councils to "give effect" to Treaty principles, represent a significant strengthening of the NPS-FM for both environmental protection and mātauranga Māori. Together with new directions to maintain or improve water bodies, increased reporting requirements, and a significantly expanded NOF (increased from nine to 22 attributes) it is evident that substantial progress was achieved across a number of areas. This progress is greater than that evidenced in previous policy workstreams on the NPS-FM and indicates that the new approach was more effective in progressing reform.

In most cases, our review of the regulatory impact assessments found that where science was contested, officials preferred the advice of the STAG and the views of the STAG and MfE were substantially aligned. This demonstrates that the close working relationship between the parties led to a strengthened approach on the science.

MPI officials were more likely to depart from the advice of the STAG than MfE. This occurred for matters where there were elevated costs, and MPI's position largely aligned with that of industry groups, particularly DairyNZ. This demonstrates how different Ministry 'lenses', and their degree of connectivity with sector groups, impacts on their policy advice. It may also reflect the more distanced relationship between MPI and the STAG.

The more significant the costs attached to a reform option, the more likely officials' advice was to depart from the advice of the STAG. Delay in decision-making on the DIN attribute is an example of this. The DIN attribute was associated with the most substantial costs on industry and was therefore strongly opposed by industry groups. The opposition significantly heightened the evidentiary burden and therefore the focus on the science. This highlights the difficult position of decision-makers when there is scientific uncertainty or contested science, and there is a need for more regulatory support and guidance to assist in such situations.

In addition to the DIN, a number of other measures associated with the broader *Action for freshwater* policy package that imposed costs on industry, were also withdrawn or delayed. The COVID-19 pandemic operated as a further lever to elevate economic considerations. Interestingly, where industry groups and MPI opposed a measure, but its costs were minimal, the advice of the STAG prevailed (eg the MCI attribute). This shows that economic considerations were a more powerful barrier to reform than stakeholder disagreement.

Lack of scientific review and input at the final refinement stages of the policy development process impacted on the clarity and practical application of some standards in the NPS-FM, for example, the definitions around wetlands. This created uncertainty and elevated legal risks.

Recommendations

- Government expectations for good regulatory practice and Cabinet directions for regulatory impact assessment remain heavily economic in their focus. There is a need to review current regulatory direction to create a more balanced, sustainability-focused lens to support environmental decision-making.
- More guidance and support needs to be provided for the application of an evidence-based approach to policy, including guidance for officials on decision-making in the context of scientific uncertainty or contested evidence. Consideration should be given to whether the precautionary principle should be included within the government's statement on regulatory practice and relevant Cabinet circular guidance for regulatory impact analysis.
- Where officials or the relevant Minister seek to depart from the findings of a regulatory impact assessment and quality assurance assessment, in order to pursue an option that scores significantly lower than the 'best' option highlighted, this should require additional justification as it will usually represent a departure from an evidence-based approach.

- Not all regulatory and quality assurance criteria are equal, and it would be valuable for more guidance to be provided in this area. Some criteria, such as 'effectiveness' could be strengthened to support a more science-based approach. Consideration should also be given to providing fundamental constitutional matters, such as compliance with te Tiriti o Waitangi principles, elevated status and weighting within these assessments in recognition their importance.
- More effective mechanisms for incorporating broader public priorities and concerns, and the public interest, into the regulatory process should be developed.
- Section 32 of the RMA should be reviewed to ensure that the focus of the analysis is on locating mechanisms that best ensure the purposes of the Act are met.
- Officials report ongoing difficulty in valuing environmental costs and benefits. More detailed guidance is needed to ensure these are not undervalued in the regulatory impact assessment process.
- Where agencies share decision-making, and a single science advisory group has been established, it is important that both agencies are highly connected to that science advice to avoid misunderstanding, enable conflicting science to be identified and tested at the earliest possible juncture, and ensure greater cohesion (and less division).
- Expert science advice should be sought when technical changes and adjustments are made to final policy outputs, even if these are minor in nature.
- Existing national policy statements are not always well aligned with each other. New regulations need to be more robustly checked and aligned with existing frameworks to ensure consistent terminology and sufficient connection at key interfaces so that they work together in harmony.

6 Lessons from the DIN case study

Our case study on the DIN undertook a more detailed examination of the decision-making process in relation to a proposed DIN attribute for ecosystem health: one of the few that did not make it into the final NOF. It was a significant source of controversy in the development of the NPS-FM 2020. The DIN was also of interest because it is an example of a 'wicked' policy problem. The science was complex with a range of uncertainties, the evidence was hotly contested and the measure was widely opposed by industry groups on cost grounds. A key question we asked was: what matters were considered and why did it fail? What we found was revealing.

First, the regulatory impact assessment reflects that four different options for addressing concerns around nitrogen were considered. Out of a possible score of 18, across 6 different considerations, the proposal for a limit setting DIN achieved a score of 11, which was the highest of any option. It scored highest (3/3) on effectiveness and compatibility with Te Mana o te Wai, and was the only option to score a 3 on either of these criteria. It also scored highest for compliance with te Tiriti principles and efficiency. The next closest contender, strengthening of toxicity attributes, scored an 8, yet was chosen as the final option by the Minister. The calculation system employed by the regulatory impact assessment did not add up the scores but calculated the 'average' score. That approach led to the characterisation of both options as having an average of '++' (2) giving the appearance that the race was closer than it was. Once construed to be broadly similar in their scores, the economic considerations became a more decisive factor.

The DIN was supported by the Freshwater Leaders Group, Te Kāhui Wai Māori, the majority of STAG members, most academics, science bodies and health providers, environmental organisations, the vast majority of public submissions, iwi/Māori and MfE – the agency leading the reform. From this perspective its failure to pass muster was surprising.

Industry approach to increased regulation

When the agricultural sector's response to issues like the DIN was examined it revealed that, despite apparent broad agreement on the need to improve freshwater quality and high stakeholder involvement in the NPS-FM 2020 development process, the degree of consensus was far shallower in practice. DairyNZ, for example, not only contested a wide range of matters, it also sought to have its data and analysis used as the basis for assessment of the DIN. Throughout the process a competition over data was evident. DairyNZ claimed that not only did it have the most comprehensive and accurate economic impact analysis and modelling, but it also had the best science and data.

MPI and regional councils appear to have been persuaded to employ DairyNZ's economic analysis and were also aligned on much of the science. In contrast, MfE favoured the science advice of the STAG and independent

economic analysis. This created a disconnect between the parties and prompted debate over the basis on which the reform would proceed.

The competition over the analysis highlights that all parties understood the importance of the regulatory impact assessment process and its influence over the final outputs. Industry bodies had the advantage of better access to the necessary industry data in order to undertake the assessment. In this context, Ministry officials were required to determine whose data and whose analysis to prefer. The existence of multiple conflicting lines of evidence created additional uncertainties.

Pressing forward in such contexts requires strong political leadership, and comes with legal and political risks, as well as the risk of practical non-compliance where insufficient social licence has been established.

Links between effectiveness and cost

Current regulatory settings are not set up to enable decision-making in these contexts. Our regulatory levers operate largely to embed the status quo and to protect private property, stakeholders and free market interests. While the vast majority of attributes recommended by the STAG made it into the NOF, the DIN did not, despite being identified as the most effective response to the problem.

Many of the STAG scientists considered that the omission of the DIN would significantly undermine improvements to freshwater quality. Not all attributes are equal. To many, the DIN was considered as central (and the *most* central attribute for some) because of its potential to drive land use change and reduce intensive farming practices that are widely viewed to be the primary *cause* of poor water quality. Ironically, its potential effectiveness was also one of the factors driving its abandonment.

The regulatory impact assessment identified that, while the costs of applying the DIN were not considered to be significant nationally, the impacts would be concentrated in specific areas (eg Canterbury and Waikato) and the localised impact would likely drive land use change and reduce industry profits. Perversely, because current regulatory settings prioritise economic considerations, they also operate as a barrier to the adoption of the most effective responses.

The final decision not to progress a DIN hinged on a mixture of scientific uncertainty and costs to the agricultural sector. Concern to protect the economic recovery through the COVID-19 pandemic was also a significant factor.

In addition to these overarching issues, the case study of the DIN highlighted a number of associated matters. First, the narrowing of the scope of the STAG weakened the science inputs on the DIN. This was evident in two main areas: human health and science for implementation.

Even though human health considerations were clearly relevant under the RMA, the separation of concerns about human health for recreation or contact recreation (eg safety of rivers for swimming) from other health concerns created a fragmented response and reduced consideration of the health concerns around nitrate. A lack of human health expertise on the STAG prevented these matters being directly examined, and submissions on human health were construed as going beyond the scope of the NPS-FM 2020 and work of the STAG. This meant that the evidentiary material considered in relation to the DIN was narrowed, weakening the science inputs.

As part of the policy development process an Independent Advisory Panel was established to consider submissions on the draft NPS-FM 2020 and make recommendations to the Minister. Its members were selected for their knowledge and experience of the RMA and its operation in practice. This was reflected in the Panel's advice, which was heavily focused on practical considerations. Because implementation had been placed out of scope for the STAG, a disconnect between the advice of the STAG and then lens applied by the Panel was evident.

The direction not to consider implementation likely detracted from 'the fit' of the science for implementation, and it is notable that the Panel struggled to locate a middle ground between the STAG recommendations and what bodies like regional councils considered would work on the ground. The separation of the science advice from implementation issues may have had the unintended consequence of weakening its influence over policy.

The second set of insights relate to scientific uncertainty and how this is dealt with. DIN was an area where the STAG was split, with a majority supporting the attribute but a minority in opposition. It may have been determinative that the dissent also came from one of the government's chief science advisory agencies: the National Institute of Water and Atmospheric Research (NIWA). Because of their roles, STAG members from NIWA (and regional councils) had more insights into political and practical implementation considerations. STAG interviewees considered that if more time had been available a solution to disagreement on the DIN might have been possible.

MPI officials characterised the scientific problem as one of scientific uncertainty, seeking to delay decisions pending more information. That

Ministry was also more focused on the economic impacts of including a DIN attribute. In contrast, MfE officials characterised the scientific problem narrowly as one of how to deal with natural variability, suggesting the issue could be navigated by providing an exemption where it could be shown that all other ecosystem health measures were being met. These positions highlight each agency's different construction of risk: the MfE focus was on protecting against environmental risk and the MPI focus was on mitigating economic risk.

A common policy output witnessed in response to uncertainty and lack of consensus is to defer decision-making pending more information. This was the outcome for the DIN. And at the time of writing it remains unclear whether the next iteration of the NPS-FM will address this issue or not.

A final ancillary issue raised by the case study is the impact of form submissions. Through the public consultation on the NPS-FM 2020, it is evident that approximately 85 per cent of submissions supported the DIN, with the majority of these being form submissions. In contrast, 70 per cent of the substantive submissions were opposed. There is a lack of clarity around how form submissions are weighted and considered. It has been noted that different approaches to counting, weighting and clustering submissions will deliver different outcomes, making them more or less influential. There is no guidance at present to assist with these situations. Overseas research has highlighted that, in the weighting process for most policy considerations, the interest of economic elites tends to take priority over that of the 'average' person. It was certainly the case that the 'public voice' remained undefined as a category in the summary of submissions on the public consultation.

Recommendations

- It is important not to sever, too completely, 'science for policy' from 'science for implementation', as these aspects are intimately connected. Greater communication and free and frank discussion between scientists working at regional councils and scientists working on national policy (such as those on the STAG) would likely strengthen the science inputs.
- Science work should not be too siloed or fragmented, so that highly interconnected areas can be dealt with together. This enables the science on one issue to inform and support the science on another (eg nitrate considerations for water quality and drinking water).
- In line with previous recommendations, the study of the DIN highlights the need to adjust our regulatory settings, to ensure that a drive to reduce economic impacts does not act as a barrier to effective policy. More guidance is required to assist officials when dealing with contested information, to determine the validity and quality of different information sources, and address issues of bias and conflict of interest that might affect its quality.
- The methodology employed for regulatory impact assessment requires critical review to ensure that it accurately represents the strengths and weaknesses of options and that important detail is not lost so that some options are undervalued.
- Significant departure from the findings of the regulatory impact assessment process should be discouraged, as it constitutes departure from an evidence-based approach. A requirement for additional justification would raise the bar for such deviation in approach.
- Greater guidance is needed to inform the consideration and weighting of form submissions in contrast to more substantive ones. Prioritisation of substantive submissions is likely to privilege more highly resourced submitters, and a more equitable approach that recognises public interest concerns may be needed.

7 Te Kāhui Wai Māori and mātauranga Māori outputs

Freshwater is an important taonga to Māori. The Waitangi Tribunal has been critical of the adequacy of existing frameworks, particularly their failure to recognise Māori rights and interests in freshwater and the narrow scope of previous policy work on the NPS-FM. These gaps remained in the approach adopted for the development of the NPS-FM 2020, which placed issues of key importance to iwi/hapū (such as freshwater allocation) out of scope. This increased legal risk and resulted in legal action being launched by Ngāi Tahu against the Crown.

Despite the avoidance of some core issues, the strengthening of Te Mana o te Wai, including through the establishment of the hierarchy of obligations under it (and placing the health and well-being of freshwater at the apex), is widely viewed as the most significant improvement achieved in the freshwater policy process. The direction for regional councils to

"give effect" to Te Mana o te Wai, recognition of Māori freshwater values, introduction of mahinga kai as a compulsory value in the NOF, and greater incorporation of mātauranga Māori all demonstrate that substantial progress has been made in this area. This reflects the effectiveness of Te Kāhui Wai Māori through its broadened terms of reference, the independence of its work, the quality and expertise of its members, its direct linkages with the Minister and its ability to communicate its vision effectively and in a way that resonated widely.

The changes made to the NPS-FM also represent an ideological, potentially paradigm shifting, change in approach that may provide an important lever for environmental well-being. These changes were widely supported by the interviewees we spoke to. However, reservations remained over how policy changes would be implemented in practice. Industry groups opposed many of these changes, particularly the prioritisation of freshwater health and well-being through Te Mana o te Wai. This serves to highlight the significance of the shift in approach and its implications for the sector. Industry may well challenge its application in the courts.

Incorporation of te Tiriti principles and Te Mana o te Wai into the regulatory impact assessment process, as assessment criteria, was an important addition that likely strengthened progress in this arena. However, our review of the individual regulatory impact assessment undertaken highlights that, even where options scored very highly in relation to these criteria, they were not necessarily adopted.

There remains a lack of NOF attributes within the NPS-FM 2020 to implement Māori freshwater values. However, this reflects (at least in part) that core decision-making for Māori is most appropriately left to iwi/hapū to exercise their tino rangatiratanga and kaitiakitanga role within their rohe.

Recommendations

- The effectiveness and value added by Te Kāhui Wai Māori underscores the need to bring more Māori-led expertise into policy processes.
- The work of Te Kāhui Wai Māori deepened broader understanding of a te ao Māori perspective and helped build the social licence for reform. The model could usefully be built on to increase cross-cultural understanding and enhance partnership.
- Regional councils and iwi/hapū require greater support to implement Te Mana o te Wai at the local level.
- Given the constitutional significance of Te Tiriti o Waitangi (and compliance with its principles), consideration should be given to making this a standard criterion for all regulatory impact assessments, and for it to be given more prominence and priority in the regulatory impact assessment process.

8 Exploring the policy supports

Of all the areas canvassed in this report, inadequacies in our policy support framework are amongst the most concerning. We found that there is a systemic lack of support for 'science for policy' and mātauranga Māori inputs for policy. These deficiencies create barriers to evidence-informed decision-making and policy development across the board.

Policy timeframes

Reactive policy development, narrowed in scope and undertaken at pace in order to fit within tight political windows of opportunity in response to the three-yearly election cycle, is a significant barrier to more strategic and substantial policy work. This undermines the establishment of the research base necessary to properly inform policy and makes highly complex matters more difficult to resolve. It places our science system under significant pressure.

The science advice inputs of the STAG were not adequately compensated. This may reflect a systemic undervaluing of the science work being out of step with how economic and legal advice were valued in the policy process.

Science for policy funding

Despite attempts to take a more strategic approach to undertaking science for policy, through the development of the *Water research strategy* and mechanisms like the *New Zealand conservation and environment roadmap*, the research priorities established within these documents are not adequately linked to research funding mechanisms. Individual government agencies, such as MfE, do not receive sufficient funding to support their research requirements. They are therefore overly reliant on the broader science funding system which is not aligned to ensure delivery of science for policy. This means that policy currently moves ahead of the science necessary to craft effective policy responses.

Current public science funding is primarily allocated by MBIE, and this is to support two core pillars: research impact and excellence. These pillars prioritise high level academic excellence and innovation ('smart ideas') but fail to ensure that more fundamental research and monitoring work to inform policy takes place. The focus of both MBIE and the *National statement of science investment* are heavily weighted towards research that supports productivity and economic growth. These settings impact on the research allocation decisions of core science funds such as the Endeavour fund and the Strategic science investment fund. Neither fund was considered fit for purpose in terms of supporting science for policy. The Parliamentary Commissioner for the Environment has also noted that these funds are not adequately resourced so acute funding shortages also exist.

Scientists seeking funding for basic research needed to underpin policy struggle to obtain it and have called for a prioritisation of 'must have' science needs ahead of 'good to have' ones.

MBIE's 'Vision mātauranga' initiative is failing to direct funding to Māori scientists and to support mātauranga Māori for policy. Like other funds, allocation prioritises economic considerations and academic excellence but does not support the science needs of Māori. There is insufficient knowledge and understanding of te ao Māori by those administering the fund, leading to inconsistencies in allocation and even box ticking approaches. There has also been a failure to measure and map the Māori science sector to identify capacity and resource needs.

Environmental monitoring and reporting

Aotearoa New Zealand's environmental monitoring and reporting system remains passive and fragmented with responsibilities spread across multiple agencies. Large data gaps remain, undermining the information base for policy development and environmental decision-making. Data accessibility is a problem, and inconsistencies in measures and methodologies applied around the country complicate the use of data collected for policy. Documents such as the NPS-FM are mechanisms for driving greater data collection and consistency and the NOF constitutes an important lever to assist in this area. However, much data collection remains ad hoc, with the data contained in our national databases and portals still patchy.

A lack of environmental data and information undermines the quality of environmental impact analysis, leading to undervaluing and increased uncertainty associated with environmental costs and benefits. In contrast, our increased understanding and collection of economic data and information means that economic considerations are much more reliably informed. This contributes to a broader imbalance in favour of the economic over environmental imperatives.

Capacity and capability

Science and mātauranga Māori expertise is in high demand and there has been a historical lack of resourcing and support to build capacity and capability across both these areas. This impairs both policy development and implementation.

Capacity and capability issues are evident within MfE. They are exacerbated by high staff turnover, reducing the degree of experience and institutional knowledge held by staff. Staff turnover complicated science communication from the STAG to officials, and a lack of knowledge and understanding of te ao Māori meant that the Ministry struggled to support Te Kāhui Wai Māori.

MfE is insufficiently funded and resourced to undertake its work, particularly in contrast to the other departments such as MPI. It has far less staff and capacity, and this contributes to power imbalances when the agencies work collaboratively. MfE's latest performance improvement review identified a need for the Ministry to reconceptualise itself and take an unapologetic lead in the natural resources sector.

Existing capacity and capability to support mātauranga Māori was a significant concern of Te Kāhui Wai Māori, given the increased expectations Te Mana o te Wai places on iwi/hapū under the NPS-FM. It noted that inequalities exist between iwi, particularly between settled and non-settled groups. A Freshwater Implementation Group has been established to oversee implementation and to set up a network of technical advisors including Māori technical specialists. Training and guidance to lift capacity and capability to deliver Te Mana o te Wai will be a priority. However, the increasing need for and use of mātauranga Māori for policy more broadly requires more extensive support.

Science and knowledge communication

Science communication was identified as a core weakness in our current policy system, impacting on the translation of science to policy, the communication between STAG and officials, and the building of broader understanding of the science underpinning policy amongst stakeholder groups and the public. The latter is crucial to policy socialisation, to address issues like science misinformation (and disinformation – misinformation that is deliberately spread), and to help build the social licence for reform.

Although many government departments (including MfE) now have chief science advisors, and this was a measure designed to enhance science communication, their role within the NPS-FM 2020 policy development process was unclear. The deployment and role of chief science advisors

in the policy process remains highly variable, and the value added hard to measure. The role is one that was widely supported by interviewees – primarily for its potential. There was a call for similar development of Māori chief science advisors to support the incorporation and use of mātauranga Māori.

Socialisation of policy

The area receiving most criticism was science communication to stakeholders and the public in order to build the social licence for reform. Tight policy timeframes undermined the degree of policy socialisation possible, and a lack of planning and strategy was evident in the policy roadshow events associated with the NPS-FM 2020 policy process. There was a call for a more strategic, planned and targeted approach, and for more time to be put into this crucial part of the policy process. Scientists and science communicators needed to be more heavily involved in these events. Interviewees highlighted the strong science communication response for COVID-19 as a model that could be followed.

Science misinformation was also a problem during the NPS-FM policy process. 'Scaremongering' amongst some industry groups, through claims that the impacts of the policy were more significant than they actually were, led to heightened opposition, particularly in the farming community. Policy roadshow events became reactive and they were dominated by special interest group concerns. They focused on argument rather than explanation and building understanding.

Recommendations

Policy timeframes

- Given tight 'policy windows' there is a need to undertake more preparatory science work and to apply a more long-term and strategic approach to policy (and science for policy) development. An extended electoral cycle may assist in this regard (but is not yet on the cards) so other options for overcoming this issue will need to be explored.
- Movement away from the use of ad hoc science advisory groups towards more structured standing advisory groups in priority policy areas, such as freshwater, should be considered. These could provide greater continuity and a more strategic approach to the science for policy work.
- Science and mātauranga Māori inputs to policy are crucial and need to be more appropriately valued and compensated.

Science for policy funding

- Greater bridging work is needed to connect research priorities for policy with effective funding mechanisms. A more directed fund designed to support research for environmental decision-making and policy would help, as this would avoid research for policy having to complete with other science needs. Core science needs should be serviced first, ahead of other work, to ensure the basics are covered.
- The science system, more broadly, requires more funding support.
- Vision mātauranga needs to be more Māori-led and designed to support the science needs of Māori.

Environmental monitoring and reporting

- Environmental monitoring and reporting forms the backbone of environmental policy-making and needs to be strengthened. The Parliamentary Commissioner for the Environment has set out ways in which this can be achieved in its 2019 report: *Focusing Aotearoa New Zealand's environmental reporting system.*

Capacity and capability

- MfE's policy capacity and capability needs to be strengthened, so it can play a stronger leadership role on environmental matters when working with other governmental agencies.
- Greater support for 'mātauranga Māori for policy' is needed: our regulatory settings and direction need to prioritise and provide more guidance for these inputs.
- There needs to be greater resourcing to increase expertise in knowledge translation, and greater involvement of skilled Māori in influential roles at the science-policy interface.

Science knowledge and communication

- Science communication capacity and capability requires more resourcing and training, with provision for upskilling scientists

and training specific science communicators through specialist courses at the tertiary level.

- The role of chief science advisor requires greater development, including clarifying the role within the policy system. The appointment of chief science advisors in priority policy areas, such as freshwater, should be considered. This may help breach existing silos and foster greater collaboration across ministries.
- More Māori science advisor roles within government departments would help strengthen the broader science support ecosystem.
- The establishment of a Mātauranga Māori Commission could be considered, sitting outside the public service, with autonomous governance and baseline funding. It could provide leadership over mātauranga Māori and set Māori knowledge priorities.

Socialisation of policy

- There needs to be more focus on science education and policy socialisation within the policy process, with scientists and science communicators engaging more with stakeholders and at public meetings.
- More planned, strategic and targeted messaging systems need to be developed to build broader understanding of the science underpinning (1) the problem addressed by the policy, so need for reform, (2) the policy itself, and (3) the impacts of policy implementation and requirements put in place.
- Science misinformation and disinformation are becoming increasingly widespread and serious phenomena with the ability to significantly undermine policy. There is an urgent need to identify effective strategies to combat them and to build these into government's policy delivery and science communication work.

Institutional reform

- Gaps and defects in the current science advisory ecosystem collectively point to a need for structural reform, in order to build a more cohesive, resourced and strategic science advisory system to support the plethora of environmental related policy currently under development.
- Consideration should be given to the establishment of a national, independent science advisory body to work on environmental policy. Such an entity could help ensure continuity of science work and advice, assist to reach across existing silos and provide a valuable oversight role. One option is an entity such as the Environmental Research Council recommended by the Parliamentary Commissioner for the Environment.

9 Conclusions

Our dive into the policy development process for the NPS-FM 2020 has revealed a much richer, more varied and diverse body of material and observations than anticipated. No two interviews were alike. While some themes recurred throughout, the perspectives expressed were highly nuanced, with the range of views and issues identified differing from person to person. STAG interviewee accounts, in particular, varied markedly across the various scientific disciplines represented, the institutional settings the various scientists worked within and their previous experience with (and views on) former NPS-FM policy outputs. The material presented in this report is only a snapshot of the most prominent and repeated issues raised. It is clear that much more work could, and should, be done in this area.

There is no question that more progress was made through the 2020 NPS-FM process than previous freshwater policy iterations. The extent to which this success was a product of the more directed and transparent approach adopted, or simply due to a new government with a greater political determination to lead reform, is more difficult to determine. Certainly, the inclusion of more diversity on the STAG, exclusion of economic considerations from the consideration of the science, and provision for an independent report setting out the science advice, made for a more robust examination of the science and provided a clearer voice for that science.

Almost everyone that we spoke to, who had been involved in the 2020 iteration of the NPS-FM as well as previous workstreams, considered the 2020 process to have been an improvement on the earlier approaches. The most oft-cited reasons for this improvement were increased transparency, exclusion of stakeholders and economic considerations from the work of the STAG, and efficiences delivered by the more directed process.

However, a recurring theme throughout this work is that the ideology underpinning our policy development system needs a nudge. Our processes need to be more open, diverse and inclusive, and we need to resource and support the policy development process better. If we want a strong evidence-based approach then we need to build a strong science support system, adequately target and fund research for policy (even if not as high profile as science excellence and innovation), build capacity and capability, and upskill in areas like science communication. We also need to think deeply about how we can cultivate a more considered, long-term and less reactionary policy response.

Globally, countries are struggling to respond to a range of complex environmental challenges. It is overly simplistic to suggest that the answer lies in 'following the science': policy is complex and highly political, and our legal systems and regulatory frameworks are not well positioned to support change. Rather, our systems have been established to be stable and predictable; they aim to provide certainty for business, and to proceed through incremental reform. In their current state, our regulatory systems struggle to be agile and responsive enough to meet the environmental challenges and pressures that exist: challenges that are likely to require paradigm shifting systemic change to meet.

Aotearoa New Zealand is fortunate to possess an already a fully-fledged and ideologically distinct paradigm shifting lever to help us reorient our direction of travel, at least with respect to freshwater management. A theme that resonated throughout our discussions with all interviewees was that of Te Mana o te Wai, and its potential to enhance a more values-driven approach to freshwater with a strengthened environmental focus.

In this study we have examined the science inputs into the NPS-FM 2020 policy-making process. We have identified the particular strengths of that process as well as areas where greater support could be given to science and mātauranga Māori to strengthen their interface with policy. Our intent is to learn from and build on past experiences to ensure that environmental policy-making in Aotearoa New Zealand is more strongly evidence-based and as a result more effective in achieving positive environmental outcomes for the country.

1 The Project

Ōrere River

Raewyn Peart

1.1 Introduction

Good environmental outcomes rely on policy and decision-making processes that are both science-based and reflective of community values and concerns. The environmental problems facing the world are complex. The issues are at scale, environmental tipping points loom ever closer and the rate of decline in environmental quality is often occurring at pace. The science is also complex. The evidentiary basis presented by experts is frequently incomplete, uncertain or highly contested. Further, the policy process requires sufficiently skilled science communicators, knowledge brokers and policy analysts who can understand and effectively translate evidence into policy.

Many of the issues are highly controversial and the options for resolving them challenging to discuss – societal and economic transformation may be required and the costs of the necessary transitions are often significant. Climate change, the global biodiversity crisis, freshwater protection and more recently the COVID-19 pandemic, have all been characterised as "wicked"[1] policy problems on this basis: they are problems that have proven to be incredibly resistant to solution because of such complexities.

Internationally, for example, a number of environmental treaties and multilateral agreements have set specific targets and timeframes for meeting them. The Aichi Targets set under the Convention for Biological Diversity and the 2015 Paris Climate Agreement are two notable examples. Their implementation requires countries to formulate nationally focused, evidence-based policy. Yet few countries are making the progress envisioned.[2]

At the 2020 session of the United Nations High Level Political Forum, ministers from around the world collectively made a commitment to "strengthen the science-policy interface through evidence-based policymaking, support for research and development, harnessing science, technology and innovation, and leveraging technologies to promote an inclusive digital economy".[3] In Aotearoa New Zealand, a number of steps have been taken to strengthen the science-policy interface. In 2009, the Government established the Office of the Prime Minister's Chief Science Advisor to strengthen strategic science and policy advice and provide a conduit between the science community and government.[4] A departmental science advisory network now exists, coordinated through the Forum of Chief Science Advisors.[5] The Government is currently undertaking a project aimed at improving policy advice and ensuring that advice "is underpinned by good evidence".[6] Express reference to an "evidence informed approach" has been included in the government's most recent statement on policy: *Government expectations for good regulatory practice.*[7]

There is widespread consensus that if solutions are to be found, we need to 'follow the science': that science is key to identifying problems, understanding causation, identifying potential solutions, determining the probability of success, and monitoring responses to gauge whether progress is being made. However, the application of science to policy, and the role and weight accorded to science within the policy process, is not straightforward. Science is seldom able to provide absolute answers and governments must make decisions in an environment where science advice may be actively evolving.[8] Further, the policy process is highly iterative. Scientists may be tasked with providing a series of assessments and options to inform ongoing policy negotiations and evolving choices.

How science inputs are utilised, the types of advice sought, the institutions established to provide and consider that expert advice, and the range of interests and concerns contributing to any policy stream are highly variable in practice. How scientific input is incorporated into policy outcomes alongside economic, legal and other technical inputs, and how it is balanced against a raft of other social, economic and cultural considerations, is often unclear. Highly complex policy problems invariably require many values-based decisions to be made and can highlight deep equity considerations that are difficult to navigate. While it is a necessary precursor to good policy, a solid scientific base alone is insufficient. To have any longevity, policy must have broad community support: there must be a social licence for change. In practice, a number of barriers can undermine the formulation of evidence-based policy: science barriers, institutional barriers, economic barriers and political barriers.[9]

For the above reasons, there is increasing interest being paid globally to the role of the scientific voice in policy-making and the supports required to ensure policy is underpinned by robust science. But what does good science advice look like and how do we deal with contested science, misinformation or even disinformation? In addition, where is the line between science and policy and how do we achieve the correct balance? Perhaps even more crucially, how do we ensure policy reflects the best available evidence, while keeping the policy process inclusive and responsive to all voices so that it also reflects the values and needs of the community?

1.2 The Better Linking Science to Policy Project

The Environmental Defence Society's (EDS) Better Linking Science to Policy Project was launched in April 2021. The objective of the project has been to explore the dynamics operating at the crucial science-policy interface. It has investigated the role of science in the policy-making process and the ways in which the scientific basis underpinning policy might be strengthened. This includes how the science and research inputs required

for policy could be better supported, and how scientific information might be best configured and deployed to assist policy-makers, so that it exerts appropriate influence on the development and implementation of policy directions. We hope that the research encapsulated in this report will improve understanding of the science-policy interface, and inform better environmental decision-making, which depends on a robust scientific grounding to be effective.

An additional and core strand of the project was exploring the relationship between contemporary science and mātauranga Māori. Mātauranga Māori is an important knowledge input to modern evidence-based policy processes, and helps to ensure that policy also reflects Māori values and priorities. It is invaluable for the specific, localised and historical information about the Aotearoa New Zealand environment it provides, for its highly contextualised approach and practices, and for the unique cultural overlay it can apply to policy development and implementation.

The Better Linking Science to Policy Project sought to highlight potential synergies between mātauranga Māori and science, particularly those aspects of the ecological sciences which take a holistic systems-based approach. It also sought to identify some of the tensions between the two knowledge systems. Indeed, such tensions often provide valuable insights into the normative and ideological assumptions inherent in 'Western science', deepening understanding of the complexities involved in applying science to policy.

In order to examine these issues, and how they operate in practice, this report takes a deep dive into a very specific policy workstream: the development of the National Policy Statement for Freshwater Management (NPS-FM) 2020, a statutory instrument created by central government under the Resource Management Act 1991 (RMA). The work was funded as part of the Our Land and Water National Science Challenge, through Challenge contractor AgResearch. The Challenge supports research and activities that aim to improve land use and freshwater management and the vitality of te taiao more generally. EDS is pleased to contribute to that important mahi.

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Wairakau Stream

1.3 Why freshwater?

Freshwater policy is a quintessential example of a 'wicked' policy problem. Over the last some forty years, a series of reports have documented the declining state of freshwater quality in Aotearoa New Zealand, and in particular the problem of diffuse pollution from land into waterways.[10] One of the most influential of these was a 2002 report from the National Institute of Water and Atmospheric Research (NIWA) that would spark the now infamous 'dirty dairying' campaign.[11] Commissioned by the New Zealand Fish and Game Council, the report titled *Review of the environmental effects of agriculture on freshwaters* confirmed the poor condition and high nutrient load of many lowland rivers, the impact on biotic communities and the link between that decline and changing land use, in particular the intensification of dairy farming.[12] Freshwater quality has been an almost constant subject of debate and controversy in the media in recent decades. It has been the focus of a number of governmental reports which have attempted to unravel the diverse array of issues arising. The Parliamentary Commissioner for the Environment, for example, has produced a series of reports recognising the complexities involved in freshwater science, generating freshwater policy and undertaking freshwater management.[13]

Despite acknowledgment that declining freshwater quality is a serious problem, there has historically been significant inertia in generating a policy response to address the issue. Since 1991, when the RMA was introduced, there have been clear mechanisms in place to generate a framework of national policy and regulatory standards for freshwater quality. However, the Government struggled to develop such a framework and "numerous national policy initiatives came to nothing during the first 20 years of the RMA".[14] It was only at an EDS conference in June 2008 that a crucial break-through was made, when environmental advocate Guy Salmon suggested that a more collaborative approach, informed by models applied in Nordic countries, might assist to break the impasse.[15] Discussions between key conference attendees (from across the environmental, iwi, agricultural and political spheres) led to the establishment of the Sustainable Land Use Forum as a stakeholder-led collaborative initiative. In 2009, Cabinet approved support for the initiative, which was renamed the Land and Water Forum (LAWF).[16] The fact that progress on freshwater policy was only made possible by the government adoption of a stakeholder-led initiative underscores the political challenges that exist in this area.

Although not without its own controversies, the LAWF played a pivotal role in the freshwater reforms that followed. It assisted to build the necessary consensus and mandate for change that enabled the country's first NPS-FM to be introduced in 2011.[17] It also helped built the support needed for subsequent iterations, including the inclusion of Te Mana o te Wai ein the 2014 NPS-FM.

Despite several more iterations of the NPS-FM (in 2014 and again in 2017), freshwater quality and regulation remained controversial and a matter of constant political debate. Freshwater became an election issue in 2017, as reports highlighted continuing degradation despite the NPS.[18] Two nutrients in particular – nitrogen and phosphorus – were shown to be worsening at more than half the river sites monitored, highlighting the inadequacy of existing management measures.[19] Debates continued on a diverse array of freshwater issues including nutrient limits, swimmable waterways, water rights and allocation, agricultural intensification, *E. coli* levels, impacts on recreational fishing, sediment loads and algal blooms.[20]

46 per cent of lakes larger than 1 hectare are in "poor" or "very poor health"	The risk of campylobacteria infection from swimming in an urban river is 94 per cent, and 76 per cent for pastoral rivers (Native forest: 5 per cent)	90 per cent of wetlands have been drained
76 per cent of native freshwater fish are threatened or at risk of extinction	68 per cent of untreated water in aquifers failed to meet the drinking water standard for *E. coli*	The area of irrigated agricultural land almost doubled between 2002 and 2017
11 species of freshwater birds are now extinct and 66 per cent of freshwater birds are threatened or at risk of extinction	88 per cent of lakes contain invasive plants and trout have replaced native galaxids as the dominant fish in many waterways	Many waterways have been significantly modified by channelling their flow, affecting ecosystems and cultural uses and limiting access

Figure 1.1 State of our freshwater
Source: Ministry for the Environment and Stats NZ, 2020, New Zealand's environmental reporting series: Our freshwater 2020, Wellington

In 2017, the Prime Minister requested his chief science advisor to investigate the matter and report back with advice. Sir Peter Gluckman's subsequent report noted the "increasingly complex and at times confusing public discourse" surrounding freshwater, and the need to enhance public and policy understanding of the values, states, trends and human impacts as well as the challenges and opportunities in the area. The report characterised freshwater issues as "post-normal" in nature and "involving complex science intertwined with a range of stakeholder values and interests that can never be fully aligned."[21] In the science space, the report emphasised that the "drivers of change are complex and inter-related, and the impacts are cumulative over many decades". It noted that, in practical terms, "the required management responses are complex, time-dependent, sometimes uncertain, and will be costly".[22]

It is precisely these complexities that make freshwater reform an ideal candidate for a study of the interface between science and policy.

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Wairau River showing algal bloom

"The quality of our fresh water is one of the biggest environmental challenges that we face in this clean green country of ours."

Jan Wright, Parliamentary Commissioner for the Environment, 2012

Water quality in New Zealand: Understanding the science

"New Zealanders want to swim, fish, gather mahinga kai and enjoy freshwater as our parents and grandparents did. We also need clean water to drink and irrigation to support a sustainable economy. But our water is suffering as a result of human activities."

David Parker, Environment Minister, 2020[23]

"Aotearoa New Zealand is in the midst of a discussion about what is required to improve the health of our freshwater. There is broad and increasing recognition that things need to change, and a growing willingness to act"... "Understanding the current state of our freshwater and the pressures on it, is essential groundwork for decisions about where to put our efforts."

Vicky Robertson and Mark Snowden, Ministry for the Environment, 2020

Our freshwater 2020

"The issues around using and protecting our water resources are 'post-normal' in nature, also referred to as 'wicked problems' involving complex science intertwined with a range of stakeholder values and interests that can never be fully aligned. National and regional standard setting, regulation and consenting must take the science into account while finding a point of equilibrium between these very diverse perspectives and interests."

Sir Peter Gluckman, Office of the Chief Science Advisor, 2011

New Zealand's freshwaters: Values, state, trends and human impacts

1.4 The case study: the NPS-FM 2020

The NPS-FM 2020 represents the most recent incarnation of the freshwater policy process and makes an ideal case study on freshwater policy for a number of reasons.

1.4.1 A new approach, a new process

The policy development process for the NPS-FM 2020 was marked by a change in approach at the political level. In 2017, the Sixth Labour government came to power, and soon announced that work would commence to further improve water quality standards. The Government's *Essential freshwater* work programme was launched in 2018. Six policy workstreams were initiated which included looking into "at-risk catchments", RMA amendments, the allocation of water resources, a futures framework, a National Environmental Standard for freshwater management, and an update of the NPS-FM.

While the LAWF had proven invaluable in progressing reform up to that point, the Government concluded that the collaborative process had reached its productive limits. It was noted, for example, that the LAWF had been unable to reach agreement on critical questions around nutrient discharges and the allocation of water rights. Environment Minister David Parker observed that "sometimes the competing interests in the room cannot realistically be expected to reach agreement".[24]

The LAWF, acknowledging these challenges but also expressing frustration at the Government's failure to act on its recommendations, put itself into abeyance so that the more politically charged "hard issues" could be dealt with by Government.[25] This meant that the policy workstream for the NPS-FM 2020 represented a more direct, government-led agenda for reform.

In alignment with this shift in approach, three new bodies were established, to sit alongside a pre-existing regional council sector subgroup:

1. The Freshwater Leaders Group
2. Te Kahui Wai Māori
3. The Science and Technical Advisory Group (STAG)

The Freshwater Leaders Group played a similar role to that of the LAWF, bringing together leaders from across the primary sector, agribusiness and environmental NGO's to operate as a sounding board for freshwater policy. However, while its membership was drawn from a range of interest groups, it was different to the LAWF in some key aspects. For one, it was much smaller in size and its membership was ministerially appointed. This meant that some sector groups, such as Federated Farmers, were excluded and sectors were not able to choose their own representatives.

The establishment of Te Kahui Wai Māori proved somewhat controversial, since the Government had previously consulted closely with an Iwi Leaders Group (within the Iwi Chairs Forum) on issues relating to Māori rights and interests in freshwater.[26] The members of Te Kahui Wai Māori were appointed by the Minister, rather than by iwi, and the group focused on undertaking research, providing advice and facilitating engagement with Māori, rather than on directly negotiating issues.[27]

There are parallels to be drawn between the shift from the LAWF to the Freshwater Leaders Group, and the shift from the Iwi Chairs Forum to Te Kahui Wai Māori; both signal a more directive role for Government in terms of setting the scope and agenda for reform. Centrally, for the current study, an independent scientific advisory body was established in the form of the STAG, to help ensure that the science was "accurately interpreted and incorporated into the policy process."[28]

Collectively these three groups were designed to strengthen the scientific, cultural, social and stakeholder inputs into freshwater policy. They were to provide fora where policy options could be tested through a range of different lenses: socio-economic, cultural and scientific. The papers prepared for each working group, and their minutes, reports and advice, are publicly available. This facilitated a closer examination of the policy stream for the NPS-FM 2020 than has been possible for previous policy work in the area. Crucially, through an exploration of the work of the STAG, it also enabled a much deeper dive into the science-policy interface.

1.4.2 Te Mana o te Wai – the mana of water

> "For Aotearoa's indigenous Māori, these freshwater bodies are part of a complex system of genealogical relationships from which derive the traditional Māori knowledge, values and ethics which shape Māori customary practices for freshwater monitoring and management."[29]

Te Mana o te Wai has been a part of the NPS-FM since 2014. It provides an overarching framework for the protection and management of water, focused on restoring and safeguarding the integrity of freshwater. It is an approach centred around the vital importance of water, its health and

well-being, and the connection between the well-being of freshwater and that of people and the broader environment/te taiao.

Te Mana o te Wai, as a framework incorporated into the NPS-FM 2014, was expanded and elaborated on in the NPS-FM 2020. This introduced a hierarchy of obligations prioritising the health and well-being of water first, then the health needs of people, and thirdly the ability of people and communities to provide for their social, economic and cultural well-being. The NPS-FM 2020 also specified that each regional council must engage with communities and tangata whenua to determine how Te Mana o te Wai applies to water bodies and freshwater ecosystems in its region. This is designed to enable tangata whenua to apply mātauranga Māori at place, to ensure freshwater policy reflects Māori freshwater ethics, values and practices.

Te Mana o te Wai provides a distinctly indigenous lens to freshwater policy in Aotearoa New Zealand, bringing together mātauranga Māori and science in the policy process. This enabled a closer examination of the interface between the two bodies of knowledge.

1.4.3 Methodology

An inquiry-based method of investigation was employed for this study. The project began with a broad review of the international literature on 'science in policy' and 'evidence informed' policy-making. That review was then extended into a more focused examination of the Aotearoa New Zealand context, canvassing what commentators in this country had written on the topic. Relevant governmental discussion papers, reports and policy analyses were also reviewed, including a number of reports from the Parliamentary Commissioner for the Environment, the Office of the Prime Minister's Chief Science Advisor and key government agencies such as the Ministry for the Environment (MfE), Department of Conservation (DOC) and the Ministry of Business, Innovation and Employment (MBIE). This literature review laid the groundwork for understanding the types of issues and concerns around freshwater policy that have been raised, and the work that has been undertaken in the area.

The review also examined literature on traditional ecological knowledge and policy formulation, and more particularly the interface between

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High country stream on Balmoral Station

mātauranga Māori and both science and policy. This is an area of increasing international focus, as indigenous voices gain strength globally, particularly in the climate change and environmental policy realms. It has been driven by a perceived need to rectify biases in current approaches and to deepen the knowledge base on which policy is drawn, in order to develop more effective and socially robust policy.

A more specific literature review was then conducted on freshwater policy and reform internationally, in conjunction with a review of international best practice. This was far more complex than initially anticipated because countries with the best water quality are, not surprisingly, those with the most naturally abundant freshwater sources, lower population densities and less industrialisation. This means that the land in those countries has not been subject to industrial or agricultural intensification at scale. The review of best practice therefore focused on identifying countries that had shown the most success in *improving* water quality in contexts most approximate to Aotearoa New Zealand.

Even within this narrower frame, the task was not straightforward. The highly political nature of freshwater issues means that policy success is often contested. Models held up as best practice by some were frequently subject to criticism by others who disputed the extent of progress made.[30] In several countries (such as Denmark[31] and the United States[32]) policy had progressed and then regressed in line with political cycles, with initiatives being introduced and then later withdrawn. This makes it difficult to assess the success of specific policy measures. It also underscores the importance of policy being underpinned by robust science and the need to obtain broad social licence for any reforms. Further, it reflects the difficulty of assessing policy effectiveness in a 'post truth' space, where science is actively contested and debates exist around science capture, misrepresentation, conflict of interest and bias.[33] Where possible, relevant lessons from the review of international practice have been incorporated into this report to inform the discussion.

Once we had laid the theoretical groundwork for the study, a more detailed examination of the NPS-FM 2020 was undertaken. This involved an examination of the relevant legal provisions under the RMA and records of related parliamentary debates, as well as media commentary and papers published on the NPS-FM 2020 and its development. The NPS-FM 2020 Regulatory Impact Statement was reviewed in order to examine how scientific inputs into the policy process were balanced against social, economic, political and cultural considerations. The government's most recent statement on regulation (last updated in 2017) guides the development and assessment of regulatory practice, and this was examined to explore its influence on policy-making.[34]

We also reviewed the case law arising under all versions of the NPS-FM, in order to identify how science is deployed in freshwater decision-making at the regional level, and its role in council and court hearings. This helped identify the types of evidentiary issues arising from the implementation of the NPS-FM, and how issues at the science-policy interface manifest in practice. It informed our broader discussion of matters such as scientific uncertainty and standard setting, contested science, evidentiary burden and science for implementation.

The reports of the various NPS-FM 2020 advisory groups were then reviewed, as were their meeting minutes (where available). MfE's discussion document on the proposed NPS-FM (*Action for healthy waterways)*[35] together with the associated report on submissions received,[36] and the subsequent report of recommendations to the Minister on the NPS-FM 2020, were also reviewed.[37] Particular attention was paid to the recommendations of the STAG and Te Kahui Wai Māori workstreams, the relevant science and mātauranga Māori based outputs, and the receipt and treatment of that material by policy-makers throughout the policy process.

A series of in-depth interviews (35 in total) were then undertaken with policy-makers, members of the various advisory groups, and other consultants and scientists involved in development of the NPS-FM 2020. In particular, the interviews targeted members of the STAG and Te Kahui Wai Māori, the scientists involved in the policy process (across all the workstreams, including within MfE), and the Ministry officials and policy analysts that worked on the NPS-FM 2020. To enable interviewees to express their views frankly, all interviews were held in strict confidence, and the identities of those interviewed kept anonymous.

The number and scope of interviews undertaken was limited by several factors, including interviewee concerns around confidentiality and the sensitive nature of their work on the NPS-FM 2020, staff turnover within MfE, and the time and capacity constraints of many of those contacted. Notably, however, 14 of the 16 members on the STAG participated in the project. This significantly deepened the examination of the scientific matters arising through the process. A draft of this report was circulated widely for peer review, including to all those interviewed, prior to finalisation.

The project was initially conceived of as a nine-month venture, running from April to December 2021, that would take a narrow but deep dive

into a very specific policy workstream. However, the amount of material uncovered and traversed in this study was much more significant than initially anticipated. The literature review, review of international best practice and review of the case law on the NPS-FM since its inception constituted substantial pieces of work in their own right. While this broader material has been drawn on where relevant, it has not been presented in detail here, due to the focus of this report being sharply on the science-policy interface of the NPS-FM 2020 policy development process.

The report aims to highlight the specific strengths and weaknesses of the approach and process used for the development of the NPS-FM 2020. We identify what aspects helped strengthen the science and mātauranga Māori inputs to support robust evidence-supported policy. We also highlight areas where interviewees felt further work, support or development was needed. In this way it is hoped that very practical and specific learnings might be taken from this study to inform future policy work.

1.5 Structure of report

The report is divided into three substantive parts. Part I explores the policy process. Within this, chapter 2 introduces the statutory and regulatory framework, the approach adopted for the NPS-FM 2020, and core theoretical and conceptual foundations underpinning our analysis. Chapters 3 and 4 then turn to examine how the statutory and regulatory settings and approach have impacted on the science inputs of the STAG and the mātauranga Māori inputs of Te Kahui Wai Māori (and more broadly of Māori scientists involved in the process).

Part II explores the policy outputs, with a focus on the examining how current regulatory settings and the regulatory impact assessment process influence policy outputs and support the production of evidence informed science. The general analysis set out in chapter 5 is deepened through a case study on the policy work and impact analysis undertaken in relation to a proposed Dissolved Inorganic Nitrogen (DIN) attribute (chapter 6). Chapter 7 turns to explore the outputs of Te Kahui Wai Māori in relation to Te Mana o te Wai, mahinga kai and Māori freshwater values. It investigates the incorporation of mātauranga Māori into the policy process and highlights significant gaps which have left some issues unresolved.

Part III consists of a single chapter dedicated to an exploration of the policy supports and scaffolding currently in place for both science for policy and mātauranga Māori. It traverses a range of issues including policy development timeframes, science for policy funding arrangements, environmental monitoring and data collection frameworks, capacity and capability, and science communication (including response to *misinformation*).

We end, in chapter 9, with a summary of our core findings and recommendations.

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Wairoa River near Dargaville showing heavy sediment loading

Endnotes

1 The formative work on "wicked problems" is Rittel and Webber's 1973 paper 'Dilemmas in a general theory of planning'

2 For example, the United Nations Framework Convention on Climate Change secretariat has warned that emissions are set to rise and climate change commitments are not on track to meet the Paris Agreement goals, https://unfccc.int/news/climate-commitments-not-on-track-to-meet-paris-agreement-goals-as-ndc-synthesis-report-is-published. Of the 20 targets set under the Convention on Biological Diversity (the Aichi Targets) in 2010, none were fully met by their 2020 target date and six were "partially achieved". Secretariat of the Convention on Biological Diversity, 2020,10

3 United Nations Economic and Social Council, 2020, 6

4 https://www.pmcsa.ac.nz/what-we-do/our-work-programme/

5 https://www.pmcsa.ac.nz/2018/12/20/forum-of-chief-science-advisors-welcome-professor-tahu-kukutai-and-dr-gill-jolly/

6 https://dpmc.govt.nz/our-programmes/policy-project/policy-advice-themes/evidence-and-evaluation

7 New Zealand Government, 2017, 5

8 Gluckman P, 2011, 7

9 Research in the climate change arena for example, has shown that "political cultures" often "give rise to variation in how climate science knowledge is interpreted, used and challenged" (Intergovernmental Panel on Climate Change, 2021). A meta-analysis of 87 studies found that the two most important predictors of views on climate change were "environmental values" followed by "political orientation and political party identification", McCright et al, 2016, 180–189

10 One of the most formative reports is McColl and Hughes, 1981, *The effects of land use on water quality: A review,* Water and Soil Division, Ministry of Works and Development. For the most recent report see: Ministry for the Environment and Stats NZ, 2020, *Our freshwater 2020*

11 For accounts see: Holland, 2014 and Tall and Campbell, 2018

12 Parkyn et al, 2002

13 These include: Parliamentary Commissioner for the Environment, 2012, *Water quality in New Zealand: Understanding the science;* Parliamentary Commissioner for the Environment, 2013, *Water quality in New Zealand: Land use and nutrient pollution;* Parliamentary Commissioner for the Environment, 2015, *Managing water quality: Examining the 2014 National Policy Statement;* Parliamentary Commissioner for the Environment, 2015, *Water quality in New Zealand: Land use and nutrient pollution – update report; and* Wright, 2016, *Next Steps for fresh water: Submission to the Minister for the Environment and the Minister for Primary Industries*

14 Salmon, 2019, 14

15 Eppel, 2013, 3

16 At 4

17 The basis of that consensus and mandate for reform is set out in the LAWF's first report: Land and Water Forum, 2010, *Report of the Land and Water Forum: A fresh start for fresh water*

18 Morton J, 2017, 'Election policy series: The battle over our rivers', *New Zealand Herald*, 31 August

19 Morton J, 2017, 'Election policy series: The battle over our rivers', *New Zealand Herald*, 31 August

20 Morton J, 2017, 'Election policy series: The battle over our rivers', *New Zealand Herald*, 31 August

21 Gluckman, 2017a, xviii

22 At xviii

23 Quoted in media, see Daalder M, 2020, 'NZ's freshwater at risk, report shows', *Newsroom*, 17 April 2020, https://www.newsroom.co.nz/new-zealands-freshwater-at-risk-report-shows

24 Parker D, 2018, 'Essential freshwater', press release, 8 October 2018, https://www.beehive.govt.nz/speech/essential-freshwater

25 Parker D, 2018, 'Essential freshwater', press release, 8 October 2018

26 Young A, 2018, 'Iwi boycott of alternative water group followed by demand for talks by Ngai Tahu', *New Zealand Herald*, 16 August 2018

27 Parker D, 2018, 'Kahui Wai Māori group to work on freshwater', press release, 3 August 2018, https://www.beehive.govt.nz/release/kahui-wai-m%C4%81ori-group-work-freshwater

28 Parker D, 2018, 'Taking action to improve water quality', press release, 8 October 2018, https://www.beehive.govt.nz/release/taking-action-improve-water-quality

29 Stewart-Harawira, 2020, 1464

30 A good example of this is the Murray-Darling river basin in Australia where different commentators disputed representations of the progress made, alternatively alleging that 'issue advocacy' or 'administrative capture' were colouring the assessments. Such was the extent of the controversy that a Royal Commission was convened in 2019. See Walker, 2019; Thompson et al, 2021; and Colloff and Pittock, 2019

31 For example, between 1987 and 2015 Denmark implemented a series of policy action plans that resulted in significant improvements in freshwater quality. A change of government in 2015 saw many of those reforms rolled back. Denmark's progress is discussed in the European Commission's 2019 Environmental implementation review of Denmark (European Commission, 2019, 22). Also see: Dalgaard et al, 2014

32 In the United States the Trump administration suspended, via Executive Order, the 2015 Clean Water Rules made under the Clean Water Act 1972. The Environmental Protection Agency, under the current Biden administration, announced its intention to restore the regulations and revoke the Executive Order. See Mihelcic and Rains, 2020 and https://www.epa.gov/wotus/current-implementation-waters-united-states for the most recent statement of the current US government's intention in this area

33 The New Zealand Institute of Agricultural and Horticultural Sciences held a symposium in 2017 on "Science in a post-truth era" on the 24 August 2017. A number of prominent scientists, including Sir Peter Gluckman gave presentations at the event (Gluckman, 2017c). For a more detailed discussion see Peters and Besley, 2019

34 New Zealand Government, 2017, https://www.treasury.govt.nz/sites/default/files/2015-09/good-reg-practice.pdf

35 Ministry for the Environment, 2019b

36 Ministry for the Environment, 2020a

37 Ministry for the Environment, 2020e

2 The policy process

Wairau River showing adjacent land uses

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Our exploration of the policy process began with a review of the regulatory requirements and settings, and the statutory framework, under which the NPS-FM was developed. We also undertook an examination of previous policy work on the NPS-FM in order to better understand the issues and pressures arising in this area. This provided insights into some of the drivers for the adoption of a new approach for the development of the NPS-FM 2020. A literature review canvassing current conceptual and theoretical thinking on the policy development process and 'policy cycle' was also conducted.

This material was then used to inform our interviews which focused more narrowly on how the policy process impacted science inputs from the STAG and mātauranga Māori inputs from Māori scientists and Te Kahui Wai Māori.

2.1 The statutory framework

The NPS-FM is just one of a number of national policy statements that have been issued under Part 5 of the RMA. The purpose of national policy statements is to provide national direction, in the form of objectives and policies, on matters of national significance relevant to the purpose of the Act. That purpose is to "promote the sustainable management of natural and physical resources".[1] The NPS-FM sits alongside a raft of other national policy statements including those for urban development, renewable electricity production, electricity production and the coast (the New Zealand Coastal Policy Statement).[2] National policy statements for highly productive land[3] and indigenous biodiversity[4] are currently under development.

The possible content of national policy statements, as set out under section 45A of the RMA, is wide ranging. They include stating what local authorities must consider when preparing policy statements and plans; methodologies and requirements to be applied; constraints or limits on the content of those documents; objectives and policies they must include; the types of information to be collected; and monitoring and reporting requirements. Regional policy statements, regional plans and district plans are required to "give effect" to national policy statements.[5] This means that national policy statements directly guide council policy and planning, which in turn can place requirements on consenting decisions. National policy statements therefore form a core part of the planning framework under the RMA.[6]

The scope of national policy statements, and therefore of relevant science inputs into their development, spans broad regulatory standard setting through to implementation directions for councils. However, national policy statements are not unbounded. By virtue of being nested within a pre-existing framework under the RMA, their scope and development approach is to a large extent pre-set by the statutory regime.

National policy statements may be prepared on their own or with an accompanying national environmental standard. As part of the *Essential freshwater* package, a National Environmental Standard for Freshwater was issued in 2020 alongside the NPS-FM 2020. National environmental standards regulate activities that pose risks to the health of freshwater and freshwater ecosystems.

National environmental standards are regulations that prescribe standards (technical or non-technical), methods or other requirements. Section 43 of the RMA provides that national environmental standards can be made for a range of matters including contaminants; water quality, level and flow; soil quality (in relation to the discharge of contaminants); and noise or air quality. In addition, they can include general "standards, methods or requirements for monitoring".

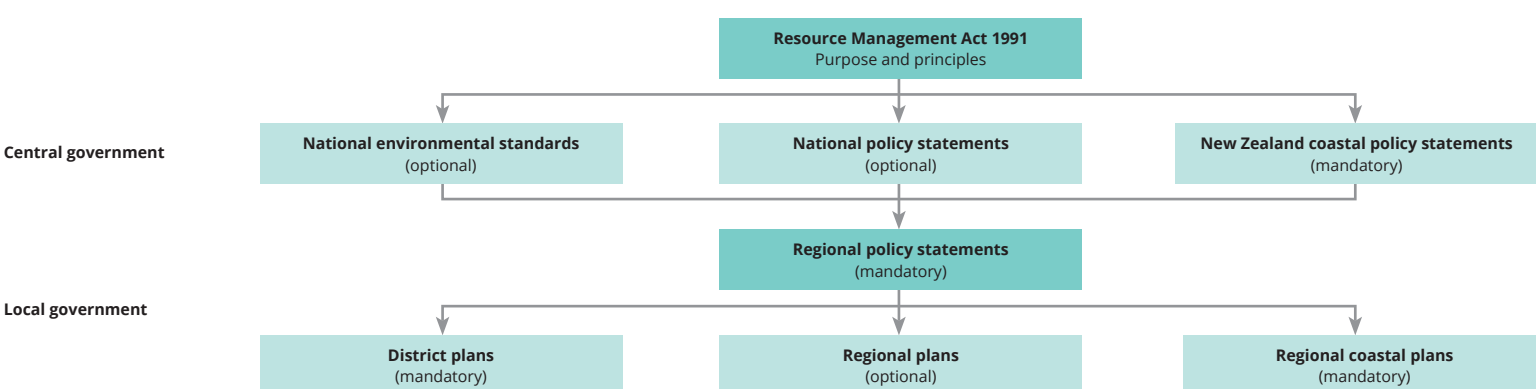


Figure 2.1 The place of national policy statements in the RMA planning framework

Source: Controller and Auditor General, 2011, Performance audit report: Managing freshwater quality: Challenges for regional councils, Wellington, 18

2.2 Process for preparing a national policy statement

It is the role of the Minister for the Environment to determine whether a national policy statement should be developed, and if it is, to prepare a proposed statement. This means there is a broad ministerial discretion in initiating any work in this area.

The RMA provides the Minister for the Environment with two procedural options for the development of national policy statements under section 46A(3). The Minister may establish a Board of Inquiry to inquire into and publicly notify a proposed national policy statement, and to consider submissions and report back to the Minister with recommendations. Sections 47 through 51 of the RMA set out the requirements if this option is selected. Alternatively, a more bespoke process is available through section 46A(3)(b). If this pathway is chosen, then the Minister must undertake the steps provided for under section 46A(4), which include notice to the public and iwi authorities, a submission period, and a report and recommendations made to the Minister. Under section 52(2) of the RMA, national policy statements are finally approved by the Governor-General-in-Council on the recommendation of the Minister, meaning that approval is effectively a Cabinet decision.

Both procedural pathways require public notification and a submissions process, the production of a report, and its consideration by the Minister. However, there are increased procedural requirements for the Board of Inquiry approach, including a formal hearings process (section 50) and public notification if the Minister wishes to suspend the inquiry (eg until such time as additional material becomes available) (section 47A). This means that time and cost efficiencies can be gained through avoiding the Board of Inquiry approach, primarily through the avoidance of a public hearing. In choosing between the two procedures, the Minister may consider a number of matters, including the relevant timeframes available and the extent to which there has already been public debate and consultation leading up to the proposed national policy statement (section 46A(6)).

There have been three iterations of the NPS-FM (2011, 2014 and 2020) as well as a more limited review and update in 2017. A Board of Inquiry was established for the initial 2011 iteration, while the alternative policy process under section 46A(3)(b) of the RMA was employed to develop the 2014, 2017 and 2020 revisions. The alternative policy process has been utilised by both National and Labour-led governments, with each administration adopting a different approach. It is useful to understand some of the factors influencing the choice of process, since process selection can impact the nature of the policy inputs and outputs.

2.3 Regulatory requirements

2.3.1 Regulatory impact assessment

Government agencies are required to prepare regulatory impact assessments when there is a proposal to create, change or repeal legislation or regulations. The assessments provide a high level summary of the problem being addressed, the options and their associated costs and benefits, the consultation undertaken, and proposed arrangements for implementation and review.[7] The requirements for their preparation are set out in a Cabinet circular, a series of guidance notes and various forms and templates.[8] These incorporate the government's latest statement on regulatory practice: *Government expectations for good regulatory practice.*[9]

Two regulatory impact assessments are normally developed for any regulatory instrument. First, an interim assessment is prepared prior to formal public consultation. This sets out the proposals developed by officials and a preliminary analysis of their likely costs and benefits. If approved by Cabinet, a discussion document is released, and the proposals opened up for broader public consultation, input and refinement.

Following public consultation and further engagement with stakeholders, a final regulatory impact assessment is produced. This is typically issued in two volumes: a shorter summary document and a more substantial 'detailed' analysis. For example, in the *Essential freshwater action for healthy waterway*s workplan, which was a complex reform package, more than twenty individual and issue-specific regulatory impact analyses were included in the regulatory impact assessment document.

2.3.2 Section 32 report

As part of the NPS-FM development process, the RMA also requires a section 32 report to be produced. This evaluation report examines whether proposals are "the most appropriate" way of achieving the purpose of the RMA. This involves identifying "other reasonably practicable options", assessing the "efficiency and effectiveness" of the proposals, and summarising the reasons for decisions made (section 32(1)(b)). The report must identify and assess the costs and benefits of the "environmental, economic, social and cultural effects" anticipated from implementation of the proposals, including opportunities for "economic growth" and "employment" that are provided or reduced (s32(2)(a)). It must assess the risk of acting or not acting if there is uncertain or insufficient information. It must also summarise all advice from iwi authorities. The report is to be made available for public inspection.

The section 32 report is often undertaken by an independent consultant. It draws on the reports and analysis of advisory groups and panels, submissions made during consultation, and MfE analysis (which includes regulatory impact assessments).

> The regulatory impact assessments conducted as part of normal regulatory practice, the section 32 report under the RMA, and the government statement and expectations for good regulatory practice, all have significant influence on final policy decisions. This is explored in more detail in Part 2 of this report which discusses the policy outputs of the NPS-FM 2020 policy workstream. But those documents also play an important role in the policy process itself.

2.4 Early processes to develop the NPS-FM

Development of the first formal NPS-FM was initiated by a Labour-led government in 2006. The then Minister for the Environment selected the process set out under sections 47 to 51 of the RMA: appointing a Board of Inquiry (to inquire into, conduct a hearing and consider submissions, and then report to the Minister with any recommended amendments). The Board of Inquiry had four members, with former Environment Court Judge David Sheppard acting as Chair.[10]

The first proposed NPS-FM was notified in August 2008 and proved controversial from its inception; 149 submissions were received and it became clear that many submitters opposed the document. Some considered it unworkable, too complex and costly;[11] there was debate about whether national direction was needed or whether policy decisions should be left to regional councils;[12] iwi called for a stronger co-management approach; and there was dispute as to whether a national policy statement under the RMA was the appropriate mechanism for dealing with freshwater protection at all. In November 2008 the government changed when National won the largest number of seats in the general election and formed a minority government. This brought with it a change in approach to freshwater policy.

As earlier mentioned, collective frustration at the lack of progress on freshwater policy had led to the formation of an independent collaborative initiative, called the Sustainable Land Use Forum, in June 2008. It was designed to bring together a range of environmental and sector groups to seek consensus on core freshwater policy matters and locate a starting point for tangible reform.

The incoming National government was receptive to adopting a more collaborative approach to freshwater policy development. In 2009 it provided backing and operational funding for the Sustainable Land Use Forum, which was renamed the LAWF. This was the start of a shift towards a more collaborative, co-production policy process between government and stakeholders, modelled on approaches used in Sweden and Finland.[13]

The LAWF was to be the primary vehicle for progressing reform and was given a broad mandate. It was asked to recommend potential reforms to freshwater management, identify shared outcomes and goals, and develop options for achieving them. Group membership was broad and substantial, with representatives from a large number of stakeholder groups. At its height, the LAWF contained around 150 members including iwi representatives, as well as active observers from central and local government. A smaller core group of 21 major stakeholders was formed to broker consensus and prepare the LAWF's reports.[14]

The government's 2009 strategic direction on freshwater also established two additional work streams to help progress freshwater reform. An 'officials workstream' was designed to be jointly led by MfE and the Ministry for Primary Industries (MPI), with officials from Treasury, DOC and the Department of the Prime Minister and Cabinet also engaged. Officials were tasked with supporting the LAWF and were directly engaged with it as active observers. There was also an Iwi Leaders Group representing Māori, which was to negotiate directly with the government to resolve questions around Māori rights and interests in freshwater (an issue placed outside the scope of the LAWF). Māori also participated in the LAWF, however, through an Iwi Advisors Group.

Meanwhile, the Board of Inquiry continued its work, issuing a report with recommendations for a NPS-FM in January 2010. The report proposed a range of amendments to the initial document proposed by government.[15] The Minister then tasked the LAWF with considering the Board of Inquiry's report and recommendations in light of how they might fit into any broader framework for freshwater reform the Forum was considering. It is important to note that the LAWF had a very open scope that went well beyond the NPS framework. It was considering a wider range of approaches to freshwater protection and reform.[16]

The work of the LAWF, as a stakeholder entity, was initially highly connected to science advice. The Forum directly engaged scientists and

involved them in its deliberations. The Forum also ran workshops on freshwater science and specific technical issues. The proximity of the LAWF to the science and scientists was identified by participants we spoke to as a core strength of the group. At the very start of the process the LAWF spent two days interacting with scientists who explained freshwater issues and the science. This was viewed as essential to achieving stakeholder acknowledgment of freshwater problems and building consensus.

> *"Having the scientists there provided a chance for everyone to discuss the science, to ask questions, to accept or contest issues. That helped make it possible to get the mandate for our workplan. It helped to get broad stakeholder agreement, and once that was in place, people took that back to their institutions."* (LAWF member)

The LAWF released its first report in September 2010, which included a wide suite of 156 recommendations to improve water management. The Forum agreed that a national policy statement was needed urgently and recommended that the Board of Inquiry's draft be used as a basis.[17] A number of other areas in need of reform were identified as were topics that required further work. The LAWF recommended that these matters be dealt with through a collaborative process.[18]

Recognising the importance of broad sector support, the LAWF also endeavoured to socialise its report as widely as possible, in order to build the backing necessary for the proposed reforms to succeed.

> *"The Forum made sure that we went out around the regions to socialise our work. There were usually six or seven people from across the sectors present and presenting. We would split into groups with one Forum member in each group to enable deeper discussion. That helped build up a lot of support at the local level."* (LAWF member)

The first NPS-FM was subsequently drafted by officials and issued in May 2011. It was a short 12 page document that adopted a non-prescriptive approach. Councils were left to determine regional freshwater objectives and limits and how they would be implemented.[19] The adequacy of the NPS-FM 2011 came under much criticism.[20]

The NPS-FM 2011 was not reflective of either the LAWF's recommendations or the Board of Inquiry's proposals. Only a select few of the Forum's many recommendations were incorporated.[21] A 2010 Cabinet paper noted that the 'Sheppard NPS-FM' "gave precedence to environmental values" and a decision was made to remove that objective in order to "provide a better balance of all values".[22] The LAWF considered that its first report and more collaborative approach had been pivotal in getting the NPS-FM across the line and in breaking the 'policy deadlock' which had endured since the mid-1990s. But the NPS-FM 2011 fell short of its expectations.[23] The LAWF sought a further mandate from government to continue its work and provide more detail to help progress its recommendations. The government agreed.

A second phase of freshwater reform was consequently initiated in September 2011, with the *Fresh Start for Freshwater* programme. This included further work on a more comprehensive NPS-FM. The LAWF was provided with new terms of reference and was asked to consider a range of controversial freshwater issues including limit setting and the roles of central and local government in water management.[24] Following the LAWF's second report, which recommended strengthening the objectives in the NPS-FM and developing a national objectives framework (NOF),[25] Cabinet decided to progress work on both a NOF and a "limited" number of national bottom lines.[26]

2.5 The NPS-FM 2014

In progressing the development of what would become the NPS-FM 2014, the Minister for the Environment elected not to appoint a Board of Inquiry but to instead utilise the alternative process available under section 46A(1)(b) of the RMA.[27] A new Water Directorate was established for this purpose in 2012 out of the joint MfE and MPI officials workstream. This enabled freshwater reform to be led by both agencies, with decisions going through both relevant Ministers for sign off. Internal memos from officials cite several advantages to adopting a joint and more collaborative approach between the agencies, including enhanced stakeholder 'buy-in' and a shorter, more efficient process. It was also viewed as more cost effective, involving reduced administrative load.[28]

The 2013 discussion document on freshwater reform *Freshwater reform and beyond,* was jointly produced by MfE and MPI, and announced that a more "collaborative planning process for freshwater" would be employed as an alternative to the process set out in the RMA.[29] The Water Directorate would jointly run the policy development process and prepare the relevant regulatory impact assessments on amendments to the NPS-FM.[30]

Although the LAWF remained involved and the process was framed as a highly collaborative one, it was more government-directed than it may have appeared, with the Water Directorate firmly at the helm. A number of advisory bodies informed the work of the Water Directorate, including the Iwi Leaders Group,[31] the LAWF, and an *officials-led* NOF Reference Group. In line with a collaborative approach, the NOF Reference Group

was comprised of fifteen stakeholders drawn from regional councils, environmental non-governmental organisations (NGOs), the Iwi Advisors Group, scientists and a range of industry groups including Federated Farmers, DairyNZ, Horticulture NZ and Mighty River Power. But while there was some crossover in membership between the NOF Reference Group and the LAWF, the Forum itself had no formal role in developing the NOF.[32] This was despite the LAWF indicating that it wanted to be the body tasked with preparing this key regulatory, limit setting, device. This meant that the process adopted went against the recommendations of the LAWF and it also placed the Forum at a greater distance from the NOF Reference Group – so the science work.

> *"Some of the Forum members were on the NOF Reference Group but the process was led by officials. In fact the Forum was explicitly excluded from the group. The process took place under a veil of secrecy. It also meant there was little to no contact between the science reference group and stakeholders."* (LAWF member)

> *"The way the government engaged LAWF scientists and stakeholders in the NOF created a secretive and disarticulated process from which the Forum was excluded... the involvement of scientists changed too. The LAWF had tried to be inclusive. We took advice from a wide variety of scientists. Membership on the new science advisory group was much narrower."* (LAWF member)

A number of specialist science panels were also established at that time. Their science expertise was drawn from a variety of sources – regional councils, universities and government departments (eg MPI, DOC and the Ministry of Health) – as well as a range of private environmental and water consultancies.[33] A Science Review Panel, made up of members of the specialist science panels, was also established to assist with technical matters and provide science advice. In addition, the Panel was charged with reviewing the suitability of freshwater attributes, and it was also able to make recommendations on other matters.

The NOF framework, and attributes developed for it as part of the NPS-FM 2014, were "set at a level agreed by the science review panel and NOF reference group" as sufficient to meet the purposes of the RMA.[34] The Science Review Panel worked closely with the NOF Reference Group to develop the framework, with oversight from the LAWF and the Water Directorate.[35] This meant that the provisions of the NPS-FM and associated NOF were closely brokered, with scientists and stakeholders working with the Water Directorate to co-produce the policy outputs.

This policy process led to the promulgation of the NPS-FM 2014, which had two new core components, both of which had been recommended by the LAWF in its reports:

- Te Mana o te Wai: formal recognition of the importance of water, its well-being and health (its mauri) as a fundamental concept underpinning the NPS-FM.
- The NOF.

The National Objectives Framework

The NOF was first introduced in 2014 to assist regional councils in applying the requirements of the NPS-FM in a more consistent way across the country. It provides a framework for managing freshwater. Its core components include the setting of:

Compulsory values: recognised national values for which freshwater objectives must be set.

Attributes: measurable characteristics (numeric, narrative or both) that are used to assess the extent to which a particular value is provided for. Examples of attributes include: nitrate toxicity, dissolved oxygen, *E. coli* and periphyton (a complex mixture of algae, cyanobacteria, microbes and detritus). The NOF enables target 'attribute states' to be set that specify the level to which an attribute must be managed, and the responses required of regional councils if these are not met.

National Bottom Lines: a specified acceptable state for an attribute, which must be met.

2.6 Calls for a shift in approach

In the 2017 general election, freshwater reform again became a core election issue. The 2017 Labour Party Manifesto called for a return to the approach taken in the NPS-FM developed by the Board of Inquiry under Judge Sheppard, claiming that the process and proposal had been "spiked" by the National Government.[36] The Manifesto cited a number of studies and reports indicating continuing decline in freshwater quality, particularly in association with diffuse sources of pollution such as intensive dairying. It also criticised regional councils for having "failed badly in [their] statutory duty" to protect freshwater.[37] Labour promised to introduce a new "stronger" NPS-FM that adopted robust nationwide freshwater quality standards "including for pathogens, dissolved oxygen, nutrients,

periphyton and macroinvertebrate health."[38] These remained areas which freshwater reform had failed to progress due to lack of stakeholder agreement. Labour also committed to address the outstanding issue of Māori rights and interests in freshwater.

Labour was elected to office in October 2017, and in May of 2018 the LAWF issued freshwater advice to the new government highlighting a series of unresolved issues. These included iwi rights and interests in freshwater; the need to accelerate work on further attributes and update the NPS-FM and NOF;[39] and the "most contentious issue within the Forum" which was the management of nitrogen contamination, an issue on which consensus had not been achieved.[40]

The 2018 LAWF report made it clear that participants were critical of the slow rate of progress, noting that there had been a failure to implement the recommendations brokered by them, even where consensus had been achieved. Indeed, by 2017, frustrations within the LAWF had led several groups to remove themselves from the Forum. In 2015, Fish and Game withdrew due to the "sidelining of environmental voices", and Forest and Bird followed early in 2017 citing disappointment at the government's continued "ignoring" of their collective advice.[41] The LAWF's 2018 report also explicitly acknowledged the limits of the collaborative process and need for some hard political decisions to be made. To that end, the report stated that "central government must provide strong leadership on freshwater" in order "to address the critical gaps in capability, science, tools and resourcing" that the LAWF had identified.

Raewyn Peart

Motueka River

This history of procedural changes reflects the highly political nature of the choice of process, and ongoing debate as to what processes deliver the best outcomes. Collaboration between stakeholders can be employed as a means to trigger a political response where there has been hesitancy by government to act and an issue has proven intractable. Stakeholder agreement reduces risk, enhances sector buy-in and enables at least some progress to be made, where more substantive reform remains unachievable. A collaborative approach can also open an often elusive 'policy window' to generate viable solutions to problems that are politically feasible.

Conversely, the scope of reform and degree of progress under a collaborative process will be constrained by the need to obtain consensus. Aotearoa New Zealand's history of freshwater reform demonstrates the limits to collaborative processes. United States commentator Coglianese has argued that frameworks based on collaborative or "regulatory negotiation" heighten stakeholder expectations; the groups who engage make a significant investment in time and resources; they tend to more heavily scrutinise rules; and progress frequently fails to live up to expectations in practice.[42]

Research on such processes has also revealed that group commitment to reaching consensus commonly results in difficult matters being left unresolved or deferred to another time, or the development of rules that attempt to circumvent or deal with the controversial issue in a vague way.[43] These dynamics are evidenced in the collaborative-based policy work undertaken for the NPS-FM between 2009 and 2017.

In March 2018, an informal ad hoc meeting took place between Ministry officials and six prominent freshwater scientists, some of whom had made contributions to the previous iterations of the NPS-FM. Collectively, the scientists initiated the meeting "to provide constructive commentary on the science behind the NPS-FM"... "its advantages and shortcomings, and to clarify the apparent disagreements" amongst scientists.[44] The scientists, which included the Chair of the Science Review Panel established to inform work on the NPS-FM 2014, highlighted that the Panel had not been reconvened since 2016 despite the 2017 update to the NPS. Other issues raised included that:

- There had been insufficient opportunity for freshwater scientists to contribute to freshwater policy and the science underpinning it. Some

were concerned that outspoken scientists, critical of freshwater policy, were being shut out of formal processes by virtue of a "closed Ministry tender" process for selection.[45]

- Differences of opinion were inevitable due to the complexity of the science but most "apparent disagreements" were either small or the result of poor communication or interpretation of policies, rather than disagreements over the science itself. This highlighted science communication, and translation of science into policy, as central issues to resolve in the policy process.[46]

- The existing NPS-FM and NOF were incomplete and lacked clarity.

- Even in contexts where the science was less clear, it was important that management decisions be made.

- Slow progress towards implementation at the local government level was concerning.

- There was insufficient transparency in the process, especially around the development of attribute bands and the basis for decisions on existing settings.

Ministry officials noted that, where the science was complex or data was lacking, councils were put in a particularly difficult position and faced legal risks in defending provisions in policies and plans (to implement the NPS-FM) through the appeals process.[47] This underscores the deep connections and interactions between science and policy, and the importance of science to policy implementation where it enables decision-making in the context of legal risk or scientific complexity and uncertainty.

As a result of the March 2018 meeting, officials determined to "refresh" the way they would engage and collaborate with the freshwater science community, including reviewing the membership, role and scope of the freshwater science advisory body.[48] The Director of Water, Jo Burton, sent a memorandum to the Minister highlighting that there was broad scientific agreement in principle on the NPS-FM and its associated NOF, but that work was needed to improve and expand it. Increased science inputs would be key to resolving stakeholder conflict.[49]

This last point had already been raised by the LAWF in its 2018 report, an entire section of which was dedicated to the science and information needs for freshwater policy and implementation.[50] The Forum had also been calling for increased science funding, inputs and advice for government, regional councils and sector groups. This was to help decision-making and make progress on highly controversial issues such as nitrate discharge.[51]

2.7 A new process and approach: the NPS-FM 2020

In June 2018, the government issued a statement that it would be prioritising freshwater and planned to update the NPS-FM.[52] With no signals that the new government would pick up on its recommendations, acknowledging that it had been unable to reach agreement on nutrient discharge issues and recognising that it was time for government to take a stronger lead, the LAWF put itself into abeyance.[53]

For the development of the NPS-FM 2020, the Minister opted to utilise the section 46A(3)(b) option for policy development under the RMA. Instead of a Board of Inquiry, an Independent Advisory Panel was established to undertake matters such as the preparation of a report and recommendations. The Advisory Panel, itself, was similar in composition to Labour's initial Board of Inquiry that worked on the first NPS-FM. It had five members drawn from backgrounds in hydrology and water management, environmental planning, animal agriculture, law and mātauranga Māori. Judge David Sheppard returned as Chair.[54]

Three advisory groups were also established to contribute to the process (see Figure 2.2):

1. **The Freshwater Leaders Group**
   The role of the LAWF was replicated in the new policy process, through the establishment of the Freshwater Leaders Group, which brought together expertise and input from across the primary sector, agribusiness and environmental NGOs. However, the Leaders Group was different from the LAWF in a number of respects. It contained no formal iwi representatives and its members, while drawn from a range of interest groups, were appointed by the Minister "because of their personal experience and commitment" and specifically "not as representatives of any organisations".[55] The group was comprised of 16 members and their role was to "provide independent advice" on freshwater policy, and to be "an independent sounding board on policy … to test and provide feedback on proposals and options".[56] The vision was for a highly iterative process, where Freshwater Leader Group members would work closely with Ministry officials. Although the group had no decision-making powers, the Freshwater Leaders Group worked with officials to set the policy work programme.

2. **Te Kāhui Wai Māori**

   Te Kāhui Wai Māori was established to "bring a broad Māori perspective". This was a new approach. Traditionally the government had negotiated and consulted directly with iwi representatives through the Iwi Leaders Group that reported to the Iwi Chairs Forum. The new body was put in place to "broaden the conversation with Māori" and "include more voices, from different areas of Māoridom".[57] It also enabled the Minister to have greater control over the selection of members, so he could influence expertise within the group and its composition. Although reassurances were made that Te Kāhui Wai Māori would not be the only way that government would engage with Māori on freshwater, this shift in approach was controversial.

3. **The Science and Technical Advisory Group**

   The STAG was established to provide independent advice on the technical and scientific basis for proposals "to support officials with science and technical advice … as requested by the Water Taskforce officials".[58] The STAG would also have "a role in ensuring the interpretation of the science for policy development is accurate and help improve protocols to better manage incorporating science into the policy process".[59] In addition, the STAG had a far more specific list of tasks that included:[60]

   - reviewing the science underpinning the NOF;
   - identifying gaps in the science;
   - improving the NOF attribute development process;
   - improving protocols to better manage incorporating science into the policy process;
   - providing overarching scientific advice and guidance on freshwater policy development;
   - contributing to science and technical guidance for council implementation;
   - providing advice on issues raised in the public submissions process.

In addition to these three groupings, a pre-existing **Regional Sector Water Subgroup** later joined the process, bringing the voice and views of regional councils.

The terms of reference for the three core advisory groups required them to produce independent reports setting out their findings and advice. For connectivity purposes, each group would have at least one member drawn from each of the other groups. For example, one member of the STAG also sat on the Freshwater Leaders Group and another on Te Kāhui Wai Māori. This was designed to provide an interface between the groups whilst maintaining the independence of each workstream. The STAG also had a non-scientist Māori member with expertise in environmental management and indigenous models in order to further strengthen this interface.

As can be seen from Figure 2.2 both MfE and MPI were to be at the core of the process.

Neil Silverwood

Packrafters in the Whataroa River

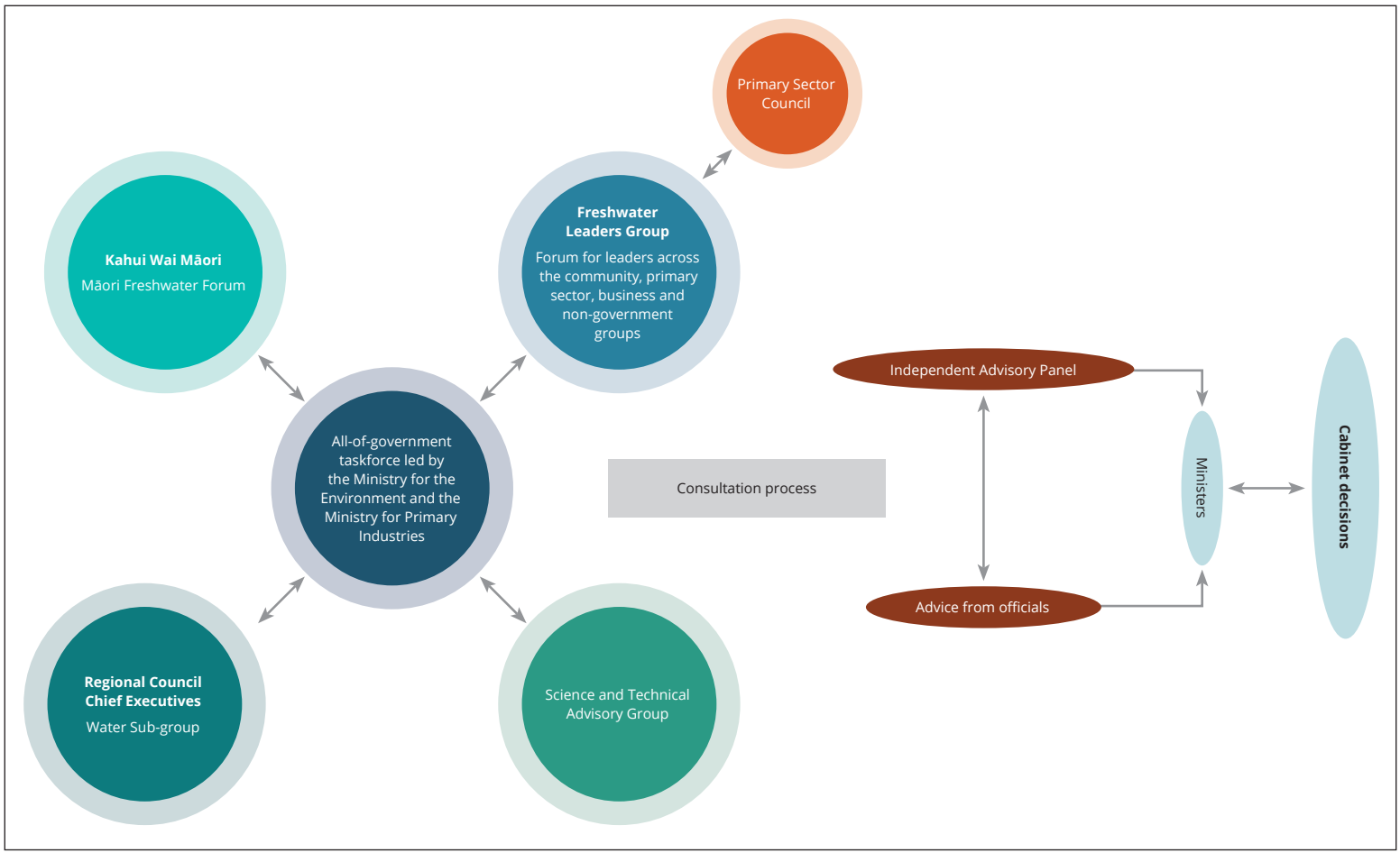
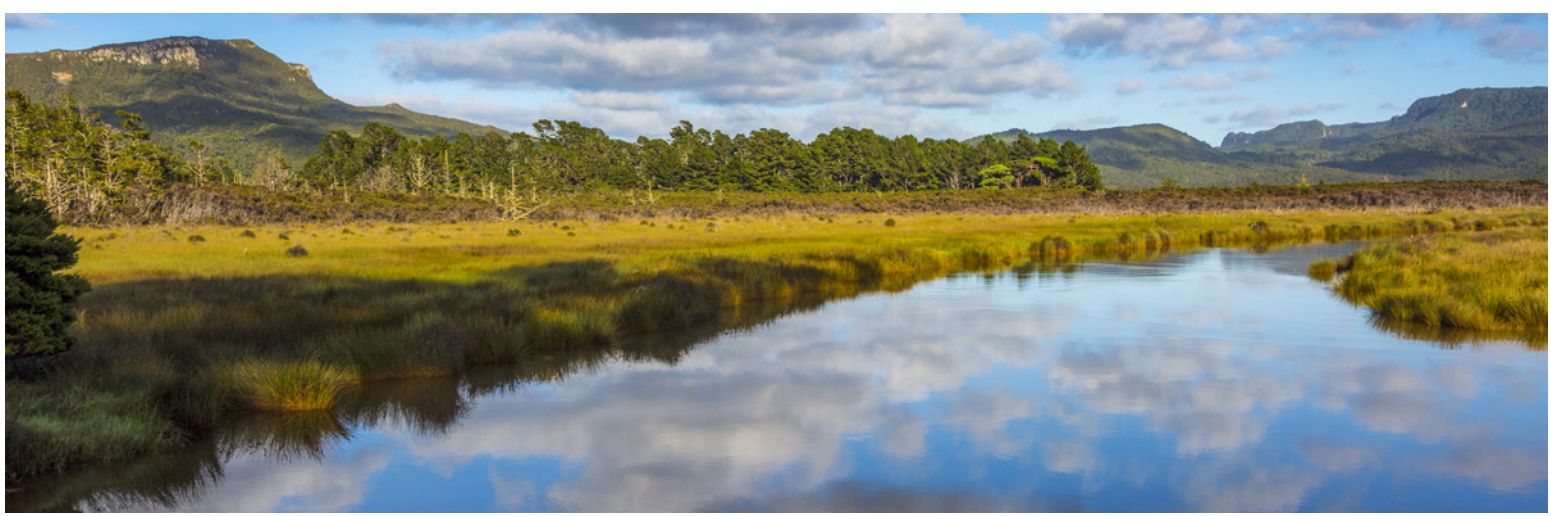


Figure 2.2 The freshwater reform process for the NPS-FM 2020 [61]

Raewyn Peart



Kaitoke Wetland

Spotlight on government agency roles in freshwater policy

The two core government agencies involved in the NPS-FM 2020 process were MfE and MPI. MfE is the government's primary advisor on environmental matters. The Ministry also plays an environmental stewardship role which involves taking a long-term perspective on environmental issues when making recommendations to the Minister. Core concerns include: the intrinsic values of ecosystems; values people place on the environment; the sustainability of natural and physical resources; the needs of future generations; and the Treaty of Waitangi.[62] The overarching role of the Ministry is "He taiao tōnui mō ngā reanga katoa" – a flourishing environment for every generation.

The Minister for the Environment is responsible for the use and protection of the environment, including the management of risks. The Minister oversees the administration of the RMA, the Environment Act 1986 and the Environmental Reporting Act 2015 amongst many other statutes.[63] Most importantly, the Minister is empowered to prepare national policy statements under the RMA including the NPS-FM.

In contrast, MPI provides policy and regulatory advice on matters such as market access and trade. A core role is to "support increased productivity across the primary sector and increase sustainable use of resources, such as water and soil". As the major regulator of the primary sector, MPI's role is to negotiate and maintain that sector's market access and work to "support growth" of agricultural industries (such as dairy, horticulture, meat, wool and forestry) in a "sustainable manner". MPI has a support role in relation to rural communities and regional economic development, "providing a rural perspective in government decisions."[64]

The Minister of Agriculture is responsible for protecting and promoting the productivity, sustainability and export performance of the agricultural sector.[65] The Minister does not have any specific roles under the RMA nor any statutory role in the preparation of the NPS-FM.

The differing priorities for MfE and MPI mean that each agency brings its own distinct policy lens. The MfE officials we spoke to acknowledged that the very different mandate and purposes of MPI and MfE made for a degree of "tension" in the policy process. However, they also underlined that this tension was "purposeful": it was a valuable mechanism for highlighting "contested advice" and pressure points, and helped officials identify areas where more work needed to be undertaken.

The framing of the role of MfE and MPI in the policy process was variable. In interviews and official documents and reports the process was sometimes characterised as a joint initiative and at other times as MfE led. This made the role of each agency, and the relationship between them, difficult to determine. A review of documents associated with the policy stream showed that for most substantive decisions, the practice was for officials to get sign off from both Ministers,[66] while day to day operational matters were handled by MfE.

The 2019 discussion document on national direction for healthy waterways, *Essential freshwater*, contains a foreword penned jointly by both Ministers, and the terminology of "we" and "our" is adopted in reference to the advisory groups.[67] The release of the NPS-FM 2020 was also accompanied by a joint press release from both Ministers.[68] At other times the lead role was attributed to MfE, with MPI's role characterised as a supporting one.[69]

The MfE officials we spoke to said that "the work was led by MfE and MPI jointly in the early days" (earlier iterations of the NPS-FM), but when the Water Taskforce was established, other departments were brought into the process. The process was "*mainly* driven by MfE" from that point onward. Another told us that "MfE was the lead agency and took responsibility for establishing the working groups", but that the Water Taskforce "often had dual sign offs and reported to both Ministers, there was a lot of co-signing". The role of MPI in the process, and the nature of the relationship between MfE and MPI, remains unclear and this is an area where greater transparency and role clarity would have been valuable.

MfE officials were the primary point of contact for the three core working groups throughout the policy process. MPI officials were therefore not 'in the room' with the STAG and did not engage with Te Kahui Wai Māori in the same way as MfE officials. When we discussed the role of MPI in the policy process, some interviewees thought that the Ministry's absence was necessary in order to

ensure that more inherently political pressures and agricultural concerns were kept out of the room. However, this meant that MPI had less understanding of the issues and science traversed by the STAG, the purpose and rationale of the settings advocated, and the finer detail or nuance of the science on which conclusions were based.

DOC was more peripherally involved in the NPS-FM 2020 development process through a role within the Water Taskforce and Sustainable Land Use Forum. Ministry officials noted that, as part of this role, DOC provided skills and expertise on a range of issues, especially restoration processes. DOC's 2020 annual report states that the Department "provided significant input" to the *Essential freshwater* package of reforms.[70] However, its role in the process was a step removed from the working groups, and its inputs into the policy process are unclear.

From a regulatory standpoint, DOC was far less involved in the process than might be expected, given its role under the RMA. This is particularly in contrast to Minister of Agriculture (and MPI), who has no formal role under the RMA, but who had dual sign off on a variety of core decisions for the NPS-FM. The RMA framework under which the NPS-FM sits contains scant reference to the primary sector or agricultural matters. In fact, until 2020, when Part 9A on Freshwater Farm Plans was added to the Act,[71] they were not referenced at all. In sharp contrast, conservation values are integrated throughout the legislation.

For example, indigenous vegetation and habitats of indigenous fauna are recognised as "matters of national importance" and the RMA explicitly deals with the preservation of wetlands, lakes and rivers. The Act makes reference to the Minister of Conservation 330 times and the Conservation Act is directly referred to 76 times. The Minister of Conservation has input into a range of resource management related policy and decision-making matters because of their clear relevance to, and potential impacts on, indigenous habitat and fauna.

Freshwater protection is also a core function of DOC under section 6B of the Conservation Act, which refers to "the preservation of indigenous freshwater fisheries and protection of recreational freshwater fisheries and freshwater fish habitat". In addition, the Director-General of Conservation has an advocacy role in relation to "the conservation of aquatic life and freshwater fisheries" under section 53(3) of the Act.

Given these statutory responsibilities, the absence of a clear and more prominent role for DOC and the Minister of Conservation within the NPS-FM 2020 policy process is somewhat surprising.

> *"The STAG tried to take a more ecosystem health and holistic approach. Considering its core roles in biodiversity protection, habitat restoration and threatened species, the absence of DOC was a gap and one that was noted on several occasions."* (STAG member)

It may be that the convergence of interests and closeness of working relationship between MfE and DOC was considered to be so strong that their relative statutory interests did not require more overt procedural accommodation. And similarly, that the far more complex and potentially conflicted interests in freshwater between MfE and MPI may have been seen as more important to formally address and resolve as part of the policy workstream.

The implications of the political choices made in the design of the policy process, and roles within it, are important factors to consider in any examination of policy-making. For example:

1. Did the increased involvement of MPI in the NPS-FM 2020 policy process undermine trust in the reforms from either the public or the environmental NGO sector? Did it raise conflict of interest concerns, or concerns at the legitimacy of the policy outputs?

2. Did the central role accorded MPI in the policy process increase acceptance of the reforms within the agricultural sector, improving 'buy-in' and the social licence for reform?

Where agency roles are fuzzy, it may also be important to consider whether that 'fuzziness' simply reflects a lack of attention to role clarity, or whether it is strategic. There can be advantages to leaving roles undefined. For example, it may allow increased flexibility, enabling roles to be renegotiated and altered as appropriate throughout the policy process. Grey areas also enable strategic management of framing. For example, where the role of an agency is unclear, the agency can claim involvement or distance from decision-making depending on which is seen as advantageous in any particular situation.

For example, when the Minister of Agriculture was questioned in Parliament by the ACT Party's primary industry spokesperson, about the economic modelling he had taken into account in setting the NPS-FM 2020, his response was that while MPI had "input" it was MfE which had undertaken that analysis.[72] An ability to defer to MfE's primacy in the process, especially when controversial elements are concerned, may have assisted MPI to manage and maintain relationships with the agricultural sector.

2.8 The government's work programme for the NPS-FM 2020

From 2018 onwards, the Water Directorate was replaced with the Water Taskforce. Like its predecessor, the Taskforce was designed to be a dedicated cross-government, multi-agency body, and was to be responsible for delivering the government's *Essential freshwater* work programme.

The framing of the Water Taskforce is subtly different to that employed for the Water Directorate. Official documents characterise the *Essential freshwater* programme as being led by MfE, "with support" from MPI,[73] or as being "managed and coordinated" by MfE with the Ministry "hosting" the Taskforce. The Taskforce itself included officials across a range of entities; MfE, MPI, Te Puni Kokiri, Te Arawhiti, MBIE and Treasury.[74] Official memoranda and advice provided to the NPS-FM 2020 workstream were addressed to the Minister for the Environment, and copied to the Minister of Agriculture, reflecting greater MfE leadership and control of the policy process.

However, it is clear that while MfE was the primary agency coordinating the policy development process, in situations where officials required approval or policy direction, joint approval and agreement continued to be sought with documents needing to be signed off by both Ministers.[75] When Cabinet determined, in July 2019, that further changes would be made to the RMA in order to progress freshwater reform, policy approval was similarly delegated to *both* the Minister of Agriculture and Minister for the Environment.[76]

It is important to note that the development of an updated NPS-FM was only one piece of the *Essential freshwater* policy package. Work was simultaneously being undertaken to develop a national environmental standard for freshwater, as well as section 360 regulations under the RMA. The latter led to the introduction of the 2020 stock exclusion regulations.[77] Regulations were also progressed to require the measurement and reporting of water takes by permit holders.[78]

This report focuses on just one aspect of the *Essential freshwater* policy package but this broader context should be borne in mind. While the work of the STAG was restricted in scope and focused on the NPS-FM, other groups engaged in the process (Te Kāhui Wai Māori, the Freshwater Leaders Group and Ministry officials) were working far more broadly and were considering a raft of additional and complementary measures. The NPS-FM 2020 therefore sits within this broader policy framework.

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Taranaki Falls

A spotlight on the process and approach for developing the NPS-FM 2020

The regulatory context

The RMA provided the statutory framework for the preparation of the NPS-FM 2020. In addition, previous iterations of the NPS-FM were already in place, including the NOF. Overall, these documents provided the regulatory 'frame' for the freshwater policy work undertaken on the NPS-FM 2020. Since policy designed to be inserted into pre-existing frameworks will always be constrained by what has gone before, these settings can be viewed as providing the boundaries or scope for that policy work and the science input sought.

The procedural choices

The procedural choices made by the Minister are indicative of a shift towards greater governmental direction in the process. These choices included: the selection of the alternate more streamlined policy process under the RMA; the stronger role and direction for MfE in the process; the increased ministerial role in advisory group composition and membership; and the strengthening of the science role through the STAG and its more formal separation from the other streams of advice.

The Minister for the Environment reiterated in various press releases and conference speeches that: the collaborative process had reached it limits and a stronger lead from government was required; the overwhelming majority of New Zealanders wanted more action to protect freshwater; freshwater was a platform Labour had campaigned on and was determined to deliver on; and that swift action was necessary to stop further degradation and start reversing past damage.[79]

The Minister gave reassurances that consultation and sectoral views remained a priority, and that the impacts, costs and timeframes of reforms would all be taken into account. But the government was also determined to get things heading in the right direction. Failing to do so would only result in water quality deteriorating further, clean-up costs increasing, and the task of improving freshwater quality being longer and more difficult.[80]

The science delivery mechanisms

The changes made to the science inputs were also notable. The STAG did not contain primary sector representatives or stakeholders. There was a clear attempt to separate the work of the stakeholder and science advisory groups, and to allocate work on attribute development for the NOF to that new, more independent, science body. Many commentators, including the LAWF, had called for increased science inputs to help resolve some of the more controversial decisions around attribute setting. Provision for a specialist independent science group was an attempt to remove political pressures from the scientific analysis. In light of this, the one appointment that proved somewhat contentious, particularly amongst industry groups, was the inclusion of a scientist attached to Fish and Game.

The requirement for the STAG to produce its own report which would be publicly available, setting out its findings and recommendations, was also intended to make the science advice clearer and more transparent. Both measures were aimed at strengthening the science inputs.

2.9 Understanding the policy process

The policy-making process, in general, has been the subject of immense study and theoretical analysis. In this section we, very briefly, highlight some of the most formative ideas traversed in this area and, in particular, those that have informed our examination of the NPS-FM 2020 development process.

One of the most influential conceptions of the policy process was put forward by Lasswell in the 1950s, who postulated the 'policy cycle' model.[81] Since that time, thinking on the policy cycle has been refined, in an attempt to articulate more clearly the various tasks that sit within the policy process. Consensus within the research community has landed on a policy model cycle which typically consists of five major stages:[82]

1. Agenda setting: identifying the public problem
2. Policy formation: identifying and assessing solutions. These may be limited by:
    - Substantive constraints – resources and capacity
    - Procedural constraints – existing governmental, institutional and political settings
3. Policy setting: finalisation and decision-making
4. Policy implementation
5. Policy evaluation

This construction of a phased policy cycle, with distinct stages of governmental problem-solving, is useful conceptually in understanding the main tasks of policy-making. What is also striking is that science inputs are key at all points in the process; scientific findings assist to identify issues (in fact scientific findings are frequently the trigger for a policy response), and they assist to identify the responses possible and inform response selection (through providing information on the relative chances of success or risk associated with the options under consideration). Science is also a key input into the development of methodologies for implementation, and into the assessment and evaluation of the outcomes of policy implementation.

However, the conceptual framing of the policy process as a 'policy cycle', with distinct stages, has attracted significant criticism. Critics argue that it is too simplistic, fragmented and linear to explain how policy-making operates in practice. Similarly, historical characterisations of the interface of science with policy (where a question or problem is identified and science used to investigate the matter and generate a solution) fail to capture the true complexity of the science inputs into policy-making. Solutions are seldom binary and science is often insufficiently precise to be applied in this way. A chief criticism of the 'policy cycle' model, in relation to how it frames the science inputs, is that it fails to take into account the "messy realities", the importance of interactions between actors, and the role of politics and power relationships in shaping the use of evidence.[83]

Most modern theoretical work on evidence-informed policy now recognises that science advice and policy formation "increasingly act in a more iterative way – what has been termed the 'co-production' model of policy-making, in which policy-makers, expert advisors and society negotiate to set policy goals and regulatory decisions that are agreed to be scientifically justifiable… as well as socially and politically acceptable."[84]

An alternative conception of the policy process is Kingdon's multiple-streams framework, which postulates 'policy windows' opening when a critical nexus exists between three factors: (1) a recognised problem, (2) viable solutions and (3) political feasibility. There is a problem stream, a policy stream and a politics stream and actors interact to define and control the policy agenda creating significant complexity and uncertainty. The model is useful for highlighting the role of the practical and the political in the policy process, including the importance of perceptions, opinions and attitudes held by those involved. It also factors in the impact of election cycles, Cabinet reshuffles, legislative time constraints and budgetary considerations.[85]

For current purposes, it is important to draw on the relevant literature across all these threads: to understand that there are a range of different tasks involved in the policy-making process to which science might be applied. The literature also highlights that *how* science is applied, and how those policy tasks are framed, is impacted by a range of practical and political considerations. In addition, the policy process is not always linear; progress and regress, and adjustments and review of settings, may occur at multiple points. Indeed, work on policy review, policy formulation and policy for implementation may occur simultaneously, rather than sequentially, especially where policy-making is refining existing regulatory frameworks rather than formulating new ones.

This iterative approach requires much from scientists, including skills in science communication, an ability to translate and apply science to policy needs, and knowledge brokering. In addition, scientists need to be aware of their own potential biases and the boundaries between the scientific and political. Such boundaries are often unclear, and can be more complex to determine than is widely appreciated.

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Tekapō River

2.10 Understanding the science-policy interface

2.10.1 'Two communities logic' and the transfer model[86]

"The transfer model conceptualises science and policy as separate domains that are disconnected from each other". The "production of scientific facts is seen as a value free process. Interactions between science and policy are seen as linear and one-dimensional".[87] The transfer model employs a *"two communities"* logic: science and policy are viewed as discrete and separate spheres, and it becomes the role of *officials* to 'bridge the gap', *translating* science into policy. The literature on 'research application' and 'knowledge translation' tend to arise in this context as core themes for examining the policy process and the science-policy interface within that process.[88]

Scholars of Science and Technology Studies, a field of study that analyses the processes of knowledge production, have highlighted that a core problem with the two communities logic is that what counts as 'science work' and 'policy work' is not a given. In practice, the boundaries are seldom clear and must be negotiated, or they will easily be transgressed. Where processes have been established, based on the perceived need to separate science and policy, it is therefore important to examine not only how the two workstreams are bridged (ie how the research is applied and translated into policy), but also the 'boundary work' that was undertaken in order to separate the two tasks.

> **Boundary work:** the establishment and maintenance of dynamic boundaries between science and other domains through explicit designation of certain matters as scientific or political.[89]

A significant degree of 'two communities' thinking is evident in the approach adopted in relation to the NPS-FM 2020, particularly in the establishment of a separate, independent science advisory body (the STAG) to inform policy development. Policy processes based on this approach require the scope of the science and policy matters involved to be clearly demarcated in the relevant terms of reference, and the roles of the various actors in the policy process to be made clear. This is to prevent transgression of the science-policy boundary. It is important to note that such transgression may operate in either direction: political concerns may unduly influence the science advice provided whilst the scientific analysis and/or science outputs may attempt to extend their influence into matters more appropriately left to policy-makers.

Criticisms traditionally associated with making such science-policy distinctions include that the boundary raised between the 'scientific' and the 'political' creates a perception of objectivity and separation when the boundary is far more fuzzy than appreciated. A further complexity is that, while a 'two communities' approach can distinguish science from policy (thereby ensuring the science advice is clear and increasing its visibility), it can also be utilised as a marketing mechanism to construct the appearance of an objective and scientific policy output.[90] Commentators have therefore highlighted the importance of examining whether claimed distinctions between 'science' and 'policy' are in fact 'real' and of understanding these more political dynamics.[91]

Practical problems have also been cited with applying two communities thinking, including increased risk of 'lack of fit': that where the two spheres have been kept very separate, they may be much more difficult to integrate. This is especially the case where there has been insufficient integration of the science into the overarching framework design. It is telling that the literature on 'knowledge translation' frequently points to the need for a more integrated collaborative approach.

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Tukituki River

2.10.2 'Co-production' and a transactional model of policy development

An alternative approach to 'two communities' thinking, is to adopt a 'transactional model', where scientific knowledge actively intermingles with political judgments through a more iterative and dynamic process. This is often referred to as "joint knowledge production"[92] or "co-production". Rather than maintaining strict separation, science and policy are produced simultaneously and interactively through the policy development process.[93] This type of relationship was more evident in the policy workstreams for earlier iterations of the NPS-FM, in the composition of the previous NOF Reference Group.

Interactions between science and policy provide a useful lens for investigating scientific knowledge production as a social practice. Such an investigation seeks to understand the 'human' aspects of 'knowledge production'; the impact of personal ideology, culture, relationships and context; and their interactions with and impacts on the science. It also explores how these matters influence the research questions asked, the degree of caution and certainty required for acceptance of the science, and applications to which the science will be put. From a co-production perspective, the process is one of "constant intertwining of the cognitive, the material, the social and the normative".[94]

A criticism of co-production is that it reduces transparency and accountability. Without sufficient checks, co-production can represent a withdrawal from distinguishing between the scientific and the political, in a context where there are often many more overlapping, and less visible, interactions taking place.[95]

Distinguishing 'front-stage' and 'back-stage' performances

Regardless of the policy process, transparency of decision-making is a key consideration of any examination of process. Hillgartner has conceptualised the spaces for interactions and transactions in the policy process as consisting of a "front stage" and a "back stage". On the 'front stage' are the published reports, impact assessments and presentations provided for the external audience. The 'back stage' comprises those meetings, conversations and negotiations that help construct the final policy output, but remain removed from the public eye.[96] What Goffman terms the "room for insiders" may, in practice, contradict the external performance.[97]

Any examination of the policy process will be restricted to examining the more visible front stage elements. It is important to understand that these only represent a part of the picture. There is a need to consider the degree of transparency and openness associated with any policy development process, and the implications for policy outputs.

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Lake Wanaka during a drought year

Our interviews with those involved in the NPS-FM 2020 development process were informed by our review of the regulatory framework and the procedural history of the NPS-FM, as well as by the issues and conceptual matters discussed above. The aim was to explore how the process impacted on both the science and mātauranga Māori inputs. Did they foster an evidence-based approach? What boundary work was undertaken and how did it operate in practice? What complexities arose at the science-policy boundary for science communication and translation into policy? What process was adopted for incorporating mātauranga Māori into policy? Were there back-stage performances and if so what was their impact? Was there sufficient openness and transparency? What were the strengths and weaknesses of the policy process?

Although the focus of this report is on the science-policy interface, mātauranga Māori was a further knowledge input into the NPS-FM 2020.

The terms of reference and approach adopted for Te Kahui Wai Māori were very different to that of the STAG, being far more open in scope and less ministerially directed. By its very nature, mātauranga Māori is also inherently highly integrated. Its knowledge inputs, ideology and values are merged and co-produced rather than considered apart. Our interviews with members of Te Kahui Wai Māori sought insights into how these aspects made the policy process different for them. We also sought to gain deeper understanding of the procedural requirements necessary to support effective Māori participation.

The contrasting approaches taken within the Te Kahui Wai Māori and STAG workstreams, and their relationship with the policy process, provided an interesting point of comparison which helped generate useful insights. We now turn to the process for inputting science into the NPS-FM 2020 policy process.

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Haast River showing cattle grazing in the riverbed

Endnotes

1 Resource Management Act 1991, s5

2 https://environment.govt.nz/acts-and-regulations/national-policy-statements/

3 https://www.mpi.govt.nz/consultations/proposed-national-policy-statement-for-highly-productive-land/

4 https://environment.govt.nz/acts-and-regulations/national-policy-statements/proposed-nps-indigenous-biodiversity/

5 Resource Management Act 1991, s62(3), s67(3) and s75(3)

6 For more detail on the permissible scope of a national policy statement see the ruling of the Supreme Court in *Environmental Defence Society Inc v The New Zealand King Salmon Company Ltd* [2014] NZSC 38

7 https://www.treasury.govt.nz/publications/legislation/regulatory-impact-assessments

8 https://www.treasury.govt.nz/information-and-services/regulation/impact-analysis-requirements-regulatory-proposals

9 https://www.treasury.govt.nz/information-and-services/regulation/regulatory-stewardship/good-regulatory-practice

10 Other members were: Associate Professor Jon Harding (freshwater ecologist), Jenni Vernon (farmer and member of the Waikato River Authority) and Kevin Prime (a commissioner with the Environment Court, beef farmer and founder of Ngā Whenua Rāhui, of Ngātihine, Ngāti Whatua and Tainui descent)

11 Board of Inquiry into the proposed National Policy Statement for Freshwater Management, 2010, 14

12 At 11

13 Wright, 2012, 20

14 A summary of the approach and details of the LAWF's membership is provided in its first report. See Land and Water Forum, 2010

15 Board of Inquiry into the Proposed National Policy Statement for Freshwater Management, 2010, 48

16 For example, the LAWF recommended a new planning and institutional framework, including the establishment of a national land and water commission and greater national direction for flood management. See Land and Water Forum, 2010

17 Land and Water Forum, 2010

18 At 45

19 https://environment.govt.nz/assets/Publications/Files/nps-freshwater-mgnt-2011_0.pdf

20 An independent scientific report prepared for Fish and Game noted that 'Sheppard's NPS recommended an objective to *protect* outstanding water bodies, *enhance* those contaminated by human activities and *maintain* all other water bodies. However this was removed in favour of a 'net improvement' approach that allowed some lakes and rivers to be degraded so long as overall water quality in a region was maintained or improved. The report criticised the lack of national standards and predicted further intensification of land use and decline in water quality as a result. See Sinner, 2011, 6

21 Brower, 2016, 393

22 Minister for the Environment, 2011, 11

23 Land and Water Forum, 2012b, v

24 Land and Water Forum, 2012, *Terms of Reference for the Land and Water Forum*

25 Land and Water Forum, 2012a

26 Ministry for the Environment, 2013, 31

27 Ministry for the Environment, 2014a, 4

28 Memorandum from Water Reform Directorate officials to the Ministers for the Environment and Primary Industries, 10 July 2013, *Freshwater Reform: Approach to consultation on NPS amendments*

29 Ministry for the Environment, 2013, 24

30 Water Directorate, 2017

31 The Iwi Leaders Group reports to the Iwi Chairs Forum, http://www.iwichairs.maori.nz/

32 Ministry for the Environment, 2015, 34

33 Including Opus, Aqualinc, Wriggle consulting, Gail Tipa and Associates, Golder Associates, Ian Kusab's and Associates. See Appendix 1 Membership of science and reference groups, Ministry for the Environment, 2014b, 57

34 Ministry for the Environment, 2014b, 18

35 At 2

36 New Zealand Labour Party, 2017, *Labour Party manifesto 2017: Water*, 3

37 At 3

38 At 3

39 Land and Water Forum, 2018, 1

40 At 2

41 Mitchell C, 2017, 'Forest and Bird leaves Land and Water Forum after "deeply disappointing" policy', *Stuff*, 7 March 2017

42 Coglianese, 2001

43 A range of commentators have noted this tendency on committees where consensus is the goal. See Coglianese, 1999 and Kerwin, 1999, 167

44 Ministry for the Environment, 2018d, *Freshwater: Resolving NPS-FM science differences*, an internal MfE memorandum to Ministers for the Environment and Agriculture, Ministry for the Environment, 10

45 At 4

46 At 5

47 At 6

48 At 8

49 At 8

50 See recommendation 38, Land and Water Forum, 2018, 37

51 At 14

52 New Zealand Government, 2018, 'Government to act on Land and Water Forum report', press release, 26 June 2018, https://www.beehive.govt.nz/release/government-act-land-and-water-forum-report

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54 Freshwater Independent Advisory Panel, 2020, 12

55 Parker D, 2018, 'Taking action to improve water quality', press release, 8 October 2018, https://www.beehive.govt.nz/release/taking-action-improve-water-quality

56 Ministry for the Environment, 2018a

57 Parker D, 2018, 'Kahui Wai Māori group to work on freshwater', press release, 3 August 2018, https://www.beehive.govt.nz/release/kahui-wai-m%C4%81ori-group-work-freshwater

58 A copy of the terms of reference can be found in Appendix 1 of the STAG's report: Science and Technical Advisory Group, 2019, 50

59 Science and Technical Advisory Group, 2019, 50

60 At 50

61 Powerpoint presentation on the Foundation for Arable Research website, https://www.far.org.nz/assets/files/blog/files//ded7c44f-6755-564f-80d5-660e817194a8.pdf

62 https://environment.govt.nz/about-us/ministry-for-the-environment/

63 https://dpmc.govt.nz/cabinet/portfolios/environment

64 https://www.mpi.govt.nz/about-mpi/structure/

65 https://dpmc.govt.nz/cabinet/portfolios/agriculture

66 See Cabinet Business Committee, 2019 and Water Directorate, 2020

67 Ministry for the Environment, 2019b

68 New Zealand Government, 2020, 'New rules in place to restore healthy rivers', press release, 5 August 2020, https://www.scoop.co.nz/stories/PA2008/S00045/new-rules-in-place-to-restore-healthy-rivers.htm

69 New Zealand Government, 2020, 'New rules in place to restore healthy rivers', press release, 5 August 2020

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71 By section 64 of the Resource Management Amendment Act 2020

72 O'Connor D, 9 February 2021, 'Questions to the Minister of Agriculture: Question 270', *New Zealand Parliamentary Debates*

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74 At 3

75 This appears to be the standard practice of officials and forms provide space for the signatures of both Ministers. For examples see Cabinet Business Committee, 2019, *Essential freshwater: Public consultation on national direction for freshwater management* and Ministry

for the Environment and Ministry for Primary Industries, 2020, *Essential freshwater 83, Policy decisions following consultation*, Cabinet paper (MFE Tracking # 2020-B-06431)

76 Cabinet, 2019, CAB-19-MIN-0337.1

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78 Resource Management (Measurement and Reporting of Water Takes) Amendment Regulations 2020

79 A good example is this speech at the Water NZ Conference in Hamilton in 2019, https://www.beehive.govt.nz/speech/speech-water-nz-conference-hamilton-2019

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87 Wehrens and Bal, 2011, 70

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94 At 15

95 See discussion in Wehrens, 2013, 29

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97 Goffman, 1990

3 The process for science inputs

Griffin Creek

Neil Silverwood

3.1 Role and scope of the STAG in the policy process

The STAG was established to support government officials by providing science and technical advice on the work programme set by the Water Taskforce. The terms of reference for the STAG included:

- reviewing the science underpinning the NOF attributes and other freshwater policy options presented by MfE officials;
- identifying gaps in the science needs;
- improving the NOF attribute development process;
- improving protocols to better manage the incorporation of science into policy processes;
- providing overarching scientific advice and guidance on freshwater policy development;
- contributing science and technical guidance for council implementation of the NPS-FM 2020;
- providing scientific advice on issues raised in the public submissions process.

While some of these matters are broader than others, the main task of the STAG was to review the science underpinning the NOF and specific attributes within it, in order to meet the policy needs of government officials. This meant that the STAG's work was far narrower in scope than might be evident from a reading of its terms of reference; the group was not engaged to develop its own ideas for water quality attributes or policy responses.

Although there was some flexibility in the process, officials set the work programme and agenda, tabling topics for discussion and requesting specific advice as needed.[1] This approach is very much in line with 'two communities' logic and highlights the strategic decision to maintain a separation between matters of science and matters of policy.

> *"The STAG was the most formal of the groups. All groups wrote their own reports, but the other groups had a more organic process, more scope to identify policy options and issues, and to discuss the implications of those things."* (Ministry official)

> *"Our work with the STAG couldn't be a truly consultative process, because it was driven by the Minister in discussion with senior officials. Groups might enter the process with their own views on what needed to be done, but the government had already formed a view on the work wanted and broad scope of reform. We tried to be flexible, but we couldn't let the scope be something that was ever expanding, and we needed to press on with the work set. This was a really tricky dynamic for staff. It put officials in an awkward position."* (Ministry official)

Many STAG members found the scope of their engagement limiting and a degree of frustration was evident at the narrow ambit of their input into policy design. The 2019 STAG report records that "important matters were not addressed or not addressed to the depth necessary to make specific recommendations". It then goes on to identify a number of gaps

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Lake Wānaka

in the recommendations.[2] This indicates dissatisfaction with the work programme set by officials.

It was apparent from both the STAG reports, and our interviews with STAG members, that the prescribed and narrow role of the group was contentious. One STAG interviewee stated that "there was limited scope for us to be innovative, to discuss more core areas or priorities". Others noted that, because the work of the STAG was so meeting driven, the entire process became very reactive rather than strategic:

> *"It could even feel a bit like rubber stamping at times, especially when there was material brought to us and they wanted a yes or no answer. That undermined the nuance or ability to consider alternative options."*

> *"From the start, the science for policy work had already been conceived, so they were looking for science backing to support their policy ideas."*

> *"The direction of travel was set. That reduced our freedom to delve more deeply into things we thought needed more work. We had to focus on getting through the issues MfE wanted us to cover. The terms of reference were good, but opportunities were certainly lost, and some important issues that needed resolution got left up in the air."*

> *"Our job was viewed as a purely technical one, providing information for critical thresholds for environmental quality that could become bottom lines in the NPS. It was highly limited."*

Other STAG members were more pragmatic, noting that the policy process was just one small part of a broader ongoing piece of work, one of several iterations. After all, the strategic direction *had* been set. Also, they thought it was not the STAG's role to 'develop policy' or set the strategic direction – but to test evidence for officials.

3.1.1 Science input to policy approach and design: front end considerations

One notable aspect of the development of the NPS-FM 2020 was that the work of the STAG commenced at an intermediary point in the policy process: the RMA, national policy statement and NOF frameworks had already been determined and these laid the foundations for the freshwater policy response. As a result, the STAG needed to build on what had already come before, and this restricted the scope of its inputs. STAG members highlighted a number of limitations arising from this situation (see spotlight).

Spotlight on limitations on science inputs under the RMA

Interviewees raised a number of problems with providing science inputs to policy within the RMA framework. The RMA was criticised as being "too effects" based, "very reactive" and overly focused on mitigation. These are accepted weaknesses of the RMA and ones that have contributed to broader calls for reform: in particular, its focus on effects creates an overly permissive regime that struggles to prevent environmental harm.[3] Adverse effects that occur across domains (eg from land to rivers), and which arise from multiple sources and/or are cumulative in nature, are particularly difficult to address without a more integrated approach that is capable of targeting the drivers or collective causes of degradation (eg land use change).

The planning process at the regional council level was also singled out for criticism. To be effective, environmental policy needs to be responsive to environmental change and new data, science and pressures. It needs to incorporate adaptive management and an agile planning process so that the system can evolve with the science. However, planning processes under the RMA are laborious, expensive and can take years, meaning that regional plans struggle to keep up with the current context:

> *"NPSs [national policy statements] need to be kept current in order to do what we need them to do and to respond to new information. Plan updates at the council level take such a long time. The 10-yearly policy cycle doesn't allow for the kind of adaptive management needed in areas like freshwater management."*

A further weakness of the process identified by several STAG members was that, although the NOF enables a more outcomes-based approach under the RMA, the focus of the NOF was on assessing "individual parameters, not the whole system". A common descriptor used was that this represented a very "compartmentalised" approach.

This limitation stemmed out of previous work on the NPS-FM and the direction the NOF had already taken by the time the STAG was constituted. This meant that the work of the STAG was very much limited to being an *extension* of that previous work. It was described by one interviewee as "a refining, a filling of gaps, restricted by the NOF, the RMA and the NES [national environmental standard] process."

"The NOF framework being applied came out of the LAWF, so when the science group was asked for advice, it was for advice to fit within that framework. That was challenging, but government had already made that decision and had put its eggs in that basket."

Even accepting the limitations of the pre-existing regulatory framework, one of the most frequently expressed views of STAG members was that it would have been beneficial to have had input into setting the STAG terms of reference and developing the plan of work.

"There is a role for scientists at the point of design, in setting the scope of the work and composition of groups. There is an argument for starting with mapping out what scientific information is available, what form of information is going to be most useful for policy, and identifying the scope of expertise required. That way we can approach the task strategically. Advisory groups always seem to end up chasing their tails, rushing to deliver. Decisions get undermined by a lack of information. The way we generate policy doesn't bring the full gravitas and value of science that it could. We end up doing work on the fly. Scientists need to be at the table when the approach and options are being discussed."

Some STAG members noted that one benefit of greater dialogue at the outset would be a better understanding of common objectives and a more symbiotic relationship between scientists and officials.

"If we were doing it again, I'd want us to all sit down before we started to ensure we were clear on the questions officials wanted answered, the structure and objectives."

"A lot of the criticisms people had really came down to different expectations. More time to talk through the workplan at the beginning would have been beneficial to helping the STAG understand its role – and the limitations."

Several interviewees highlighted that bringing scientists directly into policy design raised the risk of the science getting too close to the politics of the process. They reiterated the importance of "allowing scientists to stick to science issues, not roam into the policy space", a boundary that was considered to have been highly useful to the work of the STAG. It was also noted that very few scientists are appropriately qualified and capable of working in the strategic policy space and opening up those discussions was only likely to devolve into debate, as it did in the more stakeholder-based groups. The key to resolving these concerns will lie with identifying the 'sweet spot' which lies somewhere between scientists providing science advice on request and scientists making policy. It was suggested that (provided mechanisms were put in place to ensure high transparency and openness, including external review) there would be considerable value in adopting a more integrated approach.

Spotlight on science and the COVID-19 response

The integrated, 'co-development' approach of the policy response to COVID-19 was referenced by several STAG members who were impressed by the high degree of involvement of scientists. The COVID-19 response highlighted the benefits of looking at a problem from a science perspective and bringing in the collective expertise that exists across scientific institutions. It was suggested that a similar collaboration of freshwater scientists from universities, Crown Research Institutes, government and private (but public good focused) science research institutions (like the Cawthron Institute), in order to have an open and frank discussion with the relevant Ministers and officials at the front end of the policy process, would be highly valuable.

"We need to learn from the COVID response. The science and the policy were almost indistinguishable. That was because there was a clear goal: elimination. Having that clear common purpose and direction of travel really freed up the scientists to contribute. For matters like mask wearing, they were treated as technical issues, and the focus was kept on the science."

"The COVID response isn't unique. I am certain that if water quality scientists helped design the policy instruments they would look very different. We wouldn't be arguing the numbers, but the methods to get there."

It should be noted that these comments were associated with interviews that preceded the anti-vaccine mandate protest camp on Parliament grounds in early 2022. Later feedback variously referenced the need to develop a concerted and strategic approach to combatting misinformation and disinformation. Also, in hindsight, the approach may have been too narrowly focused on specific public health issues, to the detriment of ensuring the policy approach addressed a range of socio-economic and cultural aspects. This may have had consequences for social licence and the longer-term effectiveness of the approach.

3.1.2 Scope of the science inputs

Because of the distinct role and terms of reference set for the STAG, officials made a concerted effort to keep policy matters out of the group so that the STAG could focus purely on the science. There were diverging views on whether this was the right approach. Integrating the science work of the STAG into the policy process might have enabled the science to be a better fit for the policy agenda. It might have also provided more scope for innovation. However, confining the STAG to advising on the work of officials as directed, potentially enabled more efficient use of time as well as greater transparency and reduced risk of conflicts of interest impacting on the science.

There was some lack of clarity at the outset as to the role of the STAG, with some members anticipating greater involvement in work on policy. They were taken aback at the reduced scope of the group in practice. One interviewee said that he thought they would be working on policy development, but that the role was restricted to "providing scientific guidance". Officials said they tried to be flexible where possible, and provided scope for the STAG to suggest more attributes. But there was limited time for that additional work, since officials already had an "ambitious and substantial body of work to progress".

One STAG member noted that flexibility in scope was difficult because, even where additional things were developed, "they were too hard to apply because we were starting in the middle. The whole thing was driven by past processes, so without modifying that, they just didn't fit."

Irrespective of whether a broad or narrow scope was preferred, a common issue raised by STAG members was the need for greater context and more open communication with officials. It was felt by many that additional context, greater clarity on what the officials were looking for, and more structure and information on the work plan would have been beneficial. STAG members reported that when questions were posed by MfE officials, scant detail was provided as to the rationale for the work being undertaken, how it would fit within the broader settings under consideration, or what the core objectives of the work were. Without this information, some felt the work of the STAG was left uninformed, unstructured and lacking context.

Several STAG members felt that greater clarity and transparency would have greatly assisted their task. For example, some reported that a too harsh delineation between science and policy led to the science being treated in a very mechanistic, linear way, with questions being posed from one side and answers expected to be churned out from the other. This approach was considered too simplistic given the complexity of the issues being traversed. The fundamental difference between simply "providing reports and technical advice to officials" and *informing* the design of policy was emphasised.

> *"Our role was to provide information, advice 'on tap'. That was a very different role to that of the Ministry scientists. They had the bigger picture, the context, the goals. If we had had greater understanding of the core policy needs, we would have been better able to judge what information was of increased relevance. Our contribution could have been enhanced and more innovative. It could be hard to know how component parts were going to fit into the bigger picture. And that's an important aspect of the science."*

> *"I would've liked a more open and informal relationship with the MfE scientists, and a more iterative, open and responsive process with officials. It would have helped get us on the same page."*

> *"Some issues came to us, others didn't. Numerous decisions were made about what went to the STAG versus other consultants and staff. It was hard to understand the bigger picture, how things would fit. I think we needed better lines of communication, more connectivity."*

In seeking greater contextual understanding, the interviewees were all very clear that the intention was not to trespass into matters of policy, but rather *to improve the fit* of the science for policy and the effectiveness of the science inputs. There was concern that efforts to keep the STAG away from political considerations had restricted the science. Interviewees emphasised that many decisions, by their very nature, required integration of science and policy: for example, whether the regime is 'fit for purpose', how uncertainty might be dealt with, and how risk averse the policy needed to be. These were political judgments but ones that were also often quantifiable by science.

> *"The application of the precautionary principle, how to quantify that for the NOF and implementation, and setting up something that could structure the policy to enable it to deal with uncertainty and different levels of risk. The STAG could've had those debates, and those would have added value."*

> *"We were told not to think about how to achieve water quality, what the policy should be, but to focus on the technical questions. But you can't avoid going beyond that. So when we came up with numbers we tried to provide a narrative explanation, so we could express potential caveats on how to use that advice and some interpretation. Otherwise important*

information would have been omitted, information needed to understand the advice."

It was also noted that STAG members had not been selected for their expertise in these broader matters, such as risk assessment. So if the role of the STAG had been expanded, the composition of members would also have needed adjustment, as would have the timeframes for the work.

Spotlight on the Science Review Panel

A different approach to science inputs was applied to the development of the NPS-FM 2014. For that process, a Science Review Panel was established to advise *both* officials (the Water Directorate) and the NOF Reference Group which was undertaking work on attribute setting.[4] Selected stakeholders, sitting on the NOF Reference Group, could directly request the Science Review Panel to consider issues they wanted more clarification on. In this way, the Science Review Panel provided a direct conduit of science advice to both officials and stakeholders alike. The Water Directorate was also a more joint (rather than MfE-led) body at that time, so membership of the Science Review Panel was approved (and could be changed by) both MfE and MPI.

As part of our interview process, we spoke with several scientists who had sat on the Science Review Panel, its associated expert groups, or the NOF Reference Group, in order to gain a deeper understanding of the differences in approach.[5] Interviewees described that process as a much more interactive one, in which the Science Review Panel obtained strong inputs and feedback from the stakeholder's NOF Reference Group. The communication was described as much more open. This enabled scientists to have a greater appreciation of the pressures and politics surrounding the policy settings being discussed.

In addition, the Science Review Panel's technical discussion was informed (although potentially restricted) by a set of instructions provided by officials to guide the scientific work. This contained set criteria and a five point list of matters to consider, including "was there sufficient information available and was it practically implementable?" This meant that scientists had clear direction as to the level of evidence and requirements needed for any attribute to be taken further.

The NPS-FM 2014 process was described by interviewees as both more integrated and supported than the 2020 iteration. However, there was recognition that the lines between science and policy were more blurred and the process potentially more political. In addition, the inclusion of selected stakeholders on the NOF Reference Group, but exclusion of others (and the broader LAWF) from that aspect of the process, created uneven power balances and likely undermined the work and cohesion of the Forum. It was also noted that, even with the enhanced direction, "very few of the recommended bottom lines got through".

On balance, those interviewees involved in both processes considered that greater contextual understanding of the pressures and policy needs improved the focus of the science work and ability to get agreement. It also greatly enhanced the relationship and communication aspects of the process. As to how it affected quality of the policy outputs, interviewees underscored that this was such a politically nuanced aspect, it was simply too difficult to assess. Policy outputs will always be highly influenced by ministerial discretion and government priorities at any point in time.

> *"In my experience, nothing can really be done to improve the final step in the policy process, as a scientist. It is so intensely political there is little that can be done: our advice has to go through the legal checks, the regulatory advice, the impact analysis, the cost-benefit and economic assessments, and in the end it's a cabinet decision."*

We discussed how differences in approach impacted the NPS-FM 2020 policy process. Although MfE officials drew the STAG's attention to the five-point criteria that had previously been utilised, and explained the regulatory impact analysis at their very first meeting, a much more flexible approach was eventually adopted. The meeting minutes of the STAG show that there was some discussion around the use and adequacy of the criteria, with members calling for a modified approach, including the ability to work on adjustments to core definitions in the NPS-FM.[6] A decision was made not to apply the criteria as "strict decision gates", in order to enable the group to "consider the precautionary principle" and apply "whole systems thinking", not simply focus on individual attributes.[7]

This approach enabled greater flexibility and provided a broader scope. However, it also removed clarity and complicated decision-making, since the STAG now had to get agreement on its approach and the standards that would be adopted (a task that often took some negotiation within a tight policy timeframe). While it opened the door to more significant changes and innovation, the approach also increased the risk that measures would fail to pass muster when assessed as part the regulatory impact analysis. The broader regulatory frame, which places high value on certainty, still had to be applied by officials.

In the end, some STAG members lamented the lack of clear criteria, saying that this would have made it "much easier to reach a decision and have saved a lot of time." In order to get the best of both worlds, more space may need to be provided to discuss important preliminary and strategic matters like this.

Overall, STAG members thought that a more open and frank conversation about objectives, the limits of the process, and the criteria officials needed to meet in order to get things through, would have assisted the science work. On their side, officials were well aware of the complex dynamics operating at the science-policy interface.

> *"I support co-design, especially between scientists and MfE, but there were communication issues. The STAG didn't have enough context to understand why we were putting forward the various proposals. We wanted to keep politics out of the room, but taking a truly co-design approach probably requires that."* (Ministry official)

Raewyn Peart

Lake Rotorua

3.1.3 Policy refinement: back-end considerations

Once the STAG's work was initiated and the agenda set by officials, the STAG produced a report on the matters canvassed, and a public submissions process was undertaken. The STAG reports were made public (along with those from other advisory groups) and this was highly valuable for those wishing to make submissions. The reports provided direct access to the advice of the STAG and other groups. In addition, an interim regulatory impact assessment from MfE provided an indication of the direction policy was taking. The public submissions process provided a space to dispute any findings, raise counter arguments and provide alternative information. This space for public engagement with the science is an essential element of a modern, highly democratic, knowledge-driven process.

The public consultation process helped highlight for officials the aspects of the science most likely to be challenged and areas where further science work was necessary. As a result of matters raised in public submissions, officials returned to the STAG seeking more information on a range of issues and posing a number of further questions. These sought clarification of the scientific rationale for various thresholds and national bottom lines, perspectives on the technical feasibility of different policy options, and responses to specific points from submissions. The STAG subsequently issued a second report, in April 2020, responding to those questions and making further recommendations.[8] Some STAG members were also asked to provide assistance to the Independent Advisory Panel, which was to consider submissions and report back to the Minister. The STAG also assisted the Freshwater Leaders Group at this point, to help it to work through some of the more technical feedback arising from the public consultation.[9]

STAG members found this additional round of discussions highly valuable. It provided an opportunity to add more detail and discuss some technical aspects of policy design, although the questions at this stage were more specific and bounded.

What appears to have been equally ,if not more, valuable was that this second round also provided an opportunity for the STAG to reconvene and refine its thinking on some of the more complex issues, such as the development of NOF attributes for DIN and Dissolved Inorganic Phosphorus (DRP), which had not yet been resolved. For example, it was at this point in the process that agreement was reached on a DRP attribute.

Following this work, the Independent Advisory Panel issued its report and the various regulatory impact assessments (from MfE and Treasury), as well as the section 32 evaluation under the RMA, were produced. The task of officials

was to take all of these reports and formulate policy. It was at this policy formulation stage in the process that many STAG members considered their involvement (and consequently the science input) to be insufficient.

A recurring complaint from the STAG members we interviewed was that a number of changes were made to the proposed NPS-FM at this late stage in the process, but there was no space (or time) for discussion of those alterations with the science group. STAG members emphasised that in seeking additional input at this stage, their intention was not to influence political determinations, but to ensure that the adjustments made were scientifically robust – that they would work as officials intended.

> *"We issued our report, but that went into a black box. Policy popped out the other end. There were wording changes that were far more significant in their potential impact than I think people understood. The opportunity for more refinement and nuance was lost."*

> *"There wasn't sufficient iteration. We produced reports and policy people determined whether to incorporate [our recommendations] or not. There wasn't much feedback, it was a one-way thing. But the detail, the changes made, those things have impacts in practice. The nuance lost in the detail can be significant, it can undermine policy."*

> *"There were a number of steps between the final STAG report and the final policy formulation. Some of the changes made were significant and they suddenly appeared in the NPS but never came before us. Changes to things like ammonia and nitrate toxicity were proposed suddenly. Those needed to be science-based decisions."*

> *"There was a huge amount of science underpinning our recommendations. They were based on good data, solid evidence that could be backed up. So changes that departed from them were concerning, and they didn't come before us for discussion. We were left quite confused about a range of decisions and where they had come from."*

> *"The end stage was an issue. It wasn't just that aspects were modified, new things were added. There was no opportunity for discussion on the implications of those things."*

In essence, the concern was that limitations on the science advice at the end phase of policy development reduced the quality of the science *translation* into policy, and that a weak point of the process was that translation aspect. Several STAG members also thought that more transparency around the decisions and changes made at this point would have been valuable.

> *"There needs to be more transparency when science advice is departed from, because even minor changes that look technical can undermine the whole thing. Like a house of cards their removal can make the whole thing fall. The science is complex, things are connected."*

> *"The process was a good one, one of the best I've seen, but more input from scientists at the book ends could have added significant value. Greater communication with officials and in-house science advisors, to get us all on the same page, would have helped us focus on getting the thing scientifically robust. It was the lack of transparency that undermined that."*

> *"It would have been useful If the rationales for changes had been provided to the STAG and we had been consulted as to whether the changes at that stage would effect the biophysical values that we had strived to safeguard."*

3.1.4 The STAG work programme

In addition to exploring STAG inputs throughout different stages of the policy process, we also asked members for their thoughts on the scope of the scientific examination, and whether they saw any particular gaps or limitations in the workstream. This resulted in a cluster of reoccurring subjects being identified.

Land use change

All members of the STAG that we interviewed raised the issue of land use change at some point in our conversations, reiterating its centrality as the most significant driver of water quality degradation. Land use change, in particular agricultural intensification, was viewed as the 'elephant in the room' throughout the NPS-FM development process and discussion of the science. In being constrained to the matters officials brought to the table, scientists on the STAG were acutely aware that "some of the broader questions were not being asked". Several STAG members considered that "there was a reluctance to look more broadly, because the broader picture raised difficult, more controversial things… so instead of focusing on addressing the main drivers of freshwater decline, we went straight to looking at effects."

As noted earlier, this restriction was, to a significant extent, a byproduct of the regulatory framework already in place, of which the direction of travel had already been set by the earlier (more stakeholder driven and collaborative) processes, and the RMA and NOF. However, several STAG

members argued that discussion on what land use changes are required to improve water quality were so central, that there should have been space to investigate what could be done in this area, noting that there "were certainly science questions that could have been asked". As one STAG member noted, "the science on land use change was what was missing in our work, and yet that's the area where the science is most needed, to identify the levers. But the focus was on specific variables not the drivers that control them".

Ministry officials we spoke to were aware of this gap: that the emphasis was squarely on attributes "rather than the causes of the problems: the activities that are degrading freshwater". One official agreed that "the human element" needed to be more front and centre and that the focus needed to be far more about "what *we* do" rather than "what the nutrients and the critters in the stream do". However, the short timeframes and limited scope of the 2020 review of the NPS-FM simply did not permit these matters to be considered.

Science for implementation

Another impact of the policy workstream being so directed and focused on the NOF and attributes was that science for implementation was also outside the purview of the STAG. The group was told that this element would be left for MfE and regional councils to deal with. All members of the STAG interviewed considered insufficient work had been undertaken on the science necessary for implementation and the guidance required by councils. However, some also thought that this restriction had been a practical necessity because of the policy time frames.

There was unease from several members of the STAG about the separation between work on the science for the NPS-FM 2020 and work on the science for implementation. The concern was that the policy and its implementation were so interlinked that they needed to be considered together. Others were concerned that the focus on attribute setting, without regard to the feasibility of implementing those attributes, may have created too much complexity in the system and may make implementation more difficult than necessary.

> *"The pathway between policy and outcomes was not mapped; that transition, the timeframes and how we get there. From that perspective it wasn't optimal policy design and we need to think about how we can do better there."*

> *"Councils now have to figure out how to implement it. That's a generic problem. We needed the science presence all the way through."*

Several Ministry officials we spoke to agreed that "there would have been significant added value in taking an implementation perspective from the outset".

Human health

An aspect of freshwater quality that lacked clarity was the extent to which human health associated concerns and expertise should be brought into the NPS-FM regime. There were several areas where human health issues were clearly relevant. For example, the NPS-FM 2020 recognises values such as human health for recreational use and mahinga kai. Attributes such as those for *E.coli* also have a clear human health association. Some human health associated work was undertaken for the NPS-FM, particularly around recreational use. A report was provided to the STAG and an expert brought in to speak to it. However, there were no medical professionals or people with expertise in this area on the STAG, so this was not an aspect that it was asked to inquire into or one that members felt qualified to consider.

Some felt that medical evidence around the safety of nitrates in water could have informed settings adopted in that area. Others noted that, in any case, the science in that area is still very active and unresolved.

At present, drinking water standards are set through the Ministry of Health, and human health matters are dealt through other mechanisms.[10] There were diverging views on whether these frameworks were sufficiently integrated.

Biosecurity and biodiversity

An area where there was more agreement was in relation to biosecurity and biodiversity. These were the two most commonly cited content-related gaps in the science work of the STAG. STAG interviewees said that people brought up the problem of invasive fish, their impact on indigenous biodiversity, and their relevance to assessments of the 'health' of freshwater. But the topic was excluded from their examination.

> *"Biodiversity was a big gap. Biodiversity indicators are incredibly important. In the end, isn't that a big part of why we want healthy waterways? We dabbled at the edges of this with wetlands, but it was clear this one wasn't going anywhere politically. Biosecurity was another big one – if*

you are considering the integrity of the ecosystem, it interacts hugely with biodiversity outcomes."

"Biodiversity and biosecurity related attributes were not within scope. They were viewed as a separate issue for DOC to address, so outside of this NPS. But that was controversial. There were a few arguments over that. I think it was a gap. We should have attributes, especially ones to reflect biodiversity."

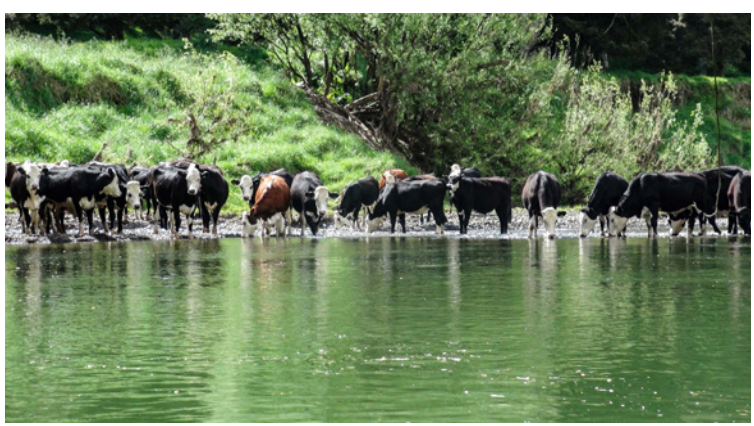
"Initially there seemed to be interest in biodiversity and biosecurity, especially after the 2019 state of the environment report came out showing such big declines in fish and plants. There was concern. But there was the idea that we just couldn't shift: that as long as water quality was protected, the rest would all just follow. But from a scientific position that's not right."

The need for greater involvement from DOC, and the incorporation of expertise on biodiversity protection within the STAG, was noted by most interviewees – most particularly in relation to invasive fish.

Advantages and disadvantages of limits in scope

Despite the limitations on the scope of the STAG, and concerns at remaining gaps in the NPS-FM 2020, there were also clear benefits from the way that science inputs were handled. Even those critical of the restrictions recognised that, in the timeframes provided, the restricted and highly official led agenda had assisted to make the workload practically manageable. "Without that, it would've been far too much work and material to traverse" and that "it provided the necessary focus for what was a time constrained policy process". "The discussions would've just been too wide ranging – and STAG meetings already went on for a very long time and pushed us to capacity!"

Millan Ruka



Cattle in the Mangakahia River

3.2 Exploring the line between science and policy

As already described, in contrast to previous policy work undertaken on the NPS-FM, the approach adopted for the 2020 update was more strongly driven and directed by the Minister, and efforts were made to separate the science work (by the STAG) from the policy development work of the Freshwater Leaders Group. In addition, measures were adopted to insulate the STAG, as far as possible, from other work on policy and political considerations so that it could focus only on the science. Clear separation of the three groups (STAG, Te Kahui Wai Māori and the Freshwater Leaders Group), and a requirement that each would write their own independent reports, provided additional transparency.

The following section explores the dynamics created by these settings and approach.

3.2.1 Two communities logic in the policy process: boundary work

A 'two communities' approach is evident in the strict separation of the STAG from more political considerations. In order to maintain this separation a number of boundaries were put in place.

Separating the science from economic concerns

Some robust boundary work was evident in the terms of reference for the STAG. Not only did officials set the agenda and work for the group, the STAG was formally requested "not to consider the economic implications of potential management categories, measures and thresholds – these implications are to be considered by others in the *Essential freshwater* programme, including government officials and the Freshwater Leaders Group."[11] Ministry officials told us that the Ministers' intention in explicitly requiring this approach, was to ensure that the scientists could focus purely on the science. This was to enable the scientific basis for policy to stand alone, to be kept separate from the subsequent cost-benefit analyses that would take place. The areas where trade-offs were made, and policy altered, would be clearer, thus increasing transparency.

"So much policy work requires the balancing of interests, trade-offs always have to be made. That's why we wanted the STAG to be solely focused on the science, so that regardless of things like the cost considerations, everyone was clear on what the science said. It was to ensure that any trade-offs made didn't affect the science." (Ministry official)

"The objective was to ensure there would not be any pre-judgement of what was being put forward." (Ministry official)

This approach was described as a significant and very intentional point of difference from the previous workstreams on the NPS-FM, the objective being to ensure a "strong science voice in the process which was able to be heard in a holistic, unabridged way".

> *"In contrast to other processes, where people often ending up battling over political issues, being that step removed from the decision-making, [meant that] people could focus on the science. There was a genuine desire to share facts. We reminded each other all the time that we weren't there to consider policy or the economics of it all. We just had to figure out the science – that really helped."* (STAG member)

Having that clear direction meant that STAG members kept an active awareness of where conversations were straying, and reigned in discussion to steer it back on course when necessary. The result was that the group took responsibility for holding each other accountable: it effectively gave members permission and a space to speak out when they became concerned. This direction was one that all interviewees found very useful.

Independent reports

Each of the official working groups was required to set out their advice and recommendations in an independent report. The meetings of each group were also made publicly available on the MfE website. Officials explained that, in the typical policy process, they would be provided with a range of advice and inputs. These would be collected and considered, and then incorporated into their findings, with the Ministry's advice laid over the top. There was an awareness that this approach made the role and sources of the policy inputs inherently unclear. In separating out the work of each of the working groups, into their own streams and reports, the process had far more independence and transparency. It also enabled officials to focus on facilitating the process.

The separation of each strand of advice meant that the Minister had a far greater and more precise understanding of the position and findings of each group when making his final decision. Officials emphasised that this helped ensure the science advice was clear and so increased its "weight".

> *"Having the advice of the STAG clearly set out increased the level of understanding of the science, so that when decisions had to be made the basis for those was clear."*

Minority views and consensus

One direction provided to the STAG that proved valuable was the lack of a requirement to reach consensus. The Minister requested that any differences of opinion, and areas where there was disagreement or dissent, be clearly set out. This would shine a light on the science debates and the different distinctions and reasoning behind them. This had significant explanatory value, deepening the insights and consideration of officials and the Freshwater Leaders' Group. It also served to identify areas of increased uncertainty and risk, where better data or further research was needed, and areas more likely to be contested in the consultation process. This helped inform officials as to the areas where external peer view and independent advice should be sought. It also made the report of the STAG more detailed and nuanced.

> *"The Minister wanted all reports presented directly, without censure, so the range of perspectives was made very clear. That was really valuable to us (officials), because once those views were out and open in the public arena, we could speak directly to what the science was and ensure it was given space and visibility in the process."*

This sentiment reflects the problem that, too often within policy processes, dissenting views may be invisible and the true spectrum of opinion unclear. STAG members found this approach refreshing.

> *"There was no need to reach agreement if that proved elusive. Differences in opinion are really valuable. They highlight things, areas that needed more work."*

> *"Recording disagreement made the whole process more transparent. There was a really strong effort to ensure that was done. That was quite new to the process. I hadn't seen that in my previous work and interactions with government, not just recording them only for the Minister, but on the [public] record."*

> *"Minority reports need to be standard practice. They add so much more openness and transparency. Across the board I think there needs to be more requirements for open access and release of science advice. It gives scientists the ability to speak out. That's really important because it frees up the science, it makes it more robust."*

Several STAG members thought that protocols in this area should be introduced more widely as part of setting a more structured, open approach and providing briefs to guide science advice.

Interviewees also saw the practical necessity of dropping the need for consensus: there was a policy timeline to consider and outputs were required at a certain pace in order to make progress. Although it was not a requirement, the STAG did strive to reach consensus where possible, and managed to do so on the vast majority of issues. Several interviewees felt that consensus on the remaining issues would also have been possible, had there been more time to explore the points of difference and options for addressing them.

3.2.2 Dynamics at the science-policy boundary: key interfaces

The NPS-FM 2020 policy workstream was the most intentionally transparent process that has been attempted in relation to freshwater management. As described earlier, the policy work and issues traversed by each advisory group were made clearly visible through the publishing of meeting minutes and individual group reports. In addition, copies of the relevant regulatory impact assessments and the RMA section 32 analysis provided additional clarity on the basis for decision-making.

However, internal processes within the Water Taskforce, MfE and MPI, including the work undertaken in-house and a range of decision-making associated with the management of the advisory groups, was far less visible.

The STAG and MfE

Transparency issues, and the concern to keep politics out of the STAG, created a number of tensions. At the same time that MfE was attempting to draw a much clearer line between work on science and work on policy, and keep politics out of the STAG room, the Ministry also had an increased role in relation to the STAG. The work programme was signed off by the Ministers, with officials left to implement it, thereby setting the agenda for the STAG. In consultation with the other advisory groups, officials then translated the STAG's science advice into policy. Also, driven by heightened expectations for the improvement of the science base for policy, officials were much more visible and engaged in the STAG deliberation space than they had been in previous workstreams. This created an inherent tension, because as several STAG members noted:

> *"When half of the people in the room are Ministry officials, you can't stop the politics coming into the room."*

For many STAG members it became difficult to ignore broader pressures: they were keenly aware that politics coloured the matters which officials brought to the table and their interest in progressing some attributes and not others. Without greater openness and transparency, to communicate what was driving questions and informing the approach, this contributed to an erosion of trust:

> *"It became clear that pressure was being applied in some areas and bigger forces were at play."*

> *"Some things were just accepted with very little discussion. Others seemed to require infinite debate, external advice and reviews, double checks, even when we felt the science was clear. Some data got analysed again and again. It was a great ideal, but politics was in the room."*

> *"I always wonder what conversations were happening, because we were very aware of the pressures and potential conflicts of interests that existed in relation to issues like the DIN. But I also don't know how you stop them coming into the room. Everyone is aware of them, you just aren't supposed to discuss it."*

That there were both advantages and disadvantages inherent in the approach adopted is reflected in a diversity of views regarding the role of MfE.

At the report writing stage, officials left the STAG to independently draft its own report, and provided an independent report writer to facilitate this. However, some STAG members thought that additional space was needed throughout the process to enable the group members to focus on the science and allow more flexibility to explore matters *they* felt were key. Less involvement of officials would have freed up the science discussions and enabled greater separation of the science from the politics. This would also have enabled more free and frank conversations within the STAG.

The perspective of officials was very different. They found their increased presence invaluable to the policy process. In speaking about their role, one official characterised it as "to build up our understanding of the views on the science, to ensure greater accuracy, so that the science advice could be put front and centre". Another stated that "our role was to take all of the information and formulate advice" noting that "we always have to do that, but in this process our much closer relationship to the science meant that the policy work felt much more like policy co-design compared to previous work."

Several Ministry officials articulated their relationship with the STAG as one of "co-design" reflecting the degree of influence the science discussions had on them in this policy workstream. Officials said that previously there had been much more separation between the science group and the Ministry. The new approach engaged officials much more deeply in

the science, with what were described as "huge benefits" accruing as a consequence. These included enhanced "understanding of the scientific basis underpinning things" and the diversity of views (and reasons for that diversity). The officials also picked up more nuance and detail around the science, and as a consequence there was better connectivity between the science and the policy advice that they formulated for the Minister. The consensus amongst officials was that this was a valuable improvement on the usual policy approach.

The scientist interviewees that had experience on previous science advisory groups, and therefore a point of comparison, mirrored these sentiments. This indicates that there were likely tangible benefits from this closer connectivity. Conversely, however, there was also likely a need to provide greater opportunities for 'scientist only' discussion, particularly on issues that were highly political in nature and for which the presence of officials might be seen as having a chilling effect or serving to increase tensions.

Non-STAG science inputs

Another complex area was the non-STAG science inputs: the internal science being undertaken by, or on behalf of, MfE and MPI as part of their policy development role. The scale of the science inputs required to inform the NPS-FM 2020 were substantial, so it is not surprising that the Water Taskforce was actively utilising its own science capacity and bringing in additional science support when this was needed. MfE's science team contains freshwater scientists and others across a number of relevant areas, for example data science. Through this policy process, MfE's science and policy teams did in-house analysis and produced a number of papers for the STAG. Where it was clear additional work was required on an issue, contractors were also engaged to feed into the policy process.

Officials underlined that the amount of science work required meant that the STAG simply did not have the capacity or expertise to provide advice on every aspect, but also that this "wasn't their job".

> *"The STAG worked on attributes and methodologies but we also needed science input into our evaluations, and modelling was in high demand. We have science capacity but utilised agencies like NIWA. There was Landcare for sediment and modelling catchment loads, and we had the STAG report peer-reviewed to get a degree of additional independence."* (Ministry official)

The multitude of science inputs and reports makes this interface an especially complex one. Officials emphasised that they presented the STAG with many external reports and had report authors come to talk to the group at multiple meetings. This provided an opportunity for the STAG to review material and provide input on it. However, many members of the STAG thought that the basis for determining what matters of science would be referred to STAG, versus what would be dealt with internally or through external contractors, was unclear. The lack of transparency in this area created tensions within the STAG, and between STAG members and the other scientists assisting with the NPS-FM 2020. STAG members underscored the value of external peer review, but sometimes found it unclear as to why aspects of their work were undergoing additional external review. When such review occurred without explanation, it felt like their work was being intentionally targeted or undermined.

Part of the reason for not providing greater explanation around these decisions appears to have been driven out of a concern not to bring external political pressures and considerations to the STAG. Yet STAG members were acutely aware that officials' assessments were influenced by a range of factors: practicalities of implementation, costs, regulatory requirements, stakeholder pressure, and political preferences; and that politics *was* at play influencing those decisions. Scientists who had been engaged in previous policy work were less concerned about these matters, likely due to their broader 'insider' perspective and increased relationship of trust with officials. For those new to the process, the lack of openness undermined the development of trust.

> *"Ministry officials provided briefing papers that they presented to us and spoke to. They were working with scientists and would invite them in to explain the science behind various reports. That helped understanding but could also put people in difficult positions. The STAG would comment. I think the main problem was that it wasn't clear how these things were working, how those scientists and the STAG should engage, how our roles worked together."* (STAG member)

> *"Unexplained pushback and lack of explanation eroded trust between officials and the STAG, people started questioning officials' motives."* (STAG member)

> *"We should have all been working as a team, but that was difficult in practice."* (Ministry official)

These comments reflect failures in communication and role clarity. The model employed was based on officials working on policy development in association with the Freshwater Leaders Group and Te Kahui Wai Māori, with the STAG playing more of a support role. The communication pathways between the policy advisory groups and officials, and between

officials and the STAG, were unclear to STAG members. A lack of transparency at this interface left several STAG members worried that "gatekeeping was going on" between officials and the Minister, since it also wasn't clear "what was being communicated back to the Minister" and how much the agenda was being driven by officials versus the Freshwater Leaders Group or the Minister. Such tensions were clear to all involved.

> *"There were really strange power dynamics between the Ministry's science team and the STAG. I felt sorry for the scientists who presented reports. They could be subject to pretty intense scrutiny. They were really put on the spot. They had to sit there and get their work pulled apart."* (Ministry official)

A point of difference between the STAG and the other workstreams was that both Te Kahui Wai Māori and the Freshwater Leaders Group regularly met with the Minister whereas the STAG was held at arms length and did not have the same sort of direct relationship. This meant that STAG members had less insight into what was driving the work and what the broader direction of travel was – and who was setting those aspects. Practically, it also meant that the STAG had less ability to exert influence over policy through direct discussion with the relevant Ministers. This highlights the very different role of the STAG in contrast to the other groups. Te Kahui Wai Māori and the Freshwater Leaders Group did delve into policy considerations and development. The STAG was more narrowly tasked to work on the science to support those other groups and officials.

While the process was designed with a relatively narrow role for the STAG, its members often had broader expectations. A number of STAG members expected their role to be far more iterative and their relationship with officials to be a far more open, informed and aligned with co-development. From the perspective of officials, the role of the STAG was as an advisory group which was necessarily limited. As one official explained, the STAG's meetings were only held every few weeks, and sometimes only every couple of months. The scope of the STAG's role was not designed to be all-encompassing; "MfE's work had to progress in the intervening times and it would be impractical to involve the STAG at every step." Looking back at the process, one official reflected that this dynamic was likely a "jarring" aspect of the group's engagement in the policy process.

Greater connection between individual STAG scientists, and MfE scientists working across their area of specialisation, was called for by several STAG members: both to enhance the science and improve relationships of trust.

In managing the science inputs, the Water Taskforce was not only working on development of attributes for the NOF (which was the focus of the STAG), it was also receiving requests for science information from the other working groups and receiving a range of alternative science advice from submitters and other government agencies (eg MPI and DOC). Taskforce officials told us that where an issue was identified as particularly controversial, additional peer review and independent advice was sought in order to provide greater certainty. Decisions on those matters were much more likely to be contested so their basis needed to be very robust.

Greater transparency around the various strands of work undertaken in the science arena would have provided valuable insights and a deeper understanding of the complexity, pressures, regulatory requirements (and potentially the politics) surrounding science work. More open communication and context would also have been valuable in building trust, especially for those new to the process. Several members of the STAG felt that better communication, and more frequent and closer connections between the STAG and Ministry scientists, would have been valuable in improving the dynamics and flow of information at this interface.

The STAG and the Freshwater Leaders Group and Te Kāhui Wai Māori

As explained earlier, connectivity between the STAG and other working groups was maintained through representatives who sat across these groups. This meant that the STAG had a member on both the Freshwater Leaders Group and Te Kāhui Wai Māori. This connectivity was viewed as useful by the advisory group members we interviewed, but its full potential and value was generally characterised as underutilised, particularly between the STAG and Te Kāhui Wai Māori. Several STAG members noted that no attributes were developed for the Māori-associated values, such as mahinga kai, where there were potentially a number of linkages that could have been collectively supported.

There was a small number of joint meetings where the groups were brought together during the policy process. Many felt that more of those joint events would have been valuable and that the distance maintained between the groups "undermined integration and collaboration". Some felt that "more cross fertilisation" would have been useful, but also understood that this did not align with the approach adopted.

These sentiments reflect a degree of stress at the boundaries of the STAG's work, and a divergence of opinion amongst members on how collaborative the process should have been. There was reluctant agreement by most that increased collaboration would have slowed down the pace of work,

and that the role of the STAG was more technical and it needed to 'get on with the science'.

For their part, the Freshwater Leaders Group and Te Kāhui Wai Māori members that we spoke to felt that there were a number of areas where greater STAG input would have been valuable:

> *"A number of scientific questions were raised in our conversations. A range of things could have been more informed by the science and the STAG could have helped us with that, such as the implications of specific measures on water quality, and questions we had on the input and output side of equations."* (Freshwater Leaders Group member)

However, feedback such as this may be less reflective of a need for greater connection with the STAG, and more indicative of a need for increased science support generally to both Te Kāhui Wai Māori and the Freshwater Leaders Group. It appears, for example, that the Freshwater Leaders Group was sometimes left waiting for the STAG to settle on the numbers, and it needed STAG recommendations to make progress. So the issue was in part due to sequencing.

It was suggested that some of the STAG's technical work could have been initiated first, especially on matters where it was clear that work was needed. This would have provided the Freshwater Leaders Group with more time to react and assess the implications of the bottom lines and attributes suggested by the STAG. It would also have extended the time available to the STAG *and* enabled more dedicated science work to occur at the front end of the policy process.

3.3 Science as a social process

A traditional characterisation or ideal of 'science' is that it is objective and value-free. The reality, however, is far messier. Science is undertaken by humans, who are seldom entirely impartial and unbiased.[12] Individual scientists may hold a range of biases associated with their values, backgrounds and relationships. The questions posed, framing of problems, setting of research priorities, application of the science and consideration of its consequences are all impacted by values. Increasingly there have been calls to shift away from notions of objectivity towards a more integrity based ideal for practitioners, where the emphasis is on self-awareness, responsibility and transparency.[13]

Complex environmental problems, for which there remains uncertainty and where decisions are frequently urgent,[14] are particularly problematic. They often require a "process of discourse between scientists from separate spaces" – a process that requires "gaining trust, building new patterns of thinking, and reaching towards new consensus".[15] This was certainly the case in the NPS-FM 2020 policy workstream, where a diversity of scientists were brought together for their collective inputs and specialisations relevant to freshwater quality.

The group of scientists brought together on the STAG was not only diverse in terms of individual fields of study, but also in terms of institutional backgrounds and experience of the policy process. A criticism of previous work on the NPS-FM was that it had been lacking this diversity and inclusiveness. In response, MfE's Water Taskforce (which was responsible for appointing members of the STAG)[16] brought in scientists who had not been involved in previous iterations, including some who had been highly critical of previous freshwater policy outputs.[17]

Every person we spoke to underscored that this shift was one of the greatest strengths of the policy process, although it was also widely acknowledged that it created a number of complexities. A second matter on which all agreed was that the choice of Ken Taylor for Chair of the STAG was integral to the successful navigation of those challenges: that he had done "a fantastic job in a tricky and complex situation". As part of our exploration of the science-policy interface, we were interested in exploring some of the complex dynamics that existed by virtue of this diversity and more inclusive approach. Our discussions with Ministry officials and STAG members provided valuable insights into the inherently political aspects of the science. When we began our interviews with STAG members, we had not anticipated the huge variety of perspectives and different, ideologically based, groupings that existed within the body, or the number of political considerations that affected its operation and work.

Raewyn Peart

Wairau River

Spotlight on Mississippi River Basin

A recent study of water quality measures in the Mississippi River Basin, which flows through a number of large and highly agriculturally based states, found that the use of best science was limited, the role of livestock in pollution and need for abatement measures was ignored, and the development of numeric criteria had stalled, particularly in highly agricultural states.[18] However, of the states that sit within the basin, the most robust monitoring and reporting was identified as occurring at the river's source (in Wisconsin and Iowa, where the river was relatively pristine and highly valued for recreation) and at its end in Louisiana, where the downstream impacts and cumulative effects were the most felt.

The study also highlighted that states with the most robust water protection schemes had greater involvement and participation of stakeholders when compared with other states along the river basin. Their processes and engagement were marked by greater diversity and inclusivity. For example, in Louisiana the range of stakeholder groups involved was much broader than in the other states, and included many private and non-profit entities.[19] Iowa was notable for its inclusion of multiple environmental NGOs and two state universities. As a result, Iowa's reporting system is now one of the most detailed of all states.

A lot of emphasis has historically been placed on ensuring 'regulated parties' are involved and engaged with policy processes. Far less emphasis has been placed on ensuring the involvement of environmental advocates, not for profit groups, and academia. It would be valuable to understand, in more detail, how these groups engage in policy processes, the benefits they bring and how their input could be more supported.

3.3.1 Ideological nuances and groupings within the STAG

During our discussions with STAG members, it was apparent that there was a number of natural 'subgroups' within the broader group: clusters of scientists that were more or less aligned in their views and approach. Such alignments were influenced by the field of expertise of individual scientists, their experience with the policy process and/or the institutional settings in which they worked. They were complex and frequently cross cutting. While some of the tensions between subgroups proved difficult to navigate in practice, the robustness of debate that resulted from the STAG's diversity should be seen as one of its strengths, rather than as a failing in the group or the policy process.

Conservationists

> *"The role of scientists in environmental protection is like that of doctors but with the rivers as our patients. And as such, our starting point should be 'first do no harm'."*

Some of the scientists within the STAG were highly critical of the existing NPS-FM and the quality of the environmental standards set under it. These scientists were consistently characterised as 'the advocates', or sometimes 'the Massey camp', a reference to the fact that several had existing or prior ties to Massey University. It was clear that the scientists on the STAG who were attached to universities were used to a significant degree of academic freedom by virtue of their workplace, and this had enabled them to be publicly outspoken on environmental and freshwater issues.

Their positioning was sometimes viewed as overly idealistic or impractical, but at the same time understandable and valuable. Despite some very different approaches, there was also a high degree of mutual respect.

> *"The scientists that are advocates for the environment are some of the best scientists we have, and honestly, their views are not surprising: they understand the science and the environmental implications."* (Ministry official)

For Ministry officials, the inclusion of these scientists had two core benefits: being 'academics' they followed closely the latest published science and research in their fields so brought additional expertise. They also sought very high environmental standards so improved both the credibility and robustness of the process:

> *"We couldn't have had the same credibility without those people, they had to be there. It was probably incredibly frustrating for them, but it was important. It was also the right call that sector groups and industry science wasn't there."* (Ministry official)

NIWA scientists

In a similar way in which some in the group were perceived as 'the Massey camp', another group of scientists was referred to as the 'NIWA camp'. By virtue of the fact that they worked for NIWA, and knew each other well, they were also perceived as an ideological cluster. The characterisation

was that they 'voted the same way' and had an institutionally aligned approach that was influenced by the 'culture' at NIWA. These scientists had previous involvement in, and greater experience of, the NPS-FM policy process. They also had a closer relationship with officials due to NIWA's statutory role as a provider of advice directly to the government and to the agricultural sector, often on a contracted basis. In addition, NIWA had itself made submissions on freshwater reform and so, as an institution, had formulated views and responses to a range of policy matters.

> *"NIWA put forward a position that was negative about the need for a DIN attribute, it felt there was insufficient evidence. That seemed to solidify the view of NIWA members on the STAG. It felt like the view was an institutional one."*

> *"It's understandable that the NIWA members thought alike. They knew each other well, and were working on a range of freshwater concerns with MfE, and making submissions on freshwater policy as an institution. But there were definite power dynamics created from that."*

> *"NIWA had been heavily involved in previous freshwater work. As an institution supplying advice for government, we approach policy in a certain way: we have to be politically neutral. So rather than supporting or opposing any specific matter, we confine our input to the technical and practical. It's important to maintain a certain independence."*

> *"NIWA's role is as an 'honest broker'. That's a vital role for all CRIs [Crown Research Institutes]: to ensure officials understand the science but that we don't try to influence policy decisions"*

Interviewees outside of these two groupings noted that the style and approach of NIWA members contrasted sharply with that of the 'advocates' in the STAG, and there was an inherent tension in the dynamics between these two groups. Scientists from each 'camp' had provided expert advice to the Waitangi Tribunal (for opposing parties), variously defending or criticising the existing NPS-FM and its associated policy processes. Historical disagreement as to the quality of the NPS-FM, discussed in more detail below, possibly contributed to this tension. It was also likely exacerbated by NIWA members (and others) having greater experience and understanding of policy processes than members of the 'Massey camp' who were relative newcomers.

Independent perspectives

The views of those outside both groups provide interesting independent perspectives.

> *"Disagreement on the DIN between the NIWA and Massey camps existed, but there were lots of us in the middle. We often felt like a bridge over a chasm. I believe the differences were actually very subtle. They were in agreement on the science. Most disagreements stemmed either from misunderstandings or the detail: not the science but the application of the science, how the science should work, how things should fit together."*

> *"Historical mistrust existed between the NIWA and Massey camps from the outset. That was the bigger barrier, institutional cultures clashed. That reflected the historical silos that existed."*

During interviews there was discussion of the role of scientists, the concept of 'the honest broker', and whether there is such a thing as a 'neutral' scientist who is detached from the broader issues. Interviewees contrasted the very open positioning of 'Massey camp' members, who wore their advocacy in a very public way, to that of NIWA members who were uncomfortable with anything that could be construed as 'advocacy'. As Crown Research Institute scientists, charged with providing politically neutral advice, there is significant risk implicit in recognising any biases, real or perceived. The elephant in the room, which was of concern to many fellow STAG members, was whether the NIWA scientists' more conservative positioning on politically controversial issues like the DIN was influenced by NIWA's commercial interests and relationships.

> *"In a sense, though both NIWA and Massey scientists came with pre-formulated institutional views, an important distinction is that NIWA has commercial interests where Massey doesn't."*

Unease about the commercial connections of NIWA highlights the need to critically examine the purposes and operation of our Crown Research Institute model, to ensure it is not contributing to distrust between scientists within our science advisory system.

Reductionist versus holistic approaches

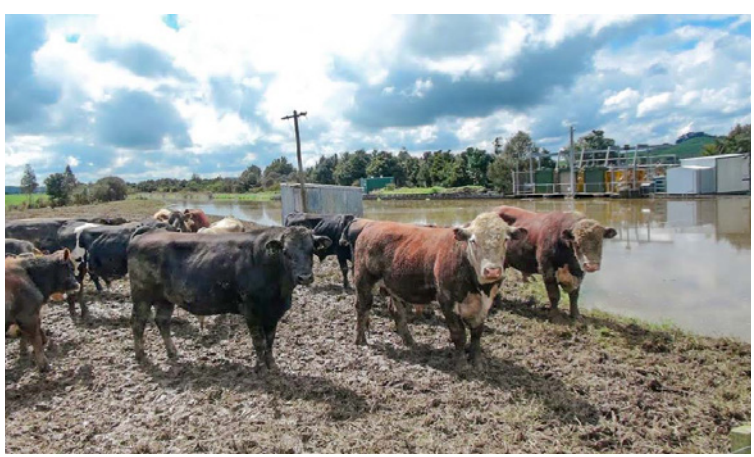
One of the themes evident in our interviews was the characterisation of the STAG's work on individual nutrients as "reductionist", and taking place at the expense of a more holistic ecosystems approach. It was often difficult for scientists who had specialised knowledge of biochemical processes and individual nutrients to 'speak to' those coming from a

more integrated 'systems' approach. In turn, scientists who came from a broader ecological discipline found it more difficult to fit into the constrained workstream. Because the NOF science needs were primarily focused on individual attribute setting, the work undertaken by the STAG largely focused on nutrients rather than broader ecosystems-based considerations (and science). This meant that input from the nutrient specialists was more innately suited to the policy needs of the officials than input from the ecologists.

Despite their differing approaches, all of the scientists we spoke to saw the value of a more holistic approach, and this was something they collectively pushed for. Notwithstanding the historical preference for a reductionist approach in freshwater policy, and restrictions arising from the incumbent framework, significant progress was made in this area. The STAG undertook work on a number of ecosystem health and metabolism attributes. That STAG members were able to get unanimous agreement on the need to alter the approach, and that MfE officials were responsive to the request and able to facilitate it, was a particular strength of the policy process. This underscores the importance of ensuring that officials and policy workplans retain a degree of flexibility.

A number of interviewees expressed their hope that Te Mana o te Wai might provide a positive "lever" for *improving* the approach of the NPS-FM. This sentiment was most strongly expressed by the ecologists in the group, who looked to Te Mana o te Wai as a 'vehicle' to address their concerns. They saw the nutrients based 'reductionist' approach as an inherent barrier to the incorporation of mātauranga Māori. Others were more pessimistic, noting that the *Essential freshwater* process was an opportunity to demonstrate the utility of Te Mana o te Wai, but that its integration into the NPS-FM 2020 was still lacking in practice.

Millan Ruka



Wairua Power Canal

Spotlight on scientists' views of Te Mana o te Wai and mātauranga Māori

> *"The input of scientists from Kahui Wai was great, it was hugely valuable. What was difficult was integrating that perspective into the NPS."*
>
> *"There was a huge amount of alignment between the Māori perspective and the perspective and approach of us ecologists on the STAG; work like this is an opportunity to increase that connection, build on those synergies, those inputs. It's an exciting area, an area if let to evolve, could produce huge improvements."*
>
> *"We need much stronger linkages to Kahui Wai Māori and mātauranga Māori. Attributes reflecting Māori values remain absent. This is frustrating. We need a more integrated approach into the scientific framework, but the space and process for that remains unclear."*
>
> *"The STAG was a big group but it was very Western science based. The attempt to bring in Māori scientists failed. We needed more links to mātauranga Māori but it didn't happen. There just wasn't the capacity."*
>
> *"Matauranga Māori was outside the expertise of the STAG. In my view there needed to be a separate dedicated advisory group undertaking that work."*

Where there were strong Māori voices, they proved able to powerfully articulate the science. Scientists on the STAG pointed to the work on wetlands as an example:

> *"The Māori voices were calling for wetland protection. They were able to articulate clearly the role of wetlands as the 'kidneys of the landscape'. They communicated the vital importance of having a functioning, ecologically based mechanism to 'clean up' our waterways. And because it was a Māori perspective, an iwi perspective, it was influential, it had weight, it had mana – and it could speak directly to values."*

This later sentiment shines a light on a key consequence of the traditional confines of 'Western science', and the criticism and derision associated with scientists who cross the line between the exalted 'objectivity' of 'the scientific method', and the realm

of values and ethics and therefore policy. These normative restrictions prevent scientists from explicitly identifying and exploring and therefore incorporating values-based concerns, such as environmental concerns, into their considerations. It was as if, by embracing mātauranga Māori in the process, the ecologists were being given the space to implement their more ecologically based approach.

Both groups, Māori scientists and ecologists, identified the same barriers to their knowledge inputs into the science. The restrictions on the STAG were strongly felt by the Māori scientists involved. In their view:

> *"The scope of the STAG and the NPS [National Policy Statement] was too limited, broader policy and values couldn't come in, mātauranga Māori couldn't easily come in."*

> *"There was usually only one or two Māori in the room, and they had no say on the framing of the science."*

> *"Yes, as Māori we were present, but there were a number of aspects blocking our input from working. That meant there was a choice to be made: do we put time into the STAG or Kāhui Wai? Do we focus on helping Kāhui Wai? We didn't get as much as we could have out of the process because of that."*

Academics and practitioners

Another distinction made by those within the STAG was the contrasting approaches of the scientists that work within academia, and those that are practitioners and work 'on the ground'. A number of stereotypes were evident here.

Academics tended to take what one described as a 'pure science' approach. These members emphasised the need for policy to be driven by peer reviewed evidence and the latest research being published in an area. Ideals such as objectivity, being free from conflicts of interests and the ability to speak freely were highly valued by this group. The concept of compromise raised inherent tensions:

> *"Compromise and science are difficult to reconcile: you often can't compromise the science, the facts. That's the reality of it. Compromises come with poorer outcomes. As scientists we need to make that very clear and push back more. There are times when the science has to be run without interference or so much direction and control."*

Practitioners were more focused on 'what would work on the ground' and what was likely to be acceptable and understandable to those having to implement it. These scientists tended to work within Crown Research Institutes, with councils or as consultants. That context gave them greater appreciation of the pressures at play for councils and stakeholders and the technical feasibility of applying any standards set. They also tended to give more consideration to legalities.

> *"I was very aware that whatever standards ended up getting through, those had to be able to be applied in practice – and they would be challenged and contested in the Environment Court, so the data would have to hold up."*

Raewyn Peart

Lake Ōkareka

Spotlight on discourse framing

The labels employed within the group to identify the various approaches or 'camps' provide interesting insights into some of the distinctions and frames being employed by members of the STAG in relation to each other. They also highlight some of the ideological tensions that existed within the group. For example, references to 'academics' in contrast to 'practitioners' implies the former have less understanding of realities on the ground, and the latter are 'less on top' of the latest research.

Similarly, the phrase 'reductionist' was another loaded term employed within the group, often used in judgement of the approach adopted. As Dawkins famously noted, "reductionism is one of those things, like sin, that is only mentioned by people who are against it".[20] 'Reductionism' is generally ascribed to contrast an approach with a more 'integrated' and 'holistic' one. However, reality is more nuanced, and commentators have argued that this is a false dichotomy, in that each approach has limitations and in practice the approaches are interdependent – reductionist approaches must be tested in more complex environments, and holistic ones also require mechanistic insights.[21]

A further label applied to some scientists was that of being an 'advocate', to contrast them against those considered to be 'pure scientists': the implication being that one is more values led or emotive, the other more objective or rational.[22] Subtle framings such as this can set one group apart from the other. While there was no indication that such labelling was reflective of an attempt to devalue the contribution of members within the STAG, their use can be very different in the media. Scientists can be negatively framed (typically by agricultural sector media commentators) as advocates and therefore as "biased, "political", "emotional" or even "alarmist".[23]

The ideological distancing created by these frames can also create practical barriers. For example, it has been noted that it would be difficult, if not impossible, to accept an 'advocate' in the role of 'honest broker' in a policy process where the ideal is neutrality.[24] The label is therefore also likely to be role limiting.

While the topic of advocacy in science has long been debated, the idea that advocacy reduces credibility, goes beyond the scope of science, or is incompatible with science, is being increasingly questioned in the literature and has received a degree of push-back.[25] There is also growing recognition of the impossibility of truly 'value free' science and the fundamental importance of values in science, and in particular ethics, responsibility, self-awareness (of ideology/biases) and transparency.

In Pielke's formative work *The honest broker* he posits four idealised 'modes of engagement' that frame the work of scientists and experts: the 'pure scientist' who is actively engaged and focused on doing the research,[26] the 'science arbiter' whose role is to answer the questions of decision makers in an empirical, factual manner, the 'honest broker' whose role is to clarify, set out options and empower the decision maker, and the 'issue advocate' who has a clear preference as to the direction of travel and is seeking specific policy outcomes.

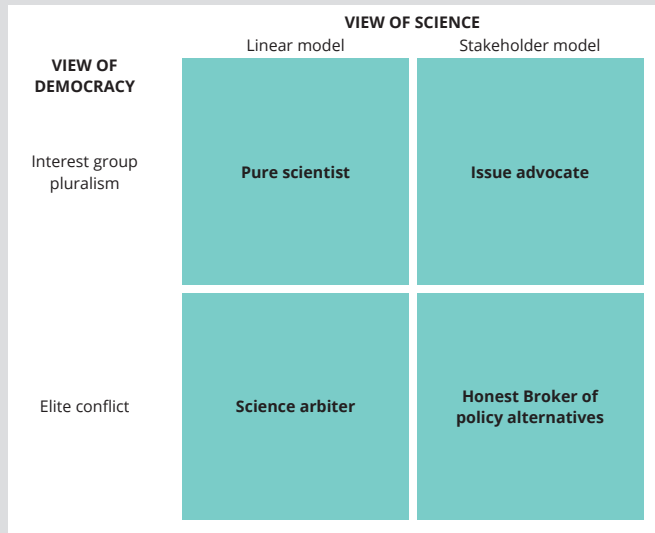


Figure 3.1 Four idealised modes of engagement for scientists

Source: Pielke R, 2015, https://rogerpielkejr.blogspot.com/2015/01/five-modes-of-science-engagement.html

Pielke argues that these roles come with certain framings or stereotypes. For example, issue advocacy is often viewed pejoratively, although it serves an important democratic function and role in public debates. Pielke also questions the true objectivity or neutrality claimed by 'science arbiters' and 'honest brokers': can anyone ever really be free from political influences?

"It is really hard, especially in highly political settings, for any individual to play the role of science arbiter or honest broker… there are often many views on what the 'science' says (including uncertainties and areas of ignorance)… each of us has biases and idiosyncrasies which can make it difficult to see an issue from multiple perspectives."[27]

Pielke also suggests a fifth mode of engagement that is typically overlooked, the 'stealth issue advocate': experts who seek to mask or hide their advocacy behind the neutral "facade of science". This role "seeks to swim in a sea of politics without getting wet".[28]

Pielke's work highlights the importance of scientists being self-reflective, of identifying the influences and pressures that exist, and having open discussions about context, roles and responsibilities. It also emphasises the need to develop a more sophisticated understanding of the politics at play, and the issues that raises for individual scientists, as well as the policy process itself. Ironically, the high value accorded to 'objectivity' and 'naturality' within the science community likely operates as a barrier to this, making it more difficult for scientists to admit to any potential biases or raise other concerns they might have.

Neil Silverwood

Taipo River

The variations in approach

While the diversity of backgrounds and approaches on the STAG created tensions at times, there was consensus that it made for a whole that was greater than the sum of its parts. While these differences were "sometimes difficult to navigate" they were also viewed as one of the most important "assets" of the group. The benefit, in having a scientist-only group, was that workplace standards of professionalism and joint agreement on the fundamental importance of the science provided a basis for approaching differences. Where disagreements existed, these were dealt with by taking a deeper dive into the science, the data and the evidence, to get to the basis of the differences in opinion. Once members were able to understand the root cause of differences, solutions were often able to be found. This approach also helped to depersonalise conflicts.

The need to negotiate differences placed additional workload and time pressures on the group. There was agreement, however, that it also improved the robustness of the science. And many members felt that the few matters on which disagreement remained at the end of the policy process would have been worked through had the group been given more time to do so. There was particular praise from all for the hard work and additional hours put into the process by Dr Adam Canning, who tracked down additional evidence and data to assist in resolving debates.

> *"It was really valuable to have the different perspectives that we did. It made for robust debate, it ensured that we covered the issues properly, and it made the whole thing tighter, more methodical. It was a really good group, [including] people with experience of the process, and new people who came in and pushed aspects deeper, to help us get to the bottom of things."*

3.3.2 Political tensions

Prior to their involvement on the STAG, some of the freshwater ecologists in the group had been highly critical of the existing NPS-FM, and the science that underpinned it. Professor Russell Death's view was that the NPS-FM 2014 would allow greater degradation of rivers and that important attributes were missing.[29] Dr Mike Joy similarly considered the attributes set to be inadequate and that significant gaps remained, to the extent that it constituted a weakening of protection: "I'm not sure who was listened to – I wasn't. I would be interested to hear a freshwater scientist detail how these 'bottom lines' could protect freshwater ecosystem health."[30]

While these STAG scientists were highly critical of the NPS-FM 2014, others on the group were heavily involved in providing science inputs for its development, sitting on bodies such as the NOF Reference Group

and Science Review Panel. The inclusion of scientists on both 'sides' of the previous policy process was a source of tension that no doubt complicated the establishment of trust within the group. Some scientists on the STAG had also acted as expert witnesses for a recent Waitangi Tribunal case on freshwater: some giving evidence for the Crown in defence of the existing NPS-FM, and others including STAG member Dr Mike Joy on behalf of the claimant (the New Zealand Māori Council), arguing that the standards were inadequate.

Spotlight on the Waitangi Tribunal Report on National Freshwater and Geothermal Resources – 'Wai 2358'

In February 2012, two claims were filed with the Waitangi Tribunal on behalf of the New Zealand Māori Council, which became known as 'Wai 2358': the national freshwater and geothermal resources inquiry. A central part of the claims related to Māori rights and interests in freshwater and the Crown's programme of freshwater reforms – including the development of the NPS-FM 2014. A range of procedural issues associated with the development of that national policy statement were also in dispute.[31]

The New Zealand Māori Council argued that the reforms had failed to recognise Māori rights and interests in freshwater or adequately protect freshwater, which constitutes a taonga under te Tiriti o Waitangi.

Dr Mike Joy presented evidence to the Tribunal that the NPS-FM 2014, particularly the NOF, "had serious shortcomings", citing gaps in relation to a number of attributes including water temperature, clarity, sediment and the Macroinvertebrate Community Index (MCI).[32] His professional opinion was that these deficiencies would permit further deterioration of freshwater.

> *"The narrative of the NPS-FM raises ambitious expectations for maintaining or improving freshwater quality, but the numbers and limits prescribed in the NOF are insufficient to achieve them. Rather, they allow for still greater deterioration. And notably most of the parameters previously used to measure the health of freshwaters are not included in the NOF. Thus, instead of supporting the NPS-FM to achieve its goals, the NOF in practical terms does the opposite, permitting further deterioration of our freshwater."[33] (Mike Joy)*

STAG members Kenneth Taylor and Dr Clive Howard-Williams presented expert evidence for the Crown. Howard-Williams had been Chair of the Science Review Panel and Taylor a member of the NOF Reference Group, so both had been involved in the science work for the NPS-FM 2014. They both acknowledged that attributes were still missing from the NOF, including the MCI. The Reference Group had recommended the MCI's inclusion but that this had not been taken up by the Crown.[34] Howard-Williams explained that further attributes had not been ignored or discounted, but that work on attributes such as sediment continued to progress.[35] In addition, for some areas such as wetlands, there had been insufficient information available although attributes in that area were necessary.[36] Howard-Williams also explained that the NOF was still being actively developed: all of the attributes noted by Joy "have been, or are being, actively considered for the NOF as it develops further".[37] The NPS-FM 2014 should not be seen as the end-point.

The Tribunal concluded that the NPS-FM 2014 contained a "very disjointed and watered-down version of Te Mana o te Wai" that was "weak and ineffective" and would not ensure Māori values would be better reflected in freshwater management or plan making.[38] However, the Tribunal made no formal finding as to te Tiriti compliance, in that the NPS-FM 2014 did not represent the Crown's final decision on the issue.

3.3.3 Insider knowledge and a diversity of experience

During our discussions with the STAG members it became evident that there was a clear split between those who felt comfortable with the process and how it was managed, and those who lacked trust in the process and outputs. Some members thought the outputs were positive and represented "significant progress" while, for others, the resulting policy fell short of expectations.

STAG members who had previous involvement in the policy process, or had worked as contractors to MfE or at the regional council interface on freshwater policy, had more understanding and empathy for what officials were trying to achieve. Because their previous policy work had been undertaken in more collaborative settings, these scientists had experienced direct engagement with both officials and stakeholders. They therefore had a better idea of officials' core objectives and the level of scientific certainty required to get policy through the political process. They

also had more insights into why certain questions were being asked, an awareness of what previous work had been initiated but failed to progress (and why), and an understanding of what areas needed further work.

Those new to the process lacked this 'insider' view of the policy process. From their perspective 'politics' was being brought into the room and they were more likely to question the motivations behind the officials' framing of the agenda.

This kind of dynamic is common within advisory bodies. Berkett et al have noted that scientists with less familiarity of the policy process, especially those without any experience of collaborative processes, frequently find the policy process 'jarring'.[39] Conversely, 'front room scientists' who have been at the table and are more integrated into the policy process, have an increased understanding of the process of bringing together a range of inputs into policy, and tend to take a more 'whole of system' view.[40] This view inherently blurs the line between science and policy and can enable politics to enter the room.

Spotlight on power dynamics within advisory groups

Uneven power dynamics are a common problem within advisory bodies. Studies have investigated the impact of factors such as seniority within the profession, experience, institutional support and resourcing, and the effects of diversity. "An inequality in contributions" is often found within advisory bodies with a "hierarchy of opinion formers".[41] Professional status has been identified as the most influential factor increasing an individual's power within the group.[42] Greater institutional support and resourcing, time availability, prior experience in the policy process (therefore greater understanding of 'what officials are looking for'), and closer relationships with officials (therefore an ability to have frank conversations with them), bring a range of advantages and additional insights for members.

In contrast, a number of issues are faced by 'new members'. They lack the insider knowledge of the process, typically need more time to 'get up to speed' with how things operate and what is required, must build up relationships of trust with officials, and may have increased feelings of being an 'outsider' because of these factors.

Evidence from observational and experimental studies also suggest "that the same evidence can be interpreted differently by different groups and that experience, composition of specialisms, and professional status within groups influence how recommendations are formed."[43] This is especially the case in situations where the "scientific evidence was of a poor quality, sparse or contradictory" and members fall back onto their professional knowledge of the field more broadly or previous experience. It is at these points that distinctions between scientists in academia versus practitioners can become more noticeable.

Globally, the COVID-19 response has seen increased awareness of the issues surrounding advisory boards, driving the introduction of measures to separate science advice more formally from policy. This is to provide scientific advisory boards with greater autonomy, increase the involvement of independent academic experts, and enable them to make reports and minutes publicly available.[44] Many such mechanisms, utilised to increase independence and transparency, are evident in the work on the NPS-FM 2020 which also attempted to break silos, introduce greater diversity and increase transparency.

The provision for a minority report, and the direction for dissent within the STAG to be recorded, are especially powerful tools for ensuring all voices, and the diversity of voices, are recorded. This helps break down some of the traditionally uneven power dynamics that can arise within such advisory bodies.

3.3.4 Policy considerations impacting on the STAG

Despite the attempt to remove economic and political concerns from the science, no science work occurs in a vacuum and STAG members were acutely aware of the broader complexities that could affect outcomes. One of the issues most frequently raised by STAG scientists was concern about how much policy and science work should be left to regional councils. This was reflected in the debate over what attributes were best set as bottom lines nationally versus what needed more bespoke design and local content. Some members of the STAG preferred a localised bespoke approach that could be crafted in response to local variation. They considered national bottom lines "too blunt an instrument" for many situations. Others felt that such national standards were a necessary starting point, providing a useful safety net as well as greater consistency. Still others highlighted the danger of national bottom lines operating

as *de facto* permissions to "pollute up to that point". This meant that deliberations on attributes and national bottom lines were complex and inevitably strayed into implementation and political matters.

There were clear science aspects to these determinations: certain water quality measures are highly variable from place to place, so the appropriateness of a national standard versus local standard setting is in large part a technical matter. However, other considerations clearly stepped into the political arena, including:

- an iwi/Māori preference for more locally set rules and standards that are determined in consultation with iwi, and concerns over the adequacy of consultation and a 'partnership' approach when they are set at the national level;
- the political balance between the influence of national and regional government in setting standards;
- the degree of uncertainty and risk associated with leaving decision-making to the regional level.

This last factor included concerns about the capacity of councils to do the necessary science work; the more contested nature of science at the regional level; the increased potential for conflicts of interest and stakeholder pressure within regional council decision-making processes; and the adequacy of the RMA planning process at the regional council level.

> *"At the council level, the scientists are very down in it all. They can't help but be acutely aware of the politics and practicalities. Their aim to focus on the science is genuine, but it's so contested at that interface, and there is a constant tension between the science and other pressures and concerns. It's much harder to set standards at that point."*

> *"Leaving core policy roles to councils is a concern. Enormous political pressures are exerted there. In rural areas elected officials are drawn from small agriculturally based communities which are economically dependent on the primary sector. Regulatory capture is a real concern. We know there's not enough oversight. It's important there is direction."*

> *"Regional councils can be so compromised. More oversight is needed to reduce the selectivity of what research and what data is used."*

> *"There are so many regional councils and views on the science at that level, so many methodologies and approaches, inconsistences and politics and protectionism. Trying to change that is almost impossible. Legal appeals can tie up their science teams and progress for years. The science inputs are variable. Agreement is more difficult."*

> *"It was clear that some didn't trust the councils to implement. That debate crystalised around the DIN. I think all sides, all positions were thinking about implementation and straying into policy there. If we were to do it again, I would want more clarity there, because even the questions of officials strayed into policy in that arena. Framing is really important."*

> *"We had significant concerns about the RMA planning process if national bottom lines were not set."*

These concerns could not help but be front of mind for many STAG members. Determining what matters should be left to the council level involved some degree of risk assessment: what might the implications of leaving core matters to councils be? STAG members appear to have been considering, not just whether an attribute was best suited to being set as a national bottom line (as opposed to being set locally according to the natural variability in water bodies), but also:

- What was the danger of leaving a specific attribute or matter to councils, if the science undertaken at that level was inadequate or overly political?
- If a national bottom line was set, how far down did that drive the standard? What would be the outcome if standards adjusted to the lowest common denominator? Would many councils strive for better?

There were pros and cons, and different risks, associated with many of the science assessments being made. It is worth noting that regional councils have been responsible for freshwater quality since the RMA was put in place in 1991, so the freshwater decline that has been evidenced in recent decades has occurred on their watch. It is therefore unsurprising that many had low trust in the sector setting locally based rules and concerns around the implementation of the NPS-FM. These concerns meant that, in practice, STAG debates often strayed into design or policy discussions – "if we set a specific number, how would that be managed?"

3.4 External interests and their influence on the science

A further aspect explored in our interviews was the extent to which external politics, interests and pressures were apparent throughout the policy process, particularly in relation to the science, and how these were

managed as part of the policy process. The treatment of conflicts of interest was a specific topic that we asked interviewees about, and that question opened up the discussion on a range of associated external pressures.

3.4.1 Conflicts of interest

While the broader function of conflict of interest protections is to prevent undue influence and bias from interfering with the independence of advisory group advice, they are also there to help keep political matters apart from the science. The science input is just one of a number of inputs to the policy process, albeit a very important one. Clear separation helps ensure that the science does not transgress into policy-making. Conflict of interest requirements were set for all NPS-FM advisory groups as a matter of course and the terms of reference for the STAG were no exception.

The terms of reference required STAG members to declare any "real or possible" conflicts of interest with the development of freshwater policy. Conflicts of interest were defined as occurring when members' "private interests interfere, or appear to interfere, with an issue that faces the group" or "when there is a possibility that a benefit may apply to a sector, industry or organisation that they represent".[45] The conflict could be real or perceived but did not include interests of a "remote or insignificant" nature.

All advisory group members (including Te Kāhui Wai Māori and the Freshwater Leaders Group) were required to sign a conflict of interest declaration form. The terms of reference also advised that disclosure of interests could be self-initiated, raised by the Water Taskforce, or raised by other members of the advisory group.[46] Any declared conflict of interest was noted on the member's record and had to be reviewed and accepted by the Water Taskforce Manager responsible for the group. Even where such a conflict was acknowledged, the Water Taskforce had a discretion to allow members to continue to "participate in discussions about issues in which they have declared a conflict of interest".[47] There was therefore no strict requirement for members to recuse themselves in such situations.

Almost all interviewees that we discussed the issue of conflicts of interest with expressed the view that the country generally manages conflicts of interest very poorly. They also noted that conflicts of interest are particularly tricky to manage for small nations, such as Aotearoa New Zealand, due to the limited pool of expertise to draw on. This means that scientists are in high demand and are utilised by a range of public and private bodies. They frequently have close working relationships and clients across several sectors. This increases the risk, both real and perceived, of sector interests influencing advice (and decision-making) and increases the importance of transparency.

> *"There was a conflict of interest form, but that was as far as anything went – we signed it and they weren't mentioned again. Some people declared conflicts, others didn't. No one formally delved into it or scrutinised it."* (STAG member)

> *"Conflict of interest is a tricky area. Members of Kāhui Wai also sit across a range of other things. We have complex interests and managing that can be difficult. We had to sign the usual register of conflicts of interest, but that was all. It wasn't actively managed or given much further consideration after that really."* (Te Kāhui Wai Māori member)

> *"It's very easy to tell people they should be independent and not represent [a sector], but that was difficult for some. People have some very close pre-existing professional relationships, and it's not that clear cut."*

> *"The way it's managed at the moment, conflicts of interest too often undermine good policy. As long as people declare their conflict that's enough. That's not how it should be dealt with. People shouldn't be able to declare but then just carry on without it being taken into account. Their input needs to be dealt with differently."*

> *"New Zealand deals with conflict of interest very poorly right across the board, we are really lax. We are so small, people always know people. We need to do a lot more direct thinking about how we can work through and address that in our policy processes."*

While officials stated that the conflict of interest forms were reviewed and checked with the group's terms of reference, the constantly stated concern from participants, was that the forms were taken too much on trust and not robustly investigated, discussed with members or actively managed.

Conflicts of interest have proven a difficult issue to address, since asking members to stand down can be problematic when there are a limited number of experts in a very specific area. Several members of the STAG raised the need for robust peer review of advice and methodologies. Within the STAG, members also attempted to incorporate peer review elements as an extra check.

> *"On the STAG, we all tried to review each other's work. That doesn't have the same level of independence as peer review, but it was at least some safeguard. If all the data we used was open to independent review, would it have come to the same conclusions? I can't say, but given the time constraints it was the best we could do".*

Other interviewees felt that expert panels in this country tend to operate in a highly insular way, which can leave a 'vacuum of knowledge'. It was suggested that one way to address this was to draw on the assistance of international experts more often. Interviewees felt that officials were hesitant to do this and that there was a preference to do things locally. They stressed that there is a need to get "more comfortable" and skilled at seeking international contributions, and that the focus needed to be on "sourcing the best information and advice and looking overseas to do that" where necessary.

Spotlight on conflict of interest and bias in the science system

In 2016, Dr Shaun Hendy wrote a text entitled "Silencing science". The objective of the book was to provide a space where some of the country's leading scientists could share their experiences and views.[48] It examined the barriers to addressing a range of policy matters, from climate change to freshwater reform, and the restrictions impeding science inputs. Issues highlighted included:

- An expectation that scientists will manage their own conflicts of interest and a system based on discretion and trust.
- Contractual confidentiality clauses which prevent scientists from speaking out publicly – even scientists at public agencies like Crown Research Institutes, government agencies and universities.
- Biases introduced into the system through the "cherry picking" of scientists with views that align with those of an interest group.[49]
- The risk of utilising industry scientists who have been paid to put forward a specific line of argument.
- The chilling effect of risks to career development and funding success for those who speak out about the science, where the science is highly politicised.
- Biases in the published scientific literature, arising from increased documentation of positive results and findings, but not negative ones that might be unfavourable to a funder. This is especially the case for industry funded studies.
- Too much "end user involvement in the contestable funding system".[50]
- Sectoral conflicts of interests built into the statutory purposes and functions of Crown Research Institutes, which work across industry and as a science provider to government.

Hendy underscores the need for scientists to insist on their right to publish their results openly, regardless of the findings, when they sign contractual agreements and to clearly declare any conflicts of interest when their research is published. Within the policy process, Hendy suggests that there is also a need to acknowledge when a scientific view provided diverges from mainstream science opinion: all views are not equal from a science perspective.

3.4.2 Chilled science: The risk of funding loss and workplace impacts

A number of the scientists we spoke to thought that 'politics' also influenced science outputs in less visible ways: there are a number of risks to scientists if they are seen to support a position that is unpopular or controversial. The principal risks identified were the alienation of clients, loss of funding, and career or workplace impacts.

> *"If you are critical or outspoken on water quality you can easily get blacklisted and then it's impossible to get funding. When there are calls for tenders that can get very blatant. I know people who have been told straight out 'don't bother to apply'. It can get pretty nasty. People get letters telling them they are 'not appropriate' with no explanation."*

> *"You don't even have to be outspoken yourself, just too closely [associated] with the wrong people. Some people are clearly on the outside, their advice isn't sought."*

> *"It's telling that when you apply for grants or involvement outside New Zealand, you get treated professionally, like scientists – based on your work, what you've been publishing, the research. There is less politics and more science focus. Freshwater science here didn't used to be like this. It has changed in the last 15 years as the issue has gotten increasingly controversial and sensitive. Too often these things come down to the people in power and whether they want to hear what you have to say. The opinions of freshwater advocates tend to be discounted."*

A survey of 384 scientists, undertaken in 2014 by the New Zealand Association of Scientists, found that more than 150 of those surveyed considered they had been prevented from making a public comment on a controversial issue because of their management's policy or the fear of losing their research funding.[51] The sentiments expressed were very similar to those articulated by several of the STAG scientists that we interviewed, including the potentially adverse funding consequences of speaking out.[52]

A positive aspect of the NPS-FM 2020 policy workstream already noted was that the STAG membership was intentionally more inclusive *and* independent of industry science. This came as a surprise to some, since it was a novel point of difference to the way that policy work is generally undertaken. The change was considered a significant and important one. STAG members said that, in their opinion, it deepened the analysis and consideration of the science, so enhanced the quality and robustness of the science outputs.

"I was surprised when several freshwater ecologists, normally completely locked out of these things, were included on the STAG."

"The group was far more diverse with people from very different backgrounds. That helped break down silos and made for a really good – a better – balance. Breaking down those siloes and working across them allowed us to do some really good work."

"I found the process much more thorough. If there were disagreements, people stepped up and did more work. There was professionalism even when that happened; more reports were brought in and we tried to get to the bottom of the thing, whether that meant investigating a specific more nuanced aspect, or by presenting more data. The value added by doing that was huge."

"This time the STAG, the process, managed to bring diametrically opposed people into the same room, into the same tent, and that ended up being a really good mix. People who had been at odds found actually we all agreed on what the problems were."

That the STAG was kept away from industry, and industry away from the STAG, was viewed as a particular strength that contributed to the independence of the science. This was highlighted by STAG scientists and Ministry officials as a positive change from previous work on the NPS-FM.

Raewyn Peart

Tukituki River

3.4.3 Back stage performance and sector influence

Sector lobbying and 'revolving door arrangements' between government and industry is a particular problem in Aotearoa New Zealand.[53] The most controversial 'back-stage performance' in the NPS-FM 2020 policy process was in relation to the role and inputs of the agricultural sector, which took place outside of the formal policy process.

The influence of primary industries on policy in Aotearoa New Zealand has often been raised as an issue. Government's historical approach to policy, cemented into government practice with the neoliberal reforms and market driven regulatory approach of the 1980s, has been to avoid regulation in favour of voluntary industry responses and to negotiate directly with industry where regulation has become necessary. This has led to close ties and working relationships, both formal and informal in nature, between sector groups and government agencies.

Examples of such close connections are evidenced in the private meetings and correspondence with sector groups throughout the NPS-FM 2020 process. The most notable involved a 'leaked email' that indicated the existence of an informal and undisclosed primary sector group which was working with the Ministry. Those involved in the formal process across all three working groups, including stakeholders on the Freshwater Leaders Group, were unaware of the sector group's input and involvement in the process. Disturbingly, the leaked email that was marked "confidential" claimed that the group which represented the agricultural industry was "writing policy".[54] MfE staff subsequently admitted there had been a dozen meetings with the industry group, and an apology was subsequently issued, but the revelation shook the trust of many involved in the policy process.

> *"I had gone into this process holding nothing back, believing we were working with the Ministry for the Environment for a good outcome for all New Zealanders. The discovery that industry lobbyists were being given secret backdoor access to the decision process shook me badly."*[55]

> *"The leaked emails... the secret meetings, there was an apology, but how does that even happen?"*

> *"People said the email was leaked, but I don't think it was. I think it was being freely circulated for industry comment. I don't think officials immediately saw the issue with it. I think they were just consulting and working on policy with the sector as they always do. In the beginning they seemed baffled."*

> *"We were so disappointed when officials admitted to meeting and secretly consulting with the farming lobby. They had been discussing big stuff, doing strategic agenda setting. It was clear that the sector wanted to avoid the nutrient issues coming up. That's a really critical issue, a key science issue, so that was really troubling."*

One interviewee told us that, part way through the process, they discovered that some of the issues being discussed in the Freshwater Leaders Group, that they understood were confidential, were being widely disseminated.

> *"It was clear officials saw industry people as internal to the process. We had a meeting to discuss this and the officials were confused it was an issue. I think they were so used to working in collaboration they didn't understand their role as regulators and their responsibility to the advisory groups."*

> *"The role of MPI was also worrying, because they seemed to disappear from the formal process, then suddenly appear towards the end with a lot of material that mirrored what industry groups had been asking for. It felt like an attempt at a takeover, to ignore all our work."*

A number of interviewees, across multiple advisory groups, raised concern about regulatory capture by industry groups. This was not in a direct sense, but due to the historical and institutional culture and practice of government agencies consulting closely with the agricultural sector. Such practice was so commonplace that many officials did not appear to understand the risks or potential impropriety involved: that it might detract from the public good or even undermine the legislative intent of the RMA. Interviewees reiterated that staff "have been working under a highly collaborative model with the sector for so long, the mindset hadn't changed, it was business as usual to bring the industry into decision-making".

Even though a specific stakeholder group (the Freshwater Leaders Group) had been established to directly input into the policy process, sectoral groups continued to be invited individually to the table, demonstrating how engrained the institutional practice likely is. Those we spoke to viewed the meetings with the sector as a 'privileging' practice that served to 'elevate' the role and interests of those groups over other groups in the process, including the public and the environmental sector.

Spotlight on influence of informal policy work on freshwater policy

Informal policy work with sector groups is not uncommon and the degree to which it influences policy outputs is impossible to gauge. Research undertaken by Tadaki on previous policy workstreams for the NPS-FM found that "selective connections" and "relationship-building" across the Water Directorate was "often informal and always selective". It was informal "because these meetings are not publicly notified, and selective because MfE officials choose who to engage with".[56] Tadaki's research investigated the norms operating within MfE and how they constrain choice-making. This included putting some topics off limits (eg 'no one owns the water') and making policy choices in order to maintain positive relationships with stakeholders (eg discourses around 'what councils should be doing for themselves'). In this way these norms inherently shape what is viewed as within-scope or off limits in the policy process.[57]

The risk posed by policy interactions that occur "behind closed doors and without procedures for determining who is invited to the table and what is the nature of involvement" is that "representative institutions are pre-empted from control" and their function within the regulatory process is undermined.[58] A number of scholars have argued that for transparent policy-making, these implicit norms must be made explicit so that they are visible and can be open to public scrutiny.[59] Without this, important aspects of the policy-making process and terms of reference for policy work remain invisible, potentially subverting democratic controls.

It is important to note that 'back-stage performances' occur not only with industry groups, but also with environmental NGOs and Māori, and more transparency across the board would be valuable. However, the significant economic power wielded by primary sector stakeholders with the substantial resources (financial, legal and scientific) they bring to bear on negotiations makes these especially problematic. It is important to recognise not all stakeholders are equal.

The back-door performances evident in the work on the NPS-FM 2020 indicate that, despite a change in approach and attempt to formulate a more transparent and open process, institutional norms and practices continued to influence the policy process. The danger arising from "the lack of clear protocols or accountability regimes for these relationships" is that it biases policy towards the interests of those sectors with more well-resourced lobbyists.[60] Ministry officials have a powerful discretion in this area, because they not only "channel political demands", but also determine which demands are or are not policy ready.

3.5 Strengths and weaknesses of the policy process

All interviewees, across both the advisory groups and officials workstreams, were asked to identify what they saw as the core strengths and weaknesses of the policy process. There was broad agreement as to what these were.

3.5.1 Agreed strengths

Giving the science a voice

The agreed strengths of the policy process all revolve around the measures put in place to strengthen the science, including:

- the diversity of views and inclusiveness on the STAG;
- the production of independent reports and openness of the STAG workstream;
- the direction to not consider economic aspects;
- the transparency and additional detail provided by not requiring consensus and enabling minority views and differences of opinion to be on the record.

The separation of the science from the policy workstreams had helped give the science a voice, and importantly it was an "uncompromised" voice.

Greater connectivity between STAG and MfE advice

For officials, driving the workstream meant that there was increased connectivity between the policy they were developing and the science underpinning it. They felt that the close relationship they had with the STAG helped deepen their understanding of the science, and consequently improved the quality of the advice they produced. While not all of the advice provided by the STAG and MfE was reflected in the final NPS-FM 2020, as other matters were also taken into account in finalising the policy and getting ministerial sign offs, officials highlighted the highly

synergistic relationship between both sets of recommendations. This issue is examined more closely in Part II of this report in the context of outputs from the process.

Ministry officials were supportive of future policy work being structured in a similar manner. They underscored the significant enhancement of the role of science in the NPS-FM 2020 policy process, though those outside the Ministry might not always appreciate it.

Enhanced professionalism

A further strength of the STAG was the level of professionalism maintained through what was a high pressure workstream. The maintenance of professionalism was put down to three factors.

- The selection of members, including the quality of the Chair.
- The approach adopted when differences arose when, as a group, the STAG would take a step back to investigate the root causes of difference and engage in work to examine the data and evidence in that area more closely. This increased the workload, and that workload was often uneven since not all members had capacity, but it enabled consensus to be reach on most issues.
- The absence of stakeholders in the group and focus on the science. Members felt that having a scientist-only body enabled a more rapid establishment of trust. As scientists, there was instant common ground amongst members of the group, and they were able to 'get on the same page' more quickly. Respect amongst science peers, and the ability to withdraw from the political aspects of the policy process, also facilitated this.

Work efficiencies

While there were disadvantages to the limited scope and more directed workstream for the STAG, it ensured greater focus and enabled progress to be made in a relatively short timeframe.

3.5.2 Agreed weaknesses

Implementation

All interviewees thought that more time needed to be spent on the practical components of the policy, applying a science for implementation lens, and that there would have been benefits in doing the work simultaneously. A degree of 'catch-up' is now necessary in this area to ensure the NPS-FM 2020 is implementable at the regional council level. The Ministry is continuing the work in this area, in association with NIWA and local authorities.

The electoral cycle and science for policy timeframes

A common factor noted by all interviewees was the restrictions and pressures imposed by the reactive nature of the policy cycle. As one person described it, "there are periods where lots of scientists felt the science was forgotten, it didn't get much input into policy. We were aghast with the things that came out. Then a new government, a new Minister swings that around. That's good but it's far too reactive."

The reactive environment means that the political opportunity available for any law reform project is invariably limited by the time constraints of the electoral cycle, with successive governments acutely aware of the three year space between elections, when they are guaranteed a window for addressing any particular concern. These pressures create an environment where policy must be developed rapidly, rather than more strategically.

It was noted that the political swings are often in different directions and allow very little time to 'shift the direction of the boat'. This is especially so where the problems (and therefore solutions) are complex and require deep thinking and detailed science inputs. A common sentiment was that "research for policy can't be pulled out of a hat", it has to be put in train ahead of time. The science voices we spoke to emphasised that there "is a real need to get agreement on how science should inform policy, the direction of travel and what the science requirements are", and to develop a longer-term strategic approach to policy work.

The rapid pace of policy development restricts what it is possible to get agreement on, the scope of the workstream, and the ability to undertake bigger thinking. It also undermines the degree of planning and coordination associated with the policy process. This, in turn, favours the status quo through supporting incremental reform and "adjustments", but prevents the deeper more systemic reform often necessary to address complex environmental problems.

The political cycle makes it difficult to address issues like freshwater decline and climate change, where the science is complex and significant science advice is required. It means that there is simply insufficient time to obtain the data necessary for decision-making, the research base to support policy development is lacking and significant information gaps

persist. However, there is always a time lag between problem identification and response formulation which enables some science to be undertaken. But whether such science occurs is contingent on funding and resources being allocated to it, and that is a highly political determination, often dependent on cabinet's budgetary decisions. This was highlighted as a significant barrier to policy development.

> *"Policy-making is so reactive. We need a long-term strategic response if we are going to provide the science that's needed."*

> *"Policy development remains really disjointed and erratic. They always require a rapid response because everything is tied to the electoral cycle. The science inputs don't work like that."*

> *"We can't keep reacting and developing policy through a series of unplanned ad hoc reviews. The timeframes are always too rushed and that undermines a science-based approach. Getting the science in place takes time, answers take time. There has to be the time to direct capacity and resources to answering that, and you can't do that without bigger timeframes."*

> *"The timing of these things is always bad. Governments change and the direction of travel can shift rapidly, but the science doesn't work like that. We've now had a series of reactive reviews. If we are going to work on strengthening the science base for policy, then we need to strengthen this interface: that means a strategic response, starting the planning and thinking earlier – five years not three months ahead."*

A recent article, penned by a group of scientists involved in freshwater policy processes, discusses in more detail the range of challenges that exist in this arena. Larned et al reviewed the historical process for freshwater policy development from the 1940s onwards. A key observation from their review was that "the development of freshwater attributes over the last decade has far outpaced progress in mechanistic knowledge and predicative science" and that in their view "freshwater science is currently lagging far behind policymaking".[61] This is because the broad policy directions and intention have not been "signalled significantly far in advance to allow for the science research and development process (eg problem framing, research design, funding, capability building, research implementation) to deliver useful knowledge and tools to policymakers in a timely way."[62] There was no "sustained strategic response".

The authors underscored that "the wicked problem of freshwater management is exacerbated when science and policy are not well aligned".[63] Better time scales are required to ensure there is a feasible science delivery pathway to serve policy needs. This issue will be discussed in more detail in Chapter 8, which examines science supports for policy. However, it is inextricably tied to policy development timeframes.

Need for a more iterative process

The timeframes for the development of the NPS-FM 2020 were such that they allowed very little iteration: when things were modified there was limited time to allow those who made the recommendations to check the changes or do further work to refine aspects that needed subtle modification. It was felt that greater iteration at the front and back ends of the policy process would have been valuable.

Lack of scope for such iteration in the final phases was seen as undermining the translation of science into policy.

> *"When aspects were changed, there wasn't the time or space to check, to refine things like they should have been. It's fine to modify things, that's the call of officials and a matter of policy, but modifications have to be done in a scientifically credible way. It's a bit like the law, minor wording changes matter, and sometimes changes don't translate, they needed further science advice. If we want to be really rigorous, we have to leave the space for that to happen."*

Raewyn Peart

Tongariro National Park

Improving transparency and trust

A lack of transparency across a range of areas created increased tensions and an erosion of trust. Interviewees underscored the importance of cultivating and maintaining trust in order to "have the hard conversations". Due to the STAG's mix of members, including those involved in previous freshwater policy iterations and new members who had been openly critical about the quality of freshwater regulation and the previous NPS-FM, there was a degree of understandable caution on both sides at the initial stages of the policy process. This made progress slower at the start. Yet it was at the start when some of the most important discussions around the workplan and scope were undertaken. Officials also noted that the STAG had a large amount of material to come to grips with in this initial phase.

A number of STAG members felt that more 'free and frank' conversations were needed in the very early phases in order to align everyone and develop greater understanding of roles and the rationale for the approach adopted. That some members, particularly those new to the policy process, complained of a lack of openness around the setting of the workplan and context for the tasks set by MfE, reinforces the need for this.

Their sentiments highlight that discussion of the workplan, and of the role and scope of the group, was likely too rushed for such a newly formed entity and that this hindered the participation and input of members new to the policy process. In turn, it also likely exacerbated uneven power dynamics and tensions within the group. In addition to more time and space to discuss these important starting points, it also suggests a need to incorporate team building opportunities into the policy process (particularly where a group has been newly established) and perhaps a formal induction process for new members.

It was also clear that a lack of transparency in relation to the role being played by sector groups – outside of the Freshwater Leaders Group – caused substantial loss of trust and raised concerns regarding undue influence and conflicts of interest interfering in the policy process. Perception of an institutional culture that places sector groups as 'insiders' in the policy process, where there is inherently less visibility and public record of interactions, was an aspect many interviewees highlighted as a concern. They saw a danger that these practices (eg private or 'secret' meetings) elevated (or created the appearance of elevating) the interests and influence of sector groups over other groups represented and engaged in the process, including the public interest.

Raewyn Peart

Awatere River showing forestry harvesting

3.5.3 Diversity of views

There were also several areas where there was a diversity of views.

Policy design/co-design

Some STAG members felt that scientists should have been more highly involved in design of the approach and in setting the workplan and agenda for the group. Others recognised that the STAG had been formed for very specific purposes, and that its input was therefore inherently limited, forming only a small piece of a broader, longer piece of policy work. The adequacy of the boundaries set therefore depended on the aspirations of the individual members.

These differing perspectives were mirrored in views on the relationship between the STAG and MfE officials, and how close or separated they should have been. Some thought the STAG should have operated more separately from MfE and should have had autonomy. Others wanted the group to work more closely and collaboratively with officials while still others saw their task as a very focused and technical one. It is unsurprising that this was an area where very diverse views existed.

"Closeness" in any policy process brings both advantages and disadvantages; a direct relationship with policymakers "makes it easier to understand the policy process, to build trust with decision makers, and to learn how to give advice and guidance effectively. However, it also raises questions over independence and objectivity, with a real risk that advisers are, or are seen to be, co-opted or compromised by government."[64]

The range of views reflects an acute awareness of the complexity of striking the correct balance in this area.

3.6 Conclusions

The work of the STAG was highly directed, with much of the scope and mandate for the work being laid out in the Labour Party's election manifesto prior to the establishment of the working groups. While this provided time efficiencies, it restricted the degree of innovation possible, and a more science driven approach.[65] Although the process was not completely pre-determined down to the last detail, and MfE endeavoured to facilitate STAG requests to develop new attributes where possible, time, workload and the pre-set policy priorities limited how much flexibility was available within the policy process.

Increased science inputs at the beginning (policy design) and end points (refinement) of the policy process would have enabled a more integrated approach and improved connectivity at the science-policy interface. The work of the STAG would also have benefited from having more structure, advance notice, information and context around matters they were asked to consider. This would have enhanced the fit of science inputs for policy.

Conversely, the boundary work undertaken increased the independence, strength and transparency of the science advice within the policy process. The diversity of membership, requirement for the STAG to produce an independent report, the documenting of areas of dissent and minority opinions, and direction not to consider the economic implications of measures (so as to focus on the science), were all regarded as strengths, making the science more visible and effectively communicated.

Our interviews with STAG members also shine a light on some of the social processes connected to the science. Factors such as member's field of study, prior experience with the policy process and institutional setting and culture all affect the social dynamics within an advisory group as well as member's views and perspectives on the policy process. Scientific professionalism, and collective agreement to adopt a strongly evidence-driven approach in response to disagreement, assisted the group to maintain its cohesion and navigate some of the more complex issues that arose. All members we spoke to considered that the increased diversity and inclusivity of STAG membership in this policy process (compared to previous ones) was a strength and made the science outputs more robust.

Millan Ruka

Oakleigh Creek showing soil pugged by cattle

Endnotes

1 A copy of the terms of reference for the STAG is attached as an appendix to the 2019 STAG report: Science and Technical Advisory Group, 2019

2 At 11

3 Resource Management Review Panel, 2020, 62-64

4 Ministry for the Environment, 2012

5 Eight interviewees in total

6 Such as the definition of "maintaining". The discussion is recorded in: Science and Technical Advisory Group Meeting minutes, 18 October 2018, 6-7

7 At 6-7

8 Science and Technical Advisory Group, 2020

9 At 11

10 https://www.drinkingwater.org.nz/general/nzprocesses.asp

11 Science and Technical Advisory Group, 2020, 9

12 See Brown, 2019

13 Sienkiewicz et al, 2020, 104

14 Such problems have been characterised as "post normal science" problems, see Funtowicz and Ravetz, 2018

15 Norgaard, 1992, 95

16 Parker, 1 November 2018, 'Oral questions to the Minister for the Environment: Question 27633', *New Zealand Parliamentary Debates*

17 For example Dr Mike Joy has characterised the NPS-FM 2014 as flawed, not scientifically sound, and considered that it would encourage poor practice. Discussed in 'Kanwal S, 2014, 'New water policy a concern', *Stuff*, 15 August 2014

18 Secchi and Mcdonald, 2019, 241

19 At 241

20 Dawkins, 1996

21 Fang, 2011, 1403

22 A formative work is is Gamson, 1999, 23

23 Agricultural scientist Dr Doug Edmeades has written several pieces along these lines, see as examples: Edmeades D, 2016, 'Water science: Rationality v alarmism', *Stuff,* 22 September 2016 and Edmeades D, 2017, 'Is Mike Joy a biased scientist?', *Stuff,* 11 April 2017

24 Nisbet, 2009, 54

25 Garrard et al, 2015

26 Pielke, 2007

27 See Pielke, 2015 on the 'five modes of engagement', https://rogerpielkejr.blogspot.com/2015/01/five-modes-of-science-engagement.html

28 Pielke, 2015

29 See Science Media Centre, 2013, 'Bottom lines for freshwater quality – experts respond', 7 November 2013, https://www.sciencemediacentre.co.nz/2013/11/07/national-bottom-lines-for-freshwater-quality-experts-respond/

30 Science Media Centre, 2013, 'Bottom lines for freshwater quality – experts respond', 7 November 2013

31 The New Zealand Māori Council argued that procedurally, it had been excluded from the policy development process because the Crown had determined to instead work with a Freshwater Iwi Leaders Group, a body appointed by the Iwi Chairs Forum to engage with the Crown on freshwater. In response, the Iwi Leaders Group argued that the engagement model was a good one and could be used in the future. It was their position that iwi authorities were the appropriate bodies to play a leadership role in their respective catchments alongside the Crown

32 Waitangi Tribunal, 2019, *Stage 2 report on the national freshwater and geothermal resources claims*, Waitangi Tribunal Report (Wai 2358), 419

33 At 419

34 At 421

35 At 421

36 At 422

37 At 421

38 At 535

39 Berkett et al, 2018

40 Berkett at al, 2018

41 Atkins et al, 2013, 101

42 At 101

43 At 101

44 Williams et al, 2020, 29

45 Ministry for the Environment, 2018c, Terms of Reference for the Freshwater Science and Technical Advisory Group, November 2018, 6

46 At 5

47 At 6

48 Hendy, 2016

49 At 22 and 33

50 At 21

51 New Zealand Association of Scientists, 2014

52 Radio New Zealand, 2014, 'Forty percent of scientists feel gagged', 2014, *Radio New Zealand*, 4 November 2014, https://www.rnz.co.nz/news/national/258512/forty-percent-of-scientists-feel-gagged

53 Edwards B, 2020, 'Vested interests in New Zealand politics are too big to ignore – we need a royal commission', *Guardian*, 19 February 2020

54 Joy, 2021, 54

55 At 54

56 Tadaki, 2020

57 At 237

58 Liberatore and Funtowicz, 2003, 147

59 See for example: Heyman, 2004 and the literature review of Hoag and Hull, 2017

60 Tadaki, 2020, 235

61 Larned et al, (in press)

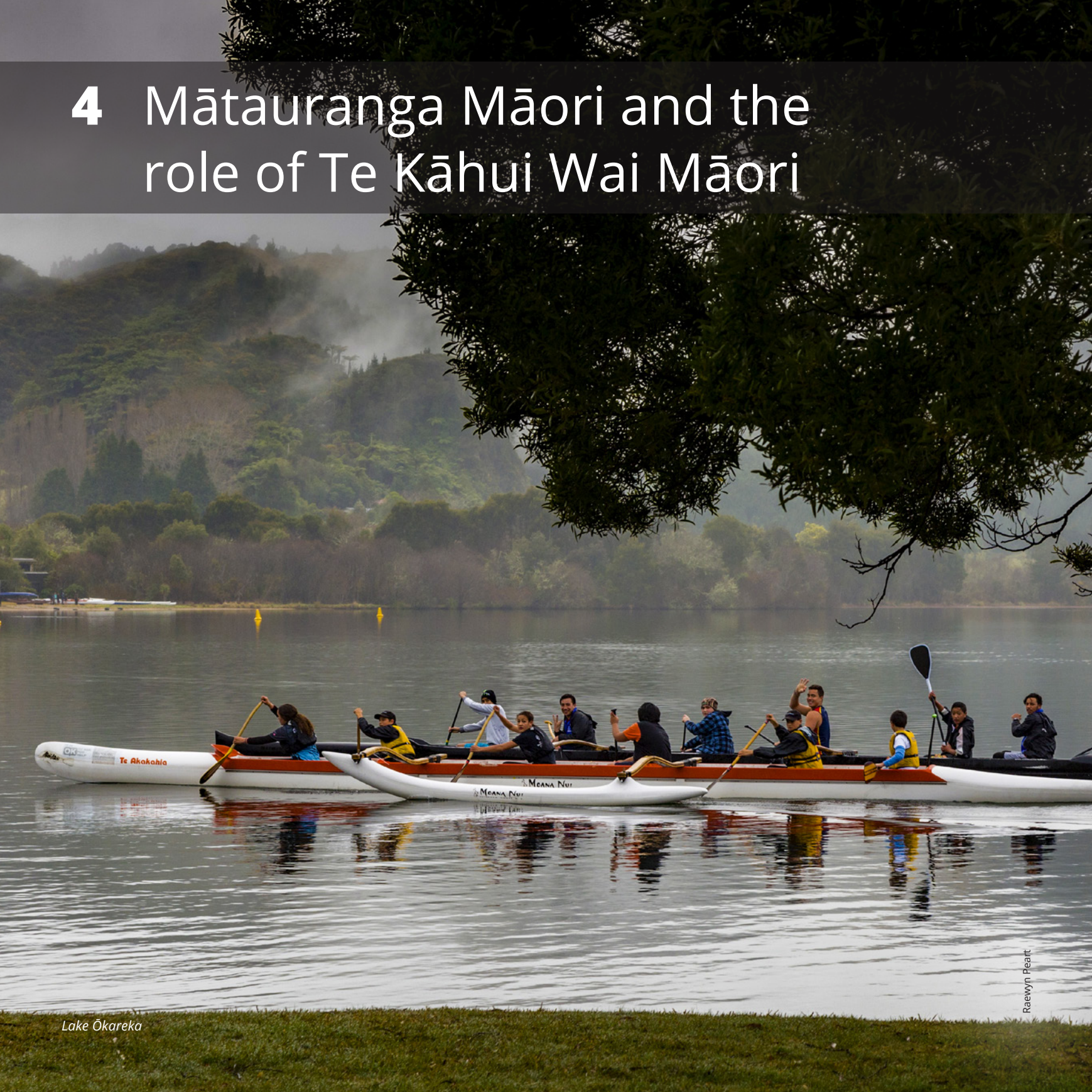
62 At 3.1

63 At 4

64 Williams et al, 2020, 29

65 The primary science input was in the form of a letter from scientists calling the Ministers' attention to issues facing freshwater regulation. See Ministry for the Environment, 2018d, *Freshwater: Resolving NPS-FM science differences*, internal MfE memorandum to Ministers for the Environment and Agriculture

4 Mātauranga Māori and the role of Te Kāhui Wai Māori



Lake Ōkareka

Raewyn Peart

Movement towards greater co-governance and working in partnership with iwi/hapū mean that Māori values and knowledge systems (mātauranga Māori) are increasingly being incorporated into policy and policy processes. This has been the case for freshwater reform.

Most modern legislation, including the RMA, makes specific reference to the Treaty of Waitangi. Section 6 of the RMA identifies "the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga", as well as "the protection of customary rights" as "matters of national importance". Under section 8, "all persons exercising functions and powers" under the Act "in relation to managing the use, development and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (te Tiriti o Waitangi)".

What remains unclear is *how* such legislative direction, and broader Treaty-based calls for movement towards co-governance and/or co-management, should be undertaken in practice. The formal role of iwi/Māori within established policy processes remains largely unprescribed, leaving significant flexibility and the opportunity for variability in approach. The complexity of establishing a policy approach that effectively incorporates the relevant Treaty partner differs according to context and scale. While it may be relatively straightforward to identify and develop the necessary relationships and processes at the local scale, the task is much more difficult and political at the national level. This is reflected in the area of freshwater reform.

Millan Ruka

Environment River Patrol, Wairua River

4.1 Previous NPS-FM policy workstreams: co-design with Māori

In previous NPS-FM processes, the Crown worked with Māori in a highly collaborative way. In 2007, the Iwi Leaders Group approached the Crown, seeking to work more closely in partnership to progress freshwater reform. This led to the adoption of a co-design driven approach to NPS-FM development.

Previous iterations of the NPS-FM adopted a two-tiered model: Ministers engaged directly with the Iwi Leaders Group at the leadership and governance level, and an Iwi Advisors Group, made up of iwi and their technical advisors, engaged with officials at the more technical level.[1] Members of the Iwi Advisors Group were also directly engaged within both the stakeholder-led LAWF and the officials programme which was responsible for scoping policy options.[2] In this way, a joint work programme was established, where officials and the Iwi Advisors Group worked in close collaboration.

This was a clear attempt to take a Treaty-based approach to freshwater reform. In the Waitangi Tribunal's stage 2 report on freshwater, produced in 2019, the Crown argued that the "co-development and co-design of reform options with the ILG [Iwi Leaders Group], alongside the iwi role in the LAWF, enabled a new and extremely collaborative form of Crown-Māori engagement to occur".[3] The Tribunal congratulated the Crown for the innovative "co-design" approach which it thought "should become a standard part of government policy-making."[4] The Tribunal described the "co-design" process entered into by the Crown and Iwi Leaders Group between 2014 and 2017 as "the most important process innovation of the Crown's freshwater reform programme."

The central role played by the Iwi Leaders Group in the policy process did raise some concerns, however. The New Zealand Māori Council felt that the joint policy approach had "wrongly excluded" a number of "significant Māori parties or sectors" from the policy development process.[5] The Waitangi Tribunal acknowledged that the New Zealand Māori Council had an important perspective and that it should also have been included. The Tribunal also noted the risks associated with the Iwi Leaders Group operating as a Crown advisor both before and after consultation rounds. This could result in the group overly dominating the Māori voice in the Crown's reforms, especially since iwi with Treaty settlements were more represented through that body.[6]

Spotlight on different Māori entities

The *Iwi Leaders Forum* is made up of mandated representatives of iwi and hapū groups who regularly meet to discuss issues of mutual significance, create strategic plans and engage on a rangatira ki te rangatira basis with Ministers of the Crown. The objective is to "enable Māori aspirations in the spheres of cultural, social, economic, environmental and political development".[7] The first forum was convened in 2005 and all iwi chairpersons have an open invitation to participate.

The *Freshwater Iwi Leaders Group* was formed in 2007 "to advance the interests of all iwi in relation to fresh water through direct engagement with the Crown."[8]

> *"Our wai (water) is an inseparable part of our whakapapa and our identity, and is a fundamental part of what drives our very existence. The future health and wellbeing of our waters are a matter of utmost importance to all iwi, as well as all New Zealanders."*[9]

The *New Zealand Māori Council* is a statutory body established under section 17 of the Māori Community Development Act 1962, that advocates on behalf of Māori.[10] The Council has a range of functions aimed at promoting, encouraging and assisting Māori across a number of areas including to improve their physical, economic, industrial, educational, social, moral and spiritual well-being and support local self-government. The Council also plays a race relations role and it collaborates with and assists government departments and agencies.[11] The Council makes representations to the Minister of Māori Affairs or any other person or authority where advantageous to Māori.[12] The Council is made up of sixteen districts, and within those, representative Māori Committees give voice to local and national issues impacting Māori.[13]

The government defended the strong role provided for the Iwi Leaders Group, arguing that it was the appropriate body "to ascertain and convey the views of a wide range of iwi and hapū, and was the organisation which best represented the customary interests in waterways".[14] Despite the concerns raised by the New Zealand Māori Council, the Tribunal found that the policy process had been "Treaty compliant for the Crown to work with the Iwi Leaders Group in this process".[15] A key factor considered in making this determination was that consultation with the Iwi Leaders Group had been followed by "wider consultation with Māori and the public".[16]

Interestingly, although the Iwi Leaders Group considered that the "engagement model was a good one", it thought the work had been "compromised by the politicisation of the process, unilateral Crown decision-making about reforms, and the compartmentalised nature of the Crown's reforms."[17] The Waitangi Tribunal concurred with the Iwi Leaders Group, finding that despite the "promising process", the "outcomes were disappointing in Treaty terms". This was because the Crown did not make decisions in partnership but "reserved all decision making to itself". The Crown had, for example, put certain matters off limits. This was evident from assertions that 'no one owns the water' and that there would be 'no generic share for iwi'.

In its summary of findings and recommendations, the Waitangi Tribunal stated that "one of the flaws in the co-design process" was that "decisions were not made in partnership but by the Crown alone".[18]

Spotlight on the Waitangi Tribunal's freshwater co-governance recommendations

The Waitangi Tribunal recommended that "an independent national body [be] established on a co-governance basis with Māori" in order "to act in partnership to ensure that treaty principles and Māori values, rights and interests are fully incorporated in freshwater policy and management".[19] The Tribunal also stated that where such a co-governance body was not established, the Crown should work in partnership and on a co-design basis with the Freshwater Iwi Leaders Group, the New Zealand Māori Council and the newly established Te Kāhui Wai Māori group.[20] Further, the Tribunal considered that the Crown should "continue its approach of co-design of policy options with a national Māori body or bodies and that this should be made a regular feature of government where Māori interests are concerned."

4.2 Controversy over Te Kāhui Wai Māori

The government's decision to depart from the previous co-design approach with the Iwi Leaders Group, and to establish Te Kāhui Wai Māori as an advisory body for the NPS-FM 2020, was controversial. The original conception was for Te Kāhui Wai Māori to be a specialist group of 'advisors' to the Minister and Water Taskforce in order to assist with the development of options for further reform and broader engagement with Māori. Te Kāhui Wai Māori members did not represent specific iwi/hapū,

but were "appointed by the Crown" to "enable collaborative development and analysis of freshwater policy options for matters of particular relevance to Māori".[21] Members of the group were selected for the "broad range of Māori expertise and perspectives" they brought to the table.

The approach was in line with the incoming Labour government's decision to take a stronger, more directive role in leading the upcoming freshwater reform. The new workstreams were to be more limited and advisory, rather than collaborative in nature. The Cabinet paper released in 2018, entitled 'A new approach to the Crown/Māori relationship for freshwater', explained that "considerably more progress is needed to improve water quality", and that there was "a building sense that there is no clear path ahead for the Crown's engagement with Māori and addressing Māori rights and interests in freshwater". It further stated that feedback from public engagement on the Crown/Māori relations portfolio was that the Crown "had not been talking to a broad enough cross section of Māori society on freshwater issues."

Te Kāhui Wai Māori would broaden the conversation and "enable collaborative development and analysis" of freshwater policy. The government promised that the group would not be the only mechanism for engagement and would not "hold a mandate to 'sign-off' on final options for reflecting Māori rights and interests in freshwater policy". Reassurances were also given that the Crown would still meet with the Iwi Leaders Group and other key Māori organisations "prior to significant decision points and wider public consultation."[22]

The change in approach affected the role of the Iwi Leaders Group, removing it from the more hands-on practical policy development task that it had previously been engaged in. It also meant that the composition of the principal group which the government would liaise with to develop policy would be controlled by the government, which would select and appoint members. The government requested "nominations" from a small number of Māori organisations and contracted additional members on the basis of their expertise. This gatekeeping role, in determining which Māori advisors would be involved, was a significant step away from a partnership approach.

The initial terms of reference for Te Kāhui Wai Māori were to:[23]

- facilitate engagement between the Crown and Māori on freshwater reform;
- collaboratively develop and analyse policy options on issues of particular importance to Māori across the freshwater reform programme;
- provide advice directly to Ministers where it wishes to;
- undertake any other advisory/research function agreed between the Crown and Te Kāhui Wai Māori; and
- undertake or facilitate engagement with the wider Māori community on key issues if necessary.

In addition, the scope of Te Kahui Wai Māori would "be limited to issues being discussed in the freshwater reform programme; and specifically exclude historical Treaty settlement issues or local issues".[24]

There were also confidentiality constraints. Te Kāhui Wai Māori conversations were conducted under a condition of confidentiality and

Raewyn Peart

Tekapō River

an "expectation of prior consent" of the Crown and other group members before members made any public statements on issues traversed.

These restrictions, and the highly Crown directed nature of the workstream for Te Kāhui Wai Māori, signalled an intention to remove Māori rights and interests in freshwater (ie issues of ownership and allocation) from the scope of work for the group. The Crown considered these matters were holding up freshwater reform, noting that a range of matters were before the courts and Waitangi Tribunal. It wished to "allow matters to unfold" in those fora, while progress was made in other areas, as part of a "phased approach" to freshwater.[25]

The Iwi Leaders Group strongly opposed this new approach and the establishment of Te Kāhui Wai Māori. It announced a boycott on the basis that there had been no consultation over the change and that the terms and membership of the group did "not reflect a relationship of partnership under te Tiriti o Waitangi".[26] Ngāi Tahu also announced that it would be seeking direct engagement, reminding the Crown that under the terms of their deed of settlement, the Crown was required to negotiate in good faith. The tribe also made it clear that whoever was appointed to Te Kāhui Wai Māori would "not have the support of Te Rūnunga o Ngāi Tahu."[27]

This made the appointment of people to Te Kāhui Wai Māori highly political from the outset. As interviewees explained:

> *"As Māori, it's really important not to just put yourself forward for things, it's important to have support from a broader body – whether the forum, iwi or the New Zealand Māori Council – because there is so much politics going on in te ao Māori."*

> *"The problem was that Kāhui Wai was a creation of the Crown in the kawangatanga space, but it was sold as if it would be fulfilling kaitiakitanga. That automatically created a division within Māori that the Crown just didn't understand. The group couldn't represent Māori, that's where the tension was."*

> *"I understand that figuring out how engagement should work is logistically challenging for the Crown. How do you provide iwi representation at the national level, appoint a group like that. But the way engagement happens, it's still old hat. We all need to take some responsibility for this."*

The Minister was also challenged in the House by Opposition members over whether ministerial appointment to Te Kāhui Wai Māori was consistent with the Treaty partnership. The justification in response was that government had been grappling with the issues surrounding freshwater for more than a decade, the Crown and the Iwi Leaders Group had been "unable to resolve the curly issues that lie at the bottom" of it, and that we needed to move forward.[28] The government did not wish to "start another journey to bring up to speed people that don't already have a deep understanding of the complexity around water issues". In short, the government was seeking a fast-track pathway to update the NPS-FM and implement its agenda for freshwater reform.

To assist in navigating the appointment process, the Minister called for nominations and expressions of interest from Māori groups and individuals. However, all members of Te Kāhui Wai Māori that we spoke with emphasised the high degree of political tension surrounding the group's formation and their difficulties in determining whether or not they would engage in the process.

> *"Government's decision not to work directly with iwi made Kāhui Wai especially challenging. We were a quasi-advisory thing, with a suite of different interests. I was very unsure about it, but decided that it was better to be on the inside and know what's going on, than be an outsider throwing rocks."*

> *"The starting point created complicated dynamics for the decision to be involved. We all wanted to make sure we did a really good job if we were going to do this thing. We were committed to influencing the process because the outcome had to be worth it – worth playing the game, doing what the Crown wanted. It was pragmatism for me. The hope was that if nothing else we could advance things a few steps."*

> *"Te Kāhui Wai Māori had a ministerial mandate, and that gave the group a status and voice, but the role of advisor or serving the Minister? Lots of Māori might say that doesn't exist. Perhaps we were naïve thinking we could do both, be inside and outside the tent."*

Participation in Te Kāhui Wai Māori was a very personal decision for members that came with a raft of broader considerations. The approach adopted by the Crown had damaged relationships and the group was controversial amongst iwi.

> *"Iwi were not fans of Kāhui Wai. As iwi, we aren't 'just part of the machine'. The question of the legitimacy of the group, of the process, and so of the policy, was huge. There was already controversy in the relationship between Labour and the Iwi Leaders Forum. Labour had very different engagement from National. Bridges were broken."*

4.3 Renegotiating scope

4.3.1 The terms of reference

One of the most problematic aspects of Te Kāhui Wai Māori was that government had pre-set the terms of reference for the group prior to its establishment, and had signalled an intention to play a strong role in directing the agenda for the group. The first task of Te Kāhui Wai Māori, after it was convened, was to redraft the terms of reference and renegotiate the approach.

The newly appointed members emphasised to the Crown that all freshwater work needed "to be viewed within the overarching need to provide for tino rangatiratanga to understand Māori relationships with freshwater, governance and decision making."[29] The group reiterated the need for Treaty partners to agree on what rangatiratanga means in the freshwater context. It was also made clear that there needed to be a direct relationship and line of communication between Te Kāhui Wai Māori and the Minister; that the core relationship was not between Te Kāhui Wai Māori and MfE or the Water Taskforce, but with Ministers themselves.

Soon after its establishment, Te Kāhui Wai Māori met with Ministers, including Ministers for the Environment, Primary Industries and Treaty Settlements, as well as the Prime Minister. Group members wanted to make it clear that they "were mainly advising Minister Parker". Even though Te Kāhui Wai Māori understood it was "not a true partnership group" members felt it was important to ensure their "mana" was recognised.[30]

> *"It was also really big learning for the Crown not to interfere in that space and to be clear and careful in scoping. The scope of Kāhui Wai changed so many times. It got extended. We set a lot of our own terms, really, and had a much bigger role than was anticipated."*

> *"The scope for the work was never negotiated with Māori and it should have been from the outset. Issues like allocation of rights and interests, they are core issues for Māori. In a perfect world we would be part of the scoping, jointly setting the parameters for what was in and what was out, starting as partners, identifying mutual things we wanted to achieve. There was huge frustration through almost all areas that we hadn't started out setting that vision, and working out the process to get there."*

Te Kāhui Wai Māori interviewees said that reworking the terms of reference was a lengthy process. It took several reformulations and edits and some "hard conversations". The new kaupapa took a lot of time to be confirmed by the government. Te Kāhui Wai Māori looked at the terms of reference for other Māori advisory groups for guidance and a point of comparison. The focus was on setting guiding principles for the group and its relationship with the Crown, through the Minister.

Spotlight on principles guiding the work of Te Kāhui Wai Māori

The work of Te Kāhui Wai Māori, and its relationship with the Crown, was governed by a set of principles established by the group which recognised the importance of (abbreviated):

- *Whakapapa and whanaungatanga*: kinship/close connection with the natural environment, and the importance of freshwater in supporting a healthy ecosystem as well as the human reciprocal obligations as kaitiaki to protect it.
- *Mana:* Te Mana o te Wai would be an important concept around which to develop understanding and practices for freshwater, based around the acknowledgment and protection of the mauri of the water.
- *Manaakitanga/kaitiakitanga*: recognising the duty of care and overarching obligation to protect the environment and waters, including for future well-being.
- *Tapu/noa/utu*: the need to restrict or limit behaviour or uses, and principle of balance.
- *Rangatiratanga:* the exercise of leadership, authority and guardianship, including the ownership, rights and interests and responsibilities of resource care and management, the practice of which includes strategic development, oversight, conflict resolution, risk management and regulation of wai.
- *Ngā tikanga:* (the correct procedure) an agreement that the Te Kāhui Wai Māori work programme would endeavour to give effect to te Tiriti o Waitangi and its guarantees.

The terms of reference recognised that freshwater is a precious taonga and that te Tiriti o Waitangi is the underlying foundation of the iwi/hapū-Crown relationship with regard to freshwater resources. It also expressly noted that nothing in the terms of reference "shall diminish the rights of Iwi, Hapū, Whanau, including the Iwi Chairs to exercise their Rangatiratanga over those matters of importance to them" as set out in te

Tiriti and confirmed in Iwi Settlement legislation.[31] In these ways Te Kāhui Wai Māori was also establishing its own independence and a more direct relationship with the Crown, through the Minister, as Treaty partner.

In bringing rangatiratanga back to the fore, the terms of reference explicitly provided that the group would explore "options for water allocation, management and protection of taonga" thus broadening the scope and putting rights and interests back on the table. They acknowledged that disagreement would exist on some precepts and assumptions that underpinned the government's approach, but stated that Te Kāhui Wai Māori would work within the *Essential freshwater* programme in good faith and in accordance with tikanga Māori, in order to develop constructive pathways and options for "the care, allocation, management and protection of Wai".[32]

> *"The principles, how we would operate, were essential. That work occupied a lot of our time, but we knew Kāhui Wai was controversial, and it needed to be clear that the Crown still had an obligation to negotiate with iwi, that Māori rights and interests remained an active discussion. We were clear ownership had to be addressed. They didn't like any of that. But that task also helped Kāhui Wai come together as a group and get clarity. We had some incredibly frank conversations that were quite intense. We got push back. They were very nervous about the references to ownership and rights."*

Raewyn Peart

Whitebaiting at Wairau Bar

> *"The process of working through the terms of reference, it highlighted that more engagement is needed up front before the process is set. It's important to resolve the higher-level elements, especially if as Māori we are to make gains. It would be a lot simpler if we addressed those things first."*

4.3.2 Boundary work: establishing independence

In addition to redrafting and renegotiating their own terms of reference, interviewees said that, as a group, they were very conscious of the need to ensure independence in practice: they "were not there to window dress". At the beginning of the workstream, Te Kāhui Wai Māori was shown a diagram by MfE officials. It put officials at the centre with other groups outside feeding in (see Figure 4.1).

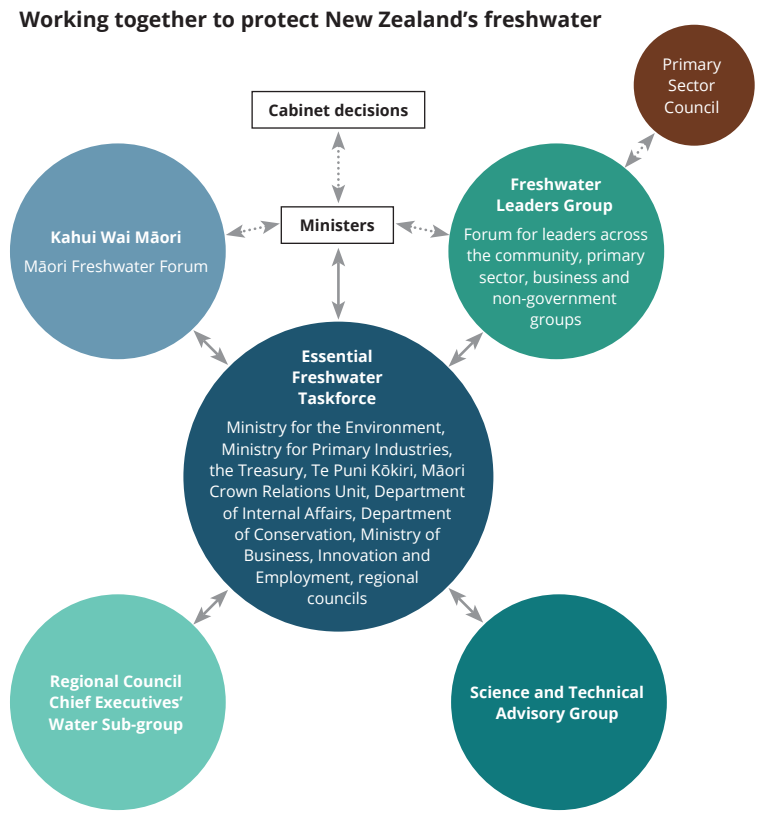


Figure 4.1 The government's approach to the Crown/Māori relationship for freshwater

Source: Ministry for the Environment and Māori Crown Relations Unit, 2018, Shared interests in freshwater: A new approach to the Crown/Māori relationship for freshwater, Ministry for the Environment and Māori Crown Relations Unit, Wellington, 9

Interviewees said that the diagram made it clear there was a need to reframe the discussion, otherwise "Māori concepts would just be inserted into their policy framework. We felt that framework was what needed to be reframed." Te Kāhui Wai Māori interviewees reiterated that, as Māori, these framing aspects had to be non-negotiable, since there was little value in doing the work if it was all going to be tightly constrained. One interviewee noted, "the reasons we were appointed was for the lens we would bring. Well you can't just then cut off that lens at the start, it wouldn't work, it doesn't work that way. That lens needed to be brought out in the open, spelt out."

I am not a mail-box

A phrase that came up in several conversations with members of Te Kāhui Wai Māori was "I am not a mail-box". This sentiment, used on numerous occasions with Ministry officials, articulated what the group felt was wrong with the initial frame the Ministry had set for the group. Interviewees said that officials would send them reports and questions. It was clear officials had their own workplan and programme they wanted to run through, with matters they wanted Te Kāhui Wai Māori to provide commentary on. Tension surrounded these interactions, as the group was very conscious of the risk of capture, and that their own vision and work might be sidelined and overly driven by the officials' agenda. Te Kāhui Wai Māori members pushed back on this, in order to define and assert their own role: reiterating to officials that they "wanted a bigger more holistic approach".

Straddling the interface between being an external independent group and an internal advisory committee was a tricky balance to navigate, and new for both members of Te Kāhui Wai Māori and Ministry officials:

> *"We tried to ensure officials were coming to us, and asking questions about our work, as part of our proposals. I'm sure that if we hadn't pushed back and created that space then they would have taken up our whole agenda."*

> *"It did get to that point sometimes, when we also had to remind officials that we weren't there to advise the Ministry – we were there to advise the Minister."*

> *"It wasn't that the Ministry was hostile to the changes, it was more that there wasn't much precedent, not much grounding on how to engage. It certainly gave us some big insights into how things operate inside the public service."*

An independent secretariat

It quickly become evident to Te Kāhui Wai Māori members that, to function effectively, the group would need its own independent infrastructure. The interface between Te Kāhui Wai Māori and officials was especially complex. Officials and ordinary secretariat support staff had limited experience or skills in working in the knowledge translation space. Even minute taking was challenging, not the least because there were times when Te Kāhui Wai Māori conversations would naturally transition into te reo Māori.

Te Kāhui Wai Māori saw the provision of an independent secretariat as key to enabling the group to craft its own truly independent response. Members said that this gave them "the space to move away from being treated as if we were just another part of the Ministry, to truly do our own work".

Several Te Kāhui Wai Māori members felt that the progress and understandings forged in this area were invaluable. There was praise for the Ministry's openness to doing things differently. As one interviewee noted, "there was an openness and flexibility from the Ministry – they really wanted to do the right thing."

A direct line to the Minster

Unlike the STAG, Te Kāhui Wai Māori had a number of face-to-face meetings with the Minister. The terms of reference and approach adopted by the group, anchored in te Tiriti, led to a model where Ministry officials supported the work of the group and the group's advice was provided directly to the Minister (and not through the Ministry). Although driven by te Tiriti, this was also viewed as essential from a 'knowledge translation' perspective. Providing "unfiltered advice" was important to ensure clarity in communication. It also helped to cultivate a deeper understanding of the issues from a te ao Māori perspective and to protect core concepts from being colonised as part of the policy process. Interviewees underscored that the use of "intermediaries always open things up to gatekeeping. It might not even be intentional. Often it just happens because people don't really understand". The importance to Māori that things not be lost in translation, modified or "co-opted" for other purposes required enhanced oversight mechanisms that were different in kind to those for other knowledge inputs.

Te Kāhui Wai Māori members we spoke to said that it was clear there was "uncomfortableness around how to deal with Māori input, how things Māori fitted, and in understanding how mātauranga might be applied and used in policy and regulation". From that perspective, the Minister's need for a group like Te Kāhui Wai Māori was understood. "He wanted more

advice and certainty, a better idea and vision of what things might look like in practice, especially around the law, because having certainty in law was important." Te Kāhui Wai Māori also saw the value for policy from that role:

> *"The Minister needed that assurance, and I think through our discussions we were able to communicate things in a way that resonated, where the mutual vision became clearer. We were able to sit down and explain culturally complex matters and a way of understanding the world that connected and drew together that mutual pathway."*

4.4 Benefits of the adjusted terms of reference and approach

It was clear from our discussions that there is often a substantial void between Māori and the Crown in terms of the Crown's understanding of te ao Māori. Having an intermediary group assisted to bridge that gap and dramatically increased the understanding of both officials and the Minister.

> *"The skills we brought were important and really necessary, because from what I could see the government lacked the skilled people to do that job. They really needed help in this area."*

Te Kāhui Wai Māori members also highlighted that, while the other working groups have now been disbanded, the work of Te Kāhui Wai Māori has continued and is now addressing implementation. The group has therefore been more enduring. Members thought this "reflects how useful the Minister found Kāhui Wai."

> *"The approach allowed vision and flexibility, but it was also very clear when something was a step too far for the Crown. But one of the biggest benefits of doing it, was that it cultivated a receptivity to all ideas, and a place for those ideas to be openly published."*

Interviewees from Te Kāhui Wai Māori and the Ministry recognised that a knowledge gap exists within government departments in this arena. Officials often have little experience, knowledge or understanding of te reo, tikanga, te Tiriti o Waitangi, or things te ao Māori. The role of Te Kāhui Wai Māori in helping to address this was, in itself, controversial on the basis that it should not be the task of Māori to upskill Crown agencies. However, in order to make progress, it was clear that performing such a role was a practical necessity. This issue is explored in more depth in Chapter 8 in relation to policy supports.

4.4.1 MfE perspective on the approach

MfE officials clearly struggled with understanding their role in relation to Te Kāhui Wai Māori. They underscored that the novelty of the group and its approach, lack of formal guidance and procedures to support officials, lack of legislative clarity, and lack of expertise and knowledge about the interface between Māori and the Crown, put officials in a difficult situation. They were 'learning as they went'.

The approach adopted by Te Kāhui Wai Māori put Ministry officials in a very different role to what they were used to. Ministry officials thought that one of the benefits of the group was that it gave them a "better, more independent understanding of the difficulties associated with managing the Crown-iwi dynamic, where there was a degree of separation". There were initial concerns that the Crown appointment of Te Kāhui Wai Māori members, rather than collaborating with the Iwi Leaders Group, would undermine that workstream. But we were told that, on reflection, "it wasn't too negative in the end" and in fact "there were blessings in disguise". One of these was the new perspectives it gave officials: highlighting gaps and issues in their normal approach.

> *"Working with the Kāhui Wai Māori group was a real challenge, and we need to do much better in order to work in true partnership – He Waka Eke Noa. And true partnership with Māori requires that we also build our understanding of Māori in that process." (Ministry official)*

4.4.2 Composition and expertise

In establishing Te Kāhui Wai Māori as an advisory body on freshwater, the Minister sought a diversity of members. Collectively the group had in-depth expertise on freshwater management including in law, planning, resource management, primary industries, mātauranga Māori, science, business and governance.[33]

The diversity of skills and expertise that were brought together on Te Kāhui Wai Māori was one of the keys to the success of the group and progress made.

> *"The strength of Kāhui Wai was in the people, the wealth of experience, historical knowledge. Collectively we had a deep understanding of where the issues had come from. We brought some well weathered eyes to the problems."*

"Kāhui Wai needed strong personalities given the politics, and we needed to be able to make sense of the broad spread of Māori expertise for our advice to stand up in a national way. I think we achieved that. It was an honour to be a part of it."

Disentanglement of Māori expertise from the role of iwi representation was an aspect that members found valuable in forming Te Kāhui Wai Māori, because of the sheer amount of experience and knowledge it brought together in a more independent forum.

Like the STAG, Te Kāhui Wai Māori also contained a diverse range of interests, with some members described as being more "iwi-centric" and others bringing more sector or landholder focused perspectives. Like the STAG, the idea behind Te Kāhui Wai Māori was that members were not representing different sectors or groups but bringing expertise in those different areas. Just as a focus on the science enabled the STAG to draw back and tackle disagreements professionally, based on the evidence, Te Kāhui Wai Māori members said they were able to pull back to their core principles and that broader cohesive framing helped centre any disagreements that arose.

4.4.3 Te Mana o te Wai

Right from the outset, within the redrafted terms of reference, the focus on 'Te Mana o te Wai' was set as a core guiding principle underpinning the approach of Te Kāhui Wai Māori. This very much grounded the work of the group. Not only did it offer an holistic approach to freshwater, it brought together a range of other threads, creating cohesion and focus.

Conceptually, Te Mana o te Wai had already been recognised in the previous NPS-FM, brought in through the work of the Iwi Chairs Forum, and building on the work of iwi advisors within the LAWF. It therefore provided a connection to that earlier policy, bringing back to the fore the work of the Iwi Leaders Group, and operating as "a vehicle already in place". It was seen as an existing foothold within policy that could be "used to push". It was also a concept the group felt already resonated more widely.

"Iwi leaders involved in previous freshwater policy work developed Te Mana o te Wai. We built on that base. The hope was this would ensure an alignment in thinking, a continuation and extension."

"Centering our approach around Te Mana o te Wai ensured Māori thinking was put up front."

4.5 Key interfaces

4.5.1 Connectivity between groups

Connectivity and interfaces between Te Kāhui Wai Māori and various working groups was complicated by capacity concerns. In general, Te Kāhui Wai Māori members thought there was not enough interaction between each of the working groups, and that the system of having a representative within each (the Freshwater Leaders Group and the STAG) was not sufficient, "spreading people too thin on the ground". Interviewees stressed that there were limited opportunities to work across silos and that the mechanisms in place did not sufficiently facilitate that happening. The large number of different, separate inputs made the process confusing for some and acted as a barrier to having the 'hard conversations'. This was viewed as an issue, not only for the NPS-FM 2020 policy process, but also more broadly. There was concern at the poor connectivity across government for most policy work.

Closer connection with other groups was viewed as a missed opportunity to forge deeper understandings and build bridges necessary to produce more holistic policy approaches.

Freshwater Leaders Group

Similar to the interface between Te Kāhui Wai Māori and Ministry officials, a gap existed between Te Kāhui Wai Māori and the Freshwater Leaders Group. For Te Kāhui Wai Māori, the policy process for the NPS-FM 2020 highlighted the lack of connectivity and engagement in policy development. Members noted that more work needed to be done to bridge these gaps, to deepen cross-cultural understandings, and to foster the relationships necessary to make more lasting, systemic change.

That there was not inclusion of iwi within the Freshwater Leaders Group was flagged as an omission. Several Te Kāhui Wai Māori members considered it strange that Māori were not part of the stakeholder group which was addressing many inherently political issues.

"Iwi leaders needed to be in the Freshwater Leaders Group, because if that group was the 'freshwater leaders' – then what does that make us? They needed Māori views around that table, but Māori were kept outside of that, outside of those admittedly hard conversations."

"When Kāhui Wai came into that group and talked about freshwater, about our values and concepts, we received a lot of feedback. Several said they

had never thought of things that way, the linkages. We all resolved to come together more regularly but pressures meant it didn't really happen."

Science and Technical Advisory Group

A similar need for greater connectivity was expressed by interviewees in relation to the STAG, except at this interface, the synergies rather than barriers to connectedness were emphasised. Discussions between the STAG and Te Kāhui Wai Māori members consistently highlighted areas of common ground and alignment.

"There were strong connections between Kāhui Wai and the STAG on so many issues, but especially with the ecologists. We were all striving to understand how things connected up, the levers."

"The goals of understanding how everything is connected and the investigation of solutions, we needed to do a lot more work on that side of things. I know many of the scientists on the STAG felt the same way. In terms of approach, we were both looking for not just tweaks, but at the problem more holistically. We were often all trying to push the scope out in the same direction."

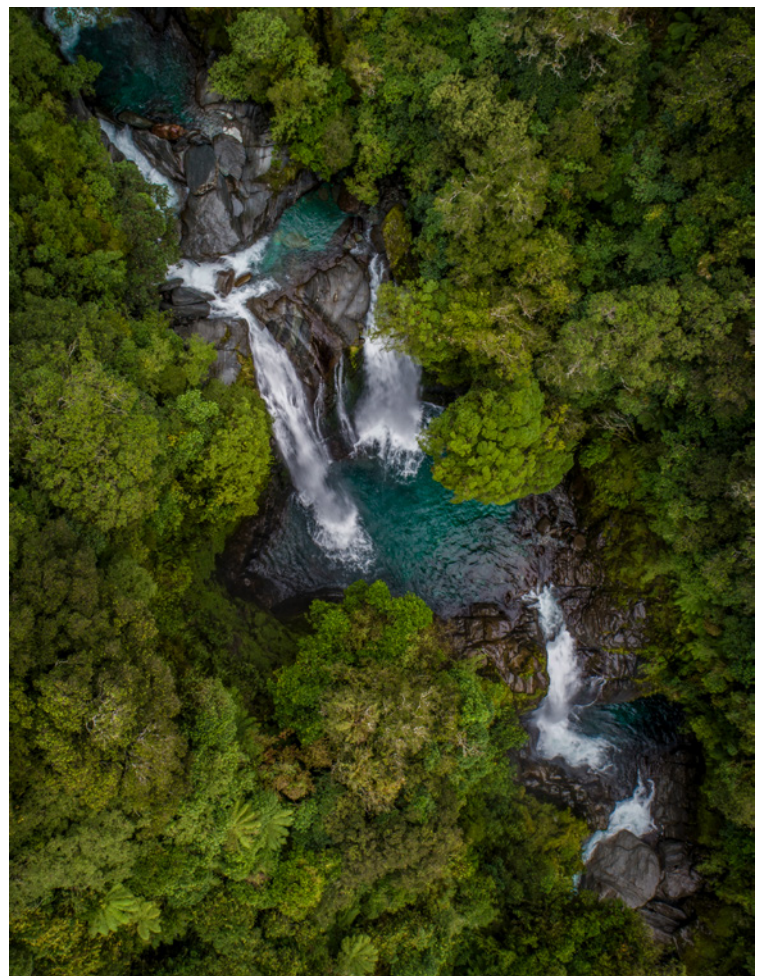
A barrier to greater connection between Te Kāhui Wai Māori and the STAG was the latter's more limited scope. As one interviewee noted, "the STAG's terms of reference were much narrower, so while our work could have melded well, it was difficult to engage." There was significant interest from Te Kāhui Wai Māori in what the scientists on the STAG were doing, and in having more time "to be in there with the scientists, because we are both systems focused and it just makes a lot of sense if we could all get on the same page." However, there were insufficient resources, capacity and accommodation within the work stream to enable those important connections, in particular for more cross fertilisation between the mātauranga Māori and science space.

Ministry for Primary Industries

The views of Te Kāhui Wai Māori in relation to the role of MPI mirrored that of other interviewees: given the strong role and sign off envisioned for MPI in the policy process, the absence of MPI staff throughout the policy development phases was worrying. Several Te Kāhui Wai Māori interviewees characterised the role of MPI as "strange" and "disappointing". It was noted that MPI was absent "then one day they just turned up with their own ideas and plans and interests. But they hadn't been there around the table. Their role was unclear".

"Not having MPI there through the process, but having such a big say in the outputs, it meant they didn't understand, they came in with their own starting point, yet we had to get agreement."

All of the feedback we received from Te Kāhui Wai Māori interviewees indicated concern at a general lack of connectivity within the policy process. In part, this was by design, since the approach adopted for the NPS-FM 2020 sought greater transparency around the different threads of advice. For Māori, the separation of different inputs with a view to bringing them together at the end, was especially jarring. It was in stark contrast to the more holistic approach intuitively sought through te ao Māori processes. It highlighted some of the ideological barriers and tensions that existed for iwi/Māori engaging in the policy process. It also emphasised the overarching and unilateral control of the Crown as designer of the policy process.



Neil Silverwood

Griffin Creek

4.6 Barriers

4.6.1 Systemic barriers

Systemic legislative and institutional norms continue to present major barriers to iwi/Māori engagement in policy processes. Interviewees noted that, even with the best of intentions, normative ways of operating and historical power relationships continued to "set the tone" for interactions with officials, as well as with the Minister.

> *"One of the biggest barriers is the system in place, fitting things into that and working in the way we need to work. MfE is struggling to break the mould. But it's also about trust, power sharing and responsibility; about Māori being able to pick up the pen and run our meetings. It took a few disruptors to shake the room up. Staff weren't intending to be a barrier, they were just following guidelines and practice. We need to get more aligned in that area too."*

Members of Te Kāhui Wai Māori were very aware that, when it comes to policy work, they are forced to operate in the Crown space. Prevailing frameworks are those that have been set by the Crown and they therefore reflect the Crown's ideology and interests. Inherent biases underpin the current system, which privilege the status quo (of recognised interests), and define what issues and lines of argument are considered to be legitimate. This operates as a tangible constraint on inputs from Māori.

The lack of guidance in the RMA on how to deal with Treaty considerations also makes iwi/Māori inputs and the task of Ministry officials difficult. This is a generic problem that is well recognised. Mātauranga and tikanga are not a defined part of the foundation of the legislation but are treated as "additional considerations within the legislative framework".[34] This situation leaves decision-makers struggling to understand Māori interests and how to interpret and incorporate them into policy and planning regimes. The RMA does not provide a process to identify and manage taonga, for instance, and a common complaint is that existing mechanism's for Māori input into environmental management and partnerships between kaitiaki and the Crown are underused.[35]

Interviewees observed that a decision to engage requires a degree of acceptance of the limitations of the process, forcing engagement to be strategic and long term.

> *"The system is constrained, our systems and the Crowns systems. We have to accept that they just don't work together right now. They have to evolve. It's the existing systems themselves that raise most of the tensions, the systemic barriers the prevent other ways of approaching things, the concepts that lie beneath."*

One of the inherent biases raised by several interviewees was the privileging of private property rights and economic interests over other values and interests.

> *"The system is, to its core, one that favours and protects property and property owners."*

> *"Existing resource rights are privileged. The underlying priorities lock in a framework that is 'first come first served', yet pre-existing Māori rights and interests remain uncertain, even stuck because of that."*

The comment of one MfE official also highlighted this underlying imbalance towards sector interests, noting that government departments are, as a matter of course, "used to having industry front and centre. We know what works there, the challenges and the needs", but that there remains little understanding of these aspects in relation to Māori.

The strong ministerial direction, and the direction of travel established by previous NPS-FMs and the NOF, were further constraints.

> *"The NPS was already in place. That locked us into incremental steps, the language, the words we could use. Things have an established meaning within an established framework. That all acts as a restriction."*

> *"We need a ground shift. That's what Māori are seeking, to see improvements within a generation. Everything always seems slow moving, tinkering around the edges."*

> *"For all intents and purposes we were ministerially appointed and the Ministry controlled a lot of the flow of information. We were able to talk to the Minister but the scope was constrained and some things were off the table."*

Interviewees found that scope setting by the Minister restricted policy work across a number of important areas, not just the discussion of Māori rights and interests in freshwater, but also discussion of implementation and land use. In these last two matters, the sentiments of Te Kāhui Wai Māori members mirrored that of many on the STAG. There were not just one, but several 'elephants in the room'.

"What we were really talking about was land use change, the effects of it. But the terms of reference prevented us doing anything. As Kāhui Wai we tried really hard to talk big picture because that's the true wairua of it for us. We have to do this together, the response has to be bicultural, and it has to bring conservationists and farmers along. Until we can speak to the big picture that can't happen."

"The restrictions meant land use change and implementation were not discussed. It was a missed opportunity and it's going to make application complicated."

"In terms of approach, we didn't just want to tweak things, we wanted to locate real solutions, we wanted to look at land use. A lot more work needed to be done in that area but most of it was seen as outside of scope."

Spotlight on 'the ruling ideas', cultural hegemony and spontaneous consent

Critical legal scholars have long contested the claim that the law is neutral, objective and rational, calling out the inherent ideological foundations and biases built into prevailing norms and frameworks. Laws are made for specific purposes, to serve specific objects and interests. Who makes decisions, the interests and values the law recognises, and the range of matters permitted consideration (and therefore entry) are all reflective of power relationships within society.[36]

For theorists, such as Foucault, lawmaking is a process of incorporation, whereby specific ideology and values are made coherent and reified, so that they become material and form the active framework going forward. It is the process by which the 'winning ideology' obtains legal authoritative legitimacy and becomes the prevailing norm.[37]

Marx labelled the dominant ideological perspectives entrenched in law as the 'ruling ideas', in recognition of the power they have to control the means of "mental production in society".[38] Legal scholars such as Hunt explain that, since all law reform projects "commence on old ground", the criteria for legitimacy and the range of arguments and interests recognised have been largely pre-set. In order to engage with current frameworks, actors are invariably forced to employ and accept the concepts, models, processes and regulatory settings and standards already in place. Those selecting to work *with and within* existing frameworks are forced to make compromises, simply in order to engage and make progress.[39]

Existing frameworks, therefore, set the terms of engagement and the parameters for judging which inputs are legitimate and can be heard. They are the gatekeeping mechanisms though which Gramsci's 'hegemony' is visible: in the processes that operate to entrench existing interests by generating the "spontaneous consent" of participants.[40] These normative processes are very powerful, and create significant systemic inertia, since they operate to insulate and entrench the status quo and confine the scope of change to the incremental.

While these barriers work in alignment with the dominant settings so are often invisible to 'insiders', to 'outsiders' with different discourses, ideology and values (such as iwi/Māori), the boundaries imposed are tangible and highly restrictive of engagement.

A range of solutions to these hegemonic processes have been proposed. Constitutive law scholars define law culturally, arguing that while there are constraints, law itself is actively pushed and pulled by a range of actors, and that law and legality are themselves constructed through social interaction: in the battles fought and won over legal meaning.[41] In this way, law is also an arena of struggle where different discourses compete for domination.[42]

The victory of neoliberal ideology in Aotearoa New Zealand during the 1980s is a good example of a paradigm-shifting discourse gaining such domination. The ascendency of economic considerations and interests, and the primacy accorded to sector stakeholders within the country's legal frameworks, policy development processes and regulatory settings, reflects the power of these discourses to create new norms.[43]

One of the core changes that occurred at that time was a shift away from governmental control and direction, towards greater collaboration with industry and a 'governance' based model preferencing non-interference and deregulation.[44] Commentators such as Wolch, who appreciated the potential risk of this ideological shift, predicted in the 1990s that it might "shackle"

the system's "potential to create progressive social change".[45] Habermas similarly warned against the retreat of government and increased self-imposed limits on political intervention, characterising it as a withdrawal of the political and therefore of the democratic.[46]

In discussing previous policy work on the NPS-FM, Steward-Harawira underscores that a truly Treaty-based partnership approach requires that our frameworks "give effect to Māori traditional knowledge, values and ethics". She highlights the difficulty of achieving this "in an environment of competing goals between stakeholders" and where there is currently a "power imbalance" in contrast to industry actors.[47] She notes the historical intractability of Māori ethics and values around 'well-being' or 'life force' of water, in the shadow cast by "25 years of neoliberal politico-economics" and western conceptions of property rights, which sit jarringly aside 'whole of the river' approaches.[48]

The challenge then, for iwi/Māori, is that the introduction and incorporation of te ao Māori and its associated concepts, principles and values into Aotearoa New Zealand's law constitutes the introduction of a competing ideology and discourse, and one that conflicts with many prevailing norms. It therefore requires a reconstitution of legal meaning and a renegotiation of the 'ruling ideas'.

Enabling this contest requires a *deconstruction* of existing *boundaries* and a more open, flexible and collaborative approach to policy-making. That was the challenge faced by the Crown and Ministry officials in the NPS-FM 2020 policy process: to create sufficient space for that to occur.

It is these dynamics that made the renegotiation of the terms of reference for Te Kāhui Wai Māori so important to its members. Indeed, several interviewees highlighted that an extension in scope was non-negotiable: if it had not been agreed to members said they "would have done it anyway". Interviewees emphasised that this process was not their "first time around the block". They were very aware of the constraints and need to push past them for the work to have any real value. And it was the extensions made in the terms of reference that enabled Te Kahui Wai Māori to set out a broader agenda for reform in its report to the Minister.

Without the lifting of these ideological boundaries, there was seen to be little value in engagement, except to progress very slow, incremental reform that would invariably be subsumed and incorporated within prevailing norms. Concerns like this show acute awareness of the hegemonic processes at play.

Legal scholars have argued that, for a hegemonic project to retain dominance, "it must address and incorporate (if only partially) some of the aspects and aspirations, interests and ideology of subordinate groups". The term 'incorporative hegemony' describes the process of incorporation and associated capture of 'other' discourses into the prevailing framework as a concession made in order to retain control and legitimacy in the face of ideological challenge.[49]

4.6.2 Te Kahui Wai Māori report to the Minister: the call for systemic change and new processes

In its report, Te Kāhui Wai Māori made it clear that the system was "broken". The report set out a "programme of action" to transition to a new model based on "care and respect for water", embedding Te Mana o te Wai principles and obligations. Consistent with these measures, Te Kāhui Wai Māori also sought recognition of iwi/hapū customary title and rights in water and a new water allocation system. The group clearly articulated broad discontent with the limitations of existing frameworks.

Te Kāhui Wai Māori sought a new, values-based system and new processes, noting that "existing requirements in the RMA do not provide for Māori rights, interests and obligations in water to be adequately addressed and accommodated in RMA processes".

Amongst the changes sought were:

- a new *Te Mana o te Wai Commission* comprised of 50 per cent Māori commissioners;
- the development of new accountability and partnership requirements for local government, including the need for iwi/hapū and councils to establish compulsory Māori values together at the outset;
- greater provision for co-governance.

The group's report explained "co-governance is implied under Treaty principles. In fact, this level of Māori governance is required as a minimum given Crown acknowledged Māori rights, interests and obligations in water. The Crown presuming ultimate control of water-related reform, as it does in the Discussion Document, is not consistent with either position. Before any water-related reform proposals can proceed, proper provision for Māori co-governance of any reform process, and even a greater role as and when Māori rights, interests and obligations are resolved, must be provided for."[50] The new approach set out in the Kāhui Wai Māori report, placed the Crown and iwi in a joint leadership role, and provided for a system 'redesign' (see Figure 4.2).

A core theme that emerged out of our conversations with Te Kāhui Wai Māori interviewees was that, in order for Māori to truly be a "partner", policy processes must be co-designed. This requires nothing to be taken off the table and hard conversations to be had. There also needs to be collective discussion about the approach to be adopted and the core objectives and scope of the work. While progress has been made in this area, it remains slow, and the rate of movement is controlled by the Crown.

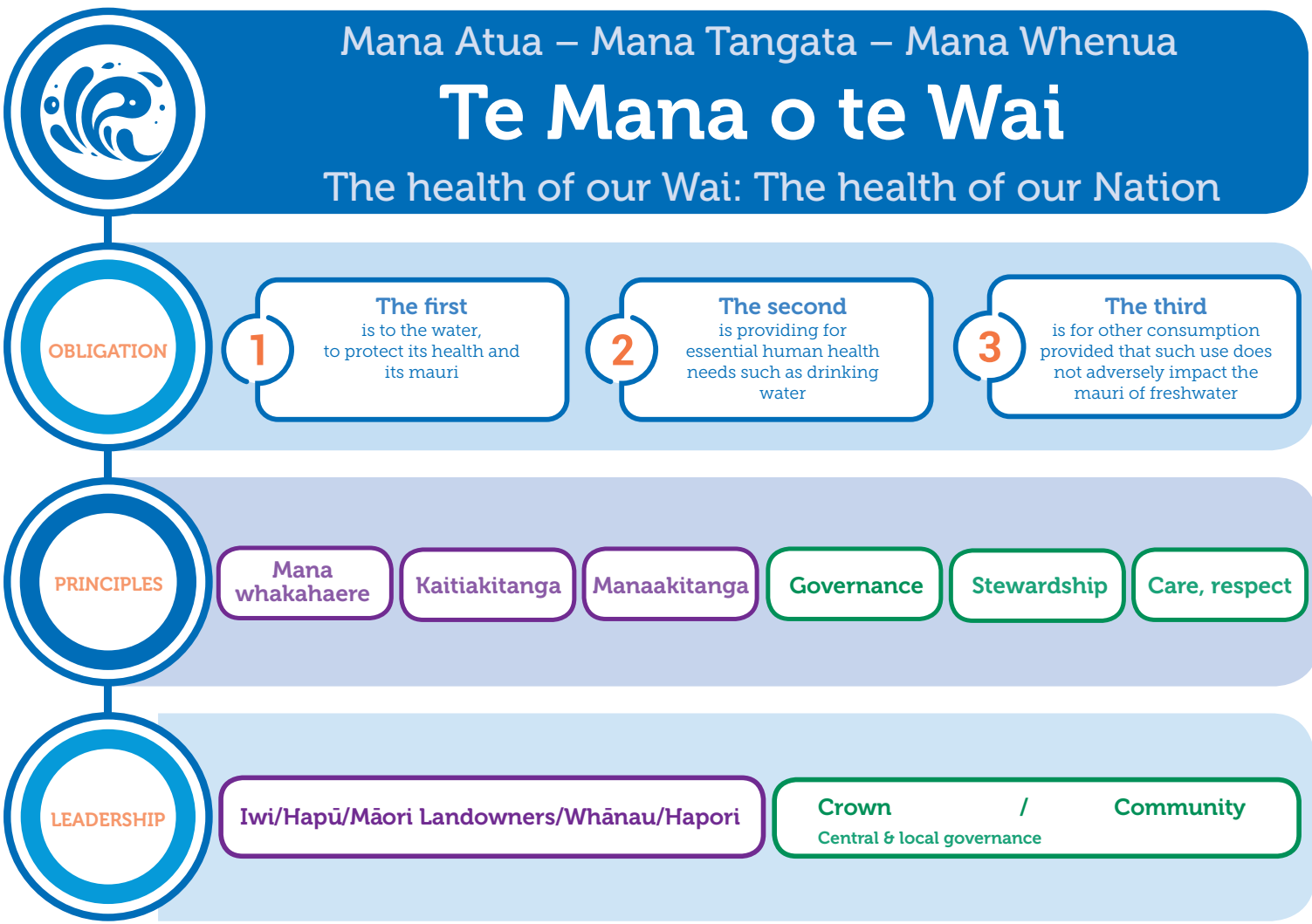


Figure 4.2 Te Mana o te Wai

Source: Kāhui Wai Māori, 2019, *Te Mana o te Wai: The health of our wai, the health of our nation,* Te Kāhui Wai Māori report to Hon Minister David Parker

"MfE is developing approaches and policy standards that will ensure the Treaty is at the forefront and they have a team embedded in that process. There is no question that the way the Ministry uses language, asks questions – a lot has changed even over just the last two years. The Treaty reference in the Public Sector Act has helped that. The 2017 speech of the Prime Minister signalled change and set expectations for the Treaty. Coupled with lots of documents to guide thinking, changes are being made, but we aren't there yet."

"Scope is a constraint on process. There is huge frustration that it's still so difficult to influence things more up front, ahead of the fact, not after a decision on the part of the Crown. Then it's too late to change the course of things."

Interviewees emphasised that, until there is a more collaborative approach to policy, partnership is impossible. They reiterated that "as a Māori partner, we don't just want to contribute to documents that haven't been co-designed by us, where we had no say in the structure. Otherwise we are limited to providing commentary and edits", to "tinkering around the edges".

4.6.3 Māori voices and representation

Because existing frameworks were not designed with Māori front of mind, Te Kāhui Wai Māori was critical of the lack appropriate mechanisms for iwi/Māori input and engagement at both the regional and national levels. Existing spaces and mechanisms often fail Māori. Nationally based policy initiatives are always problematic since iwi/hapū structures exist at the local level. In addition, current regional boundaries and structures do not match or take into consideration the boundaries and jurisdictions of Māori governance arrangements.

"The focus of government was towards national standards and consistency. Māori have an opposite view. Our concern is at the regional level: with addressing why the local decisions are not being taken, or with them being overridden by the national."

"The work, for Māori, has to be local. That's not properly appreciated or given enough weight. I understand that conceptually it's easier to have a standard across the country rather than having thousands of ways of doing something"... "but mātauranga Māori is place based, its personal. It's good to have big goals but there has to be a bigger focus on the local conversation."

"There are so many voices in the Māori world that need to be heard and the mechanisms aren't there. It ends up being a competition to be heard. We need better mechanisms to maintain relationships. We want partnership, but for that to happen, you first need representatives to work with, and who represents iwi is complex and unwieldy. In some regions there might be 30 iwi, but you can't have 30 partnership arrangements. We have to start being more visionary. We need structural innovation, especially at the regional council level, to help democratise it."

In te ao Māori, shared authority and responsibility is connected to enduring relationships built on mutual trust and respect, through manaakitanga. The type of enduring values-based relationship necessary for true cooperation and partnership is difficult to establish with government agencies and officials of the Crown. This is because they are far more transient, with values and priorities fluctuating through different election cycles. Interviewees noted that:

"Freshwater management isn't about establishing a manual, it's about relationships, about having someone you can trust and have free and frank conversations with and get somewhere. We often don't have that. Instead we have a long history of flawed relationships and loss of trust."

"Council electoral cycles mean who you are dealing with suddenly changes, regularly changes – and so do the values, the aspirations. That doesn't provide a good context for developing strong robust relationships moving forward. One constant in it all is that Māori are not going anywhere. This doesn't just happen at the local level. The same cycles impact relationships and progress with central government."

This broader political context and political cycles further operate as a barrier to relationship building to effect a truly partnership-based approach to policy.

Raewyn Peart

Waka carving at Lake Rotorua

4.6.4 Knowledge translation and policy integration processes

Te Kāhui Wai Māori also had concerns about what would happen in the policy integration phase, when the work of each of the workstreams was brought together and the real negotiations and trade-offs began.

On 5 June 2019 a joint advisory group hui resulted in a proposal to convene an "integration group" with members from each advisory group. Te Kāhui Wai Māori opposed its formation and expressed dissatisfaction with the process that led to the decision to establish the group.[51] But in the end its decision to participate was a pragmatic one, necessary to "stay engaged in this process and hold the outcomes that emerge to account".[52] However Te Kāhui Wai Māori refused to limit its attendance to two to three members.

Te Kāhui Wai Māori also stated that the policy initiatives set out in its report were "non-negotiable". The group had "no interest" in participating in a process that might cut across or substitute its work, or detract from direct engagement.[53] Again, this reflects the heightened awareness of Te Kāhui Wai Māori members of the 'necessary evils' of a policy process, and attempts to protect the integrity and boundaries around their policy work.

Smith et al argue that, in seeking to influence policy change, the relationship between Māori and the state remains "deeply problematic".[54] Failure to fundamentally address issues of rights and power sharing means that Māori interests are frequently still marginalised by government agencies. "Even when included in policy discussion and invited as experts to participate in making policy representing 'the Māori voice'" they are "inevitably part of an asymmetrical process that consigns Māori research and ideas to a limited array of speaking parts".[55]

A further concern about the policy integration process, and one that Te Kāhui Wai Māori shared with the STAG, was how knowledge would be translated into policy. Te Kāhui Wai Māori was aware that any policy recommendations and outputs, both more broadly (ideological and conceptual) or stemming directly from mātauranga Māori inputs, would be fitted into the prevailing framework. This created risks for iwi/Māori and phrases such as 'capture', 'co-option' and 'colonisation' were raised during interviews in this context.

> *"Most people today understand that indigenous knowledge has lots to offer, and that there should be a Māori voice at the table. But the whole idea that the Crown is stepping into the mātauranga space creates restrictions and risks. Care has to be taken to ensure Māori culture is not co-opted and the knowledge separated and repackaged to suit. How we do that, the necessary components to that, aren't there yet."*

> *"A better partnership model is needed to integrate it all, to allow true cross fertilisation. Without that it's too fragmented, disjointed and messy."*

The need for additional support and expertise in this area, including increased understanding and skills on the part of Ministry officials tasked with these aspects, was highlighted. Similarly, in terms of mātauranga Māori inputs, research in this arena has highlighted a number of questions over intellectual property rights, and processes to check the legitimacy of information provided and to test or interrogate its appropriateness. Certainly, the role of officials in this area remains unclear.[56] If knowledge brokering (bridging work at the knowledge-policy boundary) and knowledge translation is complex in the science space, it is more so in the mātauranga Māori space.

These issues will be examined in more detail in Chapter 8, which addresses process supports.

4.7 Strengths and synergies

Had Te Kāhui Wai Māori members simply come on board in a discrete and limited advisory capacity, operating as a support for MfE and the Minister as initially anticipated, then the work of the group would have been far more limited in value. There was a general consensus amongst interviewees that the group's hard-fought alterations to its scope and approach brought a number of benefits to the work on the NPS-FM, and many of these were unanticipated. While changes in process (including the establishment of a separate secretariat for Te Kāhui Wai Māori support, a direct line of communication to the Minister, and broader terms of reference) were challenging for officials, the steep learning curve fostered a deeper understanding between all those involved.

The perspectives and concepts admitted entry to the policy process as a result of the broadened Te Kāhui Wai Māori scope were described variously as "resonating", "affirming", "providing a fresh lens" and that they made people "think of things in a new way". The degree of resonance was unexpected and refreshing, particularly for those who felt freshwater reform had been "stuck" and "going around in circles". Many expressed the hope that the adoption of Te Mana o te Wai would provide a lever for the kind of real systemic change necessary to turn around freshwater outcomes.

Interviewees across all three workstreams said that the shared synergies were far greater than anticipated, primarily because they had never looked at things in the way that Te Kāhui Wai Māori allowed. Other workstreams felt far more bounded within the confines of the Ministry-set workstream, and also by the historical approach and mechanisms developed for previous NPS-FMs (eg the NOF). A number of interviewees were both envious and grateful for the valuable "push out of the box" Te Kāhui Wai Māori provided. Te Kāhui Wai Māori members saw how other groups struggled and "how constrained they felt", noting that other groups like the STAG had similarly attempted to push for an expansion of their terms of reference but "didn't get very far".

The mana of Te Kāhui Wai Māori, and the greater political influence its members could exert by virtue of te Tiriti, meant that its concerns regarding the scope and discourse of the group were much more difficult to suppress.

> *"The make-up of Kāhui Wai, and our approach, enabled us to work through a number of issues and we were listened to seriously by the Freshwater Leaders Group, the Ministry and the Minister. People might not have always liked what we were saying, it may have been hard to hear, but everyone was trying to be open and to listen and understand. That was an enormous strength."*

It was also noted that there were "a lot of firsts" in this policy stream. Officials were open to renegotiating, which enabled flexibility, and made it "one of the better policy processes" that interviewees had been involved in. Other policy processes had been far more heavily influenced by stakeholder pressures and economic considerations and the policy work had been far less transparent and flexible.

> *"I have been involved in a lot of policy groups… and this one stands out. It was far better than what's happening in lots of places, especially in areas like fisheries. We are all still finding our way, but we are learning, and we are getting better at it." (Te Kāhui Wai Māori member)*

> *"Each time we do this we learn. There will always be more improvements, we're not perfect. There are things looking back now that we absolutely could have done better with hindsight, but we will keep learning and finding better ways to manage these really dynamic processes."* (Ministry official)

The political complexities associated with this workstream, particularly when the Iwi Leaders Group withdrew support for the policy process, meant that although some bridges were slowly rebuilt, serious concerns remained over the adequacy of the Crown's engagement with iwi/Māori. The Waitangi Tribunal's praise of previous policy processes, to the extent that it recommended they "become a standard part of government policy-making" made the decision to depart from a more formalised co-design with iwi a significant deviation from the previous path of travel.

There is no question that Te Kāhui Wai Māori provided invaluable advice and expertise to both the Minister and the Ministry, and that its engagement deepened cross cultural understandings, highlighted deficiencies in the process and helped develop solutions to bridge the gap between te ao Māori and te ao Pākehā. However, the removal of a formal role for iwi representation within the policy development process likely decreased the legitimacy of the outputs. As one Te Kāhui Wai Māori interviewee noted, "iwi were not fans of Kāhui Wai, and that coloured the support for some of our recommendations as a result". The Crown had to "work hard to rebuild the damage wrought, and re-establish relationships with Māori freshwater groups."

Te Kāhui Wai Māori members we spoke to noted that input from the Iwi Leaders Group and New Zealand Māori Council had to be sought separately. In the view of some, the increased number of strands of policy inputs this created made the inputs and policy formation process less transparent. There was also less opportunity for all parties concerned to "sit down and have the hard conversations".

The position of Te Pāti Māori (the Māori Party) summarises some of these dynamics:

> *"The Waitangi Tribunal said that the Crown should be working directly with hapū and iwi to create a standard process for addressing Māori rights and interests. Instead, this current government decided to stop negotiating with iwi leaders and instead has established its own Māori advisory group, the Kāhui Wai Māori.*
>
> *The Crown should be negotiating with whānau, hapū and iwi directly, not just engaging with their own self-appointed Māori representatives. The Māori Party would re-establish negotiations with the Iwi Chairs Forum and with other hapū and iwi groups. The scope of the negotiations would be broad and address the key issues: rights and interests, allocation, and restoration. The Crown needs to come back to the table and not try and kick the can down the road or leave these critical issues up to litigation in the courts."*[57]

The lack of mana ki te mana engagement raised concerns about the legitimacy of the policy process.[58] At the same time, there was also acknowledgement that the arrangements adopted did lead to progress:

> *"Despite this, the Kāhui Wai Māori has successfully built on the vision of the Māori Party and the previous government … with its report: Te Mana o te Wai. This report presents a vision for protecting and restoring freshwater and has had a significant impact [on the NPS-FM 2020]."*[59]

This indicates that it is possible to progress and regress simultaneously. It also reflects the amount of work still to be done to refine and formulate a policy process capable of merging the best of both approaches.

Spotlight on whether good process leads to good outputs

It is notable that the previous approach adopted for the NPS-FM 2014, where the Crown and Iwi Leaders Group engaged through a far more collaborative, partnership-based process, had not resulted in corresponding gains in the substance of freshwater policy. The Waitangi Tribunal and Iwi Leaders Group commented that despite a "good process", "unilateral Crown decision making" and "politicisation of the process" had undermined the policy outputs.[60] This demonstrates that there is not necessarily an automatic connection between 'good process' (eg increased representation) and more favourable decision-making or policy outputs. Overarching systemic, ideological and political barriers can still restrict the options that are viewed as acceptable.

Conversely, while the appointment of Te Kāhui Wai Māori members by the Minister politicised the process for Māori, it may well have *depoliticised* it for the Crown. The fact that the Minister and officials were engaging with 'their own' Māori advisors, and not directly with iwi representatives, likely freed up the conversations. Ministry officials' description of the engagement in terms of a 'steep learning curve' reflects the deeper level of understanding that was being forged in this new context: with consequent potential benefits to policy outputs.

This highlights the importance of creating politically 'decompressed' spaces for free and frank conversations – and to enable cross-cultural learnings to occur. The repeated sentiment that the vision set forth by Te Kāhui Wai Māori 'resonated' with many non-Te Kāhui Wai Māori interviewees reinforces this need for broader discussions. It also further highlights the need for the Crown to put more time and resources into increasing officials' level of knowledge and understanding of te ao Māori and te Tiriti o Waitangi. This later aspect is discussed in more depth in Chapter 8 (on process supports).

One of the recommendations proposed by Te Kāhui Wai Māori was the establishment of a new entity, in the form of a Freshwater Commission, comprised of a 50:50 representation of Māori and Crown members. This is a suggestion that has been raised and discussed by a range of individuals and groups over the years, and was a proposal considered by the Waitangi Tribunal in the Wai 2358 case. The Tribunal agreed that "an independent national body [should be] established on a co-governance basis with Māori" and that "at a minimum its role should be to act in partnership to ensure Treaty principles and Māori values, rights and interests are fully incorporated in freshwater policy and management."[61]

However, the concept of a Commission is an aspect that the Iwi Leaders Group has not embraced. It considered that "the relevant iwi authorities in the respective catchments would be the appropriate bodies, alongside the Crown, to manage and regulate water."[62]

The Crown has also rejected the recommendation.[63] In setting out the grounds against such a measure, the Crown's counsel stated that further work was required on roles "and whether it would be consistent with the government's goals of 'efficient streamlined and well organised government administration'".[64] This reflects deeply embedded constraints imposed on regulatory reform through the focus on streamlining and 'efficiency'.

Disagreement, not simply on the substance of reform but also on the process, approach and institutional arrangements to facilitate that reform, continues to operate as a barrier to policy development in true partnership with Māori.

Endnotes

1 Waitangi Tribunal, 2019, *The stage 2 report on the national freshwater and geothermal resources claims* (Wai 2358), 146

2 At 160

3 At 153

4 At 296

5 At 233

6 At 296

7 https://iwichairs.maori.nz/

8 https://iwichairs.maori.nz/our-kaupapa/fresh-water/

9 https://iwichairs.maori.nz/our-kaupapa/fresh-water/

10 Originally the Māori Welfare Act 1962

11 Section 18(1), Māori Community Development Act 1962

12 Section 18(3), Māori Community Development Act 1962

13 https://www.maoricouncil.org/about

14 Waitangi Tribunal, 2019, *The stage 2 report on the national freshwater and geothermal resources claims* (Wai 2358), 153

15 At xxii-iii

16 At 537

17 At 152

18 At 559

19 At 559

20 At 564

21 Cabinet, 2018b, *A new approach to the Crown/Māori relationship for freshwater*, ENV-18-MIN-0032

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26 Young A, 2018, 'Iwi boycott of alternative water group followed by demand for talks by Ngāi Tahu', *New Zealand Herald*, 16 August 2018

27 Young A, 2018, 'Iwi boycott of alternative water group followed by demand for talks by Ngāi Tahu', *New Zealand Herald*, 16 August 2018

28 Parker D, 16 August 2018, 'Questions for oral answer: Freshwater management – Establishment of Kāhui Wai Māori', *New Zealand Parliamentary Debates*, 732, 6146

29 Kahui Wai Māori meeting minutes, 1-2 November 2018, 3

30 Te Kahui Wai Māori interviewee

31 Ministry for the Environment, 2018b, *Kāhui Wai Māori terms of reference*

32 Ministry for the Environment, 2018b, *Kāhui Wai Māori terms of reference*

33 Parker D, 2018, 'Taking action to improve water quality', press release, 8 October 2018, https://www.beehive.govt.nz/release/taking-action-improve-water-quality

34 Ministry for the Environment, 2019c, 27

35 At 27

36 Hunt, 1993, 236

37 This is Foucault's concept of "discursive formation" whereby law puts in place values and valorises (so normalises) them. See discussion in Hunt, 1993, 236

38 Marx and Engels, 1932, 59

39 Hunt, 1993

40 At 12

41 See Ewick and Sibley, 2003 and Ewick and Sibley, 1998, 321

42 Hunt, 1993, 321

43 Commentators such as Wolch predicted in the 1990s: Wolch, 1990

44 A 'governance' based model is premised on a preference for industry self-regulation and government non-interference as the regulatory default: a divesting or deference of decision-making. A good historical account of the context in Aotearoa New Zealand, in relation to the agricultural sector, is Le Heron and Roche, 1999, 'Rapid reregulation, agricultural restructuring, and the re-imaging of agriculture in New Zealand", *Rural Sociology,* 64(2), 204. For a more general discussion see Freeman, 2000

45 Wolch, 1990, 15

46 Habermas, 2007, 341

47 Stewart-Harawira, 2020

48 At 1464

49 Alan, 1993, 320

50 Kāhui Wai Māori, 2019, 31

51 At 36

52 At 36

53 At 36

54 Smith et al, 2019, 74

55 At 74

56 See discussion in Duncan et al, 2020, 64

57 https://www.maoriparty.org.nz/fresh_water

58 Science media centre, 2019, 'Freshwater action plan – expert reaction', 5 September 2019, https://www.sciencemediacentre.co.nz/2019/09/05/freshwater-action-plan-expert-reaction/

59 https://www.maoriparty.org.nz/fresh_water

60 Waitangi Tribunal, 2019, *The stage 2 report on the national freshwater and geothermal resources claims* (Wai 2358), 152

61 At 559

62 At 557

63 Kāhui Wai Māori, 2019, 43

64 Waitangi Tribunal, 2019, The stage 2 report on the national freshwater and geothermal resources claims (Wai 2358), 557

5 Exploring the outputs

Lake Hawea

Raewyn Peart

Following a review of the process and approach adopted for work on the NPS-FM 2020, we next considered the decision-making aspects of the process and interviewees' views on where the final policy landed. The objective of these chapters is not to judge the adequacy of the policy that emerged or the robustness of its science inputs. The first would inevitably be highly subjective, and the second would require considerable scientific expertise. Instead, we have focused on an examination of the regulatory decision-making process: how the various policy inputs were weighed and balanced, and the settings and guidance in place directing that consideration.

We have also undertaken some selective, more detailed case studies to demonstrate how these settings operated in practice (see spotlights on wetlands and the MCI in Chapter 5, and Chapter 6 on the DIN attribute). The selection of these case studies was informed by our interviews with those directly involved in the policy process. A review of the policy outputs of concern to Māori are explored in Chapter 7. Our aim in presenting these more in-depth examinations is to highlight some of the different dynamics and tensions evident in the decision-making process, to inform an assessment of the strengths and weakness of the NPS-FM 2020 policy process.

5.1 Approach to assessing outputs

One of the most important stages of the policy development process is the decision-making process itself: the task of considering all of the policy inputs, weighing the various costs and benefits, and determining the appropriate final balance to be struck. This chapter takes a broad examination of the regulatory decision-making process for the NPS-FM 2020, and the guidance that directed it.

The review has been made easier by virtue of the Public Service Act 2020. That Act sets out a requirement for open government[1] and this is serving to make an ever-increasing body of material available for public scrutiny: not only the formal reports released as part of the policy process, but a range of background material that sits behind them. MfE's website, for example, contains copies of all submissions made on the *Action for healthy waterways* package.[2]

Type 'freshwater' into the MfE website's search engine and hundreds of documents are retrieved. For the purposes of the current work, for example, it revealed that a number of Official Information Act requests had been made by persons trying to access more detailed information on policy inputs and the decision-making process. Many of these were seeking information on the Ministry's engagement with the primary sector and the types of information shared between the Water Taskforce and industry groups. Some of these requests involved the release of hundreds of pages of information. They also made publicly available officials' memos advising the Ministers and minutes of a range of policy meetings.

While much material pulled up by such searches will be extraneous to research agendas, for those with the time or inclination to go deeper there are small but important details that shine light on less visible aspects of the policy process. In relation to the NPS-FM 2020, for example, the material revealed some of the internal debates and tensions between MfE and MPI over the various policy options in play. This information provided valuable insights into the policy process – more than would previously have been possible.

There is a caveat to this, since the voluminous release of information can also serve to bury important information in an unnavigable pile of documentation. It can detract from, rather than increase, transparency and accountability. For complex policy matters involving multiple government agencies, like the NPS-FM, relevant documents remain spread across an array of agency websites.

5.2 The regulatory process

Investigating the decision-making process for the NPS-FM 2020 has not been an easy task. The sheer volume of advice, reports, submissions and analysis produced to inform and formulate policy makes the task of navigating it, and tracking its influence and significance, challenging. A vast array of inputs informed the NPS-FM 2020 regulatory process, including:

- the recommendations of advisory groups and the information on which their recommendations were based;
- each Ministry's (MfE's and MPI's) environmental analyses, scientific reports and economic impact assessments, including a large array of area-specific and sector-specific analysis on impacts and costs of the reforms;
- commissioned independent analysis and external reviews of Ministry and advisory group outputs, including reviews of the methodologies employed and peer review of controversial analysis and advice;
- the reports and advice of other government agencies which input into the policy process;

- the reports associated with the formal regulatory impact assessment required for all new regulations;
- thousands of public submissions, many of them offering their own environmental impact or economic analysis;
- the reports required under RMA processes, including the report and recommendations of the Independent Advisory Panel and the commissioned section 32 cost-benefit analysis.

All these inputs must be brought together by officials to inform their advice to the Minister. Because the NPS-FM 2020 was a joint initiative between MfE and MPI, although officials from both Ministries separately formulated their views, they then had to come together to produce their collective advice for sign off by both the Minister for the Environment and Minister of Agriculture. The collaborative approach between the Ministries, and dual policy sign-off, meant that officials had to undertake a preliminary negotiation to determine which options would be presented. There was reduced transparency at this interface and it also added to the procedural complexity.

All regulatory reform follows a very similar process (see Figure 5.1). The first step, which initiates the policy development process, is Cabinet agreeing to the proposed work programme. For the NPS-FM 2020, this decision was made in June 2018. Following this agreement, the core advisory groups were established and began working through the scope of work that had been set by the Water Taskforce. Officials, informed by the reports and advice of Te Kāhui Wai Māori, the Freshwater Leaders Group, the STAG and the Regional Sector Subgroup, then developed a more detailed proposal. Final policy decisions were not made at this juncture; rather the role of the proposal was to outline the options under active consideration and provide commentary on the advantages and disadvantages of each. Each of the options put forward was subject to a regulatory impact analysis. These analyses were then compiled into a report: the Interim Regulatory Impact Assessment.

Neil Silverwood

Toaroha Loop

2018	JUN	Cabinet paper: Agreement to *Essential freshwater* work programme[3]
	OCT	Advisory groups established and terms of reference set
2019	APR	Te Kāhui Wai Māori report and recommendations[4]
	JUN	STAG report and recommendations [5]
	JUL	Freshwater Leaders Group report and recommendations[6]
		Regional Sector Subgroup/Local Government New Zealand economic advisory report [7]
	AUG	**Interim regulatory impact assessment**
	SEP	Regional Sector Water Subgroup report Cabinet paper: Agreement to consult and introduce a new NPS-FM Discussion document: Essential freshwater: Action for healthy waterways
		Public consultation 5 Sept – 17 October 2019
2020	FEB	Independent Advisory Panel report and recommendations[8]
	MAY	Summary of submissions report[9]
		Final regulatory impact assessment Cabinet paper: Decisions on national direction for freshwater[10]
	JUL	Evaluation Report (s 32 RMA) [11]
	AUG	Order in Council: Approval of new NPS-FM published in the Gazette
	SEP	NPS-FM 2020 comes into force
	OCT	Summary of recommendations and amendments report (s 53(3)(c) RMA) [12]

Figure 5.1 Timeline of the regulatory process for the NPS-FM 2020

The proposed NPS-FM 2020 was only one item amongst many within the *Essential freshwater: action for healthy waterways* reform package, so the regulatory impact assessment undertaken for it was contained within the broader report on that package. The interim regulatory impact assessment was designed to provide a preliminary view of the likely costs and benefits associated with the reforms. This was then reviewed by Cabinet and, if and once agreement was reached, the proposal was released for broader public consultation and submissions. As part of the requirements of the RMA, an Independent Advisory Panel was established to hear the submissions on the NPS-FM, to issue a report and provide its recommendations on how to proceed.

Throughout this period Ministry officials continue to investigate the policy options available, explore issues raised in the public consultation, gather more evidence, undertake additional impact analysis on specific issues (including environmental and economic impact analysis) and to more fully refine their thinking. This enables a more detailed proposal (and options) to be developed. These are then subject to a more comprehensive and detailed assessment, the findings of which are collectively compiled into a Final Regulatory Impact Assessment report. This report sets out the findings of the various impact analyses conducted, the key costs and benefits associated with each option explored, and officials' preferences and final policy advice to the Minister – or, in this case, Ministers.

It is at this point in the process that Ministers formulate their final position and present this to Cabinet for approval. The RMA also requires a section 32 evaluation report to be produced. This involves a further cost-benefit assessment and checks for compliance with the RMA.

Before final approval is given, all policy proposals must also be checked through a legal lens for compliance with relevant statutory requirements (such as the RMA, Treaty Settlement legislation, the New Zealand Bill of Rights Act, the Privacy Act and any relevant international standards and obligations). They must also must undergo quality assurance checks through Treasury, and must comply with the government's regulatory direction and a plethora of more specific regulatory policy for sectors including Māori, Pacific peoples, women, disabled people, children and young people, older people, migrant communities, veterans and rural communities.[13] There is also an engagement framework set out for Māori by Te Kāhui Hīkina (Māori Crown Relations) to ensure public sector engagement with Māori and Treaty compliance.[14]

This chapter explores some of the key steps in this process, but in particular the regulatory impact assessment process and the regulatory requirements and guidance directing it. Regulatory impact assessment forms a central aspect of the decision-making process; it is at this juncture that the various options for reform are assessed and weighed and where officials' reasoning is set out. They inform decisions on the scope and scale of the proposals put forward, problem definition, identification of objectives and options for addressing the problem, analysis of the options (including their impacts, costs, benefits and risks), approach to consultation, implementation planning, and ongoing monitoring, evaluation and policy review.[15]

Regulatory impact assessments provide a form of quality control, operating as a gatekeeping mechanism on whether policy work is triggered, and informing decision-making and final approval, thereby bookending the process. For the NPS-FM 2020, an interim regulatory impact assessment was produced in August 2019, ahead of the production of the *Action for healthy waterways* discussion document and public consultation process. A final regulatory impact assessment was produced in May 2020 ahead of final decisions being made and policy approval (see Figure 5.1).

5.3 Agreement to a freshwater policy process

When a freshwater reform programme was initially proposed in 2018, four options were put before Cabinet:[16]

1. fundamental overhaul of the RMA to address systemic issues;
2. adopting a polluter-pays framework so that polluters bear the true costs of polluting;
3. government funding to achieve the objectives;
4. working within the existing legislative framework to make adjustments to the NPS-FM and NOF framework.

The first three options were dismissed. In light of the tight policy timeframe, more substantive reform was rejected as taking too many years to achieve.[17] A polluter-pays framework was considered too difficult in the context of diffuse water pollution. And there was ideological resistance to any government funded approach, as it would essentially 'pay polluters not to pollute' so risked causing perverse outcomes.[18]

It was therefore determined that policy work would focus on the fourth option, "using existing tools rather than fundamentally changing the RMA." In order to keep the policy scope tightly bounded, freshwater allocation (in respect to taking water and discharging contaminants) was excluded, as was consideration of Māori rights and interests.[19] In addition, drinking water regulation along with stormwater and wastewater concerns were to be dealt with separately through the Three Waters Review. These were

characterised as necessary practical constraints on decision-making for the freshwater policy stream.[20]

Through the analysis, it was clear that cost and time considerations collectively operated to drive incremental policy work; it was important that the policy could be achieved within the three-year election cycle. 'Bigger thinking' policy shifts, while potentially far more effective in addressing problems that are also largely systemic in nature, take much more time and are far less certain, so are far riskier to embark upon.

5.4 Regulatory settings and guidance

A regulatory impact assessment is guided by Cabinet directions which, in turn, are required to reflect and incorporate the current overarching direction set by government.[21] Each new government typically updates regulatory advice and directions to ensure they are aligned with its approach and regulatory priorities. This means that these documents frequently change. Below, we examine the government's statement on good regulatory practice, the Cabinet Office circular on impact analysis requirements and the 'rural proofing' guidance aimed to ensure that challenges faced by the rural sector are taken into account in designing and implementing policy.

5.4.1 Government expectations for good regulatory practice

When the sixth Labour government came into power in October 2017, it developed a new regulatory statement *Government expectations for good regulatory practice.* This replaced the previous 2009 document *Better regulation, less regulation.*

As will be clear from the title, the previous policy approach sought to minimise regulation. It was aimed at "reducing the burden imposed by such regulation" to "help unshackle our economy and give New Zealanders more ability to shape and improve their own lives".[22] The statement envisioned issues being addressed through "private arrangements" under the rationale that regulation would "impair private property rights" and "market competition".[23] Government agencies were expected to recognise the importance of productivity for enhancing the country's economic performance. This raised the bar for any new regulations being adopted, since a very strong case had to be made to justify formal regulation.

The Labour government softened this approach. Rather than requiring a "particularly strong case" for proposals imposing additional costs on business, or impairing private property rights and market competition, the new expectations for regulatory design were that objectives were sought "in a least cost way and with the least adverse impact on market competition, property rights and individual autonomy and responsibility".[24] This represented an incremental shift rather than a significant ideological change: a softening of the edges rather than a full retreat from neoliberal policy.

That the expectation for good regulatory practice remains fiscally focused is evident throughout the good regulatory practice document. The regulatory system is required to be an "asset" not a "liability" and to deliver benefits not costs. No new component should be introduced unless it delivers "net benefits".[25] However, social and environmental goods are known to be far more difficult to quantify, so are inherently undervalued in traditional cost-benefit assessments.

The focus of the government's regulatory expectations was on ensuring that regulators can "adapt their regulatory approach to the attitudes and needs of different *regulated parties*", that they produce "predictable and consistent outcomes" for regulated parties and that they treat regulated parties in a "proportionate, fair and equitable" way.[26] The key phrase repeated throughout is 'regulated parties'. The statement is designed to ensure that their interests and concerns, and the impacts on them, remain central throughout.

There is notably no reference to the public good, the public interest (including in environmental quality), or that policy should reflect the views and perspectives of New Zealanders. A 2020 international review of sustainable governance indicators, which examined regulatory impact assessment as part of an evidence-based instruments report, found that that Aotearoa New Zealand has no recognition or reference to "sustainability" in its regulatory direction or assessment criteria.[27] This makes it difficult to progress environmental reform within such a framework. The feedback from the Ministry officials that we interviewed concurs with this:

> *"The RIA [regulatory impact assessment] process is really focused on costs. I find the whole process very much biased. It's really hard to communicate the importance of environmental protection on those terms. Perhaps it works better in other areas, but in the environmental space the RIA process sets up a damn hard argument to have and get past."* (Ministry official)

> *"I don't have a lot of faith in the whole process. It's a very economic-centred focus – and not nearly as objective as it makes itself out to be."* (Ministry official)

From the perspective of fostering a robust science-based approach to policy development, it is significant that the terms 'science' and 'research' do not appear in the current statement of good regulatory practice. The phrase 'evidence-informed' appears only once, and in relation to the need for regulatory agencies to maintain an evidence-informed compliance

and enforcement strategy. This means that the robustness of the science underpinning regulation is not a matter of particular concern at this level, although the matter is referred to in the Cabinet impact analysis requirements (see below).

5.4.2 Cabinet office circular on impact analysis requirements

When the NPS-FM 2020 was being developed, *Cabinet office circular (17) 3 Impact analysis requirements* (2017) was in force.[28] This had been updated in line with the renewed regulatory practice statement described above. The Cabinet circular states that regulatory agencies are expected to adopt a "whole of system view, and take a proactive, collaborative approach to the care of the regulatory system".[29] It sets out requirements for regulatory proposals, early engagement and quality assurance arrangements.

The impact analysis process is intended to encourage a "systematic and evidence-informed approach to policy development".[30] Key aspects of the direction include that:

- measures are supported by available evidence;
- all practical options for addressing the problem have been considered;
- all material risks and impacts are identified and assessed;
- the reasons for recommending one option over others are clear.

The detail (in terms of the content of a regulatory impact assessment) is not set out in the document which is primarily focused on detailing when exemptions from a regulatory impact assessment exist, what the process is when the impact analysis is insufficient, and requirements for publication. The more detailed requirements for regulatory impact assessments and quality assurance criteria are held on the Treasury website. As these forms are frequently updated, the ones relevant to the NPS-FM 2020 are no longer accessible from the website, and we have not been able to locate them.

For current purposes, important aspects of Cabinet direction are that they drive:

- *a whole of system view.* This seeks to avoid silos and encourages government agencies to work together. This may have been the impetus for greater MPI involvement in the NPS-FM 2020 process and for the establishment of the Sustainable Land Use Forum that brought together Ministers from a broad range of departments;
- *early engagement and a collaborative approach*. This encourages forward scoping of policy proposals with stakeholders and a co-development approach with *regulated parties*;
- *an evidence-informed approach.* This is to reduce risk and ensure reforms are based on sound evidence.

The Cabinet circular also emphasises the importance of Treasury's quality assurance checks through its Regulatory Quality Team. It includes a "strong" recommendation for early stakeholder engagement where the problem is "important in terms of its human, social, economic or environmental impacts" and where the options will alter primary or secondary legislation (as in the NPS-FM). In addition, there is an expectation that a "collaborative approach to the care of the regulatory system" will be adopted.[31]

5.4.3 Rural proofing

In addition to the Cabinet circular on impact analysis, for agricultural-based reform to proceed the *Rural proofing* policy must be applied through the regulatory impact assessment process. This policy was updated and strengthened in June 2018, just as the freshwater reform process was being formulated. The policy aims to ensure that "when policy-makers sit down to design the rules they take into account the unique factors that affect rural communities such as low populations, isolation and reliance on the primary sector for employment."

MPI is the Ministry in charge of the rural communities portfolio and so is responsible for supporting analysis by government agencies in relation to rural communities. The Minister of Agriculture is also the Minister for Rural Communities. The role, of ensuring policy is 'rural proofed', is focused on "building a rural lens into the full policy cycle" from policy development through to implementation and evaluation.[32] "The aim is to have policies that are practicable and reflect the aspirations, values, needs and capabilities of rural communities."[33] This involves ensuring that policy initiatives engage closely with stakeholders who live in, or are familiar with, rural communities. MPI's direction is for policy-makers to seek advice from relevant rural contacts and organisations, including a range of industry bodies such as Federated Farmers, DairyNZ, Beef+Lamb and Horticulture NZ.[34]

The concern to ensure 'rural proofing' of all government policy is driven by the dual concern to support healthy and resilient rural communities and to support the continued success of primary industries, due to their contribution to the economy.[35] It also recognises that 86 per cent of New Zealanders now live in urban areas and there is a risk of rural populations being disadvantaged within the broader electorate.

Spotlight on rural proofing

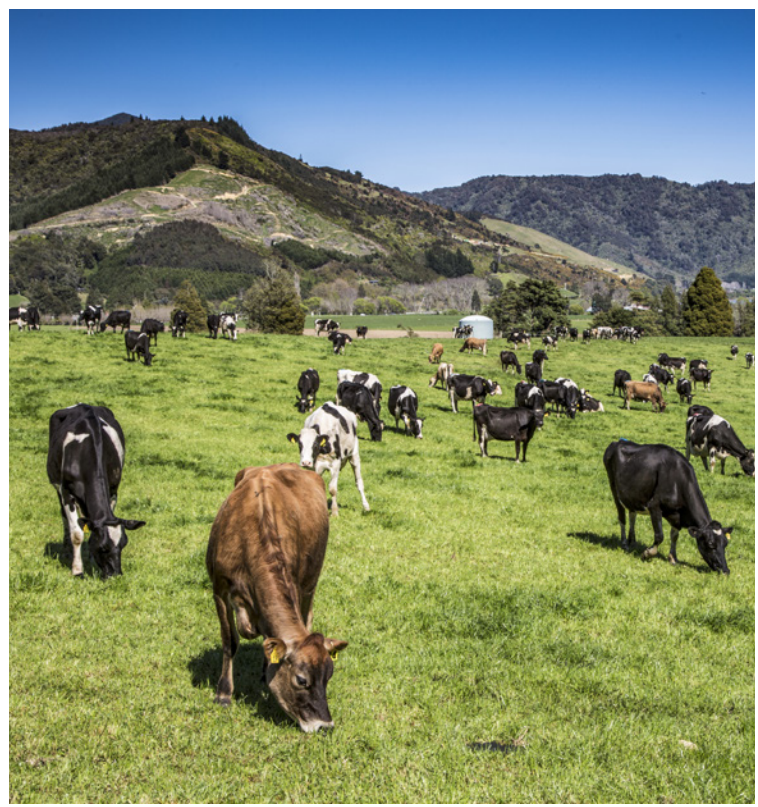
"Rural proofing is a process to assist policy-makers to identify specific rural community needs and rural factors that influence policy design. It embodies investigation to determine if the policy is appropriate and will work in a rural setting and seeks to identify and overcome barriers to policy implementation. This process provides the opportunity to avoid unintended consequences and to tailor policy solutions to ensure that rural communities are given a fair deal socially, culturally, economically and environmentally."[36] The approach first evolved in the Canadian context in the 1990s, spreading to the United Kingdom in the early 2000s and subsequently to Norway, Sweden, Finland and Aotearoa New Zealand.

The concept of 'rural proofing' has increasingly come under criticism. Research examining officials' experience with pre-legislative rural proofing, as well as outputs, has highlighted fundamental problems with the approach. The central problem is the premise on which the policy is formulated: "the approach entirely stands on an assumption of rural disadvantage".[37] In addition, the approach rests on the presumption of a blunt urban/rural binary.[38] It has been criticised for failing to account for the diversity of the rural sector and leading to a 'one size fits all' approach. It is premised on a simplistic characterisation of 'the rural interest' which in reality is far more diverse, nuanced and locally situated.[39]

Rural proofing policies typically drive a policy assessment process heavily focused on attempting to identify the 'rural impact' in the context of national policy frameworks that lack a specific geographic focus. Studies have shown that the approach is most effective where the rural areas in question are all very similar in nature.[40] This means that, while it may be an important tool in relation to place-based policy development, its broader application can undermine innovation and the generation of locally based responses required to address the disparities that exist.[41] It may be that, conceptually, the approach is more suited for use at the local authority level, rather than through central government policy processes.

Express direction that all policy be 'rural proofed' meant that a rural lens was applied throughout the freshwater reform policy process and work on the NPS-FM 2020. As Minister Parker noted, when questioned about the application of the policy to freshwater reform, "rural proofing is not a tick box exercise, it is an approach that analysts apply through the policy development process, from initiation to completion. My officials are aware of the importance of taking rural needs into consideration when developing policy, as outlined in the rural proofing policy." [42] He underscored that rural proofing occurred throughout the process of policy development, "considered during the design of the proposed *Essential freshwater* policies" and continuing through consultation to the decision-making phase.[43]

For MPI, it means that a core part of its role in the development of the NPS-FM and freshwater proposals was to provide information, advice, and regional context to MfE, and to support engagement and consultation with rural communities and primary sector agencies.[44] It also meant that, at every step in the process, policy options were "tested" against the rural proofing policy. Since part of MPI's role is to serve as an advocate for both the primary sector and rural communities, its participation as a partner in the freshwater policy reform process helped ensure that these interests and sector concerns were central throughout.



Raewyn Peart

Cows grazing in Marlborough

5.5 Implications of regulatory settings

5.5.1 Regulatory settings and science

Our examination of the regulatory direction documents identified a lack of guidance on science-based decision-making throughout each stage of the policy process. This was also one of the chief criticisms raised by MfE officials we spoke to who observed that the process did not adequately support decision-making.

What appears lacking is practical support and direction for implementing an 'evidence-informed' approach. For example, should officials apply a precautionary approach? How should uncertainty be addressed? At what level is the evidentiary burden set? How should contested evidence be dealt with? Is all evidence equal and how do officials assess its reliability? How are differing or conflicting values (Māori/Treaty, economic, social, environmental) and their associated costs and benefits to be weighed? Without such guidance, the role of officials becomes opaque, with policy matters that are more appropriate for political decision-making being left to the broad discretion of officials.

Raewyn Peart

Waimakariri River

Spotlight on the European Union's Better regulation guidelines

The EU's *Better regulation*[45] guidance, while remaining highly stakeholder focused (especially for consultation), includes direction that growth should be supported "while maintaining social and environmental sustainability."[46] The guidelines emphasise the use of "best" evidence and inclusivity in order to ensure groups with relevant expertise are involved.[47] It states that the role of stakeholder consultation is to provide feedback and evidence, and that consultation should be simple, concise, targeted and diverse.[48] Interestingly, it also states that impact assessments should be evidence based and "unbiased".[49] Quantitative conclusions should separate out 'fact', 'expert opinion' and 'stakeholder views'.

To support a focus on sustainability, a 'Better regulation toolbox' has been developed. The aim of this is to create a rigorous evidence base for policy-making. 'Tool 4: Evidence-based better regulation' is designed to ensure credibility and transparency, emphasising the need to continually check for bias and distinguish facts from stakeholder opinion. It supports peer review processes and sets three criteria for quality expert advice: excellence, independence and pluralism, including both mainstream and divergent views.[50] Where there is scientific uncertainty or conflicting views, the EU's 'Joint Research Centre' can provide expert judgments.[51] Tool 53 deals with stakeholder consultation, and includes direction to verify the reliability and appropriateness of collection methods when data or expertise from stakeholders is utilised.[52]

The EU regulatory guidance provides a strong focus on delivering evidence-based policy, which is scrutinised through a clear sustainability lens. To that end, additional direction and detail has been provided across a range of matters from stakeholder consultation, to contested and uncertain science, to ensuring a diverse range of experts is brought into the policy process and protecting against bias and conflicts of interest. With the inclusion of a greater plurality of inputs and views, the need for greater openness and transparency and tools for managing these inputs has been recognised. Requiring peer review, reviews of methodology, and distinctions to be made between different input sources (and between facts and opinion) are all responses

to the need for enhanced scrutiny. It has also been important to have a mechanism, in the form of the Joint Research Centre, to assist officials in resolving difficult matters of science, especially situations of contested science advice.

The *Better regulation* approach is not without critics. It is considered to be too technocratic by some, who argue that it can enable difficult political considerations to be avoided.[53] Similarly, Garben argues, rather than being a tool to improve the evidence base for policy, it is in reality employed as a political tool to strategically depoliticise controversial issues.[54] It has also been argued that the real problem was always political, so that the response fails to address the real issues, or that *Better regulation* is even the result of erroneous problem definition.[55] The irony is that *Better regulation* is likely "damned if it does and damned if it doesn't"... "if it takes evidence-based decision-making seriously it may lead to further regulation and further accusations of over-regulation, while if it seeks to appease concerns about over-regulation it may have to act contrary to evidence". [56]

In contrast to the EU's *Better regulation* guidance, regulatory direction in Aotearoa New Zealand provides weak support for science-based policy. There is a need to take a critical look at our regulatory settings. For all their imperfections, many jurisdictions have attempted to craft more balanced, and public good focused, science-based policy frameworks which we could learn from.

Despite the shortcomings of the regulatory settings in terms of guidance on the science, the direction for an evidence-informed approach does facilitate the incorporation of environmental data. It was clear, from scrutinising the two regulatory impact assessments for the NPS-FM 2020, that information gleaned from environmental reporting was invaluable in setting out the case for action. Environmental data and reporting were utilised by officials to establish that a problem existed and to set out the scale of the problem, thereby triggering a regulatory response.

The interim regulatory impact assessment sets out in some detail the reasons why change was required, citing a number of reviews and reports documenting ongoing freshwater decline. What this highlights is the value of the work of bodies such as the Parliamentary Commissioner for the Environment in being able to investigate matters independently and make the case for change. Environmental reporting is also of key importance through the *Environment Aotearoa* state of the environment reports. In addition, reports from the Ministry of Health and Institute of Environmental Science and Research assisted policy-makers to identify the range of human health impacts from declining water quality, including cases of salmonellosis, giardiasis and campylobacteriosis from recreational water contact.

Spotlight on Parliamentary Commissioner for the Environment investigations into freshwater

The Parliamentary Commissioner for the Environment has released numerous reports on aspects of freshwater quality. They include:

- Overseer and regulatory oversight: Models, uncertainty and cleaning up our waterways (2018);[57]
- Next steps for freshwater submission (2016);[58]
- Managing water quality: Examining the 2014 National Policy Statement (2015);[59]
- Water quality in New Zealand: Land use and nutrient pollution (update report) (2015);[60]
- Water quality in New Zealand: Land use and nutrient pollution (2013);[61]
- Land use maps: Water quality in New Zealand (2013);[62]
- Water quality in New Zealand: Understanding the science (2012).[63]

It is also clear that the work of the STAG had a strong influence on the final form of the NPS-FM (as discussed in section 5.6.3)

5.5.2 Regulatory settings and industry

Collectively, the regulatory settings outlined above drive a collaborative approach that is focused on stakeholder input and consideration of impacts on regulated parties. This means that, even where stronger government direction is required in order to make progress (such as with the NPS-FM where ongoing stakeholder disagreement was a barrier), a

series of levers within the regulatory system continues to pull the direction of travel back towards an industry-government collaborative approach.

Prior to the *Essential freshwater* package being formulated, MfE was consulting heavily with sector groups to 'sense check' options and ideas.[64] In seeking Cabinet approval to proceed with the freshwater reforms, assurances were sought that there was "broad agreement amongst primary sector leaders on an overarching vision for sustainable farming in New Zealand."[65] Broad sector support for reform was not only seen as politically desirable, but also a practical necessity: information and data on current practices, as well as their environmental and economic impacts, was highly dependent on sector cooperation and data release (see Chapter 6 on the DIN).[66]

Industry groups and officials, alike, had been operating under the previous *Better regulation, less regulation* policy direction for nearly a decade. This actively discouraged regulation that imposed costs in favour of industry *self-regulation*, and served to ingrain a culture and institutional practice that focused on the needs and concerns of industry. The continued focus on sector collaboration under the revised regulatory guidance supported industry expectations of the policy process. This was evident in the submissions of sector groups.

Through the consultation process, DairyNZ sought alignment between the NPS-FM and its own 'Good Farming Practice' regime and for the "government to work in partnership with DairyNZ" to assist and support farmers.[67] DairyNZ was especially in favour of freshwater farm plans as a policy tool, as they aligned with the dairy sector's system of environment plans. The key catch phrases in the DairyNZ submission reflect the need for 'balance', practicality, flexibility, certainty, and a 'just and fair transition'. It cites a report of the New Zealand Productivity Commission that was critical of the increased regulatory burden placed on councils, and which recommended a "significant shift" towards "co-designed regulatory approaches".[68]

Raewyn Peart

Canterbury Plains

It is interesting to note the similarity here with the language around the need to co-design policy in partnership with Māori, to enable iwi/hapū greater self-governance and control over matters of importance and high impact to them. But what was clear from our interviews with Ministry officials is that officials and departments know well how to work *with* sector groups. The relationships are so well developed, that they struggle to ensure equitable input from other stakeholders. In contrast, they are only just beginning to understand how to work in partnership with iwi.

5.5.3 Regulatory settings and the public

With the regulatory settings strongly focused on impacts on regulated parties, the 'economic good' appears to have been overly conflated with the 'public good'. More direction on what constitutes the public good, and how it is to be taken into consideration during the policy process, would be helpful.

As part of the regulatory impact assessment process, officials do investigate and consider broader public good implications arising from matters such as improved environmental amenity and recreational use, greater employment opportunities, and a more highly skilled rural workforce. These considerations inform the weighing of costs and benefits. However, the public voice on specific issues may not be heard and therefore may not be incorporated into decision-making.

Recent surveys have made it clear that many New Zealanders have strong views on freshwater issues. In a 2018 General Social Survey, the state of rivers, lakes, streams, wetlands and aquatic life was identified as Aotearoa New Zealand's largest environmental issue by 80.2 per cent of New Zealanders. Farming activities were identified as the main cause by half of participants and sewerage and stormwater by 17 per cent.[69]

A nationwide Colmar Brunton poll undertaken in 2018 similarly found that pollution of rivers and lakes was the top concern of New Zealanders, with 82 per cent saying they were extremely or very concerned about the issue. Only four per cent were unconcerned. Concern about freshwater pollution

was ahead of that about cost of living (80%) and the health system (78%).[70] Another Colmar Brunton opinion poll, undertaken in 2020, found that 83 per cent of people surveyed did not think business was doing enough to reduce its environmental impact.[71]

A study conducted by the Monitoring Technologies Working Group, a part of the Our Land and Water National Science Challenge, found that members of the general public selected very different attributes than Māori groups when asked to choose their top three (from 27). Members of the public identified algal bloom and nitrates in water as their top two priorities. Māori ranked the wellbeing or mauri of water as most important, followed by mahinga kai. When the scores were merged (see Figure 5.2) the most important attribute for both the public and iwi was nitrate, followed by *E. coli* and then macroinvertebrate health.

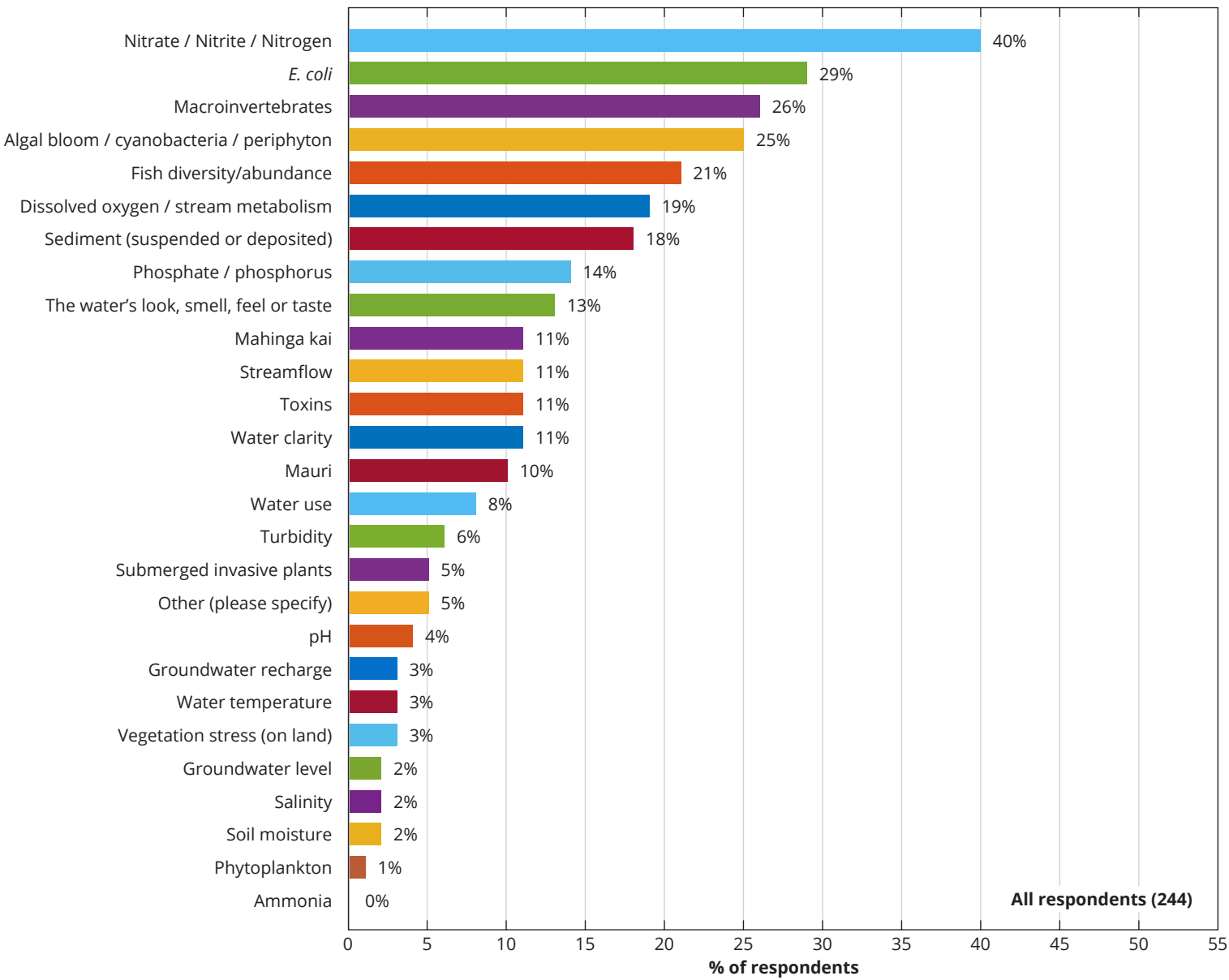


Figure 5.2 Freshwater attributes most valued by the public and Māori

Source: https://ourlandandwater.nz/news/survey-highlights-differences-in-priorities-for-monitoring-water-quality/

An argument could be made that the voice of the regional council (being a democratically elected body) is a reasonable proxy for the public voice, at least at the regional scale. However, when the positioning of regional councils (in particular the Regional Sector Subgroup and bodies such as Local Government New Zealand), which largely opposed the DIN and the STAG's recommendation on nitrate toxicity, is considered against what public opinion surveys tell us about the concerns of the community, it is clear that significant discrepancies exist.

The researchers in the Monitoring Technologies Working Group concluded that the public is interested in a much wider range of attributes than those usually monitored, have very different interpretations of what constitutes success, and have very different priorities to those of local government.[72]

Public engagement at the regional council interface continues to be problematic, even where processes are designed to increase public participation. For example, a 2016 survey undertaken by the Cawthron Institute demonstrated low public awareness of collaborative freshwater planning processes, with only 21 per cent of the public aware that such processes were being undertaken.[73] The survey also found that the more highly engaged participants were, the more likely they were to perceive greater conflict in freshwater management, to hold negative views of regional council management and fairness, and lack confidence that their interests would be addressed.[74] The survey asked people how fair they thought freshwater management approaches were in their area, on a scale of 1 to 10, where 0 was not fair at all. Areas with collaborative processes scored 5.1 and those without 4.76: a statistically insignificant difference.[75] The researchers recommended that further research be undertaken to investigate whether those engaging more were doing so because they were already highly dissatisfied with freshwater management, or whether increased involvement and greater understanding led to increased scepticism.

This is an additional area that would benefit from further research, to examine what communicative and educational supports could foster higher engagement, and how policy-making could be more responsive to the public good.

5.5.4 Quantifying non-economic costs

Social, cultural and environmental costs and benefits are far more difficult to quantify than economic ones, and a common sentiment from officials was that these are therefore consistently undervalued as a result. How do we put a price on swimmable rivers or the ability to harvest food? How do we cost the extinction of vulnerable species and the loss of unique habitat? How do we measure improvements to freshwater and ecosystems? And how do we weight these benefits against economic costs?

Such questions pose a perennial problem for regulators. Officials explained in the regulatory impact assessment for the NPS-FM 2020 that it is far easier to cost mitigation and restoration measures than it is to determine, and then quantify, environmental gains. They highlight that this complexity invariably means that "it is likely that benefits are understated relative to costs."[76]

Further, because environmental costs and benefits are likely underestimated, the threshold they must reach is elevated: the degree of harm or benefit must be more significant in order to trigger action. Moderate, or slow incremental and cumulative harm to the environment may not provide a strong enough case to justify the cost of regulation. And if the benefits from improving environmental health take many years to eventuate, or there is a degree of uncertainty in securing them, then those benefits may be deemed insufficient in light of the costs.

For the NPS-FM 2020, MfE's regulatory impact assessment concluded that the ecosystem benefits, "while difficult to quantify, appear to be very large relative to the costs for councils and regulated parties."[77]

5.5.5 Dealing with uncertainty

The regulatory impact assessment process lacks sufficient guidance on how to deal with uncertainty – and yet uncertainties occur across a range of areas. The regulatory impact assessment for the freshwater reforms involved three essential tasks:

1. consideration of the degree to which proposed policies differ from current practice;

2. consideration of the impacts of the new actions;

3. consideration of how land users may respond to new policies.

The regulatory impact assessment noted that uncertainty existed around each of these. There was uncertainty around current practice, since most regional councils had not yet implemented the pre-existing NPS-FM or incorporated it into their plans, and those which had done so had made variable efforts.[78] Information about current farm practices, and likely responses to the policy, were also difficult to consider because officials were "unable to access more up to date and comprehensive data sets held

by industry bodies", a "not uncommon limiting factor" creating uncertainty around the economic impact assessments.[79]

In addition, science inputs (particularly for complex environmental issues) are seldom unequivocal. The modelling employed by scientists for the NPS-FM process was based on assumptions about impacts taken from observed data that itself was limited.[80] While land use development can have significant effects on water flows and freshwater habitat, the regulatory impact assessment noted that "information about the extent and scale of these impacts on our ecosystem is limited" and the cumulative impacts on social and economic values were in turn "difficult to determine".[81]

The environmental impact analysis and modelling prepared by NIWA raised a number of uncertainties, including the fact that environmental benefits are often not immediate and lag times complicate the analysis. For sediment, for example, it meant that (in monetary terms) the benefits of reduced sediment outweighed the costs – but only when calculated over a 50 year timeframe.[82] Some environmental benefits are also connected; improvements may be reliant on changes across a range of aspects. Taking the example of sediment, the ratio of benefits to costs changed, depending on the carbon valuation measures used and forestry practice.[83]

Further, the environmental benefits accruing as a result of policy may not be evidenced for many years, and yet delays and inaction pending more information are likely to result in more ecosystems passing critical tipping points (thereby locking in degraded conditions).[84] These types of risks are particularly difficult for officials to take into account and quantify.

Natural environmental variability, as well as variability in land use across different regions, were also matters that the regulatory impact assessment had to grapple with. It noted Aotearoa New Zealand's diverse conditions, land use and land management practices; and varying pollution loads across different land uses and practices, soil types, slopes and climate characteristics. Understanding the variability of freshwater quality and ecosystem health, from location to location and over time, was a challenging aspect for officials to take into consideration.[85]

With regional councils left to determine their responses to the NPS-FM, officials also highlighted the uncertainty around how councils might exercise their discretion (eg in setting timeframes), and what mitigation measures resource users might utilise to meet council requirements.[86]

The final regulatory impact assessment, released in 2020, noted that the timeframe for the assessment had been "very tight". A memo noted that the impact analysis had been "developed under significant time pressure by officials, supported by consultants and expert peer reviewers". This meant there was not "opportunity to re-engage with key stakeholders" in order "to socialize the impact analysis",[87] which officials thought was important to help inform understanding of the underlying modelling and to build confidence in the approaches taken.[88]

The regulatory impact assessment underscores that tight timeframes had been a constraint to the analysis, so that many of the uncertainties in the analysis could not be reduced. The uncertainties around impacts were characterised as being of a "medium" level.[89]

These areas of uncertainty can provide grounds for contesting the policy itself. Submissions from regulated parties:

- contested the data and methodologies;
- contested the environmental impact analysis and the science underpinning it;
- contested the economic impact assessments;
- claimed the cost-benefit analysis was unreliable and insufficient to proceed.

Other common lines of argument were that insufficient consideration had been given to alternative regulatory responses, such as co-management with the sector, or voluntary measures.[90] The uncertainty of the science, the scientific complexity of the problems and responses, and the insufficiency of the data relied upon for decision-making were all raised as issues in submissions. This was particularly in the context of the scientific basis for the proposed attribute settings.[91]

Where matters of science are contested, the task of officials becomes increasingly complex. Although many MfE staff have a science background, the assessment of competing claims on the science can seldom be resolved without additional review. Regardless of the substance (or lack thereof) that might underly claims, once raised they may lead to lengthy reviews and independent analysis to be called upon. They can also prompt dialogue to be reopened with another round of consultation and debate. If such re-engagement with stakeholders does occur, it may trigger a series of late modifications and adjustments as consensus is sought. The risk of responding in this way is that any changes made late in the policy process do not provide other parties with a similar opportunity for rebuttal in defence, and lack robust scientific scrutiny.

Spotlight on wetlands

Wetland protection was one of the more complex issues dealt with in the NPS-FM 2020. With over 90 per cent of Aotearoa New Zealand's wetlands lost, and many remaining systems degraded by weed invasion, wetlands were the focus of considerable discussion by the STAG in its policy work. The NPS-FM 2020 requires that there be "no further loss *of extent* of natural inland wetlands, their values are protected, and their restoration is promoted."[92] The conditional wording "of extent" was not contained in the draft NPS-FM, but was a change made to the final document.

Wetland definition

There were also changes made to the definition of 'wetland'. Under section 2 of the RMA, a wetland includes "permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions". The NPS-FM 2020 largely adopted that definition, but carved out exclusions for artificial or constructed wetlands, geothermal wetlands and "improved pasture". Changes made to the definition of wetland between the draft and final versions of the NPS-FM 2020 included the following.

- Removing the direction that the definition of wetland in the RMA applied "regardless" of whether the wetland was "dominated by indigenous or exotic vegetation", thereby significantly reducing the extent of protection.

- Changing an exemption for "wet pasture or paddocks where water temporarily ponds after rain in places dominated by pasture, or that contain patches of exotic sedge or rush species improved pasture" to an exemption for areas of "improved pasture"… "dominated by (that is more than 50 %) exotic pasture species and is subject to temporary rain-derived pooling".

The exclusion of "improved pasture" was one of several late changes made to the NPS-FM 2020 that the government explained were "as a result of consideration of submissions and further conversations".[93] Landowners and industry groups had called for these changes, raising concerns that the wetland definition was too broad, and that it would ban activities such as quarrying, mining or landfill operations on 'soggy paddocks' (rather than protecting true wetlands), thereby forcing the closure of existing businesses. In addition, the Treasury's regulatory impact assessment noted that "despite wide support for the wetland attributes proposed by the STAG we do not recommend including these into policy because we do not believe these to be achievable under RMA processes".[94]

The last minute alterations to the wetland provisions were controversial. By that late stage, the STAG had been disbanded and so was not able to provide any input on the changes. They occurred without any further consultation. Industry and environmentalists alike complained that the new definitions were unclear, creating legal ambiguity, and would likely result in "costly court battles".[95]

Following the approval of the NPS-FM 2020, environmental organisations warned that the definition of wetlands could result in further wetland loss; it could disqualify wetland areas that had been invaded by exotic species from protection and thus undermine restoration work.[96] Such risks were apparently unanticipated, with the government responding that it was not the intention of the regulations to undermine restoration or indeed biosecurity activities (for weed control).[97] Farmers were concerned the definitions would be applied too broadly and that the process of mapping wetlands would lock up large areas of their land. Independent freshwater commissioners also considered the rules to be "ambiguous".[98]

The government subsequently released a further discussion document, *Managing our wetlands,* which was focused on amending the problematic definitions in the NPS-FM.[99] Amongst the proposals were changes to enable restoration and biosecurity activities (eg pest management) to take place without a resource consent, and provision of "discretionary consenting pathways" for quarrying, landfills, mining and urban development.

Both the last minute changes to the NPS-FM 2020, and the reopening of discussion on wetlands, were raised as points of concern during interviews. The STAG members we spoke to were worried that further revision of the standards, through a less robust consultation and science review process, had the potential to 'roll back' the gains made.

The Parliamentary Commissioner for the Environment agreed, stating in his submission that the provision of additional pathways for activities such as mining and urban development were "worrying", had the potential to "broaden the reasons to destroy wetlands to almost anything and would be a U-turn on avoiding any further loss or degradation."[100] He also noted that mitigation, compensation and offsetting balances, normally utilised under the RMA in response to dealing with adverse effects, were difficult to apply to wetlands since they were highly "place-specific" and unable to be realistically relocated or rebuilt.[101]

What these definitional issues over wetlands highlight is the difficulty of defining natural habitat at the margins, especially where there has been historical degradation or modification. The Parliamentary Commissioner highlighted that making the definition of a wetland contingent upon a 50 per cent threshold, might create a perverse incentive for landowners to enlarge or reduce the extent of exotic landcover depending on whether they want an area to be a wetland or not.[102]

The government discussion document explains that the intention of exempting "modified pasture" was to *avoid capturing* heavily modified exotic pasture dominated wetlands. However, as the Parliamentary Commissioner highlighted in his submission, wetlands (whether heavily modified or not) can still provide important ecosystem services.[103] This point, and some of the more nuanced science around wetlands, were matters that STAG members struggled to build officials' understanding on. As one interviewee noted:

> *"Wetlands was one of those really gnarly issues where the technical aspects needed to be thoroughly worked through. It was frustrating trying to get MfE to understand. I think we really needed to get them out into the field to show them how things work, where they could see it happening, how things connect up, the processes working."* (STAG member)

The Parliamentary Commissioner recommended "further work by experts is required around the definition, percentage of pasture species and species associated with pasture and including a baseline before the definition is changed." He also argued that quarrying, landfill, mining and urban development should remain prohibited activities in natural wetlands and non-complying nearby (ie within 100 metres). He did not support the provision of offsetting and compensation as management tools, underscoring that wetlands remain "one of our most potent weapons in adapting to climate change. They should be restored, not drained or developed".[104]

Wetlands were one of the issues where the complexity of the issue, and natural variation on the ground, made definitions difficult. Confusion also arose out of a lack of clarity and agreement on the *purpose* for their protection: as natural habitat (for biodiversity protection, where presence of native vegetation would be key), or for the *function* of enhancing water quality (where the existence of exotic species would not alter their functional value). In addition, determining what constitutes a wetland requires people to go out into the field. This will necessitate training of council staff around the country.

A decision on any changes to the wetland provisions in the NPS-FM 2020 is still pending. However, the current definitions, and their application in practice, continue to be contested in the courts.

In *D-G Conservation v Taranaki Regional Council*[105] the Environment Court considered resource consent applications for a state highway roading project. Waka Kotahi argued that "exotic rushland" was not a "natural wetland" under the NPS-FM 2020. The Court ran into significant difficulty in seeking to apply the wetland definition in the NPS-FM. For example:

- where exotic species had been deliberately sown, the specific composition and growth of species had been modified in the past, and the current act of grazing was 'maintaining' pasture – did that qualify the area as 'improved pasture'?
- what if the 'exotic species' is a common species of rush that also occurs in pasture? Alternatively, does the fact that an exotic species *of rush* is present indicate that the area qualifies as wetland?
- do the exotic species occurring have to be a pasture species?

The Court found "the definition of 'natural inland wetland' to be imprecise – it raises more questions than it answers, particularly in relation to the meaning of 'improved pasture'".[106] Because the NPS-FM 2020 was promulgated after the hearing concluded,

there was no opportunity for ecological experts to present evidence, and the Court was therefore unable to reach a firm conclusion on the status of the wetland in question.[107] It instead relied on section 3.22(1) of the NPS-FM in determining the legality of the roading project. That provision enabled exceptions to be made to the protection provisions where it was necessary for construction or upgrade of specified infrastructure.

Interface between documents

One particularly complex interface is between the NPS-FM and the New Zealand Coastal Policy Statement, which also has policies protecting wetlands. In theory, the NPS-FM was designed to protect natural *inland wetlands*, with the Coastal Policy Statement focused on *coastal wetlands*. Even though the NPS-FM provides for "an integrated approach", and requires local authorities to manage freshwater, land-use and catchments "in an integrated way" to avoid adverse effects on "freshwater ecosystems and receiving environments", its jurisdiction does not stretch to the coastal marine area.

One potential mechanism for integrating these two policy directions is through National Environmental Standards under the RMA. However, the Resource Management (National Environmental Standards for Freshwater) Regulations, introduced in 2020, were primarily focused on the freshwater environment. For example, the definition of 'rivers and connected areas' set out in the standards specifies that they only include those parts the coastal marine area "upstream from the mouth of a river".[108] The application of the standards to "natural wetlands", either inland or coastal in nature, is also unclear.

The Courts are already having to grapple with the complexity of this interface, to reconcile gaps and inconsistencies between the documents.

Another case on wetlands arose in the context of appeals on the proposed Northland regional plan, where the jurisdiction of the freshwater national environmental standards over coastal wetlands was considered. In *Bay of Islands Maritime Park Inc v Northland Regional Council*,[109] the Environment Court examined a range of provisions and definitions in the document, cross-referencing and comparing them to definitions in the RMA, the Coastal Policy Statement, the National Environmental Standards for Freshwater and the NPS-FM 2020. Expert evidence was provided by a wetlands specialist.

The Court noted that wetlands were described by a range of different terms, some "conflicting and confusing".[110] This was complicated by the fact that although the RMA distinguished between "freshwater" and "coastal water" (providing separate definitions), in practice there was "no dividing line" separating wetlands from open lakes or coastal water.[111] Similarly, natural wetlands could be both freshwater (inland) or saltwater (coastal) or "in freshwater areas subject to varying degrees of saline intrusion" on the basis that any area supporting vegetation that can be fully or partially covered by water is a 'wetland'.[112]

Counsel for Federated Farmers highlighted the uncertainty created for farmers "who do not know from day to day whether the river adjacent to their land will have any salt content" and where aspects such as salinity are variable depending on atmospheric, flow and tidal conditions.[113]

The Environment Court was initially swayed by the definition of rivers and connected areas in the National Environmental Standard, ruling that its application must therefore be limited to only that part of the coastal marine area upstream from any river mouth, thus also excluding coastal wetlands from its jurisdiction. Both the Minister of Conservation and Forest and Bird appealed that decision, arguing for a more extended scope.[114]

On appeal, the High Court took a broader, more purposive approach which included an examination of the intention of regulators. In doing so, the Court looked at the purposes of each regulatory instrument, the government's 2019 discussion document on freshwater reform (of which the NPS-FM was a part),[115] the interim regulatory impact assessment for the national environmental standards,[116] and the relevant Cabinet paper.[117] The Judge noted, for example, that clause 3.5 of the NPS-FM adopts an "integrated approach" that requires authorities to recognise the interconnectedness of the environment. This includes interactions between water, land, ecosystems and receiving environments. The relevant documents clearly demonstrated that the *intention* had been for the standard to apply to both inland and coastal wetlands, and for it to restrict activities that might lead to wetland loss in either area. The NPS-

FM, Coastal Policy Statement and National Environmental Standard were intended to "work together" across regional policies and plans "to create a seamless whole".[118]

The appeal was upheld and a declaration made that the standard *would apply* to natural wetlands in the coastal marine area, although the Court considered that a lack of certainty remained in relation to rivers and connected areas.[119]

These cases highlight the legal risk that can arise from making changes at the late stages of the policy process. Such changes undergo less rigorous scientific review and there is less time for robust risk analysis. The end result, in the case of wetlands, was that both industry stakeholders and conservationists were unhappy with the new wetland rules and the courts have struggled to make sense of them.[120] This has necessitated an additional policy process in order to effect a fix.

Raewyn Peart

Wetland at Mangere

5.6 Final NPS-FM 2020

The above discussion has highlighted some of the issues raised by the regulatory settings and their potential impact on outputs. In this section we take a closer look at some of the key policy changes made in the NPS-FM 2020, consider some aspects that were not adopted, and the influence of science in the process.

5.6.1 Key policy changes

The final NPS-FM 2020 made a number of changes to the previous freshwater NPS, primarily serving to strengthen its protections. The core policy changes are described below.

Te Mana o te Wai

The fundamental concept underpinning the NPS-FM, Te Mana o te Wai, was strengthened in the NPS-FM 2020. A more formalised definition was provided, alongside a framework based on six core principles,[121] and a clear hierarchy of obligations established to underpin the policy. The priorities set, in order of importance, were:

First, the health and well-being of water bodies and freshwater ecosystems;

Second, the health needs of people (such as drinking water);

Third, the ability of people and communities to provide for their social, economic and cultural well-being, now and in the future.

This hierarchy was also incorporated as an objective in Part 2 of the NPS-FM. Regional councils are required to "give effect" to Te Mana o te Wai (policy 1).

Māori freshwater values and incorporation of mātauranga Māori

Regional councils are required to collaborate with and actively involve tangata whenua in freshwater management, including decision-making processes, to ensure Māori freshwater values are identified and provided for (policy 2). Māori freshwater values are therefore broadly recognised, enabling iwi/hapū to work locally with councils to ensure that local policies and standards also reflect their values. In addition, a new compulsory value: mahinga kai (food that is safe to harvest and eat) has been added.

Mātauranga Māori is directly incorporated under clause 3.18, which *requires* regional councils, in setting methods for monitoring progress and environmental outcomes, to "include measures of mātauranga Māori". Regional councils must also "enable the application of a diversity of systems of values and knowledge, such as mātauranga Māori, to the management of freshwater"(clause 3.2(2)(d)).

Maintain and improve

Under Policy 5 there is now a requirement to improve degraded water bodies and maintain or improve all other water bodies. This measure aims to 'hold the line' while stimulating greater efforts to restore and reverse decline. In line with this approach, Policy 6 directs that there is to be no further loss or degradation of wetlands, and it requires mapping of existing wetlands.

Monitoring and reporting

There is now a requirement for regional councils to undertake annual monitoring and reporting on freshwater and to produce a synthesis report every five years assessing progress and outcomes. Regionals councils must also publish an ecosystem health scorecard with their five-yearly report (NPS-FM 3.30).

Expanding and strengthening the National Objectives Framework

Two additional compulsory values were added to the NPS-FM. In addition to ecosystem health and human contact (previously human health for recreation), threatened species and mahinga kai (food that is safe to harvest and eat) are now included.

A number of new attributes were also added to the NOF, taking the number of attributes up from nine to 22 (see Figure 5.3). Within the NOF framework, an "attribute" provides information about the state of a river or lake and must be measured and monitored. All new attributes are associated with pre-existing compulsory values. While no new attributes have been set for mahinga kai or threatened species, a range of policy measures were added to improve fish abundance and diversity, including addressing barriers to fish passage (NPS-FM 3.26).

Millan Ruka

Mangakahia River

Values	NOF attributes NPS-FM 2020	Changes
Ecosystem health	Phytoplankton (lakes)	No change to NBL
	Total nitrogen (lakes)	No change to NBL
	Total phosphorus (lakes)	No change to NBL
	Periphyton (rivers)	No change to NBL
	Dissolved oxygen (rivers below point source)	No change to NBL
	Nitrate toxicity	Strengthened from providing 80% → 95% species protection
	Ammonia toxicity	
	Suspended fine sediment	NEW: NBL
	Deposited fine sediment	NEW: NBL + AP
	Dissolved oxygen (rivers - all)	NEW: NBL + AP
	Lake-bottom dissolved oxygen	NEW: NBL + AP
	Mid-hypolimnetic dissolved oxygen (lake)	NEW: NBL + AP
	Submerged plants (natives)	NEW: NBL + AP
	Submerged plants (invasive)	NEW: NBL + AP
	Macroinvertebrates: macroinvertebrate community index and its quantitative variant	NEW: NBL + AP
	Macroinvertebrate (average score per metric)	NEW: NBL + AP
	Dissolved reaction phosphorus (rivers)	NEW: AP
	Fish (rivers): Index of Biotic Integrity	NEW: AP
	Ecosystem metabolism	NEW: AP
Human contact/health	Cyanobacteria (lakes/lake fed rivers)	No change to NBL
	E. coli (lakes and rivers)	No change to NBL
	E. coli (lakes and rivers: primary contact sites)	NEW: NBL

Figure 5.3: Changes to NOF attributes in the NPS-FM 2020

Key: NBL: National Bottom Line set AP: Action Plan required of council

Spotlight on attribute options

As shown in Figure 5.4, there are three different ways that attributes are dealt with in the NOF: limit setting attributes, where a national bottom line has been set; action-plan attributes that require council monitoring and planning (action-planning attributes without a national bottom line); and a combination of both (action-planning attributes with a national bottom line).

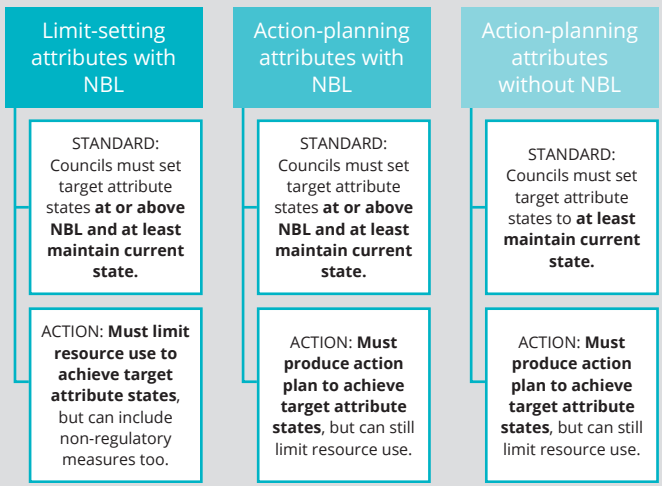


Figure 5.4 Attribute options under the NOF

Source: MfE and MPI factsheet, *Information on attributes for managing the ecosystem health and human contact values in the National Policy Statement for Freshwater (2020)*, 4

It will be clear from the summary above that the update to the NPS-FM in 2020 was a substantial one. It more than doubled the number of attributes in play, something that required a significant amount of science input to support. More than that, however, the ideological change evident in the extension and deepening of the Te Mana o te Wai framing demonstrates that the workstream went further than simply adding more to the existing regime. It set clear priorities for decision-making when there are conflicting interests, placing ecosystem health first.

5.6.2 Policy proposals that were not adopted

Although the NPS-FM 2020 contained many provisions that strengthened the freshwater quality framework, there were also a number of more ambitious proposals that were part of the broader *Action for healthy waterways* package, which were dropped or delayed. Amongst them were the DIN and DRP attributes recommended by the STAG. The omissions included the following.[122]

- delaying consideration of the DIN (nitrogen attribute) for 12 months, and in the interim requiring maintenance or improvement of existing DINs, establishing a cap on synthetic fertiliser (to be reviewed in 2023), and strengthening nitrogen toxicity attributes to provide protection for 95 per cent of species (up from 80 per cent);
- not incorporating the DRP (phosphorus attribute), citing high natural variation;
- phasing in the introduction of mandatory and enforceable freshwater farm plans, but with a focus on an early targeted rollout for highly nitrogen-impacted catchments;[123]
- managing some stock exclusion requirements through freshwater farm plans rather than national rules;
- placing a 2024 sunset clause on interim intensification controls and not applying them to vegetable production and non-dairy associated irrigation;
- dropping the need for existing permanent fences to comply with riparian setback requirements and reducing the riparian requirement from five metres to three metres.

The Ministers stated that the changes had been made "to address feedback" through consultation and "in response to COVID-19". The global pandemic made government more mindful than ever of the "unprecedented effects" on New Zealand's economy, with Treasury indicating an oncoming recession with the global economic impacts "very significant and sustained".[124] In supporting the nation's economic recovery, the government was looking to the primary sector to "help stimulate and rebuild New Zealand's economy".[125]

The policy considerations were diverse: to enhance the "primary sector's environmental credentials", to increase its resilience, to build a more sustainable operating model, to support implementation of freshwater policy in a way that would also alleviate some of the negative employment impacts of COVID-19, and to be mindful of the *regulatory burden* on the sector.[126] Reform was to proceed but the changes would "significantly reduce the costs of the package" whilst locking in as many environmental benefits as feasible.[127]

5.6.3 Influence of science

Despite some significant criticism of the regulatory impact assessment process, the large number of additions to the regulatory framework demonstrate that the NPS-FM 2020 constituted a relatively substantial policy update. Our collective review of the regulatory impact assessment documents and advice of the STAG found that, in most cases (and even where the science was contested), officials tended to prefer the advice of the STAG. The views of MfE officials and the STAG were generally aligned, and most departures from those views appear to have been brokered in association with MPI officials who had an economic and agricultural policy lens. The case study of DIN in Chapter 6 takes a closer examination of this aspect.

In other areas, however, some important progress was made despite pushbacks from some council and industry groups (see spotlight on the MCI below). Where the costs were negligible, and the measures relatively easy to implement, the pathway was much smoother and the STAG could add considerable value through checks on definitions and methodology.

Raewyn Peart

Tasman River flowing into Lake Pūkaki

Spotlight on the Macroinvertebrate Community Index

Macroinvertebrates are small animals without backbones (such as insects, mussels, snails and worms) which are regarded as a good indicator of water health. The MCI indicates the quality of water by measuring the number of species able to live in it and how tolerant the species present are to pollution. The animals are caught using a net and each species is identified and scored according to its known sensitivity to pollution. Species sensitive to pollution get a higher score, meaning a high MCI indicates a high level of river health.

The measurement and interpretation of the MCI score has been subject to different approaches over the years. As Dr Mike Joy has documented, streams with a score below 100 were originally considered "grossly polluted". But that description was altered in 1998 to "probable moderate pollution" and those *under 80* as "probable severe pollution".[128] By 2007, a score of under 100 had become "fair" and under 80 was considered "poor". This latter score was adopted by the NPS-FM 2014. It specified no MCI attribute, but included a direction that councils respond to MCI scores when they drop below 80 (although exceptions were also provided where the low score was caused by pests or infrastructure).[129] The STAG proposed that the MCI become an attribute in the NPS-FM 2020 with a national bottom line set at 90.

Methodology was also a matter of concern. Councils had adopted their own methodologies for measuring the MCI, and these were variable in quality. Joy documented how one widely adopted methodology, introduced in 2015, effectively raised MCI scores. When used to assess MCI data in streams it found only 15 per cent scored less than 100, when previous methodology set the figure at 50 per cent.[130] When the STAG considered the MCI attribute, readjusting definitions and addressing methodology were central matters of concern.

The vast majority of submitters supported the inclusion of an MCI attribute in the NPS-FM 2020, although some councils and industry bodies opposed the increase in acceptable score from 80 to 90. Dairy NZ argued that the change would have significant implications for a number of sites and that there was no scientific justification for it.[131] In response to submissions, officials asked

the STAG to consider whether the proposed bottom line of 90 was achievable, and "how much more rehabilitation would be required to get to 90 as opposed to 80".[132] The question was considered too difficult to answer, due to variability and on-site factors. The STAG reiterated that "members do not support establishing a management framework that allows communities to maintain a waterbody in a state approaching 'severely degraded'".[133] The regulatory impact assessment notes that the STAG did not support reverting back to a bottom line of 80, which it reiterated was inappropriate.[134]

The fact that councils already did MCI monitoring meant that the cost of implementing this change was not considered significant.[135] Ministry officials also felt that MCI health would be achieved, in any case, through improvements made to sediment and nutrients in other areas including through implementation of the stock exclusion rules and the new system for Freshwater Farm Plans.[136] In consideration of these factors, and that most submitters were supportive as well as the STAG, the incorporation of the MCI attribute at 90 was considered appropriate.

The review of the NPS-FM therefore enabled a review of widely used methodologies and standards. The MCI attribute added to the NOF corrected a number of historical issues, putting it back in line with the more accurate, original approach employed.[137]

5.6.4 Quality assurance

One of the final aspects of the regulatory impact assessment process is quality assurance. All regulatory impact assessments are independently quality assured against the 'Quality Assurance Criteria'. The criteria used to assess the *Action for healthy waterways* package were: [138]

1. effectiveness: the option provides a solution to the problem, how completely the problem has been addressed;

2. timeliness: the option prevents further degradation of freshwater in a timely fashion;

3. fairness: the option treats all stakeholders equitably (eg urban, rural, future and current generations);

4. efficiency: the option is cost effective and achieves the maximum benefits with minimum wasted effort or expense;

5. principles of the Treaty of Waitangi: the option appropriately provides for the principles of the Treaty of Waitangi, it promotes partnership and protects Māori rights/interests and relationships to taonga;

6. Te Mana o te Wai: the option prioritises the well-being of water and ecosystems, promotes values-based holistic management to sustain the well-being of people, and acknowledges mātauranga Māori.

The regulatory impact assessment for the *Action for healthy waterways* package,[139] of which the NPS-FM was only one part, was complex. More than twenty individual documents were produced.[140] A review panel with representatives from Treasury's Regulatory Quality Team, MfE and MPI jointly developed the assessment.

Overall, it was determined that the package "partially" met the quality assurance criteria: of 20 individual reforms considered, 12 met and eight "partially met" the criteria.[141] Because the associated regulatory impact assessment considered the overall package, it is difficult to disentangle the component parts and determine how the NPS-FM component would have scored as a standalone piece of policy work. Nor does the report clearly outline or summarise which aspects met the criteria or fell short; that detail is lost in some 400 pages of data and tables. Any real analysis of how the quality assurance criteria operate in practice, to inform final decision-making, needs to be undertaken at the micro level through examination of how the criteria were applied in relation to a specific aspect of the reforms. Because the most controversial aspect of the proposed NPS-FM 2020 was the DIN attribute, we explore this area in more detail in our case study on the DIN in Chapter 6.

What our examination of the regulatory impact assessment found, however, was that the options scoring most highly in terms of compliance with the criteria set are not always the options selected to progress. It may be that not all criteria are equal. For example, how are decision-makers to weigh an option that represents the best Treaty compliance but is also the most costly? Or weigh effectiveness against fairness concerns? How important is social licence? How do we measure and assess "good policy"? While the regulatory impact assessment was helpful in demonstrating the benefits of reform relative to the status quo, in effect setting out the case for change, officials considered that a lack of clarity remained around which options and alternatives provided the *best response*.

5.6.5 Section 32 analysis

Once the two formal regulatory impact assessment analyses had been undertaken, one further and final cost-benefit analysis took place: the section 32 evaluation under the RMA. While it might be expected that the focus under the RMA would be on sustainability and environmental protection, the cost-benefit evaluation is actually also very economically focused. The section 32 analysis requires a final evaluation of the "appropriateness" of the proposal. Proposals "must" be the "*most* appropriate" way to achieve the purpose of the Act.[142] This requires that "other reasonably practicable options for achieving the objectives" are identified and that the "efficiency" and "effectiveness" of proposals are assessed.[143]

The section 32 evaluation requires that the costs and benefits anticipated *from implementation* must be considered, and the RMA also provides specific direction to consider the opportunities for "economic growth" and employment, as well as the "risk" of acting or not acting where there is uncertainty or insufficient information.[144]

The fifth National government amended the original section 32 in 2013.[145] The explanatory note attached to the amendment bill explains that the aim was to add further requirements "concerning the anticipated economic effects" of proposed standards or regulations "with particular attention being drawn to the opportunity costs for economic growth".[146] Tadaki has argued that the changes were an explicitly ideological move to "privilege economic value as a decision-making criterion".[147]

Engineering and design consultancy Harrison Grierson was contracted to undertake the section 32 evaluation on the *Action for healthy waterways* package. The proposal the firm reviewed was the Ministers' adjusted draft. This means that some of the more controversial and costly aspects, such as the DIN, had already been removed. This made the section 32 evaluation relatively straightforward. In relation to the NPS-FM, the report noted that a significant factor in favour of proceeding arose from the fact that it was not novel: "the proposal works within the existing legislative framework" and simply "makes enhanced regulatory responses" so that "the overall approach is not untested."[148] These comments however, highlight that the regulatory setting under the RMA also operates to foster approaches that are incremental and normative in nature.

5.7 Interviewee responses

In order to obtain a deeper assessment and analysis of the policy outputs, we asked interviewees for their thoughts on where the policy had landed, and what they considered to be its core strengths and weaknesses.

Each interviewee group had quite different concerns which were closely associated with their *role* in the process. In this section we profile the views of STAG members and officials. The views of Te Kāhui Wai Māori members we interviewed have been incorporated into Chapter 7, which takes a deeper dive into the Māori aspects of the policy outputs.

5.7.1 Outputs voice of the STAG

For the STAG, one central and reoccurring theme stood out from all the others: frustration about the omission of DIN and DRP attributes.

> *"It's a positive step but there are some critical omissions – allocation and the DIN. Lack of a DIN is going to delay improvements to freshwater, and improving toxicity limits won't address the problem."*

> *"Nitrates, land use change, the need to drive land use change, those things are still the elephant in the room. We tried. Those conversations aren't going to just go away."*

> *"I think we probably did enough to hold the line, maybe stop things getting worse. But to turn it around, no. Substituting nitrate toxicity for the DIN, that's not going to do much for ecosystem health."*

> *"Most of us were really disappointed the DIN didn't get through. I do think it reflects the value and importance placed on NIWA advice. They are MfE's freshwater CRI [Crown Research Institute]. I think with less dissenting voices the Minister might have felt a bit braver. But who the voices dissenting are also matters."*

Raewyn Peart

Piako River

There was also concern about a lack of input at the end of the process when the policy was refined. It was considered that important detail and nuance had been lost and this could undermine the operation of the policy in practice. In addition, not enough work on the science required for implementation had been done.

> *"The NPS reflects the findings of the STAG pretty well. What was missing was often the commentary, the caveats, the detail, they are the areas that worry me. There were still a lot of things to work through to get it fit for implementation. That's where the hard work is now."*

> *"Changes were made to undermine end settings, like wetlands. We need stronger science inputs at that final step. It's intensely political. There are all the RIAs [regulatory impact assessments], economic analysis, legal analysis – but after the science advice has been input, it gets a bit left out in the cold after that."*

> *"The fact that we put forward 13 recommendations and 11 got through, or at least were incorporated in one way or another into the NPS – only two weren't – shows that the science input really was taken on board and was valued in the process. You have to take the big picture."*

> *"Strengthening Te Mana o te Wai, that was important, a big advance, and I think we made a lot of progress on ecosystem health, fish and plants, [there was] a lot more detail on that front. [There were] some big improvements – but there is still a lot more to do, the DIN, it's not complete."*

> *"I am hopeful there are things that will really cut through – wetlands, fish passage, the stronger focus on Māori values, and the more integrated, holistic approach that offers. There is some real potential to get some real improvements and changes there. We need a new approach."*

> *"Major progress was made, especially if you compare it with previous NPSs. It's a major step towards halting, even reversing, the decline of our waterways."*

> *"Lots of gaps remain, biodiversity is one. We aren't targeting restoration yet. There's an assumption that if we reverse the direction of land use, things will be fine. That could well be a forlorn hope. It's likely we will need to take specific action too. That's still missing."*

Science voices were positive about the addition of new ecosystem health measures like fish passage, the fish index of biotic integrity, submerged plants and the wetlands policy. Progress made by Te Kāhui Wai Māori on Te Mana o te Wai as an overarching principle was noted by many as one of the most positive changes. The synergies between ecology and mātauranga Māori were such that the vision set for the policy was well aligned with the aspirations of scientists. These things were sources of optimism.

It was apparent that STAG members who had been involved in previous policy work on the NPS-FM were more likely to view the outcomes in a positive or pragmatic light (similar to officials). These members had a point of comparison, and perhaps lower expectations of the policy process, and greater awareness of its limitations.

On the issue of nutrients in the NOF, the reviews were very mixed, especially on the DIN around which significant frustration remains. Most troubling was the view of several STAG members, that despite being held out as an 'alternative' to a DIN, the nitrate toxicity attribute was not going to address the main problem which the DIN was designed to fix – which was "*not toxicity*" but rather *eutrophication* – the *process* by which freshwater becomes progressively enriched with nutrients, thus leading to excessive plant growth and low oxygen levels.

A number of STAG members answered questions on the 'overall progress' in more indirect ways:

> *"We need more clarity on the level of confidence. How does the precautionary principle operate? How do we deal with uncertainty? We need that conversation and a clear reasoned approach."*

> *"How can the precautionary approach be quantified so it is applied to policy analysis? How do we deal with uncertainty? That was the biggest barrier to the science, the biggest frustration. The science group needed to have a conversation on what was 'fit for purpose' so we could advise the Minister on that. We needed the level of caution made more consistent."*

> *"A degree of uncertainty wasn't a big deal in some areas but it was a roadblock to the policy machine in others. Things with costs required so much review. The machine pushes back strongly on those."*

We found that most STAG members had reflected on what could have been done differently to improve the outputs. Many were still very mindful of the areas where important detail had been missed, and many remained concerned at the level of certainty required if an issue was controversial:

that it prevented the adoption of a precautionary approach which was vitally important to prevent environmental harm. While the regulatory impact assessment process quantifies costs and benefits, further work was seen as necessary on how the science fitted into those equations and frameworks, how decision-makers should deal with uncertainty and what level of certainty was required. It was acknowledged that the final determination was obviously still a political one. But how you calculate whether something meets the scientific criteria was quantifiable, and more certainty in this area would be highly valuable to lay persons (officials and the Ministers).

These comments align with our own analysis of deficiencies in the regulatory impact assessment process and with current government direction on regulation: that there is inadequate focus and guidance to ensure evidence-informed policy-making occurs in a systematic and robust manner. Neither is there sufficient recognition and prioritisation of environmental (and social) concerns and 'sustainability' in current regulatory direction.

5.7.2 Outputs: the voice of officials

For officials, it was the task of weighing the costs and benefits, resolving contested advice, and dealing with uncertainty and stakeholder conflict (particularly within the timeframes set) that left some unease. Officials were far less likely to openly criticise the final outputs. They tended to back where the policy had landed and also to be more pragmatic in their expectations. It was telling, however, that the most universally criticised aspect was current regulatory policy. We were told that it hindered rather than helped officials deal with these difficult aspects of policy formulation and decision-making. Most people we spoke to considered regulatory policy and the regulatory impact assessment process to be the biggest barriers to good policy.

Millan Ruka

Looking up the Wairua River from Jordan Bridge

"Regulatory impact statements are an ingrained part of the regulatory system. We have to deliver them, they are pretty significant, it means everything is driven by the costs. That's problematic. How do you value the environment properly so it can compete? And everyone's figures are wildly different!"

"Look, with policy it's always a balancing act. Things do tend to be incremental. Bigger shifts take time and we have to consider implementation. How does the system deal with significant change and much bigger shifts? There's a lot of councils. That would need to be a much bigger, longer conversation."

"I know some were disappointed with the outcome. People had high ambitions, but there was a huge amount of work to be done and there's never enough time, you can never do everything. You can only do the best you can. That's the nature of the beast."

"We tried to get consensus. Not everyone agreed with the DIN but we put it forward. The Ministries were painted as pretty far apart, but we were closer than was understood, and had a good relationship. Ultimately the Minister had to make a call and he would be aware of the range of perspectives and who was putting them forward, as were officials. We aren't naïve."

"I think we landed in a good place from a policy perspective. The process reflected the uncertainty and the range of views. In the end that's all we can do, ensure that the options and evidence are put forward."

"To the extent that there might be errors or omissions, and things that we could have done better, there will always be those things when looking back. Some of those things we will be able to manage and address at council level implementation."

"I think we did really well. We made a lot of progress and I am not quite sure people understand just how valuable the STAG's role in that was. We made some significant changes to the way freshwater is managed as a result. Yes it was exhausting, but industry bodies were always going to push back, and we expect that when there are such diverse interests and impacts. You just have to embrace it for what it is."

The tensions and conflicting lenses of MfE and MPI was highlighted by many, and we heard a range of perspectives on how it impacted outcomes. There were both strengths and weaknesses arising from the joint approach.

"MPI and MfE working together did undermine things. It was strange. MPI had little direct role in the policy development and advisory group sphere, but then all our advice had to get signed off by both Directors. MPI was coming from a very different perspective. It was difficult, it could feel like they were working in opposition to us most of the time. Reconciling things at the end was always going to be really hard even though MfE is the one with the regulatory stewardship role."

"In fairness I think MPI's role was even harder. They were pulled in so many directions and had capacity issues. The same team was dealing with climate changes issues. Our focus was much clearer. It's about delivering environmental outcomes, and that's our core business."

"There are big differences between MfE and MPI. But that was purposeful, getting visibility on the contested advice. Other than on the DIN, there was not too much disagreement. We got there on most issues and MPI is changing, sustainability is seen as the future. We are getting closer."

Because of the clear importance and controversy over the DIN attribute, including the complexities of the science and the treatment of the economic concerns within the regulatory impact assessment process, we selected this issue for a more detailed review through a case study of the policy work undertaken on that attribute in Chapter 6.

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140 Ministry for the Environment, 2020c, 5

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6 The story of the DIN

Waimakariri River flowing through the Canterbury Plains

Raewyn Peart

It is not possible to consider, in detail, all new matters proposed for inclusion in the NPS-FM 2020. However, some matters were more complex and controversial than others. As already indicated, Dissolved Inorganic Nitrogen, or 'DIN', was one of the most complex and certainly one of the most hotly contested of the new attributes proposed for the NOF framework. An examination of the proposal, and decision-making process for this attribute, offers insights into the broader policy process and some of the tensions and pressures that had to be navigated.

6.1 Introduction

It is widely acknowledged that three main types of pollutants are driving freshwater quality decline in Aotearoa New Zealand: pathogens (disease causing microorganisms), sediment and nutrients.[1] Two nutrients – nitrogen and phosphorus – are of particular concern.

Nitrate pollution has been an increasing problem in recent decades. The OECD's 2017 environmental performance review highlighted that the nitrogen balance in Aotearoa New Zealand had worsened more than in any other country in the OECD.[2] The report observed that the trend was connected to Aotearoa New Zealand being "unique among OECD member countries in deriving nearly three quarters of its goods export earnings from agriculture, horticulture, viticulture, forestry, fishing and mining". [3] The use of nitrogen fertilisers increased by 75 per cent between 2000 and 2013.[4] Intensification of land use, made possible through increased irrigation and use of fertilisers, had driven sector growth. The dairy industry is our largest export goods sector, accounting for one in every five dollars earnt in trade.[5] The economic importance of the sector to the country makes regulatory interventions that impact the industry politically complex. However, the *Essential freshwater* discussion document did recognise that "it is more cost effective to prevent degradation of waterways, by limiting nutrient pollution, than to attempt restoration after degradation has occurred".[6]

The NPS-FM 2014 had set limits on total nitrogen in lakes (but not in rivers) as well as for nitrate and ammonia toxicity in all freshwater. Because the latter two attributes focused solely on toxicity, and not on maintaining healthy ecosystems, the extent of environmental protection they provided was limited. The interim regulatory impact assessment for the freshwater reform package highlighted the lack of adequate management of nutrients, noting that "between 1998 and 2017, concentrations of nitrate-nitrogen worsened at 54.7 per cent of river monitoring sites."[7] The advice from the STAG was that the attributes and bottom lines in the NSP-FM 2014 were insufficient to protect ecosystem health, particularly in rivers.[8] One aspect of the NPS-FM that Ministry officials therefore wanted to explore was options for improving nutrient management and, in particular, placing stronger controls on nitrogen levels in freshwater.

Raewyn Peart

Dairy farming in the Mackenzie Basin

Spotlight on nitrogen in freshwater bodies

Nitrogen is a nutrient that, in excessive quantities, can lead to accelerated periphyton (slime) growth in lakes and rivers, affecting ecosystem health and people's use and enjoyment of freshwater bodies. Excessive nitrogen can change the way that microbes and invertebrates break down and recycle organic matter (like leaf litter) in rivers and alter ecosystem function. It also has a direct toxic effect on aquatic animals, limiting their growth and even causing death.[9]

Nitrogen is a complex nutrient. It occurs in a number of forms (eg as nitrate or ammonia, which are both nitrogen compounds) and it interacts with a number of other chemicals and elements within the environment. The NPS-FM 2020 regulates nitrogen in a number of ways: directly through limits on total nitrogen, nitrate toxicity and ammonia toxicity; and indirectly through limits set for periphyton growth, fish and macroinvertebrate health which nitrogen levels impact.

Nitrogen interacts with the natural environment in complex ways that can be difficult to measure and address (see Figure 6.1). For example, while riparian strips can assist in taking up some nutrients (like phosphorus), they are much less effective in absorbing nitrogen which is water soluble. This means that nitrate can bypass roots and travel through groundwater directly into waterways.

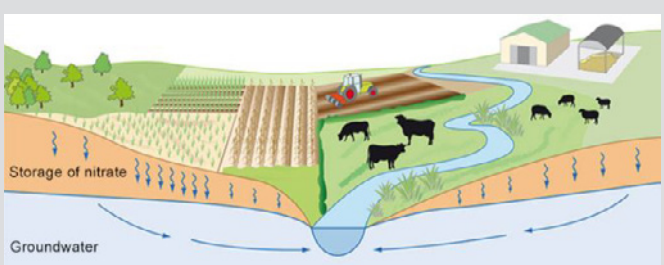

Figure 6.1 How nitrogen enters waterways in rural areas
Source: http://www.purewatergazette.net/blog/nitrates-in-water/

Fertiliser application and stock effluent, particularly from dairy animals, are the greatest sources of nitrate and ammonia in catchments.

DIN includes three different forms of nitrogen: nitrate, nitrite and ammonia, but in waterways DIN is comprised mostly of nitrate.

6.2 Scientific complexity

The discussion document released by MfE for consultation on the *Essential freshwater* programme in September of 2019 acknowledged the complexity of the science around nutrient management. This was because of a range of matters discussed below.

6.2.1 The linkages between nitrogen and periphyton (slime)

Because high nitrogen levels drive periphyton growth, the periphyton and nitrate toxicity attributes are linked. This meant that the existing periphyton attribute in the NPS-FM 2014 was effectively serving as a check on the nitrate levels in *many* rivers. But there was a limitation: periphyton does not grow in soft bottom waterways and these constitute around 27 per cent of the country's rivers and streams. So without further limits, the nitrate controls in these rivers were insufficient.[10]

6.2.2 Nitrate and ammonia toxicity

In soft bottom rivers, the main mechanism for controlling nitrogen levels in the NPS-FM 2014 was through nitrate and ammonia toxicity attributes. Because these attributes focus on setting the upper limit for how toxic a river can be, not on ensuring good water quality or preventing degradation, they are a limited lever for broader ecosystem health and functioning. The national bottom lines for nitrate and ammonia toxicity in the NOF were set at a level sufficient to protect approximately 80 per cent of species, so restrictions were only triggered once more than 20 per cent of a species showed a "reduced risk of survival".

6.2.3 Complex interaction in the environment

As explained in the spotlight above, nitrates are a diffuse form of pollution, leaching into waterways through groundwater. Diffuse pollution is much more difficult to understand and regulate than traditional point source discharges, where the source and amount of discharge is much clearer, and the environmental impacts more immediately detected. Importantly, there is a lag time between nitrogen being released into a catchment and it reaching lakes and rivers. In some systems, this lag time can be up to 50 years.[11] This means that the true impacts of land use change over the past few decades have yet to be seen in terms of degradation of freshwater quality.

Nitrate presence in a catchment will come from a number of sources, which can be complex to identify and so difficult to regulate. The STAG report notes that "there may not always be a direct link and well-defined mechanistic models between nutrients and components of a healthy ecosystem; ecosystems are dominated by indirect relationships". [12]

All these factors make regulatory action problematic. When nitrates come from different sources, and have a cumulative effect, it can be difficult to identify the precise causes of freshwater pollution. In addition, any benefits of stricter regulation on freshwater quality may take decades to become apparent. This means the costs of behaviour change will typically be incurred long before the environmental benefits become apparent.

6.3 Development of policy options

The scientific complexity of nitrates in the environment makes both the understanding of their interactions and the crafting of an effective regulatory response challenging. Similarly, the economic importance of the agricultural sector, and the political complexities this generates, mean that regulatory interventions that impose significant costs require robust justification. This elevates the evidentiary requirement to demonstrate both the need and effectiveness of any policy adopted for the control of nitrate pollution. Together these aspects placed increased demands on the science advice and made the role of the STAG central to the policy development process in this area.

Raewyn Peart

Drainage canal, Hauraki Plains

6.3.1 The initial advice of the STAG

In response to the nutrient issue, the STAG proposed in its first report (2019) that a DIN attribute be added to the NOF at a setting of 1.0 mg/L.[13] This was designed to address the ecosystem effects of nitrates in soft bottom rivers that were not protected by the periphyton attribute. It was not expected that setting such a DIN attribute would impact the management of hard bottom rivers, as meeting the periphyton limit for these rivers would necessitate nitrate levels being kept below 1.0mg/L in any event. Adoption of a DIN limit would also mean that the ammonia and nitrate toxicity attributes, the later set to 6.9 mg/L, could be dropped. If nitrate levels were kept at or below 1.0 mg/L, it was estimated that 99 per cent of species would be protected (in contrast to 80 per cent at current settings).

The STAG noted the complexity of the science on the impact of DIN in waterways but emphasised that ecosystems are inherently complex and relationships often indirect. The group reiterated the need for the freshwater management system to be able to account for and deal with such complexity.[14] The thresholds proposed for the DIN were based on "multiple lines of evidence of multiple ecological responses to nutrients across different trophic levels". It was in line with the global literature on effects of inorganic nitrogen pollution in rivers. In addition, the science underpinning nutrient attributes had been peer reviewed by an independent (Australian based) researcher.[15] The STAG report stated that "almost all members" supported this approach.

6.3.2 Interim regulatory impact assessment

In the interim regulatory impact assessment, MfE concluded that there was "justification for introducing a more stringent bottom line or threshold for DIN compared to the current nitrate toxicity bottom line" and that a DIN would "contribute to improvements in ecosystem health". It would "help maintain fish and invertebrate communities, the structure and function of ecosystems, and their resilience to negative impacts".[16]

However, the assessment also signalled caution: MfE had only just received the finalised advice on the science, and "up until then" there had been "considerable discussion amongst scientists" about DIN settings.[17] Officials were aware, for example, that a DIN attribute had been resisted in previous work on the NPS-FM and was controversial. The assessment noted that the primary economic impact of incorporating the proposed DIN attribute was limited to soft bottom rivers and that, while nationally the economic impact would likely be "small", in some catchments it would drive land use change as it would require over 50 per cent reductions to the current nitrogen load.[18]

The regulatory impact assessment considered what support there was for the STAG's proposed DIN. Both Te Kāhui Wai Māori and the Freshwater Leaders Group supported the STAG's recommendation. However, the Regional Sector Water Subgroup was opposed, arguing that the DIN would come at "considerable cost" and "will not result in better ecological health".[19] It instead recommended that existing nitrate and ammonia toxicity measures be strengthened. The assessment also noted that the STAG's position on the DIN was not unanimous and there had been confusion on the issue in the previous NOF Reference Group.

The interim regulatory impact assessment identified a range of options for comparison:

1. **status quo:** with additional non-regulatory mechanisms;

2. **DIN attribute of 1.0 mg/L** (and also the STAG's recommendation for a DRP): on the basis that, where multiple attributes exist, only the most stringent would be applied (eg if meeting the periphyton limit maintains a lower DIN, that measure would be used);

3. **DIN attribute of 1.0 mg/L with action plan**: DIN's above the bottom line would trigger a requirement to investigate the cause and put in place an action plan to reduce nitrate levels;

Raewyn Peart

Crossing over the Waimakariri River

4. **strengthen nitrate toxicity attribute**: so that more than 80 per cent of species are protected.

It then considered the environmental benefits and economic costs of the options. The effects of each on land use and management practices were considered in detail and this analysis takes up a considerable proportion of the document. The regions most likely to be affected were identified as Canterbury, Waikato and Southland (see Figure 6.2), with localised impacts being detailed. Social impacts, especially on rural communities, were also traversed.

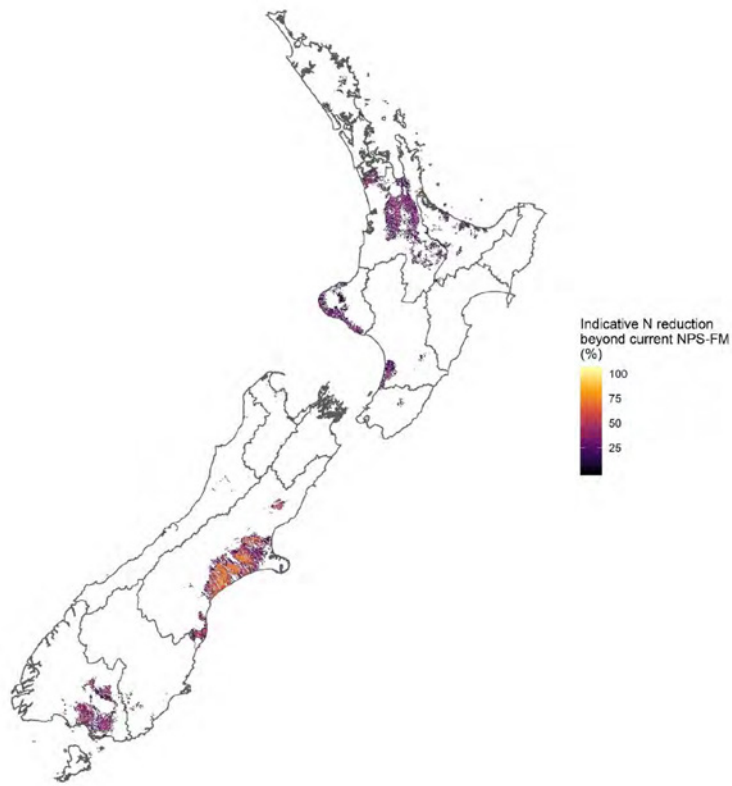

Figure 6.2 Anticipated impacts of proposed new nutrient bottom lines

Source: https://environment.govt.nz/assets/publications/Files/action-for-healthy-waterways.pdf

6.3.3 Preparing the NPS-FM for consultation: Action for healthy waterways discussion document

Economic considerations were clearly looming large when the Ministers for the Environment and Primary Industries finalised the freshwater reform package for Cabinet approval prior to its release for public consultation. A Cabinet paper addressed to the Chair of the Cabinet Business Committee

outlined that "the scale of mitigation and land use change" simply to meet *existing* (NPS-FM 2014) settings, in particular the periphyton attribute (that also managed nitrate in some 70 per cent of rivers), was "significantly greater than previously estimated."[20] This indicated that it was the costs associated with councils catching up with previous standards, where most of the economic impacts lay, and not necessarily with the relatively modest change that would occur with the introduction of a DIN attribute.

The Ministers agreed to include the STAG's DIN proposal in the public discussion paper but they highlighted that further information was needed and, until that material was available, no decisions would be made. Substantial nitrate load reductions would be required in several regions and more information was needed to model the impacts of the proposed nutrient settings. The *Action for healthy waterways* discussion document contained the proviso: "It is important to understand more about the ecological benefits from limiting nutrients, whether it varies by waterbodies, and what impacts the proposed new bottom lines would have on individuals and communities"... "final decisions will not be taken until further analysis has been done."[21]

These comments clearly signal that there were concerns about the potential impacts of DIN attributes and a cautious approach was being adopted.

6.4 Consultation: contested science, contested economic analysis

The extent of disagreement with the approach of the STAG became very apparent in the consultation process. It is useful to summarise the broad perspectives. The Summary of Submissions report associated with the discussion document provides valuable insights into the core arguments and matters under debate.[22]

6.4.1 Support for the DIN

The summary of submissions document shows that "academics", most "science organisations", health providers, Māori and iwi organisations, and environmental NGOs supported the STAG's recommendation of a DIN of 1.0 mg/L.[23] This included organisations like the New Zealand Freshwater Science Society, Scion, the Institute of Environmental Science and Research and the Cawthron Institute. Health providers were strongly in support of the STAG's position, some calling for the measure to be made even more stringent.[24] The Public Health Association expressed concerns about how the various considerations might be weighed, warning against the issue being driven by public acceptance and understanding, without greater public education and awareness of the issues and the science.

Spotlight on the human-health interface

A number of interviewees highlighted the lack of human health expertise on the STAG, and the restricted scope and lack of attention to human health related matters in the development of the NPS-FM 2020.

The core purpose of the RMA is to promote "sustainable management" of natural and physical resources. Section 5 of the Act defines sustainable management as management that enables peoples and communities to provide for their social, economic and cultural well-being "and for their health and safety" while sustaining the potential of those resources to meet the needs of future generations.[25] It is (in part) on this basis that the RMA controls the dumping and storage of waste ("to save or prevent danger to human life")[26] and includes a plethora of provisions regulating the discharge of contaminants.[27]

The NPS-FM 2014 clearly recognised the need to protect freshwater for human health reasons. Te Mana o te Wai sat in prime position within the NPS, as the first objective (AA1), and provided an overarching frame. The NPS-FM explained that upholding Te Mana o te Wai requires providing for te hauora o te tangata (the health of the people), amongst other things.[28] The updated NPS-FM 2020 took this further, setting out the hierarchy of obligations that exists under Te Mana o te Wai. The first priority is the health of water bodies and freshwater ecosystems. The second is the health needs of people ("such as drinking water"). The third, and lowest, priority in the hierarchy is the ability of people and communities to provide for their social, economic and cultural well-being.

Te Mana o te Wai is not the only aspect of the NPS-FM regime to address human health concerns. A second objective in the NPS-FM 2014 (A1(b)) highlighted the need to safeguard "the health of people and communities", although it then restricted its application to health aspects "affected by *contact with freshwater*" thereby excluding drinking water.

"Water supply" is instead dealt with under Appendix 1 to the NPS-FM 2014 as a non-compulsory "national value". It must be considered but sits in a tier of importance down from "compulsory values" (which are ecosystem health, human contact,

threatened species and mahinga kai). It includes the ability of 'freshwater management units' (typically catchment scale areas) to "meet people's potable water needs", and for the "water supply to be safe for drinking with, or in some areas *without*, treatment".[29] This recognises that many rural communities rely largely on unregulated and unmonitored on-farm bores for their drinking water supply. Because drinking water matters are managed at a catchment level, responsibility for this value has largely been delegated to regional authorities.[30]

The scope of work for the NPS-FM 2020 excluded drinking water supply, so the provisions remain largely unchanged.[31] Drinking water considerations were to be addressed through amendments to the National Environmental Standards for Sources of Human Drinking Water. Putting consideration of drinking water supply and safety outside the scope of work reflected the more siloed approach traditionally adopted under the RMA and NPS-FM. However, it is arguably inconsistent with the broader, more integrated, perspective embraced by Te Mana o te Wai.

Even putting drinking water matters aside, it is clear that human health considerations were relevant to a range of matters being examined during the NPS-FM 2020 process. For example, human health for recreation (swimming, boating, fishing etc) is a compulsory value under the NPS-FM 2014 and the *E. coli* attribute serves to protect and support that value. But despite this, no medical or human health expertise was included on the STAG. The omission was noted by a number of interviewees.

In the 2019 STAG report, work on "human pathogens" (as opposed to ecologically relevant indicator bacteria) was identified as a "serious gap".[32] The STAG also highlighted that, although its membership contained a cross section of the science community, it lacked expertise in this important area. The STAG did not therefore feel competent to comment on human health issues.[33]

The STAG also recommended that "urgent work" be undertaken in relation to groundwater contamination:

> *"Groundwater is also highly utilised in ways that affect human health, either directly as drinking water or indirectly through food production"... "development of protective measures for groundwater quality is urgently needed, as demonstrated by the increasing exposure of rural residents in many regions of New Zealand to higher nitrate concentrations and the presence of pathogens in their groundwater drinking supplies. National guidance and direction on limits for groundwater extraction also need to be further developed and implemented."*[34]

Microplastics and chemicals, and their impacts on human (and ecosystem) health, were also outside the scope of the work on the NPS-FM 2020, but were identified by the STAG as matters requiring urgent work alongside the impacts of heavy metals in food production systems.[35] The Soil and Health Association and Physicians and Scientists for Global Responsibility echoed this opinion, noting that consideration of chemical contamination of lakes and rivers had been consistently placed out of scope and their inclusion opposed by primary sector industries.[36]

A number of submissions on the NPS-FM 2020 cite human health considerations as a key omission and defect in the policy document. The summary of submissions noted that "submissions from the general public centred on access to clean drinking water".[37] Many of these specifically raised the links between nitrogen concentration, drinking water contamination and impacts on human health, emphasising the close connections between water quality and health. Chief amongst these concerns was the link between nitrates and colorectal cancer.[38]

Health impacts were also raised by environmental NGOs and healthcare providers. Hawkes Bay District Health Board and the Public Health Association of New Zealand advised that the science on nitrates and cancer was such that "a precautionary approach" was warranted,[39] and that the time lag for nitrate to make its way through the soil into aquifers meant that addressing land use intensification was central. The Public Health Association recommended "an immediate and rapid reduction" of nitrate: to a level of 0.5 mg/L: half that recommended by the STAG.[40]

The above suggests that, had there been better representation and input from health agencies and experts (especially on the STAG), the argument in favour of a DIN attribute would likely have been strengthened. It may even have resulted in a more stringent DIN being proposed. Water New Zealand noted that, once in the water supply, nitrate is incredibly difficult and costly to remove, meaning that nitrate contamination needed to be addressed at source.[41] This *was* therefore something the NPS-FM could help address.

Submissions on these issues were generally considered to be out of scope, caused by "confusion about the role of the Ministry for the Environment, Department of Internal Affairs and the Ministry of Health in setting drinking water standards".[42] Despite being out of scope for submitters, the positive effects to human health were (somewhat oddly) noted within the regulatory impact assessment where the "benefits of setting nutrient bottom lines" were cited as providing positive protective effects to public health from managing excess nitrates in drinking water.[43]

Removal of consideration of human health impacts meant that decision-makers were only seeing part of the picture, thereby skewing the balance when the merits of including a DIN attribute were weighted against potential costs. As the Hawkes Bay District Health Board emphasised, a bottom line for the DIN would "not only reduce impacts on instream values" it also "would help to reduce the risks of nitrate accumulation in ground drinking water sources" when it is clear that some already exceed the maximum allowable value.[44]

Inputs from the Ministry of Health into the NPS-FM 2020 development process remain unclear. A Cabinet paper produced in May 2020 explained that a range of agencies were consulted and views "taken into account where possible", and these included the Ministry of Health.[45] An ESR scientist was called on to give a presentation to the STAG on the science on nitrates in drinking water and Ministry of Health officials came to one meeting to provide context. However, restrictions on the scope for the NPS-FM limited the impact of these inputs. A search of the MfE and Ministry of Health websites located no relevant documents to indicate what direct inputs into the policy process, if any, the Ministry of Health might have had.

A memorandum from Water Taskforce officials indicates that a Ministry of Health taskforce was researching linkages between drinking water and human health impacts and was due to report back in August 2020.[46] That work was not therefore available to inform the NPS-FM 2020 development process.

A subsequent investigation into nitrates in food and water, which examined exposure to nitrate in the Aotearoa New Zealand population and the effects of ingesting it, was published in July 2021. The study was jointly funded by MBIE and Fonterra.[47]

It concluded that nitrate uptake fell within internationally acceptable daily limits and a press release on the report "emphasised that the causal link between nitrates and bowel cancer is unproven."[48] No conflicts of interest were declared in the document. The study raises questions around the role of private sector interests in public good research and whether industry stakeholders have too great an influence in this realm.

Greenpeace has argued that the study is flawed by its "lack of inclusion of data on rural people with private bores" and by focusing on averages that mask differing regional exposure rates. It sees the study as an attempt by industry to bury the cancer risk.[49] Greenpeace's own testing of nitrate samples found that two-thirds of rural bores tested had nitrate levels above the cancer risk limit. Five per cent of samples exceeded the current drinking water standard of 11.3 mg/L.[50]

Submissions from iwi emphasised the need to restore catchments impacted by nitrogen, prioritise science and environmental capacity, and seek broader land use change – to move away from approaches that support intensive agricultural activities.[51] Like health providers, iwi groups frequently stressed the need to go further.[52] Many submitters referenced Te Mana o te Wai, and its clear direction to prioritise the mauri of the water, to ensure the environment was put *first* "when considering nutrient pollution" in accordance with this central underpinning framework.[53]

This indicates that Te Mana o te Wai, which had already been incorporated into the NPS-FM, was being used as a lever to help ensure environmental bottom lines and ecosystem health were prioritised, and not discounted against powerful economic drivers and concerns.

There was also significant public support for the DIN in the form of 10,700 form submissions from Greenpeace, Fish & Game and Forest and Bird supporting the STAG's recommendation.[54] Collectively, 85 per cent of submissions received supported the adoption of the DIN attribute.

6.4.2 Opposition to the DIN

Those bodies opposed to inclusion of the DIN attribute included most councils, Local Government New Zealand, "agricultural sector individuals and organisations", and NIWA.[55] Opposition to the DIN was also supported by 600 form submissions from DairyNZ, Horticulture NZ and Beef &

Lamb. The submissions opposing the DIN tended to be more substantive than those supporting it, since they were mounting an argument against the DIN proposal and its foundations, variously challenging the science and the economic analysis of the Ministry. While the overall number of submissions opposing the DIN were smaller than those supporting it, they represented 70 per cent of the substantive submissions, and included a range of economically important industry bodies. One of the most prominent industry stakeholders engaging in the freshwater reform process was DairyNZ, which was influential by virtue of its financial interests and contribution to the economy.

Spotlight on pro forma or 'form submissions'

In Aotearoa New Zealand, it is common for advocacy groups to offer their members and supporters pre-filled out submission forms that may simply be copied and emailed in. Some issues have attracted tens of thousands of such forms.[56] Form submissions are one way that interest groups mobilise their support base. They make the submissions process much simpler, by avoiding the need to write a substantial submission, and so enable a much larger number of people to have their voice heard. However, a downside to such submissions is that, while they may serve to demonstrate how widespread the social licence for reform is, their actual impact on decision-making is unclear. Because they are not substantive, it seems likely these types of submissions carry far less weight.

Public consultation is an important aspect of any policy-making process. However, how public submissions are valued and weighed against those from the regulated community remains unclear. Legal commentators have frequently noted that decision-making processes frequently fail to live up to their democratic ideals of inclusiveness and responsiveness to the electorate. Too often, public consultation becomes tokenistic, a mechanistic process that must be undertaken but which has little influence on the final outcome (which is more influenced by economic factors).

A salient example is the review of the Layer Hen Code of Welfare. Despite over 100,000 submissions supporting a ban on caged hens, and public opinion surveys consistently reflecting over 80 per cent public opposition to the practice, the review failed to progress such a ban.[57]

In relation to the DIN attribute, 10,700 form submissions from Greenpeace, Fish & Game and Forest and Bird supporting the STAG's recommendation were lodged. In contrast, around 600 form submissions from DairyNZ, Horticulture NZ and Beef & Lamb opposed the recommendation. Of the more substantive submissions expressing an opinion on the DIN or DRP, around 70 per cent opposed its inclusion in the NOF.[58]

It is unclear what officials are to do in such situations: should more significance be given to substantive submissions, 70 per cent of which opposed the DIN? And how much weight should be given to the over 85 per cent of total submissions that supported the proposed DIN?

Different approaches to counting and weighing, and to clustering submissions, will deliver different outcomes, making different submissions more or less influential. "Whose input counts is tightly intertwined with *how* input is counted".[59]

Research undertaken by Jollymore et al, of freshwater reform processes in the Canadian context, provides insights into the power relations implicit within public policy-making.[60] They argue that in a participatory democracy it is important to be attentive to the different policy outcomes for different groups by asking, for example, whether outcomes address or reinforce existing inequalities. In particular, they were concerned to examine the influence of the 'economic elite' on public policy-making.

One American study, a quantitative analysis of 1,779 public policy issues consulted on, found that "when the preferences of economic elites... and organised interest groups are controlled for, the preferences of the average American appear to have only a miniscule, near zero statistically non-significant impact on public policy".[61] This aligns with a larger number of studies demonstrating bias in the policy-making system that privileges the influence of the economic elite.[62]

The summary of submissions on the NPS-FM provides a detailed breakdown by category: environmental groups, agricultural and industry based organisations, academics and research groups, health sector, Crown Research Institutes, councils/local authorities, infrastructure operators and iwi/hapū. What is less clear, and often lost within these framings, is the public voice and identification and discussion of the public good or public interest.

There are a few places where the summary of submissions does highlight the feedback of "individual submitters" as a category. One of these was in relation to wetlands protection, where "individual submitters tend to support the proposals, but many are concerned they are not strong enough".[63]

In practical terms, the amorphous 'public at large' is far more difficult to engage in the policy process, without national campaign style initiatives being run. Invariably submissions are drawn from interest groups. However, obtaining a true picture of public opinion is vital to ensuring that true social licence for reform exists and that powerful interest groups do not effectively capture public policy.

Raewyn Peart

Glendhu Bay, Lake Wānaka

6.5 The role and input of DairyNZ

Dairy NZ opposed the DIN on the grounds that it disagreed with both the science and the economic analysis undertaken as part of the regulatory impact assessment process.

6.5.1 Industry claim of 'best science'

DairyNZ disagreed with the scientific analysis in several areas and, in particular, claimed that the science on nitrogen was not rigorous. Its own technical analysis was set out across three appendices to its submission (which contained over 120 pages of technical commentary on the *Essential freshwater* proposals).[64] DairyNZ also drafted its own set of alternative recommendations in response, which it argued were "designed to ensure that any new attributes incorporate the best available scientific data and will deliver measurable and sustainable improvements to ecosystem health."[65]

6.5.2 Industry claim of best economic analysis

Dairy NZ also argued that the *Essential freshwater* package was not underpinned by a comprehensive economic assessment. It engaged technical experts and commissioned its own reports, including an economic analysis, to assist to "plug this analytical gap".[66] Three economic impact reports were attached to its submission. These cast the broader package of reforms (including the NPS-FM) as "one of the largest economic challenges that the dairy sector has faced in over a generation."[67]

DairyNZ's alternative proposal was to abandon the proposed DIN and DRP attributes, and instead adjust the nitrate and ammonia toxicity settings to a level that would protect 90 per cent of species (up from 80 per cent in the NPS-FM 2014). [68]

6.5.3 Industry leverage

In addition to the formalised consultation process and public submissions, Water Taskforce officials and the Ministers met directly with industry groups behind the scenes and engaged with them to address the concerns being raised.[69] As already indicated, Ministry officials were meeting with industry bodies throughout the policy process as a matter of course, in order to 'sense check' ideas on the *Essential freshwater* reforms.[70]

Ministry officials attended meetings with groups such as DairyNZ, Federated Farmers, Beef and Lamb and Horticulture New Zealand and worked with a range of sector groups to obtain the data and information necessary to inform policy work and produce the required economic impact analysis. Industry claims that the economic modelling of the Ministry was flawed had some credence. The final regulatory impact assessment for the NPS-FM 2020 records that information was sought on the extent of current practices, and the associated profitability of different farming practices, but that officials were "unable to access more up to date and comprehensive e-data sets held by industry bodies".[71] This operated as a "limiting factor on the economic assessment".[72]

The final regulatory impact assessment also notes that inaccessibility to industry data to inform environmental and economic impact analysis is not an "uncommon" problem and often operates as a constraint undermining the robustness of the work.[73] Criticism of the Ministry's economic analysis led to closer talks with DairyNZ over the modelling work. In November 2019, Ministry Taskforce officials advised Ministers that they were talking with DairyNZ about issues with the Ministry's analysis. They reported that, although they had issues with "a number of assumptions" underpinning the DairyNZ analysis, they considered that "working with DairyNZ" would usefully allow the analysis to be enhanced and tested to "improve the usefulness of the analysis for ministerial decision making."[74]

The controversial leaked emails between officials and industry bodies, which claimed to be 'writing policy' (discussed in chapter 3), is important to note in this context because they included graphs of 'nitrogen surplus' that appear to have originated from DairyNZ.[75] It also became evident that a Ministry official had emailed a policy advisor at DairyNZ, outlining a different idea for addressing nitrogen through a "nitrogen surplus system", and advising that officials were "keen to have sector organisation help with drafting the scope of work for this analysis."[76] The documents sent to industry already had the DIN and DRP removed.[77]

The use of data, whose data would be used, and what assumptions it would be based on became a central point of tension in the policy work on nitrate. Such tension undermined the STAG's work and caused a degree of conflict between MfE officials, who opposed the use of DairyNZ's modelling, and MPI officials, who supported it.[78] While MfE found the modelling useful, it considered it to be only one piece of modelling from amongst many provided by submitters.[79]

This all highlights the increased influence that entities can have when they hold data not easily accessible to others. In response to DairyNZ claims over the modelling, freshwater ecologist and STAG member Dr Mike Joy gathered data from all Landcorp dairy farms on the same measures and plotted the data himself, with very different findings to those presented by Dairy NZ.[80] He concluded that DairyNZ's science was selective and was used to push for measures that suited the sector's pecuniary interests. The data shown seemed to "be selected for fitting the line rather than reflecting reality".[81] Joy considers that incidents like this reflect a degree of capture of Ministry staff by vested interests. At the very least, it emphasises the need for sufficient independent checks and reviews of information provided by vested interests.

A number of commentators have been critical of the influence of industry stakeholders over policy. Bailey et al concluded from their research into policy development processes in Aotearoa New Zealand that "the contemporary outcome of historical processes ... has been a normative and cognitive environment in which particular agricultural concerns continue to exert a strong influence on policy". They also highlighted the difficulties that exist in challenging embedded ideas that operate to entrench exceptionalism for incumbent industries.[82] In speaking to the freshwater context and former work of the LAWF, Dr Ann Brower argues that "no matter how well intentioned the government officials, well trained the scientists, and altruistic the collaborative constituents, the logic of collective action predicts that the vested resource development interest will usually emerge as the winner".[83]

6.6 The role and input of Local Government New Zealand

Another significant group opposed to the incorporation of the DIN was regional councils and local government more broadly: the agencies charged with implementing the NPS-FM. It is important to note the complexity of the regional council sector; its positioning is influenced by a diverse range of pressures, including stakeholder pressure (particularly in rural regions), practical complexities and costs associated with implementation, and council placed-based science advisors. Centralised national bottom lines tend to remove much of the flexibility and bespoke policy work that councils undertake based on local conditions and circumstances.

Throughout the policy process, there was an inherent tension between using national direction as opposed to locally crafted responses to address freshwater quality issues, with councils generally preferring to take a lead. In part, the disagreement on the science at the council interface was about whether natural variations in nutrient levels should be managed through an exemption for naturally occurring processes, or by more bespoke, council set measures tailored to catchment conditions.

Calls for better or more thorough evidence also came from this sector.[84] It argued that, because there was no guarantee that DIN and DRP would "improve ecosystem health in *all cases",* there was insufficient certainty given the costs involved. [85] Councils' emphasis on much higher levels of certainty than other submitters, reflects the fact that councils (by virtue of being accountable to their electorates) are acutely aware of the need to show tangible gains, in order to justify the increased compliance costs that would be placed on landowners. However, science can struggle to provide such certainty, particularly when dealing with complex natural systems and when there are long lag times between such things as reducing nitrate inputs and improvement in freshwater quality.

Several council submissions disputed that there was a correlation between nutrient concentration and other indicators of stream health, including macro-invertebrate health.[86] They cited swift moving streams and volcanic soils naturally high in phosphorus as examples. Local Government New Zealand provided several regional case studies to demonstrate the varied response to DIN and DRP.

The regional council sector recommended abandoning a DIN attribute in lieu of strengthening the nitrate and ammonia toxicity attribute settings to a level that would protect 90 per cent of species (up from 80 per cent in the NPS-FM 2014). The LGNZ submission opposed a prescriptive approach that might limit council's response. It was critical of the science behind the proposed DIN attribute, citing local variations, and highlighted the cost implications for territorial authorities and local communities.[87]

Spotlight on the interface with local government

Councils are a principal point of contact for industry stakeholders. Because regional councils implement environmental regulations, operating as the effective 'regulator' on the ground, agricultural sector actors have a high degree of interaction with them. When issues or problems arise in relation to a regulatory response, councils are one of the first to hear of industry concerns.

Those investigating conflict and power dynamics at this interface note that stakeholders and councils are 'mutually dependent' upon each other in many ways. Councils frequently require data and information only held by industry stakeholders. However, industry in turn, may hesitate to share data out of a fear for how it might be used.[88] Access to information can also be used by stakeholders as a lever to secure increased representation and collaborative decision-making arrangements, or to contest information and reopen policy negotiations.

Turner et al has documented the difficult position of regional councils, sitting at the policy-implementation interface, where they are forced "to mediate tension between national policies and the agricultural sector regarding environmental issues".[89]

Councils have enhanced understanding of practical and implementation barriers and they develop close relationships and connectivity with stakeholder groups in their role as a representative of rural communities in their region. Councils frequently raise industry concerns in national conversations, and view themselves as the intermediary between industry and national government, and between policy and implementation.

Turner et al's research examined industry responses to nutrient management and found that industry organisations mobilised their resources to stage conflicts with the environmental regulator (regional councils) to influence the use of industry science data and the timing of regulation. The study highlights that the way resources and power are mobilised in this context serves to "hide conflicts of interest and thus maintain existing power relations."[90] It also highlights the need to address issues such as data ownership.

6.7 The position of NIWA

The summary of submissions places NIWA alongside industry and councils in not supporting the proposed DIN attribute. However, a more detailed examination of its submission reveals different reasoning behind its opposition.

NIWA was concerned that there was insufficient data and detail to ensure that the DIN would work in practice. In particular, NIWA scientists wanted more time to develop the methodology and modelling required to better

understand the relationship between DIN and other attributes, particularly MCI, but also others such as dissolved oxygen, flow conditions and sediment.[91] They concurred with the view, set out by Ministry taskforce officials in the discussion document, that it was important to understand more about the ecological benefits of limiting nutrients and the variability in such impacts, and that a final decision should not be made until the results of that work were available.[92] They were also concerned that the DIN might be superfluous in many instances, and that compliance with all the other attributes might provide sufficient protection for water quality. In line with that argument, NIWA proposed that if DIN was made an attribute, it should only be compulsory if other target ecosystem health attributes were *not* being met. If all other important indicators were healthy then a limit on nitrate was not necessary.[93]

The position of NIWA is of interest because, in the broader context, it appears out of step with the positioning of the other science and academic submissions. However, there are a number of points of difference that may explain this seeming incongruence: the role and context of NIWA was distinct amongst the science community. First, NIWA had been involved in previous freshwater planning processes. As a result, NIWA scientists were aware of previous work and concerns about the science on the DIN. Secondly, NIWA had a close working relationship with the Ministry. Its scientists had undertaken independent environmental modelling for MfE in order to establish the level of nutrient reduction required to comply with the existing NPS-FM 2014, such as meeting bottom lines for periphyton, total lake nitrogen and nitrate toxicity. This meant that NIWA had been working on the science for implementation, *a matter outside the scope of the STAG*. Third, NIWA plays a core role in advising the government and it frequently assists councils with freshwater implementation guidance. Lastly, NIWA also operates as a consulting company for many industry groups, increasing its understanding of industry interests and concerns. These factors collectively provide NIWA scientists with practical insights of how feasible – and acceptable – policy is likely to be in practice. This may have contributed to NIWA's more conservative approach and likely gave its views additional weight.

Raewyn Peart

Dairy herd on the Hauraki Plains

The position of NIWA was that more research was required and a decision should be delayed until further work was undertaken. If the DIN was progressed it should be used as a backstop and not be applied where all other important ecosystem health measures were being attained. It supported an increase to ammonia and nitrate toxicity attributes to provide 90 per cent species protection.

Spotlight on Crown Research Institutes and provision of science advice

NIWA is a Crown Research Institute that provides atmospheric, freshwater and marine research and associated services. Crown Research Institutes are owned by the Crown (with the shares held by two Ministers) and operate in accordance with the Crown Research Institutes Act 1992. The core purpose of Crown Research Institutes is "to undertake research" and section 5 of the Act sets out the principles of operation. These are to conduct research "for the benefit of New Zealand", to "pursue excellence", to comply with applicable ethical standards, to promote and facilitate the application of research results and technological developments, to be a "good employer" and to exhibit "a sense of social responsibility" by having regard to the "interests of the community in which it operates". Section 5 also provides direction as to financial operation, requiring Crown Research Institutes to maintain "financial viability" and be fiscally responsible. Financial viability is determined on a number of bases, including provision of "an adequate rate of return on shareholders' funds" and operating as a "successful ongoing concern."[94] Crown Research Institutes are therefore science research *businesses*. Each is governed by a Board of Directors appointed by the shareholding Ministers.

Each Crown Research Institute operates under a statement of shareholder expectations, which sets out a core purpose, expected outcomes, scope of operation and operating principles. NIWA's core purpose is stated as being "to enhance the economic value and sustainable management of New Zealand's aquatic resources and environments, to provide understanding of climate and the atmosphere and increase resilience to weather and climate hazards to improve safety and wellbeing of New Zealanders." The expected outcomes include statements such as "increase economic growth", "grow renewable energy production", "increase resilience" and "enhance stewardship". As a Crown Research Institute, NIWA is expected to "to develop strong, long-term partnerships with key stakeholders, including industry, government and Māori and work with them to set research priorities that are well linked to the needs and potential of its end users".[95]

All Crown Research Institutes are therefore expected to have close links with industry groups, and to work in collaboration with them, including for economic-focused purposes. This is reflected in their governance, where directors may have close industry ties, or even be selected for connection and experience working for bodies like DairyNZ or Fonterra.

The commercial role of Crown Research Institutes and the requirement for them to return a profit (and so maintain good relationships with clients), when set alongside their public service consultancy functions, creates additional pressures. What is seldom discussed is how the interface between those more commercially-driven purposes, and the provision of public good science, should be managed. While there may be a range of synergies between economic growth and the public good, there are also a range of competing interests operating at this interface.

In 2020, the New Zealand Association of Scientists put out a paper: *Renewing the Aotearoa New Zealand science system,* calling for a review and renewal of approach.[96] The paper highlighted that a recent review of Crown Research Institutes, culminating in the *Te pae kahurangi* report, found them "to be overly business-orientated at the cost of some of the driving motivations for their existence".[97]

The New Zealand Public Service Association's briefing to the incoming Minister for Science, cited the same report, advising that "Researchers in CRIs have come under increasing pressure from their institutions and under commercial pressures to abandon their important role in speaking out on issues of public concern. This damages the quality of the public debate, the regard given to quality research, and the morale of researchers".[98] The Association recommended that the Crown Research Institutes Act be amended to ensure that scientists working at Crown Research Institutes have similar rights of academic freedom as those located within tertiary institutions.[99]

The Association of Scientists paper noted that the country faces a range of environmental problems, from climate change to increased pressure on land, marine and freshwater resources, and it questioned whether the science and research sector is "fit for purpose" to address these.[100] It expressed concern at science funding being largely undertaken through MBIE, which it called the government's economic development agency.[101] It also asked what might have been lost in making "the connection between economic growth and science the singular pillar of our science system?"

A number of STAG members (around half) criticised these economic focused settings and their potential influence on policy advice. They thought that concern to maintain industry relationships and funding fosters conservatism in the sector. Many perceived the more cautious approach of NIWA scientists to the DIN as an example of this. While there is no suggestion of undue industry influence on NIWA during the freshwater policy process for the NPS-FM, it was clear that the broader tensions operating at this interface contributed to perceptions of bias and undermined trust.

NIWA scientists highlighted to us that they were not the only STAG members who considered the science on the proposed DIN insufficiently resolved. Collectively five STAG members adopted this position. They also noted that many agencies and institutions have similar collaborative and funding associations with industry stakeholders. For them, this is simply a 'fact of life' and the environment in which most scientists operate. It is the 'system at work' and they found many positives as a result of this connectivity. It was also noted that other STAG members drawn from Crown Research Institutes (eg Landcare) had supported the DIN.

This issue is a complex and sensitive one, and likely highlights not only the risk of perceived bias arising from the Crown Research Institutes model, but issues around how conflicts of interest are dealt with more generally.

Because policy development in Aotearoa New Zealand relies heavily on the science support provided by Crown Research Institutes, it is important to critically consider this mode of delivery for science advice. Even if adequate conflict of interest arrangements exist, close relationships with stakeholder groups can undermine public trust, and raise concerns around the expanded potential for bias. This is an issue which will be explored in more depth in Chapter 8 on 'science supports'.

6.8 The view of the Independent Advisory Panel

As part of the regulatory process for developing and revising the NPS-FM under the RMA, the Minister established an Independent Advisory Panel to consider submissions and prepare a report with recommendations. The position and advice of the Panel is therefore also important to consider.

The Independent Advisory Panel was comprised of a relatively small group of five members, four of which (including a freshwater scientist) had extensive practical experience of RMA planning and decision-making processes. The fifth member was a trained agricultural economist and farmer. This background meant that Panel members had unique insights into practical implementation, and the types of concerns, risks and competing interests faced by councils.

The Panel found debate on the science difficult to address. It noted that "many submissions challenged the science underpinning the proposed national bottom lines for DIN and DRP, based on lack of correlation of these attributes with ecosystem health measures".[102] The Panel understood that the STAG had been asked to provide an additional report setting out its thinking in more detail, but the Panel did not yet have access to it.[103] So the Panel brought in a STAG representative to provide further advice which reiterated that, although the links and interactions between different attributes were complex, the proposed limits for nitrogen and phosphorus constituted "a conservative approach" to reducing nutrient losses across the country.[104]

It was at this point in the policy process that the degree of dissent within the STAG over the DIN attribute appears to have become more apparent, with additional members voicing their view that the science remained inadequate (this is discussed in more detail below). The Panel noted in its February 2020 report that it had been "advised that there was not unanimous support from STAG members to the DIN and DRP proposals".[105]

With a number of submissions contesting the science, a degree of dissent evident within the STAG and no access to the STAG's more detailed reasoning, the Panel looked to other sources for further information. These included the preferred approach of the NOF Reference Group in the previous workstreams, and the more detailed analysis and options set out by Local Government New Zealand and NIWA in their submissions. The Panel also considered the approach of the Environment Court on the science.[106]

Unsurprisingly, given the background of its members, the Panel paid particular attention to practical considerations. Many of the Panel's recommendations for changes to the NPS-FM involved the inclusion of

modifiers to standards; additions such as "where practical" and "as soon as reasonably practical". The Panel frequently found that proposed provisions were too "prescriptive" and "impractical".[107] It expressed concern at the practicalities of the monitoring requirements, the feasibility of proposed measures (including costs of sampling), the reasonableness of timeframes, and the legal uncertainty of the terminology employed.[108]

The Panel also considered the economic implications raised by submitters. Noting natural variability of nitrogen and the "significant socio-economic costs" that would be incurred by including a DIN attribute, and given the uncertain science but significant costs, it formed the view that the DIN would be an 'inefficient regulatory solution'.[109] Instead, the Panel looked to locate a middle ground.

The position of the Independent Advisory Panel was that the DIN should be an *action plan attribute.* This would allow councils the flexibility to consider catchment and water body variation.[110]Alternatively, it recommended that, if the DIN was retained as a target setting attribute, then the approach of NIWA should be adopted: that the DIN only apply if other ecosystem health attributes states were not being met.[111] It supported the call from Local Government New Zealand and NIWA for ammonia and nitrate toxicity to be set to provide protection for 90 per cent of species.

Note on science for implementation

It is worth remembering that, in terms of its science advice for policy, the STAG had been directed *not* to consider implementation. This likely reduced the extent to which the science advice was 'fit for policy'. But crucially, by instructing the STAG not to consider implementation, but then applying a critical implementation lens to that advice through the Independent Advisory Panel, the STAG's advice was already put on a back foot. It created practical gaps and technical issues, which in turn provided space for contesting the adequacy of the science, and consequently the policy proposals based upon it. In effect, the direction to ignore implementation which was designed to strengthen the science advice, may have had the unintended consequence of weakening its influence over policy.

6.9 Formulation of officials' advice for policy on the DIN

The second more detailed regulatory impact assessment for the proposed NPS-FM was produced in May 2020, ahead of final decision-making.

6.9.1 Assessment of costs of nitrogen measures

MfE's assessment of costs and benefits, contained in the final regulatory impact assessment, tested a number of options against a modified status quo. The three main options assessed were: a DIN of 1.0 mg/L, a DIN as an action plan (as recommended by the Independent Advisory Panel), and no DIN but adjustment to the nitrate and ammonia toxicity attributes to the higher 95 per cent species protection rate. Each option was assessed against six factors: effectiveness, timeliness (of getting it into place and obtaining results), fairness (eg treating stakeholders equally), efficiency and support for Treaty principles and Te Mana o te Wai, in order to calculate an overall score.[112] Figure 6.3 summarises the findings in the regulatory impact assessment.

	Option 1: Enhanced status quo	Option 2: Limit setting DIN	Option 3: Action plan DIN	Option 4: Strengthen toxicity attributes
Effectiveness	+	+++	+	++
Timeliness	-	+	++	++
Fairness	++	+	++	+
Efficiency	--	+	+/-	0
Treaty principles	0	++	+	+
Te Mana o te Wai	0	+++	+	++
Total	**0**	**++**	**+**	**++**

Figure 6.3 Summary of the findings of the regulatory impact assessment on the inclusion of a DIN attribute

The regulatory impact assessment noted that although options 2 and 4 both delivered "overall significant improvement on the status quo", option 2 came with associated "very high scores". Importantly, the DIN option stood out for its increased ability to deliver in relation to Treaty considerations and Te Mana o te Wai. This was in line with submissions by iwi who were supportive of the approach. It also delivered better on effectiveness than any other option.

The regulatory impact assessment notes that a recent review of global nutrient criteria found the STAG's recommendation to be more stringent than overseas criteria for nitrogen, but also noted that "many Australian and New Zealand states and regions have already set criteria which are more stringent" with "several EU countries and US states also having set more stringent criteria."[113]

6.9.2 Sectoral impacts and costs associated with nitrogen measures

Because the changes to the NPS-FM were undertaken alongside other freshwater reforms, and the regulatory impact assessment considered the 'package' as a whole, it was often difficult to determine the specific effects of the NPS-FM apart from these other reforms. A significant amount of the costs generated by the *Actions for Waterways* reforms related to non NPS-FM aspects, such as new stock exclusion regulations and the development of freshwater farm plans. The total reduction in farm profits from the broader freshwater package were put at $113 million per annum at the point when full compliance occurred.[114] Over a third of this, around $40 million, was to be incurred in the Canterbury region. Significant costs in other regions were: $18m in Otago, $13m in Southland and $11m in Waikato. What is harder to determine is the particular contribution of the NPS-FM to these costs.

The final regulatory impact assessment did highlight that there were three parts of the package that would incur the most significant costs: stock exclusion, farm plans, and nitrogen associated measures.[115] This makes it clear that the DIN, as well as ammonia and nitrate toxicity attributes, were the primary source of increased costs associated with the NPS-FM and therefore the most controversial part of that work.

In terms of the impact on land use, MfE modelling indicated that a DIN of 1.0 mg/L would require a reduction in nitrogen loads of 10.2 per cent across the country. In contrast, a nitrate toxicity of 2.4 mg/L would require a 7.7 per cent reduction.[116] In both cases, the most noticeable impacts would occur in Canterbury and Waikato. It was estimated that the impact on profits for the dairy and sheep and beef industries, if the DIN were adopted, would be 5.3 and 0.1 per cent respectively. If no DIN was put in place, and nitrate toxicity was instead adjusted to 95 per cent, the impact on profits was reduced to 0.2 and 0 per cent respectively.[117]

The costs of the DIN were expected to be $294 million per annum up to 2050, in contrast to $30 million for relying on an improved nitrate toxicity attribute.[118] But there was an additional complexity: many councils had not yet implemented the nitrogen requirements under the NPS-FM 2014. The costs of meeting those nitrogen reductions alone was estimated at $395 million per annum to 2050. The regulatory impact assessment notes that this meant the costs of meeting the proposed DIN were less than the costs of complying with existing requirements. What this demonstrates is the unfortunate knock-on impacts of delays in implementing policy, which then add to the overall assessment of cumulative costs of successive reform. Achieving compliance with the pre-existing NPS-FM was estimated to cause a 8.9 per cent reduction in profits for Canterbury and 400,000 hectares of land use change.[119]

6.10 Formulation of advice from the Ministries and Water Taskforce

The formulation of advice based upon multiple inputs, and the task of balancing a range of competing interests, is a complex process. It is even more so when there is a high degree of contested information and conflicting advice. Adding to that complexity in the case of the NPS-FM 2020 was the fact that the policy work, while technically being managed by MfE, was being formulated jointly with MPI officials and required sign off from both Ministers. It is at this point in the policy process that dissent between the two ministries is most apparent. While they managed to get agreement on most issues, MfE and MPI had very different opinions on how to deal with nutrients, and on whether the DIN should proceed: with MfE supportive and MPI opposed.

Raewyn Peart

Kawerau River

6.10.1 Further inputs from the STAG

The STAG continued to meet throughout the consultation period and continued to operate as a source of advice to officials. Officials asked the STAG to provide more detail across a range of issues, including the scientific rationale for thresholds on the DIN. The STAG was asked for perspectives on "the technical feasibility" of different policy options, highlighting that issues over science for implementation were emerging as a barrier to decision-making.[120]

Discussion about the DIN was also creating tension within the STAG. While the STAG had been broadly supportive of a DIN in its first report, by the time of the second report (in April 2020), a more significant split had emerged.

A majority of the STAG advised that:

> *"The bottom lines and thresholds for DIN and DRP for rivers are scientifically rigorous, well explained and well justified, have been discussed at length by the STAG and peer reviewed independently by Professor David Hamilton who generally supported the approach adopted."*[121]

A minority of the STAG dissented:

> *"The evidence provided to establish nationally applicable bands and bottom lines is insufficient to provide confidence that a given DIN or DRP concentration will achieve the desired improvement in ecosystem health" … "There are concerns about the reliability and effectiveness of nationally-applied nutrient criteria in managing for ecosystem health, given they have been derived from weak relationships that vary spatially."*[122]

The majority also warned against the alternative option of altering the nitrogen toxicity attribute from 6.9 to 2.4 mg/L as a substitute, stating that: "We are very uncomfortable with the use of nitrate toxicity data (which is poor for New Zealand ecosystems and does not yield a relatable phosphate limit), as a basis for nutrient limits. As we understand it, this would make New Zealand the only country to try to manage the effects of nutrients on ecosystem health based on nitrate toxicity."[123]

6.10.2 The 'DIN disagreement'

STAG members' accounts of the decision-making on the DIN, and the nature of the disagreement and how it arose, varied significantly. The different narratives were complex to unravel or reconcile.

A number of STAG members spoke of their exasperation and surprise at the "altered position" of many of the scientists in the minority group. They said that there had formerly been only one dissenting member but this suddenly increased to five at the final stage.

> *"There wasn't disagreement on the day, in the room; the disagreement happened afterwards… when the scientists went back to their organisations."*[124]

> *"The penultimate version of the STAG report was the first time I saw that we had five dissenters, that was a red flag which I thought we had sorted out."*

> *"Initially we just had one person not supportive of the DIN, and theirs was almost a philosophical position to setting it on a national basis, but by the end surprisingly more climbed on board. The dissent came so near the end there wasn't time to respond and rebut criticisms. I'm not sure why it turned out that way, that concerns weren't voiced earlier. Then there was no time. It felt like a bit of an ambush."*

> *"I felt that we had discussed and resolved this issue in the meetings, then it popped up as a caveat to our recommendations just before the STAG report was finalised… we were all concerned it would significantly weaken the policy package I thought we agreed on – and it did."*

The dissenting scientists strongly contest this narrative.

> *"The lack of consensus on the DIN went back almost a year before the final STAG report. The Chair had been trying to get further clarity on the divisions of opinion that were apparent, particularly with the weight of evidence approach to the DIN attribute."*

> *"Some of us had reservations… we outlined those concerns back in June 2019 [the time of the first report] and were waiting for further information that might change our position. Our view was always open minded – if our concerns could be allayed with robust evidence then we would support the majority view. Further evidence was not provided until the very end, it wasn't robust enough, so our position remained."*

The view that NIWA scientists (and others) only came out in clear opposition to the DIN at the very end of the policy process was supported by most in the 'majority' camp (supporting the DIN). However, the dissenters were just as adamant that their position had remained unchanged between reports: the DIN didn't measure up yet, it needed more work – and it didn't get there. We sought additional information to

try to pin down what had occurred, including an informative document by the Chair that did indeed seek clarity on each member's positioning on the DIN, recording that, as at 22 May 2019 there were five members who considered the science was "unresolved".

The distance between these accounts indicates significant miscommunication. It appears that, despite initial concerns about the science underpinning the proposed DIN, all but one of the 'cautious five' initially felt that it should remain up for discussion and be actively pursued: *but* they clearly considered more work was needed. This was viewed by many as a 'green light' to progress the DIN, where it possibly should have been viewed more as a challenge: an indication of disagreement, but with a willingness to keep an open mind, and consider more evidence.

It also seems clear that, through the process, STAG member positions were altering as new information came to light. One STAG member told us that "over time views on the robustness of the science around DIN and its impacts continued to shift"… "some members were able to firm up their views", and even those that remained opposed "became more comfortable with elements of the weight-of evidence approach."

Despite these subtle shifts, it is clear a minority remained unconvinced, and when it came time to make the final call, the abrupt 'no' *was* unexpected; many in the group were under the impression that the necessary progress had been achieved. One comment was particularly informative:

> *"I suspect that participants from all sides of the discussion tended to hear what they wanted to hear."*

The positions of STAG members *were* less 'fixed' and more 'transitioning' than might be appreciated from the STAG reports and media commentary around the DIN. Many interviewees considered that if the STAG only had more time, it would have been able to resolve an approach that all could agree on, and that the group "were not as far away from each other as might be imagined". They also noted that, given the importance of the DIN and known controversy around it, it should have been given earlier attention in the policy workstream.

> *"I was really dismayed at what happened over the DIN. I know we could've sorted it out. I'm still not clear what happened and still don't know how to solve it." (STAG member)*

> *"Getting the science work done for the DIN in time was challenging. It was a tight schedule and you have to get everything lined up and done at the right time so the evidence is there. That's always a barrier. I think the health impacts of nitrates are only going to increase. We should have been investing in that – not just ecosystem impacts." (Ministry official)*

The additional advice of the STAG and the dissent it demonstrated, albeit by a minority who were often referenced in the media as 'the cautious 5', gave additional credence to claims that the science was not sufficiently robust.

6.10.3 Advising the Ministers

Dissent also remained between MfE and MPI. When their joint advice was presented to the Ministers, ahead of final decisions being made on the settings in the NPS-FM, they stressed that because of disagreement on the DIN they had "limited ability to advise Ministers" or "give them confidence that benefits for freshwater and ecosystem health will outweigh costs".[125] Instead, separate advice from each Ministry was provided on this matter.

MfE's position

MfE's preferred option remained the adoption of the DIN, with provision for an exemption where councils were meeting the bottom lines for other ecosystem health measures, thereby adopting the STAG's proposal and incorporating aspects of NIWA's advice.

MfE commissioned independent research on the impacts of DIN, which undertook economic modelling of the impact of on-farm mitigations to meet the standard of 1.0 mg/L. This indicated that "these could be met without requiring land-use change in most regions."[126] It demonstrated that the economic costs of a DIN nationally were considered "modest", and "in most parts of the country, the DIN attribute [would] have a marginal impact over and above existing attributes".[127] It was only in highly localised, specific catchments where reductions were more substantial. However, these catchments were clustered, falling mostly within two regions: Canterbury and Waikato, and in Pukekohe (where there is a significant vegetable cropping industry), so that the costs were concentrated in these areas.[128] On the basis of this independent economic modelling, MfE concluded that nationally "the difference in impacts between the two options [DIN or increased nitrate toxicity] would be minimal."[129] MfE also supported raising the ammonia and nitrate toxicity attributes to provide protection of 95 per cent of species.

MfE supported a DIN of 1.0 mg/L and an increase of the ammonia and nitrate toxicity attributes to provide 95 per cent species protection. Its position was aligned with the STAG, Freshwater Leaders Group, Te Kāhui Wai Māori and more generally with the submissions of iwi/hapū, science agencies, academics, health providers and environmental NGOs.

MPI's positioning

MPI officials argued that nitrate and ammonia toxicity attributes were "key components of DIN" and sufficient, emphasising the continued "scientific disagreement" around DIN and whether it would lead to improved ecosystem health.[130] Improvements were not guaranteed in *all* situations, and in situations where benefit was not proven, the attribute would put "unnecessary limits on resource use".[131]

One of MPI's concerns was that a DIN of 1 mg/L would have disproportionate effects in some areas, even if the national cost was not significant. Like MfE, MPI also commissioned its own impact analysis of the freshwater reforms, and this included the impacts of the DIN for vegetable cropping. It cited Lake Horowhenua and Pukekohe as examples of areas where application of the DIN would likely drive "extensive land use change", moving these areas out of vegetable production. These changes might also have national impacts since Horowhenua is responsible for 20 per cent of the total domestic supply of green vegetables.[132] MPI officials considered that the potential negative economic impact of DIN outweighed the environmental benefits.[133]

It has been noted that the position of MPI closely mirrored that of DairyNZ, both on the DIN but more generally. This appears to be in large part because MPI was working from DairyNZ's modelling.[134]

MPI was opposed to progressing the DIN attribute and recommended instead the strengthening of nitrate and ammonia attributes to a level of 90 per cent protection (nitrate-N 2.4 mg/L). This was in line with what industry groups, such as DairyNZ, and local government (Local Government New Zealand) had been recommending.

6.11 Ministry framing of the science

For MPI officials, the scientific problem was characterised as one of *scientific uncertainty* which required further ecological analysis. They recommended deferring any decision pending more ecological as well as economic impact analysis, particularly of the impacts in "key regions".[135] MPI's approach emphasised economic priorities, and its expectations of the science were far higher than MfE's, approaching a requirement to guarantee benefit across all contexts.

MfE officials characterised the scientific problem more narrowly, as one of how to deal with *natural variability*: of providing for contexts where despite a higher DIN, it was clear from other measures that ecosystem health was nevertheless acceptable. MfE officials proposed incorporating an exception from compliance where all other national bottom lines were at or above the national standards, so long as it could also be demonstrated that the DIN was "maintained or improved".[136] This reflects that the priority and focus of MfE officials was on ensuring healthy ecosystems.

The alternative Ministry positionings were well aligned with the respective statutory and regulatory focus and functions of MfE and MPI, reflecting the different lenses and priority of each agency. They also demonstrate how greater prioritisation of economic considerations impacts on the science requirements: the greater the value an agency places on compliance costs – the higher degree of scientific certainty it will require in order to trigger regulatory action.

The contrasting positions on the DIN are also connected to agencies' different construction of risk. MfE's focus was on protecting against risks to environmental and ecosystem health (noting its suggested exemption was to accommodate natural variation, *not* exempt heavy polluters from the burden of increased cost). Conversely, MPI's focus was on protecting against economic risk to the primary sector. Unsurprisingly MPI's position was that, if a DIN was progressed, broader exceptions should be available based upon socio-economic grounds. This serves to demonstrate how placing economic concerns at the centre of decision-making creates systemic inertia in favour of the status quo. It can also lead to exemptions for the largest polluters with implications for fairness and the effectiveness of the policy.

"As scientists we tend towards being conservative. No-one wants to put their name to something unless there is sufficient certainty. And the standards of proof for some attributes had to be much higher than others. The DIN was much more rigorously assessed because of the politics surrounding it." (STAG member)

Conflicting positioning between MfE and MPI also led to heightened competition over the framing of advice to the Ministers. Information released to journalists under the Official information Act indicates that MPI officials "wanted the economic cost" of introducing a DIN set out "more prominently" in the Cabinet paper for government. There were also debates over what information should be presented.[137] For example, MPI sought to highlight DairyNZ's modelling that emphasised the impact of a DIN on farmers. The Ministry also sought more discussion of the economic impacts generally. Amongst the correspondence released is a missive from a MPI policy analyst writing to a MfE colleague, suggesting a number of changes that were viewed as important for "evening out the tone" of the joint advice, and ensuring "Minister O'Connor's voice is throughout".[138]

In April 2020 a subsequent ministerial briefing (to both the Environment and Agriculture Ministers) occurred. Officials noted that "significant refinements" had been made to reduce the costs (by almost half) to local authorities and farmers and to defer these until 2023, primarily through delayed NPS-FM implementation requirements for councils.[139] The briefing note states that this final raft of refinements were due to two main factors: the impacts of COVID-19 "to enable the agriculture sector to better contribute to the economic recovery" and feedback from stakeholders.

Raewyn Peart

Tongariro National Park

6.12 Decisions on national direction

In May 2020, the Ministers for Environment and Agriculture put forward final proposals to Cabinet's Economic Development Committee seeking agreement on the final policy.[140] That document highlighted the core changes made to the proposed NPS-FM as a result of consultation and Independent Advisory Panel advice, *and in response to COVID-19*. The Ministers recommended*:*

- strengthening nitrogen toxicity attributes and bottom lines from 80 to 95 per cent protection;
- new nitrogen toxicity bottom lines set to 2.4 mg/L (previously 6.9 mg/L);
- delaying a decision on the DIN for 12 months to enable a "thorough review of the environmental and economic implications".

The Ministers signalled that "if such a bottom line were to be adopted, it would most likely be with exceptions".[141]

"The views on the DIN were so divided, there wasn't much chance of everyone reaching an agreement. In that situation, well it put the Minister in a really tough spot. Either way there was going to be a lot of criticism." (Ministry official)

"I think in the end the choices were too stark, a DIN of 1 or nothing. That was polarising. It struck fear into people, it created anxiety in the farming sector, and made it a hard choice." (Ministry official)

6.12.1 Impact of COVID-19

It was unfortunate timing that final decisions on such a substantive package of freshwater reform coincided with the COVID-19 pandemic. This made government more mindful than ever of the "unprecedented effects" on New Zealand's economy, with Treasury indicating an oncoming recession and global economic impacts that were "very significant and sustained".[142] In supporting the nation's economic recovery, the government looked to the primary sector to "help stimulate and rebuild New Zealand's economy".[143] The policy considerations moving forward were diverse: to enhance the "primary sector's environmental credentials", to increase its resilience, to build a more sustainable operating model, and to support implementation of freshwater policy in a way that would also alleviate some of the negative employment impacts of COVID-19 on

the country, and in a way that was mindful of the regulatory burden on the sector.[144] On that basis, reform was to proceed, but changes had "in light of COVID-19" been necessary to "significantly reduce the costs of the package" whilst locking in as many environmental benefits as feasible.[145]

In July 2021, it became clear that the reconsideration of the DIN had not been favourable and a DIN attribute would not be included in the NPS-FM. When questioned in the House, the Minister for the Environment stated that reconsideration "likely with exceptions" was taking place and he would be considering "the marginal environmental benefit of a DIN bottom line, the marginal economic impact of a DIN national bottom line and whether the science behind a national bottom line of 1 milligram per litre of DIN has become clearer".[146]

6.13 International best practice

As part of the research for this report, EDS undertook a review of international best practice. While there has not been space to delve into this in detail, one notable example that deserves to be highlighted is the case of Denmark. Denmark is one of the few countries globally that has been able to make good progress towards improving water quality, and in relatively short timeframes. Its approach provides a number of insights, but in particular, emphasises the value of science and having the necessary data.

Spotlight on Denmark

More than 60 per cent of the land in Denmark is farmed and it has one of the most intensive export-oriented livestock sectors in the world. This means that there are some good points of comparison with Aotearoa New Zealand. By the 1980s, Denmark was witnessing severe nitrogen pollution pressure. According to the standards set under the EU Nitrate Directive, the whole territory of Denmark was designated as nitrate vulnerable.[147]

As a result, between 1987 and 2015, Denmark implemented a series of policy action plans employing an array of approaches: command and control legislation, market based regulation, government funding, information and voluntary initiatives.[148] A range of mitigation measures were made mandatory. The key policies were as follows.

- *Command and control* ('sticks'). This took the form of state administered legal prohibitions with sanctions for breach. They included maximum stock density, minimum slurry capacity and bans on spreading of slurry for spring crops, mandatory fertilizer and crop rotation plans, minimum proportion of area to be under winter crops, statutory norms for manure nitrogen utilisation, maximum nitrogen application settings, localised requirements for buffer zones around streams and lakes and in nitrogen sensitive habitats, and localised ammonia restrictions.
- *Market based regulation* ('carrots') included subsidies to invest in slurry tanks; locally-based subsidies for more organic farming, wetlands, extensification and afforestation; localised subsidies to shift to low nitrogen grasslands in environmentally sensitive areas; subsidies to promote better manure handling and animal housing; and tax on mineral phosphorus in feed.
- *Information provision and voluntary action* included promotion of low excretion livestock feeding and optimised feed practice promotion.

The approach was successful and resulted in a 50 per cent reduction of nitrogen and 70 per cent reduction of phosphorus concentrations and load in streams and rivers. Nitrogen efficiency in the agricultural sector significantly increased and nitrogen leaching from the field to root zone was halved. As a result, many papers cite Denmark as an example of how agricultural production and environmental protection concerns can be balanced.

Action on nitrate pollution was driven by evidence showing that a clear decline in water quality had occurred. This led to acceptance of the seriousness and urgency of the problem thereby providing a trigger for regulation. However, at least initially, there was inadequate data available across a range of areas. In the face of insufficient information, the first measures introduced were command and control mechanisms, implemented nationally and focused where the most immediate gains could be made: *the inputs side of the nutrient equation*. These had the added benefit of being able to be implemented with less government expenditure.

Output-focused measures came later in association with increased government funding, and as data availability and science capacity increased. Finally, more targeted and specific measures became possible. This time lag between problem

identification and the crafting of a response is inevitable. Denmark's approach demonstrates, however, that some responses require less science and progress on these can result in significant gains in the interim period.

One of the most effective aspects of Denmark's response was the utilisation of targeted measures. However, these only became possible later, once data availability increased and groundwater mapping information became available. Regional authorities were required to collect this information and use it to designate 'environmentally sensitive areas'. Farmers had to keep account of their nitrogen application, and document crop rotation plans and manure and mineral fertiliser use. It was at this stage that market-based mechanisms and incentives were added. There was a focus on new technologies that were not expensive and measures to stimulate voluntary action. Crucially, the later differentiation in standards and introduction of environmentally sensitive areas came in association with *compensation payments* to address the increased burden on affected farmers.

Denmark's approach was very data intensive. It required significant resourcing to build science capacity and monitoring networks and to provide compensation to address equity considerations. This highlights that securing effective change requires *both* increased science and economic inputs. Denmark required prioritisation of environmental protection alongside a response to support transition in the sector.

The approach was highly effective. In 2009 Denmark became the first EU country to fulfill all the demands of the EU Nitrate Directive. This delivered benefits not just to freshwater, but also to the ocean environments which had reduced nitrogen inflows. Figure 6.4 shows Denmark's progress to reducing DIN discharges in the Baltic Sea, in comparison to other countries in the region.

The case of Denmark comes with a further salient reminder: changes at the political and governmental level are often volatile and reforms can be peeled back. The impacts of these changes were controversial within the agricultural sector, which had opposed the increased costs and burdens they entailed. In 2015, a liberal minority government took office with a Food and Agriculture Package, emphasising the need to ensure the economic feasibility of the agricultural sector. This led to some (though not all) of the reforms being dismantled. For example, the mandatory scheme of buffer zones along watercourses was abandoned and the maximum amount of livestock manure that could be applied to land was relaxed.[149] A mini wetlands programme was introduced for 2017-2020 as a measure to avoid increases in nitrogen leaching as a result of these changes. The scheme is run through a mixture of carrot and sermon (targeted advice by consultants) with no sticks employed.

Despite the weakening in approach, the gains made are being maintained, even if they are not improving at the previous rate. The European Commission's 2019 environmental implementation report for Denmark notes that "progress has slowed in recent years".[150]

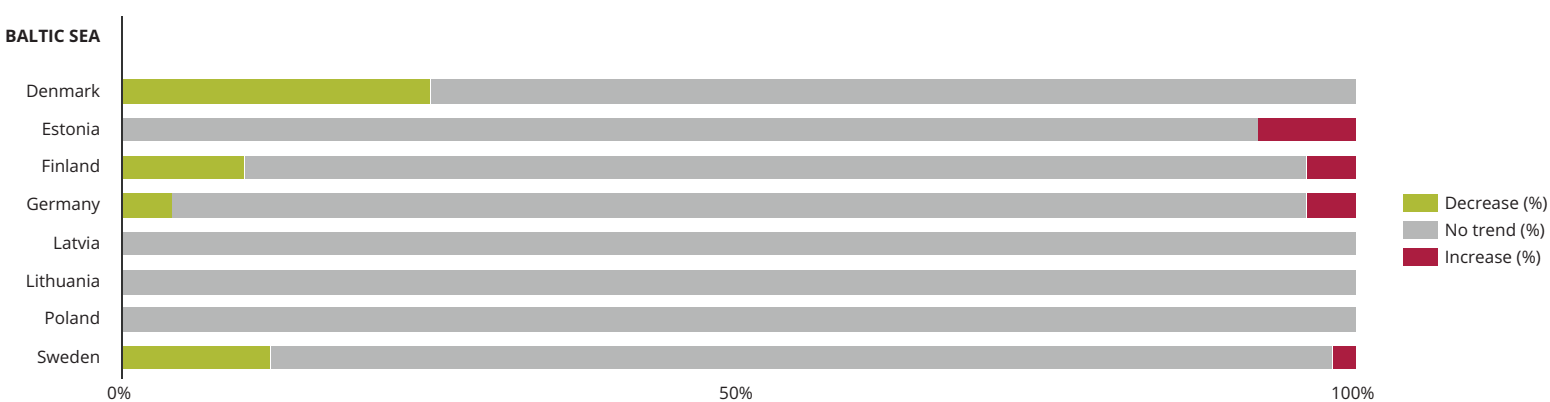

Figure 6.4 Trends in dissolved inorganic nitrogen concentrations in European seas

Source: European Environment Agency, 2014[151]

6.14 Insights from the DIN case study

6.14.1 Joint Ministry policy work and contested policy lenses

The story of the DIN provides a number of insights, but in particular it highlights the difficult nature of joint policy work, where the two Ministries involved have very different policy lenses to apply.

Embedded in MPI's institutional culture is a strong 'working in partnership' approach with the primary sector. For MPI, the conflicts of interest associated with a highly collaborative approach are less visible, as one of its core functions is to advocate for the primary sector. However, context matters, and for the purposes of *environmental policy* development a greater degree of scrutiny and transparency should have been applied to MPI's work. There also needed to be a greater degree of role clarity as to whose policy advice would prevail in the event of conflict, how the priorities would be set, and for the Ministry and Minister for the Environment to have a clearer lead (as anticipated by the statutory framework). Without this, the risk is that the environmental and sustainability lens set by MfE (and the RMA) is considerably weakened.

The substantive regulatory impact assessment produced by MfE in May 2020, in comparing the different options, found that the DIN policy represented the most effective solution and had the highest compatibility with Te Mana o te Wai and Treaty principles. The DIN was also rated as the most effective option.

It is worrying that even when a piece of environmental policy, such as the DIN, was assessed as the best overall option in the regulatory impact assessment, was supported by the STAG (majority), Te Kāhui Wai Māori, the Freshwater Leaders Group, MfE officials advising the Minister, and by 85 per cent of public submissions (including those from science, academics, health providers, iwi/Māori and environmental NGOs), it still did not get across the line and economic priorities prevailed.

6.14.2 Political avoidance of contentious issues

Current regulatory practice is predicated upon a presumption in favour of political consensus and co-development with stakeholders, the avoidance of regulatory burden and adopting the most economically efficient response. These settings entrench the normative position allowing only agreed, incremental reform to proceed. This case study on the DIN highlights the uphill battle that is involved in putting *new* measures that involve any sort of significant cost into place, even if that cost is highly localised in nature (and, ironically, would drive the very land use change required to achieve environmental protection). Those seeking a lever for land use change are therefore presented with a Catch 22 scenario, because if that lever is identified, the economic considerations required of current cost-benefit analyses and regulatory impact assessments may remove it from the table.

By their nature, contentious or 'wicked issues' are those that have this combination of environmental complexity (and so heightened uncertainty) in the face of significant cost implications. This all serves to generate conflict and difficulty in achieving stakeholder agreement. If regulatory direction and regulatory checks serve to prevent decision-making in these contexts, in favour of the status quo, then systemic inertia against reform can be difficult to overcome.

A common pattern emerges around these wicked issues as a result: the failure to achieve an agreed collaborative and consensus-based decision (here between MfE and MPI) often leads to deferral of decision-making. This pattern has long been noted by political commentators: deferral is used as a mechanism to depoliticise the debate, in the hope that progress can be made some time in the future. And scientific uncertainty is often utilised as the rationale to justify deferral, pending 'more evidence'.[152] This approach can be seen in the deferral of the decision on the DIN until more information is available and greater certainty achieved.

Insights from STAG interviews point to a need for more time in the policy cycle for highly complex matters like the DIN to be worked through, for increased support for the science work on the DIN, and a broadened scope to enable the health and implementation related aspects of the science to be properly incorporated.

The literature also reveals a second oft-used route through contentious matters: decision-makers will seek to address the issue in an indirect, unresolved or vague way.[153] The alternate option of strengthening the nitrate toxicity value is an example of this approach.

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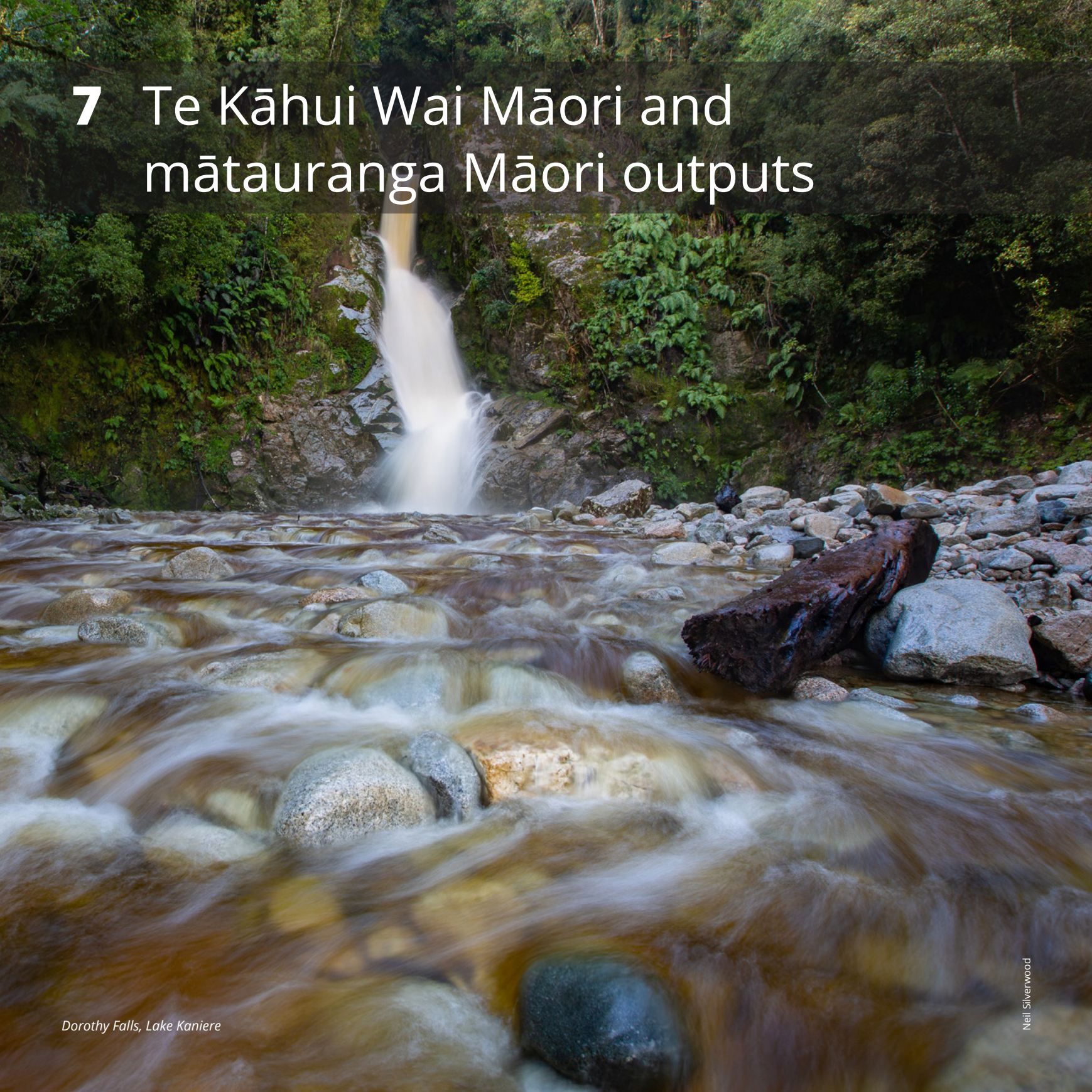
7 Te Kāhui Wai Māori and mātauranga Māori outputs



Dorothy Falls, Lake Kaniere

Neil Silverwood

While chapter 4 considered the role of iwi/Māori in the freshwater policy process, and the political controversy surrounding the establishment of Te Kāhui Wai Māori, this chapter turns to examine the policy outputs as a result of that process.

Freshwater is acknowledged as a taonga of huge significance to Māori and, as such, the Crown has a broad range of responsibilities under te Tiriti o Waitangi to protect it and iwi/hapū relationships with it.[1] The Crown's specific obligation under the RMA is set out in section 8, which states that all persons exercising a function or powers under the Act, in managing the use, development, and protection of natural and physical resources "shall take into account the principles of the Treaty of Waitangi (te Tiriti o Waitangi)." Section 6(e) further identifies "the relationship of Māori and their culture and traditions with their ancestral lands, water sites, waahi tapu and other taonga" as a matter of national importance.

Despite the statutory direction under the RMA, Māori participation in the management, use and development of freshwater protections, and the historic recognition of Māori interests and concerns in this arena, have been limited. In considering Māori claims in relation to freshwater in the Wai 2358 decision, the Waitangi Tribunal undertook a close examination of iwi involvement in previous NPS-FM development processes and of the document as it stood in 2017, prior to the current review. In that decision the Tribunal made a number of criticisms of the RMA framework, including its lack of provision for alternative co-governance or co-management arrangements or mechanisms to formally recognise iwi and hapū relationships with freshwater bodies.

Neil Silverwood

Styx River, Hokitika River Catchment

The Tribunal also noted a number of omissions in previous freshwater policy work, including the Crown's failure to make any commitment to allocate water or discharge rights to Māori, lack of recognition for Māori proprietary rights in freshwater and more generally the lack of provision for Māori rights and interests.[2] The Tribunal considered the scope of work for previous freshwater policy processes to have been too narrowly set. It found a failure to enhance the ability of Māori to participate in freshwater management and decision-making.[3] The NPS-FM 2014 was specifically criticised for its weak requirements regarding the role of Māori in freshwater decision-making. The observations and findings of the Tribunal provide a robust independent assessment as to the adequacy of the provisions in this area.

7.1 Failure to address Māori rights and interests in freshwater

The Waitangi Tribunal's observations and criticisms on the scope of freshwater reform under previous iterations of the NPS-FM also hold true for the most recent iteration. Prior to commencement of work on the NPS-FM 2020, a decision was made to put issues such the efficient and fair allocation of freshwater, and the broader consideration of Māori rights and interests (including property rights), out of scope.

Prior to the release of the draft NPS-FM 2020, the interim regulatory impact assessment highlighted that a claim over freshwater management was before the Waitangi Tribunal. This was considering the adequacy and Treaty compliance of the previous document (both the process and outputs). However, because the Tribunal report was not expected back until late 2019, and the Crown was concerned not to hold up freshwater reform, the process had been initiated in any case. This was on the basis that the Waitangi Tribunal's report and recommendations would be considered alongside submissions as part of the public consultation process.[4]

Although the Tribunal's report was released in August 2019, so was available to inform decision-making on the NPS-FM, the government later decided to defer fuller consideration of the recommendations on the basis that it needed to "take some time to fully engage with the Tribunal's recommendations so that it can provide a robust and well-informed response."[5] This meant that the Crown not only failed to address these matters in the freshwater reform process, but that any formal response to the Tribunal's fundings and recommendations was also delayed.

The decision to proceed, and nevertheless limit the scope of freshwater reforms, raised legal risks for the work undertaken. Throughout the consultation process, iwi submitters underlined that they considered the proposed changes represented a "fragmented approach" which failed to give effect to Māori rights and interests in freshwater, and that the Crown was failing in its obligations to work with its Treaty partner to address these issues.[6] In March 2020, a Water Taskforce memoire underscored that Māori groups had expressed serious concerns and considered "the process has not been conducted in good faith" and had "not involved them in their rightful status as a Treaty Partner".[7] It also noted that the New Zealand Māori Council had questioned whether the reforms were Treaty compliant.[8] Māori engagement, officials warned, was considered a key risk that was likely to escalate in the future.

Interviewees who were members of Te Kāhui Wai Māori expressed concern that outstanding issues were placed out of scope, so were not addressed in the policy work, including allocation, and Māori rights and interests in freshwater.

> *"It's good – as far as it goes, but the issues raised by the Waitangi Tribunal in Wai 2358, they haven't been addressed, allocation, Māori rights and interests, that was all avoided, so there are a lot of really important outstanding things that remain. I understand it's a can of worms, but government stepped back – again."*

The words of the Waitangi Tribunal in the Wai 2358 decision had already put the Crown on notice of the legal risk around continuing to adopt a restrictive approach to policy-making. Indeed, the Tribunal went so far as to advise that the continuing failure of the Crown to recognise Māori rights and interests in freshwater was a matter of such significance that it *recommended a test case* be taken to settle the matter.[9] In their briefing to the incoming Minister in 2020, officials drew attention to these outstanding issues, noting that the "governance and decision-making dimensions of rights and interests is closely linked to allocation system reform and wider reforms of the resource management system"[10] but that work on these matters was being undertaken separately.

While the decision to confine the scope of work for the NPS-FM and *Action for healthy waterways* package in 2020, enabled work to proceed at pace, failure to address these issues led Ngāi Tahu to file legal proceedings against the Crown in November 2020. Ngāi Tahu was seeking recognition of their authority in relation to freshwater in their region, and the case sought to establish "joint authority" with the Crown over policy and practice.[11] Ngāi Tahu was seeking "declarations that the Crown should design a new freshwater governance and regulatory regime with Ngāi Tahu in its takiwā recognising its rangatiratanga; that the current regime constrains Ngāi Tahu rangatiratanga; and that the Crown should not develop any new legislation or policy which would further constrain Ngāi Tahu rangatiratanga entitlements."[12] Ngāti Kahungunu joined the action in February 2021, seeking similar recognition over freshwater in their rohe (Hawkes Bay region).

7.2 Te Mana o te Wai

> **Te Mana o te Wai** refers to "the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of the wider environment. It protects the mauri of the wai. Te Mana o te Wai is about restoring and preserving the balance between the water, the wider environment, and the community." [13]

Despite the significant criticism of the NPS-FM for its limited scope, work undertaken to strengthen Te Mana o te Wai has met with widespread support. Indeed the Waitangi Tribunal had already highlighted Te Mana o te Wai as a "major achievement" of the previous policy workstream[14] with the "potential" to make the NPS-FM a much more powerful instrument for recognition of Māori values in freshwater management and the exercise of kaitiakitanga. However, the Tribunal's approval had some substantial qualifications and it noted that a number of factors weakened its application; there were insufficient tools for giving it effect and the direction for councils to "consider and recognise" Te Mana o te Wai was not considered strong enough, restricting the degree to which it was being implemented and applied in plan making. It also considered that Te Mana o te Wai sat too separately apart from the NOF and values set within it. This meant that, while some improvements had been made, the Tribunal still considered the NPS-FM 2020 non-compliant with Treaty principles. The defects associated with Te Mana o te Wai were therefore a "serious matter". [15]

The interim regulatory impact assessment acknowledged the practical problems in applying Te Mana o te Wai and Māori freshwater values more generally, noting that:

> *"At a national scale, Māori values and attributes of health are not being adequately identified, reflected or incorporated by regional councils into regional freshwater planning instruments and processes. This*

suggests that there are barriers in place that prevent meaningful Māori participation in these processes. It also suggests that the Freshwater NPS has failed to provide strong direction to regional councils requiring them to prioritise and incorporate Māori freshwater values and attributes more effectively into freshwater planning processes. The major causes of this problem are a lack of strong regulatory direction requiring regional councils to incorporate Māori values into regional freshwater planning and a lack of resourcing (capacity, capacity, financial) faced by regional councils and hapū/iwi."[16]

One of the core issues the NPS-FM 2020 sought to address was the inadequacy and variability with which regional councils were engaging and working in partnership with iwi/hapū in the development of freshwater policy and planning, as well as in the implementation of the standards in the NPS-FM.

7.3 Strengthening of Te Mana o te Wai

In order to more strongly reflect the values of iwi/hapū, the fundamental concept of 'Te Mana o te Wai' and directions associated with it were significantly strengthened in the NPS-FM 2020. As noted earlier a hierarchy of obligations was set to provide clear direction for decision makers:

First, the health and well-being of water bodies and freshwater ecosystems;

Second, the health needs of people;

Third, the ability of people and communities to provide for their social, economic and cultural well-being, now and in the future.

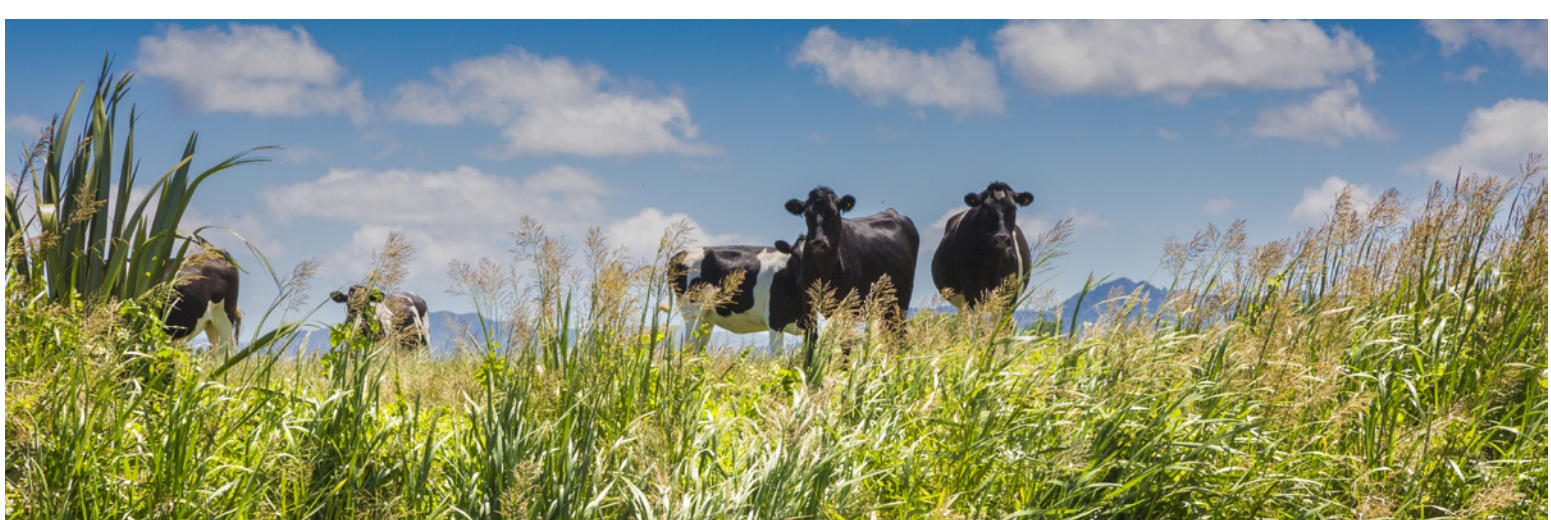
The NPS-FM 2020 also now requires regional councils to "give effect" to Te Mana o te Wai. This represents the strongest direction possible and sets a clear expectation that councils work in partnership with tangata whenua, with significant governance and decision-making implications. The NPS-FM sets out "the responsibility of those with authority for making decisions about freshwater to do so in a way that prioritises the health and well-being of freshwater now and into the future". [17]

7.4 Incorporation of Māori freshwater values and mahinga kai

Responding to criticisms around a lack of recognition of Māori values and insufficient linkages to the NOF, the NPS-FM document now recognises 'Māori Freshwater Values'. It has also incorporated one, 'mahinga kai', as a compulsory value within the NOF framework. This raises some issues for Māori, because the setting of national attributes and standards can be seen to undermine the authority of local iwi/hapū and their rangatiratanga and role as kaitiaki in their rohe. Te Kāhui Wai Māori supported the addition of mahinga kai as a compulsory national value due to its very widespread acceptance, but emphasised that additional Māori values in freshwater, and their associated standards, needed to be developed locally. This would enable tangata whenua to identify their own freshwater values and priorities at place.

For this reason, the NPS-FM leaves the identification of Māori freshwater values in relation to freshwater management units for tangata whenua to determine with councils, through a collaborative process. The only compulsory national value set is for mahinga kai.

Raewyn Peart



Cattle on the banks of the Ōhinemuri River

Spotlight on a new compulsory value for mahinga kai

The mahinga kai value is defined as kai (food) that is safe to harvest and eat.[18]

Mahinga kai refers to freshwater species that have traditionally been used as food, tools or for other purposes. It encompasses the places where those species are found and the act of catching or harvesting them. The ability of such sites to provide sufficient food, which is also safe to harvest and eat, is used as an indication of the overall health of the water. At the level of a freshwater management unit, it requires that the desired species should be plentiful enough for long-term harvest, and that the range of desired species are present across all life stages.

These aspects are used to ensure *kei te ora te mauri*, that the mauri of the place is intact: that customary resources are available for use, customary practices are able to be exercised to the extent desired, and tikanga and preferred methods are able to be practised.

7.5 Strengthening the role of mātauranga Māori

The interim regulatory impact assessment acknowledged that mātauranga-Māori based freshwater data is currently difficult to source "due to ad hoc approaches to data collection based on funding/opportunity." Stronger direction to councils to involve Māori in freshwater management should, in turn, also strengthen this aspect. Under clause 3.4 of the NPS-FM 2020, tangata whenua must be involved (to the extent they wish to be) in freshwater management and decision-making processes. A key part of this is the development and implementation of mātauranga Māori. The NPS-FM 2020 also requires regional councils to establish methods for monitoring progress towards target attribute states and environmental outcomes. These methods must incorporate mātauranga Māori. Cultural monitoring will be a critical mechanism for implementing mahinga kai as a compulsory value.

7.6 Māori response

Te Kāhui Wai Māori interviewees expressed their broad support for the changes to the NPS-FM.

"The NPS-FM is a big step forward from previous versions, it gives effect to Te Mana o te Wai. I hope that this helps to get the big issues to the forefront of everyone's minds so they can't be ignored."

"I think it's the most successful step so far, relatively speaking, and that's because there was the political will at the ministerial level to do the right thing. In previous iterations it was unclear whether Māori input had anything practical to bite. Now hopefully it will."

"Mahinga kai was a tangible thing we thought could at least be started. Now councils will need to work with iwi/hapū to actively address that. I think greater opportunities will be opened up for Māori to participate more fully now."

"Don't under-estimate the power of incorporating Te Mana o te Wai: it's the umbrella under which everything else sits. Expectations come with that."

However, a degree of caution remains around how the changes will be practically rolled out. There are concerns over the adequacy of resourcing for iwi/hapū and their capacity to effectively participate. It is also unclear how councils will respond and engage.

"The journey will determine the destination. It's not about manuals, it's all about relationships: we get that right, then the rest will follow. You can put the best policy in place, but if there are flawed relationships, and there are many at the council level, then it will remain difficult. But the one constant is Māori are not going anywhere."

"As a Māori partner there should be more design input, co-design. The timeframes were tight and the NPS was an exercise in compromise. But, I'm relatively pleased about where our work landed. The Treaty reference and Te Mana o te Wai, it has potential to reshape things. The proof will be how councils respond, and there is so much inconsistency."

"There are still things to be landed, limits that have to be set, gaps around councils and who monitors and enforces things. I think we have to wait and see if its effective on a range of levels, whether things flow through into plans."

"Implementation is going to be a complex space, a challenging space, but change is in the wind now across the board, it's happening quite rapidly."

So despite opposition to the scope and approach to developing the NPS-FM 2020, there has been widespread support for work undertaken on

Te Mana o te Wai, although with some reservations. For example, Ngāi Tahu reiterated that they "support Te Mana o te Wai and its strengthening and integration of this into the wider freshwater framework" but emphasised that "the concept of Te Mana o te Wai cannot be used as a substitute for, or to prevent, recognition of Ngāi Tahu rangatiratanga."[19] Similar sentiments were expressed around support for mahinga kai as a compulsory attribute provided there were appropriate mechanisms at place for tangata whenua authority to be expressed.

All Ministry officials and STAG members interviewed, as well as Te Kāhui Wai Māori members spoken to, supported the changes. The incorporation of mātauranga Māori, and the associated cultural monitoring requirements, traverse new ground for many. Some were unsure how they might be applied in practice, including their interface with contemporary science.

Spotlight on what a mātauranga Māori based approach looks like

A range of mātauranga Māori and contemporary science-based approaches for monitoring and reporting have already been developed and are in use around the country. MfE commissioned a report to assist regional councils to implement mahinga kai and other Māori freshwater values under the NPS-FM. The resulting report, published as an implementation guide, canvasses the tools that exist in this arena, providing case studies to demonstrate how various iwi and councils have worked together to protect Māori freshwater values.[20] It also provides guidance for engagement to help tangata whenua and councils work constructively together.

Cultural mapping

Cultural mapping is increasingly used worldwide, and is recognized under a range of regimes, including by UNESCO.[21] It involves the identification and documentation of local cultural resources and actions to record, monitor and protect them.[22] A number of cultural mapping tools have been developed. Examples include those described below.

Mauri compass

The Mauri compass (see Figure 7.1) was developed by Te Rūnanga o Turanganui a Kiwa and the Gisborne District Council to assess and restore the mauri of oceans, rivers and lakes.[23] The tool assesses 12 different aspects of a water body across three different areas or kete.[24]

1. *The Tangata Whenua Kete* assesses the attributes of Tangata Whenua, Tikanga, Wairua and Mahinga Kai. Narrative, descriptions and a rating system (Likert scale) are used to assess these values. This category assesses the degree of acknowledgment and respect accorded tangata whenua to assert mana whenua.

2. *The Tāne Kete* holds the environmental attributes: habitat, biodiversity, biohazards and chemical hazards and assesses these using data from Land, Air, Water Aotearoa, regional council monitoring and tangata whenua monitoring.

3. *The Tangaroa Kete* assesses the quality and quantity of fish species through measures such as abundance, fish health and growth rates, so is a stock assessment model.

The framework integrates a complementary blend of contemporary science and indigenous knowledge (mātauranga Māori) tools to formulate an assessment as to the mauri of the wai.

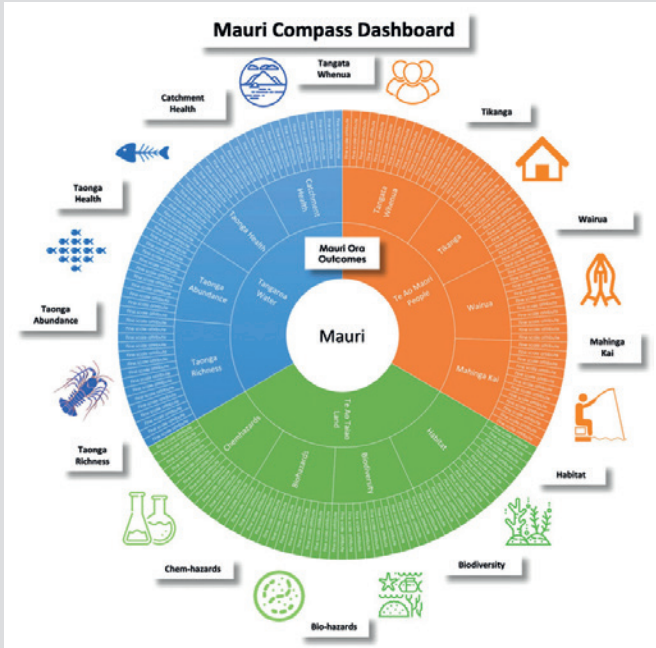
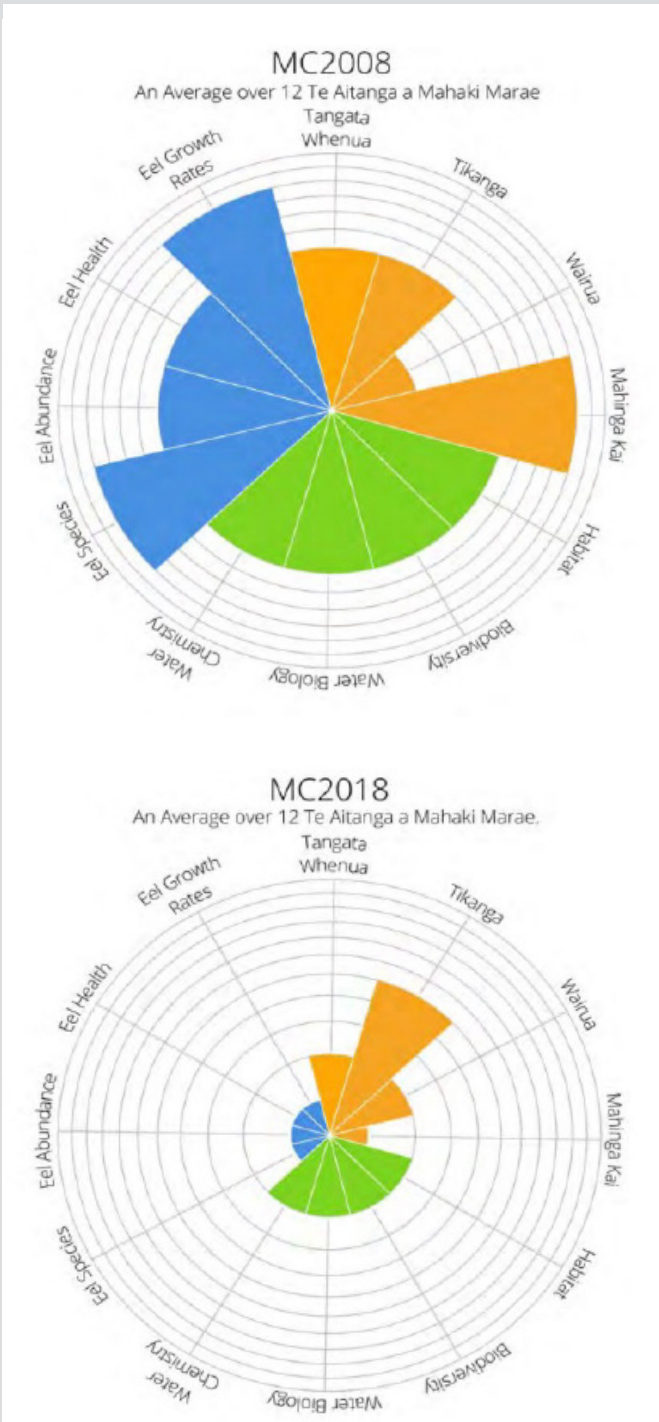


Figure 7.1 The Mauri Compass Dashboard

The diagrams below are taken from the Te Aitanga a Mahaki project and demonstrate how the Mauri compass can be used to track water health over time.[25]



Cultural Health Index

The Cultural Health Index and associated mapping is another national tool that measures factors of cultural importance to Māori in freshwater management. The index supports tangata whenua in capturing and recording the cultural health status of a waterway site based on local indigenous knowledge.[26] An overall score is calculated taking three factors into consideration: the status of the site, its mahinga kai or customary food gathering status, and water quality or stream health. The index was developed as part of the environmental reporting programme of Statistics New Zealand and MfE, with data sources from iwi and hapū. The framework differentiates between cultural stream health and mahinga kai, and provides both a site status and an overall status.

The mahinga kai aspect identifies the species present and scores their abundance, comparing current and historical information. It also assesses whether Māori have access to each site and whether Māori would return to the site and use it.[27] Water quality includes indicators of stream health that reflect iwi perspectives and can be defined objectively. Data is collected on-site by representatives of the local iwi, hapū and rūnanga and considers a range of factors such as riverbank condition, indigenous species, river flow (sight and sound), odours and appearance of pollution. Each of the three attributes is scored on a scale of 1 to 5.

Mauri model

The Mauri model was developed by Te Kipa Kepa Brian Morgan (see Figures 7.2 and 7.3). It is an impact assessment model using mauri as the measure (or performance metric)[28] of sustainability.[29] Mauri is measured in four dimensions: "environmental wellbeing (taiao mauri), cultural wellbeing (hapu mauri), social wellbeing (community mauri) and economic wellbeing (whanau mauri)".[30] Specific indicators are used to determine whether the mauri of the dimension is being fully restored, enhanced, maintained, diminished, or denigrated/destroyed, and these can be adjusted according to the priorities of the local hapū. Weighting can also be adjusted for different stakeholders to compare the impacts on different groups, and an "absolute sensitivity" calculated where equal weight is given to each dimension.

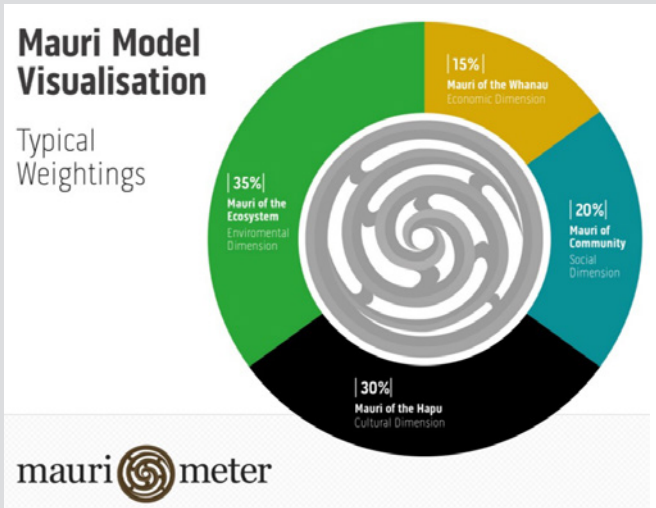


Figure 7.2 Mauri model: mauri-meter
Source: Dr Kepa Morgan[31]

The Mauri Model

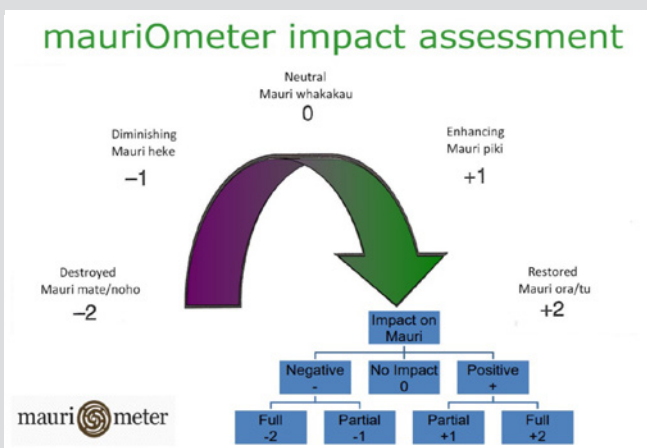


Figure 7.3 Mauri model: impact assessment
Source: Dr Kepa Morgan[32]

These models are only a small selection of the wide range of tools that have been developed but serve to demonstrate some of the possible approaches. A point of difference with contemporary, science-based monitoring regimes is that they explicitly integrate social and cultural considerations. What they also demonstrate is how interconnected and integrated the relationship between mātauranga Māori and contemporary science is in practice.

Implementation of mātauranga Māori will require its own resourcing and capacity building, including science support. This is to ensure that the best tools are available from across both realms and are brought together to support the protection of Māori freshwater values.

7.7 Strengthening Māori inputs into the regulatory impact assessment process

The strengthening of Te Mana o te Wai and recognition of Māori freshwater values, including mahinga kai, *may* in part have been the product of a strengthened regulatory impact assessment process. Previous regulatory impact assessments, undertaken for the 2014 and 2017 iterations of freshwater policy, focused on assessing "impacts", "effectiveness" and feedback from "consultation".[33] The regulatory impact assessment for the amendments made in 2017 makes no explicit reference to te Tiriti o Waitangi or Treaty Principles at all. While presumably appropriate checks were undertaken, this indicates a lack of integration of these considerations into the regulatory impact assessment process.[34]

In addition to the usual legal checks for consistency with Treaty settlement legislation and Treaty principles, the regulatory impact assessment process for the NPS-FM 2020 was far more integrated. All options were assessed for the degree they supported and were aligned with Treaty Principles and Te Mana o te Wai. These were both included as formal criteria in the regulatory impact assessment process.[35]

- **Principles of the Treaty of Waitangi:** This criterion required that proposals and options were assessed to identify the degree to which they appropriately provided for the principles of the Treaty of Waitangi, promoted partnership and protected Māori rights/interests and relationships with their taonga.

- **Te Mana o te Wai:** This criterion required assessment as to whether options put the well-being of the water first, and promoted values-based (based on the needs of the community), holistic management to sustain the wellbeing of the people. The option also acknowledged mātauranga Māori.

As the case study on the DIN in Chapter 6 demonstrated, high scores in relation to these two criteria were not determinative. Options with lower levels of compliance were still selected. The interim regulatory

impact assessment noted, at the outset, that some of the policies might not meet the higher expectations of Māori for water quality or be consistent with te ao Māori.[36] Where this occurs, greater explanation of the rationale for selecting less compliant options would be valuable. This would ensure overt acknowledgement of the conflicting political priorities and, more importantly, acknowledgement of when these operated to trump Treaty considerations.

Given the constitutional significance of te Tiriti o Waitangi, and the Crown's additional responsibility in this area, development of further policy guidance would be valuable. How should policy priorities be dealt with where they are in conflict? Should additional weighting apply in relation to Treaty principles, and if so, when and what kinds of matters may trump these? It would also be timely to consider more fully the role of iwi/Māori in the decision-making process, and what 'working in partnership' requires at this final stage, when the decisions involve matters of significant cultural importance.

To the extent that Māori and environmental groups have a significant confluence of interests in relation to issues such as freshwater and biodiversity protection, strengthening the regulatory framework's treatment of iwi/Māori concerns is also likely to deliver more sustainable and environmentally robust outcomes. As noted in the regulatory impact assessment, improving Māori involvement and the Te Mana o te Wai framing lens inherently also provides for better outcomes for freshwater since "traditional Māori practices have an inherently integrated and holistic approach to resource management". This means that "integrating Māori knowledge into freshwater management allows us to understand more about freshwater systems in New Zealand, improving the information available to regional councils."[37]

7.8 Friction between sector groups and Māori

The potential lever in favour of heightened environmental protection provided by Te Mana o te Wai has been understandably controversial in some quarters. It is clear from their submissions that a range of industry groups had concerns about the impact of Te Mana o te Wai, particularly in giving the health of water and ecosystems priority over other considerations. Many gave submissions in opposition to the changes. This

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resistance is not new. The Waitangi Tribunal has noted that when Te Mana o te Wai was first introduced into the NPS-FM, a number of submissions were made in an attempt to disconnect and dislodge it from the national values set.[38] Indeed, this may in part explain the previous disconnect between Te Mana o te Wai and the NOF, and softer direction ("take into account") for councils on implementation.

A range of concerns were raised by industry groups during the consultation on the NPS-FM 2020. Some of opposition was on the basis of the 'uncertainties' raised around what the application of mātauranga Māori would look like in practice and how it would work. For example, Federated Farmers opposed the monitoring provisions on the basis of a lack of clarity on the application of Te Mana o te Wai and mātauranga Māori in this arena.[39] It also expressed "real concerns with the significant shift that results from proposals, in particular the hierarchy of obligations: to waterbody health and ecosystems first, then to essential health needs of people, and only thereafter other uses". Federated Farmers argued that this framework was potentially in conflict with the focus of section 5 of the RMA on "sustainable management of natural and physical resources" in a way that "enables people and communities to provide for their social, economic and cultural well-being".[40] It also claimed that it was potentially inconsistent with "years of case law."[41]

Horticulture New Zealand raised similar arguments regarding the compatibility of the hierarchy with section 5. It argued that the "black and white prioritisation" undermined councils' ability to make management decisions in a balanced way, in line with an "overall judgment" approach.[42] In its view, the hierarchy approach of Te Mana o te Wai in the NPS-FM undermined the purposes of the RMA, so raised legal risk and uncertainty. Horticulture New Zealand commissioned legal advice on the matter. The 17 page legal analysis attached to its submission argued that the directions to local authorities went beyond their functions and were ultra vires and vulnerable to legal challenge.[43] Its core concern was that if sector uses were only considered after ecosystem and human health, "businesses reliant on the use of water will be seriously compromised."[44] The organisation therefore supported retention of the status quo and opposed the change, in particular the hierarchy it established.

The threats of potential legal challenge from industry groups highlight not just the controversial nature of these changes, but also how significant and potentially impactful they might be in practice. Both Federated Farmers and the Environmental Defence Society have joined the Ngāi Tahu freshwater rights case against the Crown as intervenors. Intervenor status is provided to non-parties where the issues are of wide importance and include matters of general principle where the intervenors possess important expertise or a unique perspective that will assist the court.[45] That both sector groups and environmental NGOs have sought intervenor status in relation to a case over Māori rights and interests in freshwater underscores the high importance and significance of the decisions being made in this area.

Conversely, DairyNZ adopted a very different approach in its submission on the proposed NPS-FM, characterising the approach of Te Mana o te Wai as "helpful" but not providing much more than what is already expressed through the RMA. It considered it "a useful tool to reframe challenges in a way that resonate" but argued that it would not resolve challenges and that it was doubtful that elevation of Te Mana o te Wai would "fundamentally change the outcome of regional and freshwater management processes."[46] While framed rather differently, these lines of argument were essentially also arguments made in opposition to the adoption of Te Mana o te Wai.

The positioning of DairyNZ is interesting, given Māori expectations that Te Mana o te Wai will deliver the system changes they feel are necessary to improve freshwater management and well-being. It is of note that DairyNZ did not *directly* challenge the incorporation of Te Mana o te Wai. However, it did pose questions querying its utility: would it advance regulatory arrangements? Deliver a paradigm shift? Make resource allocation and management easier? Who would determine the degree of impact, or at what level that the mauri of water has been appropriately safeguarded? [47] These sentiments also reflect industry unease around the uncertainties of recognising Māori values in freshwater.

It is difficult to reconcile the diverse arguments raised by industry groups against the strengthening of Te Mana o te Wai, based variously on uncertainty, inconsequence and significant impact. Collectively they highlight industry resistance to the changes, likely driven by concern that they *will* deliver changes to the status quo.

7.9 Legal risk

Further legal debate through the courts is likely to be raised by sector groups as regional councils respond to the requirements of the NPS-FM 2020 and incorporate the changes into freshwater planning and decision-making. A number of STAG and Te Kāhui Wai Māori interviewees considered it likely that sector groups would strongly oppose regional council policy and plan changes to incorporate Te Mana o te Wai, as well as mahinga kai and mātauranga Māori methodologies.

"It's a step forward, but it's not a level playing field. The big guys, Federated farmers, Fonterra, Dairy NZ… we know things are going to be contested. Māori are going to have to step up at the local level and be there for the duration, to see it through the next steps. So I have concern they will unwind our aspirations." (Te Kāhui Wai Māori member)

"The council interface is intense. There is still a risk that councils might be picked off by industry groups, and in court that can be very unbalanced. They are much better resourced." (STAG member)

"It's inevitable things are going to end up in court, they usually do. The adversarial framework isn't conducive to making progress or getting good science advice. How the courts will deal with mātauranga Māori advice and expertise is unclear. But I know how intensely the science advice is contested." (STAG member)

"The courts are getting more comfortable and confident in taking judicial leadership and emphasising the importance of te ao Māori, tikanga. I'm hopeful the courts can address issues that come up – because they will. Its going to be very interesting." (Te Kāhui Wai Māori member)

Because so much relies on implementation at place (with councils working with iwi/hapū), and with standards likely to be hotly contested through regional council planning processes, uncertainty and trepidation around the next stage exists.

7.10 Conclusions

While falling short of fulfilling the more substantial aspirations of iwi/hapū by putting broader Māori rights and interests in freshwater out of scope, what *was* achieved in the NPS-FM 2020 is significant in shifting the framing and priorities for freshwater management, especially through the strengthening of Te Mana o te Wai. Such changes are much more fundamental than the incremental reforms typically evidenced in the policy process. That they were achieved in the face of industry opposition indicates that the more government-directed approach did facilitate decision-making on some of the more inherently political matters that collaborative stakeholder-based groups struggled to reach consensus on.

The changes highlight the powerful policy lever that te Tiriti o Waitangi has become, and the growing strength and resonance of te ao Māori-based narratives. These are increasingly being seen as *better articulating* the broader public voice calling for change. They also provide a voice for the environment, for Papatūānuku, thereby challenging exploitative framings that characterise nature as a 'resource'. In addition, the changes have implications for governance, with councils being directed to actively involve tangata whenua in freshwater decision-making processes.

All parties now have their eyes on the regional council space, to see if implementation of the NPS-FM 2020 honours its spirit.

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Lake Ōhau

Endnotes

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27 Tipa and Teirney, 2006

28 See Morgan, 2007 and Morgan, 2011

29 Mahi Maioro Professionals, The Mauri model, <www.maurimodel.nz/about-1>

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39 Federated Farmers, 2019, *Submission on Action for healthy waterways documents: discussion document, draft NPS, proposed NES and draft stock exclusion regulation,* 31 October 2019, 68

40 Resource Management Act 1991, s5

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42 Although the courts in *Environmental Defence Society Inc v New Zealand King Salmon Company Lt* [2014] NZSC 38 repudiated the overall broad judgment approach, Horticulture New Zealand claims that decisions made under the NPS-FM fall within the recognised caveats set out in the case, so contest its application. See Horticulture New Zealand, 2019, *Submission on Action for healthy waterways documents: discussion document, draft NPS, proposed NES and draft stock exclusion regulation,* 31 October 2019, 5-6

43 Appendix B at 53

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46 Dairy NZ, 2019, *Action for healthy waterways Dairy NZ submission,* 31 October 2019, 25

47 At 25

8 Exploring the science for policy supports

Taieri River

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While most interviewees were positive about the process itself, and felt that (except for the issue of the DIN) improvements had been made to the NPS-FM, a recurring theme expressed by all groups was that there were insufficient policy supports in place. The issues raised in this context often highlighted broader system-wide deficiencies that served to undermine, not just policy work on freshwater, but also environmental decision-making and policy development more generally.

There was significant criticism of the science funding system and its lack of connectivity to policy needs. This served to undermine the funding of crucial research necessary to support policy development. There was also criticism of environmental reporting, monitoring and data collection frameworks and their adequacy to inform policy development – and to review policy implementation to determine its effectiveness. In addition, there was concern over inadequate capacity and capability across the board, including at central and local government level, as well as within iwi/hapū to support their expanded role under the NPS-FM.

There was a general call for a more strategic, planned and considered approach to science communication, to build the social licence for reform and combat misinformation. There was also a call for more support and training to build greater expertise in knowledge translation, knowledge brokering and science communication, including in the understanding and knowledge of te ao Māori. And, from both officials and the STAG, there was a call for more guidance and direction on how to deal with scientific uncertainty and contested information.

Resolving issues like these would require a substantial redirection of resources, a reorganisation of funding priorities and delivery mechanisms, and potentially the establishment of new support institutions. It would also require a review of our current regulatory direction, to strengthen the guidance for, and prioritisation of, evidence-informed decision-making.

While the scientists we interviewed spoke of policy having to proceed in a context of inadequate science supports, Māori interviewees noted that iwi/hapū have been placed in a very similar predicament. With a host of new 'opportunities' for engagement and to work in partnership on freshwater policy, but with similar concerns about the adequacy of funding support for the science needs of iwi/hapū and mātauranga Māori, iwi/hapū face similar capacity and capability challenges. The incorporation of mātauranga Māori into our policy frameworks requires greater support and guidance.

The broader project of transitioning Aotearoa New Zealand towards a bicultural and partnership-based approach to policy constitutes a paradigm shift: two world views are meeting and collaborating. The system is in the process of incorporating new values, new ways of presenting information, new ways of testing evidence, and new priorities and ways of balancing those matters. This requires new relationships to be built, new processes and methodologies to be employed, and new supports to be put in place. The necessary scaffolding, across all these areas, remains in its infancy.

There is not space here to delve into each of these areas in depth. Each is a substantial issue in its own right, and more research is necessary to inform a more detailed and comprehensive analysis. It would be valuable to understand how these issues manifest across other environmental policy areas, and the impact they are having more broadly on our science for policy system, before exploring options for resolving them. It would also be useful to examine their effect, not just on policy-making, but also on policy-implementation. Although interviewees raised concerns at the lack of supports for both policy implementation and policy development at the local government level, our investigation was very much focused on the development of the NPS-FM at the national level. We did not, therefore, explore how these issues manifest at the regional council and iwi/hapū interface.

The concerns raised by interviewees can be separated into five main categories: (1) policy timeframes, (2) science for policy funding, (3) environmental monitoring and reporting, (4) capacity and capability, and (5) science communication. This chapter briefly highlights the key issues raised in relation to each. Although we have dealt with them separately, it is important to keep in mind that, in practice, they are highly connected and interdependent.

8.1 Policy timeframes

Our STAG interviewees said the following on the timeframe for policy development, and its impact on the policy process:

> *"We were asked for advice on so many things and the timeline was tight. It made for a high workload. Those who could tried to get across as many aspects as manageable, but the extent to which people could go the extra mile required, was really variable."*

> *"The policy timeline didn't match what was necessary to do the work. That made the science patchy and rushed in some areas."*

"There was a huge variability in the depth of analysis of different attributes. The pace didn't allow for much flexibility and restricted how much review could take place."

"Officials needed quick answers, ideally a simple yes or no to a question for an on the spot decision, because they were under such huge time pressure. But science doesn't work that way."

"For the science to be there and ready, you have to plan to make that happen. It doesn't happen spontaneously, there has to be more of a lead in time."

These responses highlight the pressure that tight policy timeframes place on the science advice, potentially undermining the quality of the science inputs. Tight timeframes may lead to overly simplistic responses, undermining important nuance and so impeding effective science communication. They also increase the workload on scientific advisors, creating inequities in participation, since not all advisors have the same degree of institutional support and time availability. These comments also make clear the need for more preparatory work ahead of policy development, particularly where timelines are expected to be tight. It is important that the data sets, research and information necessary to underpin decision-making are available in a readily accessible form. In short, policy work has to be planned, and the science to support that policy established, prior to the policy-making process commencing.

Ministry officials noted that the timeframes for the development of the NPS-FM 2020 were particularly tight because the scale of the policy workplan was ambitious. This created a "huge workload on everyone" and it also limited what could be done. However, officials with more experience of the policy process underscored that this high pace of policy development was not especially unusual.

"It always feels like it's an urgent dash. It certainly makes our task difficult. We are always talking about having evidence for policy but never given enough time."

"It wasn't just this work. A three year election cycle is a really short timeframe. It places a huge stress on the policy system. The time for policy development is always hard to work within."

The three-year election cycle was noted as a problem by a range of interviewees: for creating tight policy timeframes that necessarily restricted the scope of reform and degree of innovation and deeper thinking associated with policy changes. It also fosters a reactive policy response cycle where Ministers try to 'do what they can' in a limited window of opportunity. There is a need to identify mechanisms to help maintain policy development across multiple electoral cycles. We might even seriously consider the potential policy benefits of a longer parliamentary term.

Short timeframes also impede the policy process in less obvious ways. Several interviewees noted that for newly established entities like the STAG and Te Kāhui Wai Māori (some Freshwater Leaders Group members had been involved previously through the LAWF), it takes time to build the trust and relationships necessary to enable free and frank conversations, both internally as a group and with officials. Conversely, while utilisation of pre-existing groups can lead to significant savings in time, it can detract from the degree of innovation and 'new thinking' achieved. There are benefits and disadvantages to each approach.

The membership of both Te Kāhui Wai Māori and the STAG was broader than previous policy workstreams, but a commensurate period of relationship building was not provided for to establish a strong foundation for the work. STAG members noted that, by the end of the work, they were able to make progress at pace, with momentum having slowly built throughout the process. But they thought the process would have greatly benefited from more time.

The members of Te Kāhui Wai Māori who we interviewed raised similar concerns. The tight timeframes also served to undermine their inputs into the process and the Crown-Māori relationship more generally. Several members emphasised that 'relationship work' was not peripheral, but a central anchor necessary to support discussions. It was also necessary to enable officials to develop sufficient knowledge and understanding of te ao Māori and the perspectives of the group.

"Māori are not only expected to contribute to draft documents not co-designed with us, but to provide commentary and edits with no additional resource and under tight timeframes. It's a completely poorly designed framework."

Not only was the workload incredibly high, given the time expectations on participants in the process, but we were also told that their inputs were not appropriately compensated. The lack of renumeration for advisory work likely limits who can be involved and the extent to which they can set aside time for the task. Involvement is almost conceived of as a form of community or public service, yet the time commitments associated with

policy work are significant. This may point to a systemic undervaluing of the importance of this work. Several interviewees noted that, in contrast, no one would expect to receive "legal advice" or "economic analysis" free of charge. They questioned why science advice or cultural inputs and advice are treated differently.

> *"The workload, resource barriers and timeframes made some things impossible. We need a model shift. Policy work is time consuming and STAG members weren't compensated for their time. Meeting costs were met, and expenses, but people were expected to provide their time for free."*

8.2 Science for policy funding

During our interviews almost all STAG members identified a lack of funding support for practical, applied research as a serious and significant barrier to policy development. Research to inform policy development and decision-making, to identify solutions to key policy issues, and for implementation are all aspects that are underfunded within our current frameworks.

> *"There is a lack of funding for the basics, basic monitoring, data and research. That's a real roadblock to the whole framework. You get a political window, so it's urgent. But there's been no funding support, so the science isn't there, and it's too late at that point."*

> *"It's linked to a cyclical problem: policy work is reactive because its tied to constantly changing political priorities. That then means quick solutions to complex problems are always needed – but the science hasn't been resourced."*

These comments serve to demonstrate the interconnectedness of the issues. The problem is not simply one of funding inadequacy, but also of short policy timeframes and the lack of longer-term policy and research priorities. A longer-term policy agenda needs to be articulated, and supported by research strategies and priorities, which are in turn linked to research funding mechanisms.

8.3 Setting research priorities and strategies to support policy

There have been numerous attempts to ensure better delivery of science for policy. However, these have proven inadequate in practice. We detail some of these initiatives below.

8.3.1 Water research strategy 2009

When work began on the first NPS-FM, it was recognised that freshwater policy would require a strong research base, but that there had been a longstanding decline in investment in freshwater research.[1] MfE, in collaboration with the Foundation for Research Science and Technology (now MBIE), worked together to produce a *Water research strategy*. Released in 2009, this was intended to guide investment in water research over the following decade. The aim was for "current and emerging science to be delivered and converted into the tools required for better water allocation and control, better water conservation and better water quality."[2]

The *Water research strategy* acknowledged that there were gaps in information and science which undermined good planning and decision-making. It sought to improve alignment between water management needs and research funding, prioritisation and deliverables. Published the same year as the New Start for Freshwater programme, it was designed to be complementary: to support development of national and regional regulatory mechanisms as well their implementation.[3]

The *Water research strategy* was, however, contentious from its inception. When the freshwater reforms commenced in 2009, sector groups played a strong lead through the LAWF and the process was far more collaborative than that for the NPS-FM 2020 (to the extent that a DairyNZ scientist was contracted to draft the *Water research strategy*). Green Party MPs raised concerns over potential conflicts of interest and industry being too close to the science priority setting process. The Minister for Research, Science

Neil Silvenwood

Wetland on Cook River

and Technology responded, confirming that government had a contract with DairyNZ to facilitate and prepare the draft *Water research strategy*, and that the "conflict of interest potential has been carefully managed".[4] The contract had not been put out for tender but had been awarded through a private arrangement with DairyNZ. The Green Party was concerned, not only at potential bias created by the closed shop arrangement, but also that environmental NGOs had not been consulted on the Strategy, only industry stakeholders.

In research for this report, a review of the literature was undertaken to identify any available commentary on the quality of the resulting *Water research strategy*, but very little material was found. In 2010, both the Iwi Chairs Forum and LAWF called for the Strategy to be "formulated and agreed in consultation with science providers, stakeholders and iwi" and for it to be more frequently reviewed and updated.[5] The Strategy itself acknowledged that its potential uptake and effectiveness would be limited by "any shortfall in technical capacity and/or capability, and wider capability issues, across central government, local government, businesses, the primary sector and our research, science and technology sector."[6] This highlights the issue that even the best designed research strategy will fail to gain traction in an environment where science capacity and capability remains unsupported and is therefore limited.

When the NPS-FM was reviewed and updated in 2014, the *Water research strategy* was slated for concurrent review. However, it is unclear whether that review took place, and we could find no documentation on this.

8.3.2 New Zealand conservation and environment roadmap 2017

A number of other research strategy documents have since been crafted.[7] Most relevant to freshwater policy is the *New Zealand conservation and environment roadmap*, which was released in 2017. The Roadmap was developed by DOC and MfE and, like the *Water research strategy*, it reiterates the need for a long-term vision for the science system.

The document identifies environmental monitoring, including the deployment of new and improved tools for gathering and reporting data on the condition and trends in freshwater, as a priority. As part of the climate change puzzle, it notes the need to develop models to help us "better understand how changes to land-based activities that affect greenhouse gas emissions also influence freshwater quality and quantity".[8] It also identifies assessment of freshwater restoration programmes, and the prediction of environmental thresholds and tipping points, as important areas for investment. The document highlights the need for "a better understanding of how contaminants, including excess sediment, affect ecosystems, human health, and recreation to inform how we manage and maintain urban and rural land and water use."[9]

In their submissions on the Roadmap, environmental and science bodies underscored the importance of ensuring the it was "monitored and supported" and that it be connected to and inform science investment strategies, (notably the *National statement of science investment*, Strategic science investment fund, Endeavour fund and National science challenges).[10] The Royal Society considered that the document would benefit from greater clarity as to how the elements would be integrated and linked to those funding mechanisms.[11] It noted that, for example, most ecological research has no long-term funding associated with it. Such gaps within the science system remain largely unbridged.

8.4 Lack of bridging between research strategies and funding mechanisms

Although significant effort has gone into the production of science strategy documents, they remain substantially unaligned and disconnected from the funding mechanisms in place. One point of disconnection is that the vast majority of science funding, including for environmental research, is administered by MBIE, rather than MfE or DOC.[12] Several interviewees were critical of this administrative arrangement.

> *"There is a real funding disconnect. We need to ensure priorities get funding. MfE needs to be able to have more influence on MBIE environmental funds. To run policy processes properly, they need dedicated and ongoing funding. A funding stream allocated to them to get the science done on specific issues would be really helpful."* (Te Kāhui Wai Māori member)

On average, MfE has budgetary provision to spend approximately $4.8 million per year on research.[13] Most of that money goes towards developing the advice needed for policy. Although it is committed to building a better knowledge base, the Ministry has highlighted that its current investment is insufficient and that changes are necessary to the broader system.[14] The Ministry is currently reliant on the wider research, science and innovation system for support "in tackling some of the toughest challenges we face, be that climate change, be that freshwater degradation, or the loss of ecosystems" … "we rely on goodwill"… "this is inadequate".[15]

8.4.1 Environmental research funding: lack of alignment in priorities

The most recent government statement setting out the long-term vision for the science system is the *National statement of science investment 2015-2025.* This document introduced "two pillars" to guide research investment: **impact** and **excellence**.

The objective of the *National statement of science investment* was to focus the science system on "ideas led, discovery research which is likely to have more long term transformative impact" and to "shift contestable funding towards higher risk science with longer term impact and grow it over time."[16] The "vision" is heavily weighted towards funding research that can make a "visible, measurable contribution to our productivity and well-being through excellent science".[17] Growth in GDP and a "flourishing" research and development sector are priorities. Attracting direct investment from multinational organisations is a further focus. Measuring performance is a key aspect of the regime. This includes, for example, tracking academic outputs through publishing (the number of citations), growth of the research workforce, degree of international collaboration and investment, and contribution to productivity.

The National Statement influences the approach adopted throughout the science funding framework. Two primary funding mechanisms, the Endeavour fund and Strategic science investment fund, were established in line with its vision in 2016 (see Figure 8.1). The Endeavour fund replaced MBIE's general contestable fund and the Strategic science investment fund was established for a range of specific purposes, including the maintenance and upkeep of nationally significant collections and databases held by Crown Research Institutes, and to support "strategic freshwater research".[18]

The Endeavour fund (MBIE) is an open contestable fund with a focus on excellence or "smart ideas" and research "impact". It prioritises innovative research ideas with "high potential for benefit to New Zealand" and research programmes "with transformative impact". This includes "better environmental management, regulation, conservation or restoration activity" leading to "better environmental quality or reduced risks to the environment, or healthier environment."[19]

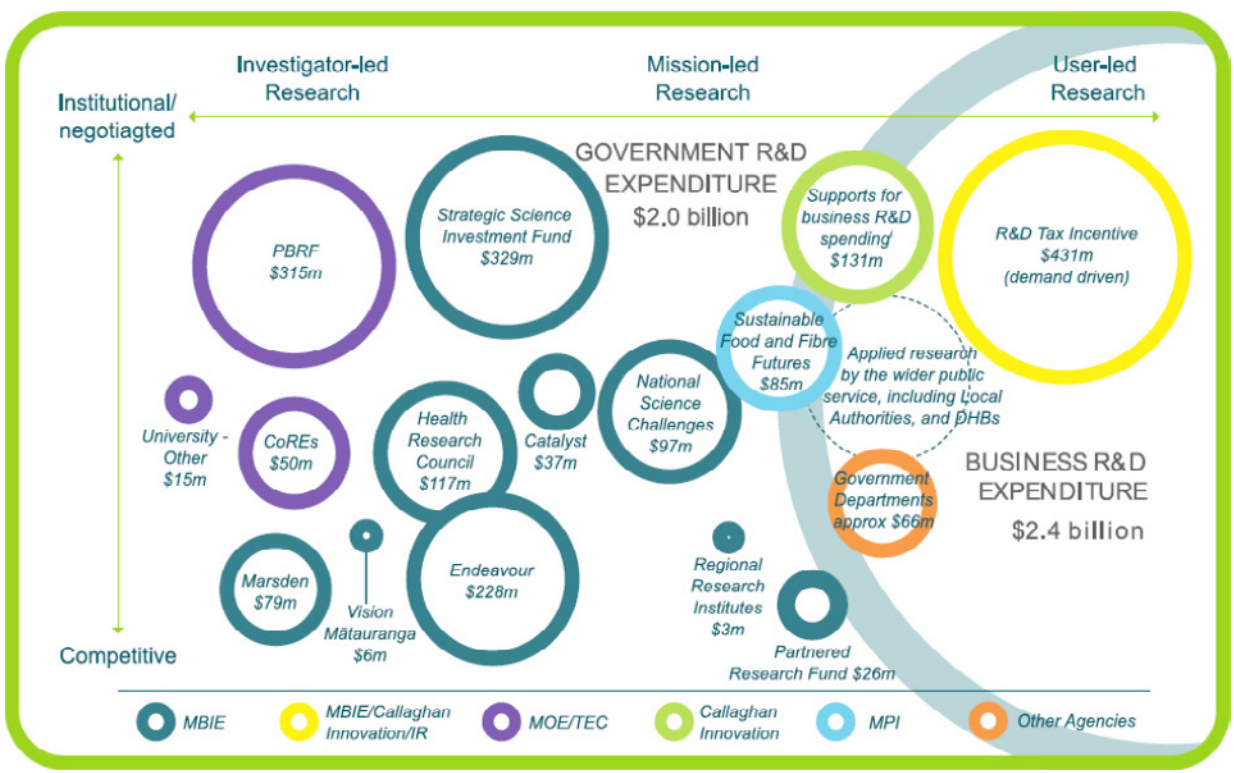


Figure 8.1 Research and development expenditure in Aotearoa New Zealand Source: MBIE

The Strategic science investment fund has two components: programmes and infrastructure. The programmes portion is designed to enable organisations to undertake long-term, mission-led research programmes. The infrastructure element supports national research technology, facilities and infrastructure, as well as significant national collections and databases. Spending is allocated across 21 'platforms', one of which is a 'freshwater environment' platform. A platform is defined as "a combination of people, facilities, information and knowledge that provide a particular, ongoing science and innovation capability for New Zealand".[20]

While both the Strategic science investment and Endeavour funds appear to support science for policy, neither operates as might be expected. The Strategic science investment fund primarily supports the research of Crown Research Institutes (which have received over 90 per cent of the funding allocation).[21] This means that, although the fund claims to be "provider neutral", the "platforms map squarely on to organisations" with the freshwater environment platform closely connected to NIWA.[22]

Even with this narrow recipient focus, the level of funding is still insufficient. The Parliamentary Commissioner for the Environment has noted that the "SSIF funding level have risen only slightly over the last ten years or so" and "the need to supplement these resources from other sources appears to have become increasingly acute".[23] In short, the

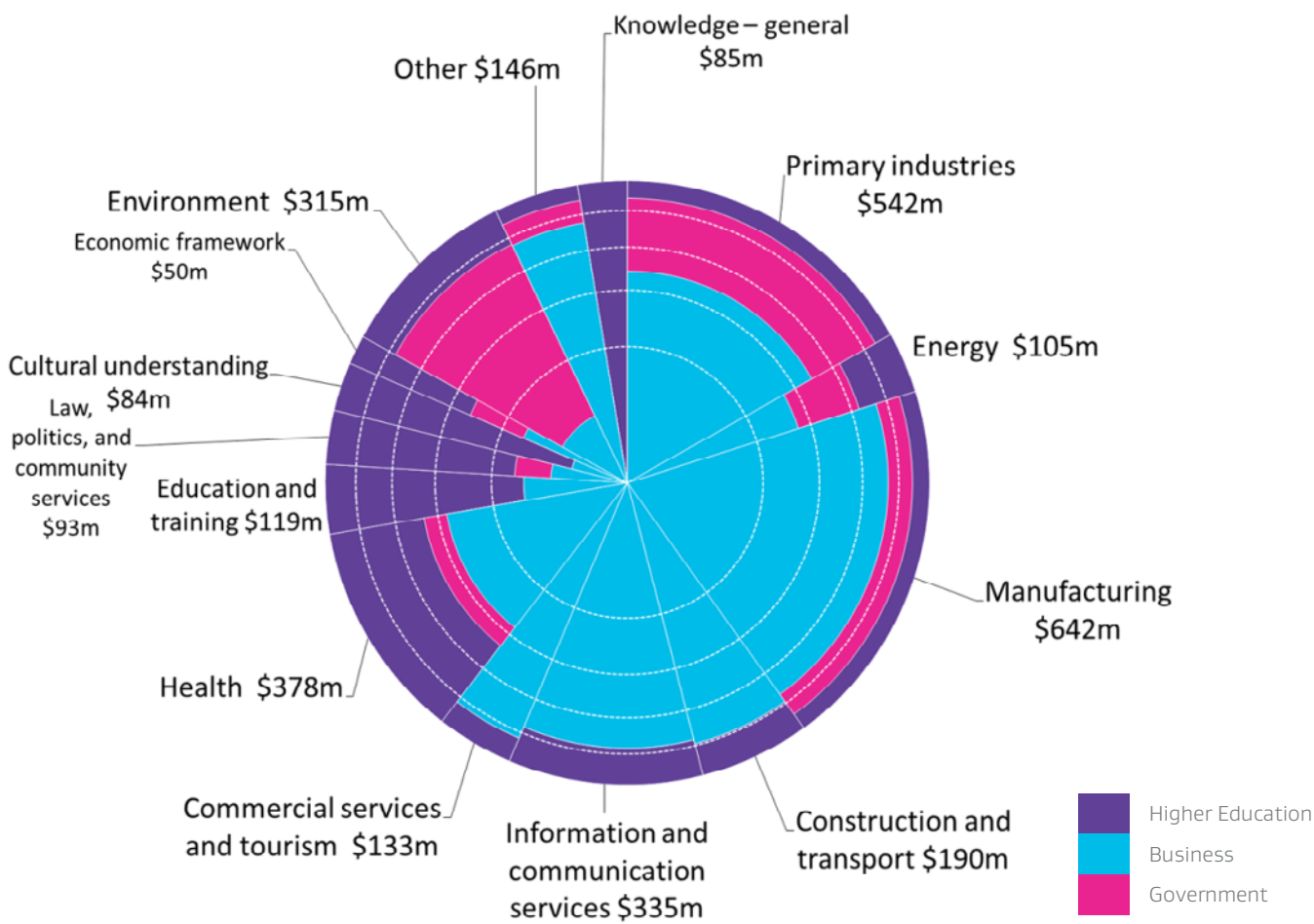


Figure 8.2 Endeavour fund expenditure by purpose and sector, 2016

Source: https://www.mbie.govt.nz/dmsdocument/1283-endeavour-fund-investment-plan-2017-2020-pdf

funding from this source to support Crown Research Institutes like NIWA is insufficient and this reflects its lack of responsiveness to policy needs.

Environmental research is just one small component of the Endeavour fund (see Figure 8.1) which tends to prioritise academic excellence and economic outputs. In practice, approximately 70 per cent of the fund is allocated towards economic outcomes, with 25 per cent going to environmental research (see Figures 8.2 and 8.3).

Portfolio targets: Research outcomes	
Research outcomes	**Proportion of portfolio** (annual contract value)
Economic	70%
Environmental	25%
Societal	5%

Figure 8.3 Portfolio targets for the Endeavour fund (2022-2024)[24]

Source: Ministry of Business, Innovation and Employment, 2021, Endeavour fund: Transforming New Zealand's future, New Zealand Government, 11

The criteria for the Strategic science investment and Endeavour funds are not formally integrated with, and do not even reference, departmental or Ministry research strategies or roadmaps. Although such documents inform the funding application process in practice, because the funds do not prioritise science for policy, those strategies and roadmaps struggle to provide an effective lever to obtain funding. While valuable, the National science challenges also operate under the 'impact and excellence' lens set out in the *National statement of science investment* and are not designed to serve policy-making needs. This leaves a significant funding gap in the science system for policy support.

Spotlight on the National science challenges

The National science challenge funds were established in 2014, with topics set by Cabinet. The Our Land and Water National Science Challenge, from which the current report is funded, was launched in 2016 and is aimed at enhancing "the production and productivity of New Zealand's primary sector, while maintaining and improving the quality of the country's land and water for future generations."[25] Research funding focuses on three themes: future landscapes, incentives for change and pathways to transition. The National science challenge funds are an attempt to break silos, and foster the collaboration necessary to address large and complex issues. The challenges are a valuable conduit for bringing together industry, Crown Research Institutes and university researchers and fostering big thinking on key challenges facing the country.

Raewyn Peart

Clutha River

Given that the government is the largest investor in environmental research, the lack of linkage and integration between policy research priorities and research funding is somewhat surprising. Although 33 per cent of the country's gross expenditure on research and development is directed at environmental topics, it is not earmarked to serve basic environmental policy needs well.[26] This disconnect was one of the strongest and recurring complaints of interviewees.

> *"We know what work is needed, but we apply for the funding and it fails, even when everyone's signed up; councils are asking for it, the top scientists are involved, the LAWF is on side. It either fails on the science, or on the impacts. I don't know what's going on in MBIE, but the priorities, the policy needs, they don't get supported."*

> *"Central government is under the illusion that the MBIE Endeavour fund satisfies the need, but it doesn't. Most policy research fails the criteria, it misses a lot."*

"All the criteria undermine policy support, it's not incentivised. The MBIE and Smart Ideas funds target science excellence, innovation. It's all about economic potential, novelty. But we can't get the basics covered. It's not sexy stuff but it's important to fund the basics first. The way things are set up, its perverse."

"Pure science, smart ideas, that's great, that's important – if we have our bases covered, but we don't. The funding priorities have to reflect the priorities for New Zealand."

"Recommendations? Change the funding system. Frame it in favour of applied problem solving. It can't all be about pure or commercial research. Some science is a 'must have' and it needs to go to the top."

"We need a commitment to funding science for policy, acknowledgment that it's critical, to force the funding system to be responsive. Other than MBIE, it's hard to find sources."

"The commercial model is a barrier. CRI's could potentially help fill the gap. They get money for strategic science investment, but that's not targeted to science for policy either. The whole model needs to change."

"Everyone knows it. It's crystal clear to everyone, policy is advancing ahead of the science and the science can't keep up. There is something inherently wrong in the system."

"The funding doesn't line up with what's needed. Funding is there, it's just not applied for policy, it's not fit for policy."

The Ministry officials we interviewed agreed with these complaints.

"Most funding arrangements are based on high-level high-impact journal publication and excellence. That's not useful for policy-making. We are data poor for freshwater and there isn't the funding to do it right. MfE talks about it a lot, it's a difficult problem to solve."

"Getting funding for applied science is difficult, for modelling it's difficult. It's all too difficult."

"The reality is that the money isn't invested in the areas where it's needed most. Work on future pathways is really critical work, more than 'science excellence'. "

"If we can't understand the basics, how can we resolve anything? We need to fund data sets, nationally significant data sets."

"Our science community spends a lot of time asking for money, we fund science terribly."

8.4.2 Environmental research funding: Vision Mātauranga

Te Kāhui Wai Māori members and Māori scientists that we spoke to were similarly critical of the funding supports and levers in place to support mātauranga Māori. They especially highlighted MBIE's 'Vision Mātauranga' funding policy which applies across, and is integrated into all, MBIE science investment mechanisms.

Vision Mātauranga is an MBIE funding policy mission aimed at unlocking "the innovation potential of Māori knowledge, resources and people to assist New Zealanders to create a better future".[27] The concept was that it would enable the "contribution of Māori communities, knowledge and resources" through "research, science and innovation".[28]

Ironically, like many other science funding sources, the Vision Mātauranga policy includes a broader economic and normative funding focus around innovation, excellence, contributing to "economic growth", commercial asset management, business grants and industry opportunities for Māori. While it also recognises the relevance of environmental sustainability, and Māori health and social needs and relationship to te taiao, it says very little regarding mātauranga for policy development. The focus is squarely on innovation and opportunity. The policy has been criticised for being implemented in "a very patchy way across the science sector" with the level of impact of the policy in practice falling well short of what was initially intended.[29]

"Vision Mātauranga was written in 2005 as an enabling science policy, but it went nowhere for many years. There weren't sufficiently strong signals to help focus and support it. But I think over the last five to seven years we are finally seeing a gradual building of the infrastructure needed to give it teeth." (Māori scientist)

"Funding for mātauranga Māori isn't easy to get, there are inequities. You really need a team of influential science brokers to help assess what projects would make the most difference. Most of the fund goes to

academia, so many people miss out on project funding. And the MBIE smart ideas Endeavour funds are very complicated, the applications need to be very academic. There are so many missed opportunities." (Te Kāhui Wai Māori member)

In October 2019, a Vision Mātauranga leadership hui was held to gather perspectives. Participants expressed the view that Māori-related research funding "exacerbated the lack of equity" and was overly reliant on competitive funding rounds which operated as a barrier for many.[30]

"A large number of Vision Mātauranga assessors and commentators across a diverse number of funding streams and organisations have no deep knowledge of mātauranga Māori. This has created incorrect expectations for what Vision Mātauranga is, and the priorities it should address."[31]

Hui attendees called for a greater Māori role and leadership in the allocation and funding assessment process:

"It is not the role of the Crown to regulate and shepherd our Indigenous knowledge system through the lens of Western science strategy, policy and instruments. This management needs to be led by Māori, adequately resourced, evaluated and designed properly."[32]

Other criticisms were that there was a widespread practice of incorporating mātauranga Māori aspects into projects (in order to secure funding) but then under-resourcing contributions from Māori. There was also a lack of consistency in the assessment of applications.[33] Too often, the process was treated as a box ticking exercise, without genuine engagement and consideration of Māori needs.[34] Effective decision-making requires assessors to have a good understanding of the priorities, needs and concerns of Māori and an understanding of mātauranga Māori. Shortfalls in this arena can impact the quality of the assessment and allocation process and undermine the effectiveness and outputs of the policy.

A 2021 report, *Te Pūtahitanga: A Tiriti-led science policy approach for Aotearoa New Zealand*, produced by a collaboration of te ao Māori experts and scientists, highlighted that there has been "long term negligence" in making decisions on science policy and investment for mātauranga Māori. Despite Vision Matauranga being in place for more than 15 years, the report noted that there has been a critical lack of review and evaluation of how the policy is operating in practice.[35] Further, "underpinning this, is a failure to measure and map the Māori science sector", to identify how, where and to whom investment in Māori research is allocated, or its impacts. [36] This makes evaluation and identification of what works highly problematic. [37]

The Parliamentary Commissioner for the Environment has also noted that "funding directly targeting mātauranga Māori environmental research remains limited" and that there is a need to better "engage with mātauranga Māori as it is understood by Māori, not as others perceive it to be."[38] The Commissioner has highlighted problems, not only with the funding mechanisms in place, but also with existing policy research priority settings. He noted that the *Conservation and environment roadmap* produced by MfE and DOC has also been criticised for lacking mātauranga Māori input.[39]

Attendees at the 2019 hui made a number of recommendations, underscoring the need for a more creative response to drive a more transformative approach. They cited National science challenge efforts to allow more freedom and openness for Māori researchers, as a positive example of this. Other recommendations were that there is a need to: [40]

- establish minimum cultural competencies for researchers working with Māori;
- establish minimum standards for assessing Vision Mātauranga and for assessors to be Māori;
- establish an expert council for a māturanga Māori/science sector review;
- create a dedicated mātauranga Māori commission to formulate and oversee a national mātauranga Māori agenda.

8.4.3 The Parliamentary Commissioner for the Environment report on funding and prioritisation of environmental research

In 2020, the Parliamentary Commissioner for the Environment released a report on the funding and prioritisation of environmental research. The aims of the review were twofold: first, to deepen understanding of what research gets funded (and why) and, secondly, to investigate the extent to which publicly funded environmental research is prioritised towards addressing environmental challenges facing Aotearoa New Zealand.[41] The Commissioner reiterated the need for "a strong link between the priorities the Government articulates and where the funding is allocated" but found that this was difficult to achieve with funding spread across multiple funding mechanisms.[42] The conclusions of the Commissioner support what the STAG, Te Kāhui Wai Māori and Ministry officials also report.

"Public funding for environmental research is fragmented, its links with policy priorities are not always obvious and its contribution to ongoing environmental monitoring and reporting is uneven."
Parliamentary Commissioner for the Environment, 2020

It is notable that MBIE's most recent statement of "Investment signals for 2022-2024" for the Endeavour fund directs that "proposals should reflect government policy, strategy and roadmaps where relevant."[43] This indicates effort is being made internally to improve the degree of linkage. However, without more substantive review and changes to the priorities of the individual funds, the ability for research strategies to impact funding decisions remains limited. Research for policy proposals continue to compete against very different research proposals and projects in highly contested funding rounds, and within regimes not designed to support or prioritise their work.

8.5 Monitoring and reporting

Intimately connected to the lack of funding to support policy-related science is an ongoing underinvestment in a robust and comprehensive environmental monitoring and reporting system. STAG members were critical of the state of the country's data and reporting frameworks and their ability to support policy development.

"It's a cyclical argument, the research funding and data issues. But the system is so dishevelled, that I am sure if we went back and tried to identify the real data gaps, we would find that there has been a huge amount of research done on things like nutrients, it's just not mapped or collated effectively, consistently."

"Data gaps need to be reviewed and identified, and for this to then drive the funding. But data also need more consistent collection and reporting. There is a lack of coordination centrally and between councils."

Aotearoa New Zealand was the last OECD country to regulate the need for environmental monitoring and reporting, with our system under the Environmental Reporting Act only being enacted in 2015. The regime was reviewed by the Parliamentary Commissioner for the Environment in another report published in 2019: *Focusing Aotearoa New Zealand's environmental reporting system,* which highlighted serious issues. The Commissioner reported "huge" data gaps undermining environmental stewardship, describing it as a "passive" and "fragmented" system, with unclear responsibilities and a mosaic of requirements across multiple pieces of legislation.[44]

"To say we have designed a national reporting system would be to overstate its coherence." … "New Zealand lacks consistent, authoritative time-series data and comprehensive spatial coverage. For example, the last national survey of land cover was taken in 2012 – how can policymakers make decisions using seven-year-old data?"[45]
Parliamentary Commissioner for the Environment, 2019

Because much environmental data is held by regional councils, data accessibility is a further challenge, and there is wide variability in the degree to which local authorities make data publicly available.

8.5.1 The National Environmental Monitoring Standards

The National Environmental Monitoring Standards regime is a regional council led initiative established in 2011 with funding assistance from MfE. It aims to improve consistency in the way that environmental monitoring data is collected and handled. It is the current vehicle for prescribing guidelines for state of the environment monitoring. Documents within the system prescribe the technical standards and requirements that apply throughout the country, including the way that data should be collected and handled. The framework is a work in progress. Standards are in place for some freshwater attributes, such as macroinvertebrates, suspended sediment, and dissolved oxygen. But many important areas remain absent, for example, continuous nitrate, fish, pH and submerged plants.[46] The National Environmental Monitoring Standards regime has been described by researchers as a widely agreed on but problematic platform, with "working groups being under-prioritised" so that "document writing only progresses slowly".[47]

The costs of developing guidelines predominantly lie with regional councils, which must pay for both traditional and new monitoring methods. This operates as a barrier to the uptake of more modern technologies.[48] Effective monitoring of freshwater is thought to require "a significant change of pace and funding".[49] A further barrier to a more consistent approach is that science capacity at the regional council level is itself variable and there are inadequate opportunities for collaboration between scientists at this interface.

"Scientists at regional councils are really time poor to have capacity to engage more widely, they have limited interaction outside of their council framework. Just monitoring, consenting, everything required takes a huge amount of their time." (STAG member)

"Scientists at regional councils don't get many opportunities to meet others and share notes, to discuss broader concerns and issues, except maybe once a year at a conference. If we want more consistency and connectivity, and better thinking, we need to build more opportunities for bringing scientists together. There is some great discussion when we do, but we don't do it enough." (STAG member)

8.5.2 Land Air and Water Aotearoa

Land Air and Water Aotearoa is an online portal established in 2014. It is a collaboration between regional councils and unitary authorities, and attempts to pull together publicly available state of the environment data. The vision is to provide easily accessible, understandable environmental data through an independently verified website.[50] The framework has slowly been expanded to work in greater partnership with agencies such as MfE, DOC and Statistics NZ in order to connect and share environmental data and information.[51] The initiative is a major achievement and is serving to foster greater consistency and access. However, it remains limited in scope with patchy coverage. Because it requires nationally consistent datasets, and these are lacking in many areas, Land Air and Water Aotearoa is updated on a topic-by-topic basis as more data sets become available.

8.5.3 Issues with regional council data gathering

While the Land Air Water Aotearoa and National Environmental Monitoring Standards regimes are valuable, they rely heavily on regional authority resource and capacity, so reflect their needs more than those of national environmental decision and policy-making. As one STAG interviewee noted, there is a continuing "need for a system responsive not just to supporting regional council needs, but [also] national policy requirements. Councils are the end users, but we also need the information for policy".

Data consistency and availability currently rely on effective regulatory drivers to direct the adoption of nationwide standards and methodologies. This means there is somewhat of a Catch-22 situation, since the development of the regulatory drivers themselves requires sufficient scientific information.

A significant part of the value associated with the promulgation of the NPS-FM 2020 lies in the potential impact it will have on driving greater data collection, monitoring and reporting, and for it to drive greater consistency through specifying specific measurements and methodologies. For scientists and policy-makers, the development of the NPS-FM is also an opportunity to improve and make more consistent the country's freshwater reporting and monitoring frameworks. Conversely, when standard and methodology setting is left to the local level, there is often a variation in response adding to the complexity of the wider framework.[52] This aspect is an underappreciated collateral matter relevant to the NPS-FM development process.

8.5.4 Impact of data gaps on the policy development process

Data deficiencies have severe practical implications for policy-making processes. This is particularly the case when undertaking regulatory impact assessments, as data deficiencies create gaps in our knowledge base that "bedevil our understanding" of the environmental aspects of the equation when cost-benefit analysis is undertaken.[53] And these gaps sit in "stark contrast [to]our economy where we are much more reliably informed".[54] They therefore contribute to imbalances in the broader system, where there is already an uneven playing field in favour of economic considerations, undermining the construction of a robust science-based response. And, as already noted, these gaps provide a space for contesting the science and leveraging uncertainties which can be used to stall reform.

The poor state of our national monitoring and reporting system leaves MfE in the situation of having to make "the most out of what we can get our hands on as opposed to being able to really drive the monitoring and reporting system that's needed."[55] It undermines policy development and the ability of MfE to defend policy decisions where the science is contested. It likely impacts on policy effectiveness and implementation. Researchers have highlighted that, overseas, policy targets and timeframes (such as those set by the European Water Framework Directive) have had to be adjusted, and a core reason for this was that effective monitoring capable of detecting the impact of policy changes had not been put in place.[56]

These issues are widely acknowledged, and impact not just MfE's work but also that of a wide range of agencies (including the Environmental Protection Authority, DOC, Crown Research Institutes and local authorities).

"Environmental data is not collected in a consistent manner and environmental reporting effectively relies on cobbling together what we have on hand"... "Without good environmental data good decision-making is difficult. There are significant data gaps such as the environmental fate of chemicals in soil and water, how the cumulative use of chemicals is affecting long-term soil productivity, the collection of chemicals in ground water" ... "We also need good, often long-term, data to allow us to measure

the efficacy of our decisions, and if they need to be revisited." … [we need] "a regularly updated environmental research strategy, and that funding for environmental research should link to the strategy."
Dr Allan Freeth, Chief Executive, Environmental Protection Authority, 2021[57]

The Parliamentary Commissioner for the Environment has recommended amending the Environmental Reporting Act to improve its operation and drive the changes necessary in our data collection system, including:[58]

- provision of a clearer purpose;
- establishment of a standing science advisory panel;
- development and identification of core environmental indicators to form the backbone of reporting;
- refocusing of the system's priorities while retaining state of the environment reports;
- replacement of domain reports with flexible, theme-based commentaries;
- requiring a formal response from government to state of the environment reports, to make the system more responsive.

8.6 Capacity and capability

Various capacity and capability concerns were also expressed by members of all advisory groups, in relation to central and local government and iwi/hapū. Science and mātauranga Māori expertise are in high demand, but there has been a historical lack of resourcing and support to build capacity and capability across both these areas. This has consequences for the quality of knowledge translation and communication associated with the policy development process. This is an aspect that will be explored in more depth in the following section, but the two are highly connected.

8.6.1 Capacity and capability in MfE

Many interviewees spoke of long-term under-prioritisation, under-resourcing and a lack of expertise building within MfE, making the Ministry heavily reliant on external advice. They also noted a lack of experience within the organisation. A common sentiment was that "most people at MfE are young and relatively new to policy analysis and development", and while they were typically viewed as "highly dedicated, intelligent" and "bright", they tended not to remain in the position for very long. Interviewees were very aware of a high staff turnover within the Ministry, which led to a cycle of bringing the next person 'up to speed' on issues that were often highly technical. The task of building relationships and understanding within the policy process was made more difficult and time consuming because of this turnover and it led to worry about the ability of the Ministry to effectively support the policy process.

"It felt like we saw a lot of different people come and go. Smart young people, very smart, but young and they didn't stay long. There seemed to be a high staff turnover, so things like experience and institutional knowledge was a problem". (STAG member)

To get a more detailed and informed perspective of the institutional pressures and challenges facing MfE, the most recent Performance Improvement Framework review of the Ministry was examined. Undertaken in 2018, just prior to the commencement of work on the NPS-FM 2020, it provides a valuable snapshot of the Ministry at that time.

Performance Improvement Framework reviews are a tool to assist government agencies to build on their strengths and identify priority areas for development. They look at the current state of an agency, its work programme and organisational management, and how well it is placed to deal with upcoming issues. The reviews are published on the website of the Public Service Commission.[59] MfE has had reviews in 2012, 2014 and 2018.

These reviews underscore a number of the observations and concerns raised by participants in the NPS-FM 2020 workstream. The 2018 review identified several factors that were confounding MfE's operations and delivery of its core functions.

"There is little doubt that MfE has many capable, competent and dedicated people who do an excellent job for the organisation. However, its ability to make the most of its human resources is thwarted by its high historical and current staff turnover. This turnover at a concerning level of 25% undoubtedly affects its impact, credibility and momentum."
(MfE Performance Improvement Framework Review, 2018)[60]

The review notes that this turnover is not compatible "with realising the capacity to meet its ambitious targets."[61] The staff turnover rate has since dropped to 9.5 per cent. However, the fundamental fact remains that the average length of service with the Ministry is only 3.3 years.[62] The age of people at MfE is also very young, with more than 60 per cent of staff being

under 35 years old.[63] These metrics raise the issue of lack of institutional knowledge and experience, as well as continuity.

Differences in staff demographics between MfE and MPI, in relation to the age, experience and gender of employees, as well as the relative size and resources of each agency, were highlighted by STAG members. The concern was that collectively these differences created uneven power dynamics that had the potential to influence the policy development process. The high staff turnover, younger age and proportion of female employees (data indicates that around two thirds of MfE staff are women)[64], sits in contrast to MPI. There, the average age of staff is 44 years, the workforce is much more male dominated and the average term of service is between eight and nine years.[65] While there was not scope within this study, it would be interesting to explore in more detail the first-hand experiences of MfE employees to obtain their views on the power dynamics that played out.

To put the small size of MfE in perspective, in 2019 when work on the NPS-FM was taking place, the Ministry had a full-time staff equivalent of just 360 people. This can be compared to the more than 3,000 staff at MPI.[66] This staffing differential is mirrored in the agencies' respective budgets. Crown revenue funding in 2019 was $76 million for MfE, $399 million for DOC and $518 million for MPI. Indeed, MPI's revenue stream from other sources that same year, such as levies and industry contributions, contributed a further $205 million.[67] In contrast, MfE has few additional external funding sources on which to draw.[68] Year on year MfE runs on a budget of less than 20 per cent than that provided to MPI.[69] This raises the potential of power imbalances that could disadvantage MfE in its negotiations with the much larger MPI.

The 2018 Performance Improvement Framework review made a number of key observations about the relationship between government agencies. It was critical of how well MfE, MPI and DOC were collectively working together, noting that there was a need to shift lenses to formulate a more system-wide and integrated approach: to develop a shared vision. This was identified as a barrier to delivering effective outcomes.[70]

The review underscored the disadvantages suffered by MfE, in comparison to the other agencies, not only in size and resources but also because the Ministry is so heavily reliant on regional and local government and the Environmental Protection Authority for delivery capacity (in a way that other agencies are not).[71] It noted that MfE found collaboration with MPI "challenging".[72]

Interestingly, MPI's most recent Performance Improvement Framework review, which was undertaken in 2016, notes its far more dominating presence when interacting with other agencies. The review records that other departments and organisations found MPI "diffident about the nature of whole-of-government processes" and sometimes "hard to work with, having a predilection to work in its own space".[73] It also notes that there is a resistance to taking a longer-term view, and that more care needed to be taken in ensuring its research priorities "were based on a good understanding of the science."[74]

On the other hand, reviewers characterised MfE as a "small but important policy shop"[75] that has "a limited space to operate and a diluted mandate".[76] The commentary paints the picture of a small under-resourced agency, struggling to compete against the bigger government departments and to take a more powerful lead in its core area.

The impact that differences in size, resourcing and workplace demographics had on the policy outputs for the NPS-FM 2020 remains unclear. Officials, for example, underlined that people with a range of experiences and tenures within MfE were working on the NPS-FM. The review was a significant focus for the Ministry and as such it had "a large MfE team working on a large work programme", whereas MPI, with its much wider mandate, was spread across many more issues (food safety, biosecurity, animal welfare etc). This meant that the policy teams were more closely matched than might be expected, and comparisons of the Ministries' workforces at the macro level were perhaps less important than imagined.

However, taking the broader view and given the scale of environmental challenges we face today, there remains a strong argument for expanding and better resourcing MfE to play a more critical, higher value role in policy-making. The 2018 MfE review made recommendations along these lines. It called for greater alignment and public sector stewardship: the challenge it set for MfE was to "reconceptualise itself". The review emphasised the need for MfE to step into its stewardship role further and take a more "unapologetic" *lead* in the natural resources sector, an area in which it works closely with both MPI and DOC.[77] It said that MfE needed to "own its role" and become the "system choreographer" or architect, establishing and managing the broader system required to deliver complex environmental outcomes. MfE, it was reiterated, is the logical agency to fulfil that role.

However, what that review also highlighted was that in order for MfE to do this, systemic issues require addressing. Many of the supporting recommendations will therefore be familiar:

- a significant and intentional paradigm shift is required in science and research investment to support the work of MfE;
- the historical focus on economic use of the environment, and on identifying negative impacts and mitigation approaches, has "rapidly decreasing relevance" and a shift towards a "solutions and improvement" focus is needed;
- a high quality national environmental monitoring framework is required, and is essential to support enviromental improvements and increase transparency;
- improved communication, collaboration and national leadership from MfE is needed, especially in respect of regional government, which is critical to implementation.

"Building a foundation of definitive evidence, information and intelligence" was viewed as crucial to developing and supporting that leadership, and the necessary credentials to fulfill the role.[78] The review also noted the importance of strengthening MfE from a democratic and social good perspective. There was an urgent need for a joined up national discussion on beliefs, values, aspirations and bottom lines to give voice to the public's concerns. Current frameworks were too fragmented and bureaucratic, and did not achieve high levels of engagement and participation. The review observed "the key feedback from the New Zealand public is that what they value about the New Zealand environment, has been undermined or ignored."[79] MfE is the most appropriate agency to uphold the public interest in the environment, but achieving this requires broader systemic weaknesses and inequities to be addressed.

8.6.2 Capacity and capability to support mātauranga Māori

Existing capacity and capability to support mātauranga Māori was a significant concern of Te Kāhui Wai Māori members interviewed. If the capacity and capability of MfE was under strain, more broadly, then this was doubly the case in relation to Te Kāhui Wai Māori and its inputs.

> *"MfE seemed to have lots of analysts but we needed analysts that understood te ao Māori, and our language. Initially we found that our advice just wasn't understood or was even deliberately ignored. So we ended up employing our own advisors with MfE contracts. It was good there was support provided for that, but there was a clear gap there."*

> *"I found it mindboggling, it's clearly a whole area of the Ministry that's been completely underfunded. There were very few Māori working there and those who did were very young, junior, so weren't empowered to speak and had limited contribution. There was little Māori leadership and capacity. This was a huge barrier to our work and was why an independent secretariat was needed for Te Kāhui Wai Māori. MfE couldn't have provided that support in-house."*

Raewyn Peart

Lake Wānaka

"Most of the people at MfE are young Pākehā women and they stay 2-3 years. For many it's their first entrance point to government and their first experience with Māori. Ministry staff just weren't competent, it was a capability issue, they didn't understand what we were asking."

The high staff turnover also impacted on relationship building and was viewed as a systemic issue in government, and not one isolated to MfE.

"The staff turnover in all of the institutions Māori have to engage with, it's appalling. You build relationships and understanding, then need to start again. It happens at council too, and they are so pivotal. For implementation, relationships as well as capability are important."

Te Kāhui Wai Māori interviewees were also concerned about whether iwi/hapū had been adequately resourced and had sufficient capacity and capability to engage in the new NPS-FM to the full extent sought. Members emphasised that the strengthening of Te Mana o te Wai, inclusion of Māori freshwater values, and enhanced role of iwi/hapū in decision-making and monitoring (including incorporating mātauranga Māori) all come with increased expectations on Māori to engage and undertake this work. Te Kāhui Wai Māori members highlighted the need to develop sustainable pathways for iwi and hapū to do this work themselves and not be reliant on consultants. Considerations such as capacity building, funding and retention of expertise are all likely to be challenges moving forward.

Interviewees also underscored the diversity of resourcing, capacity and capability between iwi, who did not all start on the same footing, and who are not all equally able to engage and respond to the new requirements. They noted that big, settled iwi often had resource management teams and there was clarity around who councils should contact, enabling established relationships to develop. However, in other areas, such as Northland and Hawkes Bay, many hapū had expressed tino rangatiratanga but had not yet settled their te Tiriti grievances so had poor resources. As a result, it is more difficult for both the Crown and councils to work through the reforms and implementation with these groups. There was concern that insufficient consideration and resourcing had been given to these aspects in the policy process.

"Non-settled iwi need to be funded to do this work. It's not just a resourcing issue, it can also be an organisational one. The degree of cohesion, internal policy development and expertise disadvantages them at the table, especially if they have to engage with resistant councils. And some councils really need to still get their heads around these issues and have a bit of a reset, a culture change. There are some big roadblocks in place still."

"I think the methodologies and mātauranga Māori knowledge exists locally to do this. We've been doing it for a long time, but there is debate around it all. We've been building capacity but there's a gap in resourcing to help manage and develop that."

"We need the resources that set out how to give effect to the mahinga kai, the process to develop that. Then we can transplant the good, effective models to groups that don't have that maturity and capability to work on that aspect."

The government is aware of these issues and the challenges that implementation of the NPS-FM raises for both council and iwi/hapū capacity and capability.[80] MfE has established a Freshwater Implementation Group, with representatives from MPI, to oversee implementation. This is setting up a "Te Kupenga" (a network of specialist technical advisors including Māori technical specialists) to support the work.[81] The first set of guidance advice will focus on the new compulsory mahinga kai values. It will provide training and guidance to lift the capability and capacity of the sector to give effect to Te Mana o te Wai.[82]

Interviewees also emphasised that greater support for te ao Māori and mātauranga Māori in regulatory settings, policy processes and implementation is currently necessary. Kukutai et al highlight that "hierarchies of evidence" currently privilege particular kinds of knowledge over others. This means that, where mātauranga Māori inputs and Māori values conflict with other regulatory priorities, a clearer more rigorous approach is needed.[83] As our story on the DIN highlights, policy options that rate very highly for compliance with Treaty principles, and Te Mana o te Wai as well as effectiveness, do not necessarily compete well against economic considerations. The regulatory priorities set down in processes, such as cost-benefit and regulatory impact assessment analysis, likely need deeper thought and review in this area.

Matauranga Māori inputs to the policy process are of a very different nature to contemporary science inputs. The policy supports, checks and balances and processes necessary to foster their development and incorporation into policy, while protecting their distinct approach and integrity, are still in their infancy.

"The notion of scientists providing objective evidence input to policy, while also remaining somewhat detached from it, partly results from the articulation of science and policy as separate spheres with distinct cultures, methods and epistemologies. In te ao Māori, it makes little sense to draw a sharp distinction between science as the creation of knowledge

and policy as the enactment of knowledge. Science and policy exist alongside each other."[84]

This is an exciting and rapidly evolving space. It is also proceeding faster than existing policy settings and processes can respond. Concerted directed thinking and structural innovation is needed to appropriately support this work. Kukutai et al have recommended the following:

- greater supports to enable closer relationships and authentic partnerships between scientists and policy-makers;
- better policy settings for equitable access to science sector resources;
- greater numbers of skilled Māori in influential roles at the science-policy interface;
- efforts to improve understanding of responsibilities of policy-makers;
- greater development of knowledge translators;[85]
- proper resourcing of science in the rangatiratanga space and development and deployment of science initiatives directed to Māori.[86]

There are numerous intricacies arising at the science-mātauranga Māori interface that also need addressing. For example, traditional approaches to evidence-based policy-making place high priority on objective, replicable evidence, but mātauranga Māori inputs are not articulated in a way that is readily amendable to being applied in this frame.

Inadequate understanding of mātauranga within the broader science community is already causing tension in some quarters. Some within academia have even asserted that mātauranga Māori is "not science" and should not be accorded the same status as contemporary or "Western" science.[87] This debate arose following proposed education curriculum changes which attempted to ensure parity between mātauranga Māori and other bodies of knowledge.

The controversy prompted the Royal Society to speak out in rebuttal to reject a "narrow and outmoded definition of science".[88] Māori scientists, such as Dr Dan Hikuroa, remind us that Māori cultural understandings are based on systematic observation, experience and relationships built up over generations. They frequently possess the same 'scientific' rigor – but information may be expressed very differently, even as part of myth and legend.

Spotlight on braided rivers and taniwha

"For generations, local Māori have conceptualised the stream as a taniwha (water monster) in the form of a lizard. The river's headwaters are the taniwha's head, the main channel is its sinuous body, tributaries form its legs, and where the river leaves the hills and flows onto the plain, that's its flicking tail."

The lizard shape describes the geomorphology of braided rivers, and the presence of the taniwha conveys a warning: "not only does it tell you what to expect — that the tail will flick from side to side — but because it's codifying it as a taniwha, it effectively becomes a disaster risk reduction strategy at the same time. It's the evidence, and it's the policy."[89]

The rules, embedded and expressed through mātauranga, provided guidance for practice. When a flood engulfed the township of Mātata in 2005, few buildings escaped damage, but amongst those that did were the three marae. "The reason was a pūrākau, a narrative applied to the landscape. The river was said to house a taniwha in the form of a lizard, its tail flicking side to side, a sign that people should be cautious. The story contains a basic geomorphological fact; the lower channel of the river laterally shifts after floods." [90]

"The two forms of knowledge (contemporary science and mātauranga Māori) are not inherently in conflict, and can be complementary. It is an idea, appropriately, informed by the structure of a braided river itself: he awa whiria, two channels weaving and twisting, creating something stronger.[91]

Dr Dan Hikuroa asks us to "imagine two strands of knowledge, when you have woven them, they'll be stronger than if those individual strands were on their own."[92] How these strands are woven into policy, and interpreted and applied in practice, is one of the upcoming challenges we will face as mātauranga Māori is increasingly incorporated into our regulatory frameworks.

While the debate over the science curriculum demonstrates the more overt face of bias, most is far less visible. It is reflected in "sustained underinvestment in Māori research infrastructure, Māori capacity and Māori science advice across the sector" that operates to perpetuate "inequities in what is considered legitimate evidence."[93] It is seen in the

"choices about what is worth evidencing, how to evidence, whose view counts, and who has resources", all of which tend to favour dominant world views and create closed and exclusionary loops; where the preferred researchers and approaches have preferential access to research, evaluation and policy-makers and processes."[94]

Addressing these inequalities will require building an indigenous science curriculum at the tertiary level, to deepen cross-cultural understanding. It will also need to be done on a very practical level, to enhance science capacity and support for iwi.[95] Such initiatives would not only build capacity and capability, but develop further expertise and knowledge of the interface between mātauranga Māori and contemporary science.[96]

Now that mātauranga Māori has been incorporated into the NPS-FM more fully, concern was also raised about how these issues will play out in the courts when decision-making and plan changes are legally contested, as they invariably will be. Interviewees had more questions than direct criticisms in this arena.

How will decision-makers and the courts deal with mātauranga-based evidence? There will likely be arguments that proposals affect the exercise of kaitiakitanga; that discharges degrade the mauri of the wai, deplete mahinga kai and compromise the ability of iwi to show manaakitanga so diminish their mana and rangatiratanga. Should the courts be able to examine, interrogate, disprove or even reject mātauranga based evidence? What might be acceptable grounds for doing so and how should the investigation proceed? What kinds of new conflicts and tensions will emerge and how will the courts address these things?

Raewyn Peart

Lake Ōkareka

Spotlight on the Environmental Protection Authority guide to mātauranga

The Environmental Protection Authority recently produced a guide on its mātauranga framework, identifying a number of areas of legal risk in handling mātauranga evidence. These included an increased risk of predetermination or bias, including unconscious bias arising from a lack of familiarity with the cultural perspective. The guide also identified the increased risk of misinterpretation when there is a lack of understanding. In addition, courts might discount oral tradition because it does not conform with the hearsay rule.[97]

The Authority notes that the traditional criteria utilised for scientific inputs raises new difficulties when applied in this arena. For example, "mātauranga experts will not necessarily have the same degree of independence that scientific or technical experts have, because they are experts in their own culture."[98] A review of court judgments, commissioned by the Environmental Protection Authority, found examples of courts rejecting mātauranga evidence on the basis that the person giving it was not sufficiently independent from the issue at hand.[99]

The guide has been produced to raise the awareness of decision-makers on the issues and challenges arising at this interface and to assist them in dealing with mātauranga Māori evidence. For example, the guide covers how to test conflicting evidence in situations where it is necessary to prefer some mātauranga evidence over others: through examination of connection/whakapapa, the cultural concepts, value and practices, and the external evidence; and consideration of how widely the evidence is expressed.[100]

There is a need to work closely with Māori to develop a better supporting framework around mātauranga Māori inputs into the implementation of the NPS-FM 2020, and the guidance necessary to ensure they operate as intended.

8.7 Science and knowledge communication

A final area that frequently came up in our discussions with interviewees was science communication. There were number of related threads to this: knowledge translation into policy and bridging work, engagement

and socialisation of ideas to build social licence, and how to address misinformation and even disinformation campaigns.

The more complex the science, and the more controversial the issues that policy must address (ie the more 'wicked' the problem), the greater the need for effective science communication. Issues such as climate change and freshwater have been identified as especially intractable matters that countries around the world struggle to address.

Today's policy analysts must not only assess a much vaster array of information, they must also assess its quality and sufficiency as a basis for policy. With increasing uncertainty comes increasing risks to weigh and manage. It is important that regulatory policy directions support and guide these assessments. Effective science communication is also central to this process, to assist decision-makers to understand the complexity of the issues, make accurate and effective risk assessments, and make decisions where uncertainties exist.

> *"Science today is no longer considered a linear search for 'truth', but rather, increasingly the analysis of complex systems leads to scientific conclusions expressed as probabilities rather than certainties… Ironically, with the enormous progress in science, there is a commensurate increase in the complexity and incompleteness of our knowledge. The very issues for which policy-makers most urgently need scientific advice, are the issues for which the science is often far from definitive."*[101]

The availability of skilled science communicators is important for articulating the science and its implications to officials, to ensure accurate and effective translation and use of science for policy. The MfE officials we spoke to were acutely aware of the challenges in this area.

> *"Some of this stuff was really complex, complex concepts and relationships. But understanding that was fundamental to understanding what we were trying to do, the factors we had to consider, the connections. We aren't all scientists, and it can be really difficult for lay people to get their head around some aspects, like sampling methodology. There were lots of challenges to ensuring the science advice was properly translated into policy."(MfE official)*

The high staff turnover, discussed earlier, was an additional barrier to science communication.

> *"Science communication was definitely an issue. It felt like we had to keep re-teaching people to bring them up to speed. They were clever and willing, but that slowed things down in an already rushed timeframe."* (STAG member)

Where science communication is weak, the risks at the science-policy boundary become more pronounced. Researchers investigating bridging work undertaken at the science-policy boundary emphasise that transparency is essential, to prevent officials from operating as knowledge brokers, or 'gatekeepers'. Their role of making complex decisions on multiple levels, about what aspects of the science are passed on or kept back, can give them a profound influence over the integration and translation of science into policy.[102] This interface was one of the less transparent parts of the policy process for the NPS-FM 2020, made more complex by the involvement of multiple agencies. Enhancements to transparency at this important bridging point in the science-policy interface would have been valuable.

8.7.1The need for more science communicators and facilitators

A role in the NPS-FM policy process that appears to have been underdeveloped was the formal use of science communicators and people equipped to facilitate the translation of science into policy in order to connect the dots. This was an area in which several interviewees felt that the policy machine in this country generally 'doesn't do well on' and that it was important to try and build this more formally into the process.

> *"Overseas it's understood that science communication is key to the policy process. They have knowledge brokers and science communicators built into the process: people that focus on translating science for officials, science for policy, science for the public. I'm a scientist, I can provide facts but that's the best I can do. How those are taken and used is out of my remit."* (STAG member)

> *"We need to build and strengthen the role of science brokers, communicators, facilitators into the process if we want to be really rigorous. Science translation is a skill." (MfE member)*

We were told that an important aspect to address, when selecting people to be involved in policy work, was to ensure that some effective skilled science communicators are included. In the same way that officials need people who can explain the legal interface, it is important to have people capable of synthesising information and putting it into a form that is accessible. A number of people also emphasised that "communication" is

not a skill frequently found amongst the science community and was a role few were adept at or very comfortable with.

> *"Science communication is always tricky. If you simplify things too much that creates inaccuracy. It's key to have some good science communicators in the room, not everyone is good at it, it's a skill." (STAG member)*

Studies have shown that 'front room scientists' are generally both more experienced and better prepared, and they have a greater understanding of the knowledge exchange process. They know that, by necessity, the role must extend beyond technical science matters to social, political and economic realities.[103] The separation of the STAG (and so the science) from the broader political and economic considerations in the policy work for the NPS-FM 2020 likely reduced the ability of STAG scientists to provide more effective science (and so policy) advice.

8.7.2 The role of science advisors

One aspect of the policy supports that we were keen to investigate further was the role of departmental chief science advisors, their participation in the policy development process, and the value added by this position.

In 2008, the role of the Prime Minister's chief science advisor was established to advise the Prime Minister about how science can inform good decision-making.[104] Sir Peter Gluckman was the first to take up the position, which he held for a decade. He issued a number of influential reports, including of particular relevance to this inquiry, '*Towards better use of evidence in policy formation*' in 2011, '*Interpreting science-implications for public policy understanding, advocacy and policy formation*' and '*The role of evidence in policy formation and implementation*' in 2013, and '*Enhancing evidence-informed policy-making*' in 2017.

An early recommendation was that Ministries should establish chief science advisor roles within them. The overall aim was to create a 'science advisory ecosystem', of which departmental chief science advisors would form an important part, alongside a "healthy and politically independent research community" and "highly effective science communicators".[105] This science advisory system would assist to bridge the gap between science and policy and perform an important knowledge brokering function.

A number of government departments subsequently followed this advice, and by 2017 both MfE and MPI (as well as a host of other bodies including the Ministry of Health, MBIE and DOC) all had chief science advisors in place.[106] What was somewhat surprising, however, was that almost no interviewees we spoke with had a clear view of the role or involvement of the relevant Ministry's chief science advisors in the NPS-FM 2020 policy process.

> *"I suspect chief science advisors are adding value, even if we can't yet see many of the ultimate benefits of that. What they are doing is raising the profile and place of the science, giving greater prominence to it. They are also providing a forum for better networking and connection. Silos will always exist, but if we want to tackle issues that sit across these, we are going to need people like this across the board. We still have some material problems to overcome though."* (STAG member)

> *"Chief science advisors helped? They haven't done harm. I'm not sure yet how much they've helped. I think at the moment that still very much comes down to who the individual in the role is. I'm not sure we are harnessing the necessary intellectual grunt of those positions yet. It's certainly not utilised enough in the policy process".*

The only chief science officer specifically referenced in response to questioning in this area was that of DOC.

> *"I know that DOC's chief science advisor definitely helped. He was a pipeline between science providers and provided a point for increased collaboration."* (STAG member)

These comments highlight the detachment of the chief science advisors from the coal face of the policy development process, and their impact and value added here remains unclear. It has been noted that there is considerable variation in the ways and extent to which departments deploy chief science advisors, and this appears to have been the case here, with DOC's chief science advisor being the most visibly engaged.[107]

The Prime Minister's chief science advisor commented, in 2017, that departmental chief science officers were being underutilised and that this represented a missed opportunity. He noted that they were appointed precisely for their ability to provide valuable insights on scope setting and policy ideation, to assist in situations where officials must consider and weigh complex or uncertain evidence, to assist with science communication, and to operate as a direct advisor to the Minister.[108] These tasks are all key to the policy development process, and the Prime Minister's chief science advisor has reiterated that "a more consistent view of the DSA (departmental science advisor) role" is required to ensure they are "brought into the policy development process and that their input be directly and explicitly available to Ministers."[109]

The underutilisation of this role has left many scientists supportive of the position in principle and optimistic about its potential, but underwhelmed with the value being added in practice. Some members also raised concerns at the selection process, and whether it was sufficiently robust, noting that a lot of political considerations influence appointments.

> *"The role of chief science advisor, it's a very political one, and I think that needs to be sorted. We are still hiding away our best and brightest, putting them in a corner and restricting them. The chief science advisor has greater space and voice, but that selection and role is political, and that makes it a very complex thing to disentangle."* (STAG member)

It is common for the role of chief science advisor to be a part-time secondment position, with researchers frequently drawn from Crown Research Institutes and occasionally universities. MfE currently has a full-time chief science officer, drawn from Landcare, with a background in soil science and geomorphology. MPI's chief science advisor has a background in agricultural science, is an adjunct professor at the University of Auckland, and former principal scientist for DairyNZ.[110] Their backgrounds reflect the science priorities of each Ministry. Given some of the political optics associated with the position one interviewee suggested that the terms of reference and conflict of interest requirements for the role need to more fully circumscribed.

A recent report on knowledge sharing between academics and policymakers, produced by the Office of the Prime Minister's chief science advisor, recommended that consideration be given to appointing chief science officers "in high priority areas where there is likely to be a long-term need for science advice".[111] For example, specialist chief science advisors could be appointed in specific areas like climate change, freshwater, energy, biodiversity or infectious diseases. Such positions could be tied to national priority areas and strategies.[112] In addition, the report recommended the provision of training to chief science advisors in science communication, knowledge brokering and networking, to ensure they are connected to relevant academics.[113] The report noted that there were "compelling arguments" for a review of the current operating model for chief science officers to maximise the benefits of this framework.[114] These recommendations highlight that there is broad recognition that the framework needs further refinement and support to enable it to fulfil its full potential.

Raewyn Peart

Wetlands on the shores of Lake Pūkaki

8.7.3 Mātauranga chief science advisors

During our interviews and discussion around the further work necessary to support the incorporation and use of mātauranga Māori, the need for more Māori chief science advisers was raised, in order to assist, monitor and review the utilisation of indigenous knowledge for policy.

The lack of Māori science advisors was also noted by the Prime Minister's chief science advisor, who pointed out that Te Puni Kokiri had not created such a role, despite his urging. The benefit of an advisor within Te Puni Kokiri, it was argued, was that he/she would "better bring to bear the considerable formal research on mātauranga Māori and other relevant research disciplines as well as providing a Māori perspective to the collaborative activity of the DSAs [Departmental Science Advisors]".[115] It would also help unlock the importance of traditional knowledge to areas like environmental health in an applicable and policy relevant way.[116] This role is notably still lacking.

Two agencies have appointed Māori to core advisory roles. The Environmental Protection Authority's principal advisor leading development and implementation of the Authority's mātauranga programme has tribal affiliations to Waikato and Ngāti Maniapoto. The Ministry of Social Development's chief science advisor is of Ngāi Tūhoe descent and is also a Professor of Indigenous Studies at the University of Auckland.[117] Both have a seat on the Chief Science Advisor Forum coordinated by the Office of the Prime Minister's Chief Science Advisor.

The creation and further development of Māori chief science advisors within key government departments was also recommended in the *Tiriti-led science policy approach for Aotearoa New Zealand* report. This suggested that these positions be resourced to connect and extend cross-agency Māori science leadership capacity.[118] The vision set out in the report is ambitious and would significantly strengthen the role and support for mātauranga Māori.

The report additionally recommended the establishment of a Mātauranga Māori Commission, sitting outside the public service with autonomous governance and baseline funding, to provide leadership over mātauranga Māori including setting Māori knowledge priorities. It also envisioned te ao Māori policy hubs that would work to identify iwi, hapū and community policy priorities and needs, and provide a forum to foster Māori thought leadership. These hubs could operate as key connectors between Māori researchers, experts and policymakers.[119]

The report highlights a number of additional issues for Māori that require further work. For example, data sovereignty and the imperative to "develop Māori controlled data infrastructure that meets Māori data sovereignty best practice and supports wise decision making" needs to be addressed.[120] Such a framework would enable a far more effective partnership with the Crown, by properly supporting autonomous Māori science advice and decision-making.[121] The report indicates the types of mechanisms and structures that are possible, and gives insights into what the future of a properly supported mātauranga Māori-based advisory system might look like.

8.7.4 Science communication: socialisation of policy

The aspect of science communication that attracted the most comment, and the most highly critical feedback, was science communication for the public and stakeholders. Interviewees underlined the crucial importance of effective science communication in building the social licence necessary for reform. This included building better understanding of the policy, communicating the need for it and how it would operate in practice, and combatting misinformation.

> *"So many environmental issues are urgent and we haven't done a great job of ensuring people are aware, that they have the basic facts, we haven't done a good job at science communication. We need to do better at explaining the practical implications to the public, so they get how important action is, that it's relevant to them, it's not just all theoretical or esoteric."*

> *"A key failing has been not keeping the public and stakeholders aware of the science, the environmental problems, the solutions. If we don't do that the problems aren't understood."*

> *"We need more scientists to communicate. When you have scientists that are good communicators that can open political opportunities. It's a skill to be able to bring a whole lot of material together and assist the audience to understand what it means."*

> *"Some of the issue is not just science communication, its science education, and that's broader."*

Science communication is an area where Aotearoa New Zealand is lagging. Universities are only just beginning to offer science communication courses. These provide training, not just in science communication itself, but in the complexities of the role: "the broader 'civics' of science including science communication, science-in society approaches and the philosophy

and ethics of science and science policy interactions."[122] This is necessary, because science communication is not simply required to assist officials and decision-makers, it is a central part of the policy socialisation process, bringing understanding and therefore reassurance to the public at large. Tight policy timeframes can operate as a barrier to public facing science communication, but it is a frequently an under-planned and under-managed aspect of the policy development process, and one that can significantly undermine the social licence for reform.

8.7.5 Public engagement and the policy 'roadshow'

As part of the socialisation process for the NPS-FM 2020, a freshwater 'roadshow' was organised and taken around the country. This event was highly criticised by both STAG and Te Kāhui Wai Māori members who felt there was a weakness in the science inputs to the roadshow. The policy roadshow event ran as part of the public consultation process. This involved 17 general public meetings, eight meetings focused on the primary sector and rural communities, and 16 hui for iwi/Māori around the country.[123] A number of scientists (STAG and non-STAG) were involved in these events, to facilitate discussions and build community understanding of the science.

The concept and practice of undertaking such a roadshow was wholly supported by all interviewees. They saw it as a positive and important aspect of the policy process, facilitating active engagement with the public, and providing a space for community voices to be heard and more in-depth conversations to be had. Aotearoa New Zealand was even characterised as "ahead of our colleagues in Europe" in bringing the community and community values into the policy development process. The impression we were given was that there was less comprehensive consultation overseas.

Most interviewees felt, however, that we still do very poorly in terms of our science communication, and that this was reflected in the roadshow events. Interviewees said that better management and a more strategic approach was needed.

First, the events tended to draw "the vocal minority that actively lobby and engage", and that increased effort was required to explain the relevance and importance of freshwater reforms to the broader community and ensure 'whole of community' engagement. It was noted that discussion at the roadshow events was dominated by special interest group concerns, and that discussion and understanding of the broader 'public good' considerations relevant to policy reform, was sidelined as a result. We were told that both conversations are necessary, but there was an imbalance in focus.

Secondly, the events frequently ended up "just being a huge argument between people who had preset, often incorrect views, with groups set on opposing changes in principle". This was an area where the impacts of science misinformation were visible.

> *"Even when we explained that the National Bottom Lines proposed were more permissive than what was already in place in a region – because their plan already set higher standards – there was still opposition. There was opposition in principle. People didn't understand what was being changed and didn't want to. They came out guns blazing and already worked up."*

> *"It was clear that there had been lots of scaremongering of the farming sector and there was basic confusion about the NPS and settings."*

Thirdly, it was considered that the role of science communication needed to be more front and centre at these events. It was underscored that effective science communication requires a unique skill set and that the appointment and selection of scientists for this task needs careful thought and a more strategically directed approach.

Lastly, most interviewees noted that there was a level of disorganisation around the roadshow and hui events. Members of Te Kāhui Wai Māori were especially critical of the hui that were organised and thought that, while well-intentioned, insufficient planning and attention was given to them and they had been "poorly organised and managed". They reported that people had been sent to some events only to have them cancelled at the last minute. It was noted that advance notice was needed to enable optimal attendance and preparation time for iwi.

All of these issues highlight the need for a more planned and strategic approach to policy roadshow events; in terms of audience targeting, management and preparation, science communication and strategies for dealing with misinformation.

Several interviewees cited the science communication response that had occurred in relation to COVID-19. They lauded the value added by those 'science stars' that had stepped up into that crucial science communication role: "we need to do a lot more of that"... "and do it in a planned and strategic way." This was viewed as an essential part of the policy process, enabling rational debate from a place of joint understanding. It should also be noted, however, that our interviews took place ahead of the national

anti-vaccination mandate protest and camp in Parliament grounds. Indeed, subsequent events highlight the need for ongoing and active management of misinformation, and the importance of addressing inequities associated with policy and building public trust.

Science communication has been an historical weakness of MfE and its 2018 Performance Improvement Framework review highlighted this as an area where the Ministry had capacity and capability shortfalls. The review emphasised that "facts don't speak for themselves" and that a range of communication-science disconnects exist, warning that "poor communication creates an opportunity for the 'narratives of doom' to overwhelm or displace the 'narratives of possibility'". [124]

The review found that MfE required a "much higher order communications capacity, able to create the context for, and understanding of science and data." Interestingly, MPI's most recent review had an opposite take on the same topic, noting that the Ministry needed to better filter "the evidence base on which compelling arguments can be mounted for increasing productivity in a way that is consistent with achieving environmental outcomes" and work towards articulating "a value proposition to New Zealanders as a whole, as opposed to the interests of the primary sector."[125] MPI's role in the socialisation process, and much closer access and relationship with stakeholders, should have greatly enhanced the lines of communication that existed with the agricultural sector. It may be that this shift towards a less stakeholder-influenced role, and the application of a stronger sustainability lens, is complicating communication with the sector. Similarly it is possible that unresolved tensions between MPI and MfE, with ministries having quite different views on the proposed policy and options put forward, muddied the way information was socialised and communicated.

Interviewees considered that the dynamics between MfE and MPI were slowly changing, and that there had been movement towards a stronger common vision (through a sustainability approach) than had been the case in the past. Where a policy initiative is being jointly led and communicated, as was the case with the NPS-FM 2020, additional planning will be necessary to ensure clear messaging, as inadequate preparation can have a significant impact on the socialisation process.

> *"From the farmers I've spoken to it's clear the Ministry, the Ministries, did a bad job of communicating. The roadshow was focused on arguing about specific things rather than explaining."* (STAG member)

> *"Communication is so fundamentally important to building understanding but there is no one size fits all approach. Different methods are needed for different groups. We had some industry sessions but they should have been more targeted to their concerns. We could have done much more work on that, there were missed opportunities. If you haven't done that groundwork ahead of a public meeting it undermines the thing."* (Ministry official)

A number of interviewees raised the issue of misinformation and felt that this had interfered with the science communication process. They thought that not just MfE, but all government agencies, need to be better prepared for misinformation campaigns and have a response strategy in place.

> *"There were definitely issues with misinformation, a lot of the economic forecasting had elements of that. There are a lot of subjective elements to the modelling, the methodology, that can be used to paint the picture they want."*

> *"Yes there was misinformation, more in the form of fearmongering. A lot of the information farmers were getting was just not correct and it made people really worried. It caused a lot of stress."*

> *"I don't know whether I would characterise it as misinformation, but there was definitely 'manipulation' of the costs forecasts that exaggerated the level of adjustment required."*

> *"The issue is systemic. The scientific community has done a terrible job of communicating the science of climate change too. This whole area isn't something that our frameworks are set up to do or experienced at doing. The public doesn't understand a lot of key aspects: probability, uncertainty, complex issues like these are ripe for people to take advantage of and spread misinformation, and they do."* (Ministry official)

> *"It's a trend. Information is increasingly contested. There are disputes over the seriousness and magnitude of environmental harm. Establishing that something is necessary can be difficult. People were being told that Te Mana o te Wai would mean shutting down all sorts of land-use and public access. There was a lot of scaremongering."* (Ministry official)

These issues are not unique to Aotearoa New Zealand, but they are becoming more pervasive as the increased channels of communication are ever more easily utilised to disseminate unreliable, biased or even intentionally false information. Such issues have been recognised as a threat to the democratic process, social cohesion and good governance.[126]

8.7.6 "Democratising science" and "socially robust knowledge"[127]

Globally there has been a trend towards greater public involvement in science and the contesting of science in public fora. Some legal scholars have highlighted that these situations should not necessarily be framed in the negative, as value exists in the additional level of scrutiny that it brings to decision-making.[128] It drives a deeper, more robust review of the science, and tends to lead to increases in transparency, enabling the science and views on it to become clearer. It can also help shine a light on hidden biases operating within established institutions and processes, providing enhanced accountability.

In making the case for a more participatory approach to science, Liberatore and Funtowicz argue that, in line with the democratic ideal, dissent must be recorded and engaged with. Agencies should actively try to identify and clarify sources of conflict, to understand the drivers of it, and directly address these if possible.[129] In a post-truth environment, science communication is not a 'good to have' but a 'must have' and there are also important educative and trust building benefits to making the science more open and accessible, and providing a space for all voices to be heard.

The observations of interviewees involved in the development of the NPS-FM 2020 reinforce a broader call for deeper thinking about how government and decision-makers engage with the public and stakeholders, and communicate to make the case for reform. Increasing levels of misinformation place additional stress on the policy system, and are likely to require far more planned and strategic management than in the past, including the building, resourcing and refinement of science communication expertise.

8.8 Science institutional reform

Our study of the science-policy interface highlights the need for structural reform of our science service system. The feedback from interviewees reflects that there is widespread agreement and concern regarding our current science capacity and capability, at both the ministry and local government levels. High staff turnover exacerbates this issue. Science for policy work is typically undertaken by temporary, ad hoc groups, where the scientists involved are not remunerated for their efforts (only for their expenses) and are expected to undertake the role on top of their other work commitments. This also undermines the quality of the science work possible. That this work operates under tight timeframes, and that many of the scientists involved have only a transitory role, further complicates the operation of such advisory groups; just as trust and relationships are built and those new to the policy process have found their feet, their role ends.

Although there are dedicated, permanent advisory entities in some areas (such as climate change), similar structural support does not exist for the vast majority of pressing environmental issues, whether that be for freshwater, marine or biodiversity protection. Such issues require a dedicated, long-term adaptive management approach to resolve. This means that a truly robust science-policy process requires sustained science advice bodies to support relevant research and science review. Sporadic, ad hoc science advisory work is insufficient. This has now been recognised with several proposals for change on the table.

In a discussion document released in February 2022, MfE put forward a number of proposals aimed at improving our environmental reporting system.[130] At present the Ministry draws on a range of external skills and expertise in preparing reports and one of the measures proposed is the establishment of a standing statutory advisory panel to provide independent advice.[131] It should be noted, however, that the proposed panel would not have a direct link to the Minister, but would rather advise the Secretary for the Environment. In addition, its terms of reference would direct it to focus on data, monitoring and reporting, so excluding critical issues such as environmental limit setting, broader policy work or an oversight role. It would also be a small entity, consisting of between five and seven specialists. While the proposed panel would constitute an improvement, its role, size and scope is constrained, which reduces its value to the broader policy work undertaken by MfE.

Raewyn Peart

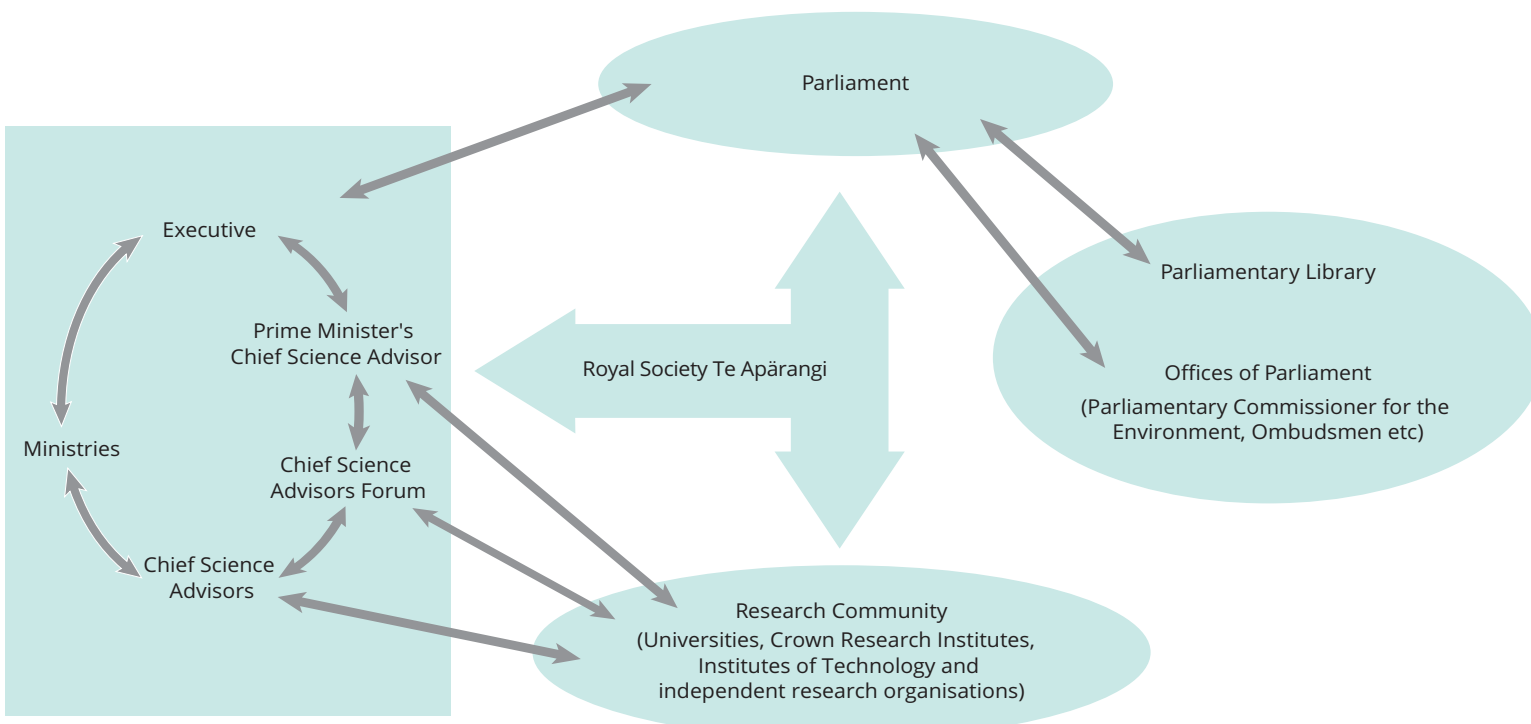
Waikato River near Huntly

Some commentators have suggested that the Royal Society should play a more active role in this area, given that it already has the legislated mandate to provide expert and formal independent advice (see Figure 8.4).[132] The Parliamentary Commissioner for the Environment has recommended the establishment of an independent Environmental Research Council modelled on the Health Research Council approach. This would enable funding to be ringfenced for environmental purposes, and to be allocated in line with an environmental research strategy, developed and administered by MfE. MfE has indicated support for this approach, arguing that we need a "dedicated specialist agency" able to sit at arms-length from government to "apply its knowledge of the environmental research domain to funding decisions, reduce fragmentation, and directly link funding to strategy by coordinating research needs of the sector as a whole."[133]

There is also the vision of a Mātauranga Māori Commission, providing leadership from outside the public service, and setting Māori knowledge priorities in close association with a network of te ao Māori policy hubs and Māori science advisors. There could be Māori controlled data infrastructure, meeting Māori data sovereignty best practice, and supporting iwi/hapū decision making.[134]

8.9 Conclusions

There are significant deficiencies in our policy support frameworks. They constitute substantial barriers to effective policy-making and contribute to systemic inertia. Their combined interaction and cumulative impact places our policy processes under a high degree of stress, greatly complicating our responses to already scientifically, socially and economically complex problems. Viewed collectively, our legal and policy system's inability to be agile and responsive in the face of serious and urgent environmental issues is perhaps made more understandable. Our science and policy support frameworks are weak and inadequately conceived, having been frequently developed in a reactive and ad hoc manner by successive governments operating within narrow policy windows of opportunity.



Potentially, the Royal Society Te Aparangi could play an important role as a peer reviewer of government science activities, and an important link between the research community and Parliament to ensure science-informed scrutiny of policy.

Figure 8.4 Rethinking the science advice ecosystem

Source: Jeffares B, J Boston, J Gerrard, S Hendy and W Larner, 2019, 'Science advice in New Zealand opportunities for development, *Policy Quarterly*, 15(2), 20

Clearly there is much work to be done in order to properly resource and support the science necessary to inform policy. It is beyond the scope of this report to engage in a detailed examination of the science advisory ecosystem and how it might be improved. It was clear through our interviews that the issues in this area are longstanding and complex, and this chapter has only skimmed the surface. Indeed our research raises more questions than it answers.

What the deficiencies in our science-policy support system indicate is a need to critically consider what is required to apply a truly evidence-informed approach to policy. What would this look like? How much do we need to spend on environmental research? How can we better link funding to policy needs? What building blocks are needed to strengthen the science advisory ecosystem? Do we need institutional innovation, perhaps a permanent independent high level science advisory council?

It is insufficient to simply state, in our regulatory direction, that an evidence informed approach will be adopted and then omit to provide the means to effectively employ it. It is unfair to our regulators and scientists. It is similarly unfair to iwi/hapū. That progress can be made despite these challenges speaks volumes for the perseverance and dedication of those working to improve our environmental and freshwater protection frameworks. Rather than reform through ad hoc and piecemeal adjustments, and minor alterations to existing frameworks, there is a need to grapple more directly with these issues and to focus on ensuring the 'must haves' of our policy system are in place and appropriately prioritised.

Raewyn Peart

Lake Taupō

Raewyn Peart

Wairau River

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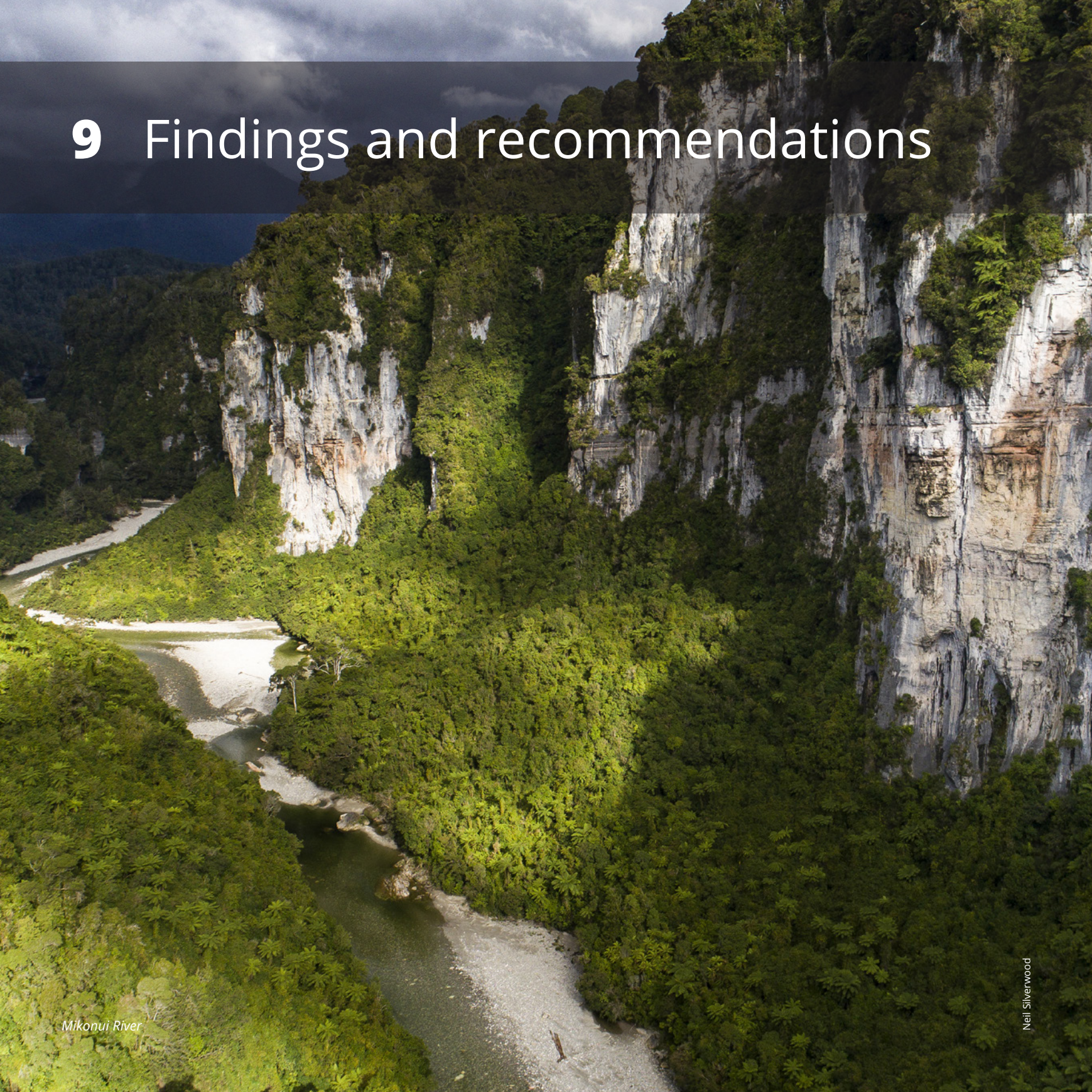
9 Findings and recommendations



Mikonui River

Neil Silverwood

Our dive into the policy development process for the NPS-FM 2020 has revealed a much richer, more varied and diverse body of material and observations than anticipated. No two interviews were alike. While some themes recurred throughout, the perspectives expressed were highly nuanced, with the range of views and issues identified differing from person to person. STAG interviewee accounts, in particular, varied markedly across the various scientific disciplines represented, the different institutional settings scientists worked within and their previous experience with (and views on) former NPS-FM policy outputs. The material presented in this report is only a snapshot of the most prominent and repeated issues raised. It is clear that much more work could, and should be done in this area.

There is no question that more progress was made through the 2020 NPS-FM process than previous freshwater policy iterations. The extent to which this success was a product of the more directed and transparent approach adopted, or simply due to a new government with a greater political determination to lead reform, is more difficult to determine. Certainly, the inclusion of more diversity on the STAG, exclusion of economic considerations from the consideration of the science, and provision for an independent report setting out the science advice, made for a more robust examination of the science and provided a clearer voice for that science.

Almost everyone that we spoke to, who had been involved in the 2020 iteration of the NPS-FM as well as previous workstreams, considered the 2020 process to have been an improvement on the earlier approaches. The most oft-cited reasons for this improvement were increased transparency, exclusion of economic considerations from the work of the STAG, and efficiency delivered by the more directed process.

However, a recurring theme throughout this work is that the ideology underpinning our system needs a nudge: the regulatory settings and directions require a range of adjustments; our processes need to be more open, diverse and inclusive; and we need to far better resource and support the policy development process. If we want a strong evidence-based approach, then we need to build a strong science support system, adequately target and fund research for policy (even if it is not seen as attractive as science excellence and innovation), build capacity and capability, and upskill in areas like science communication. We also need to think deeply about how we can cultivate a more considered, long-term, less reactionary policy response.

Globally, countries are struggling to respond to a range of complex environmental challenges. It is overly simplistic to suggest that the answer lies in 'following the science': policy is complex and highly political, and our legal systems and regulatory frameworks are not well positioned to support change. Rather, our systems have been established to be stable and predictable, and they aim to provide certainty for business. They evolve through incremental reform. In their current state our regulatory frameworks are incapable of being more agile, more responsive and supportive of paradigm-shifting system change.

Aotearoa New Zealand is fortunate to already possess a fully-fledged and ideologically distinct paradigm shifting lever to help us reorientate our direction of travel. A theme that resonated throughout our discussions with all interviewees was that of Te Mana o te Wai, and its potential to enhance a more values-driven approach to freshwater management with a strengthened environmental focus.

These are the key takeaway messages from this report. We also make a number of more detailed findings and recommendations which are set out below.

Neil Silverwood

Pororari River

Part 1: Exploring the policy process

9.1 The STAG

9.1.1 Views of the STAG on process

The work of the STAG was highly directed by MfE. This provided focus and time efficiencies but prevented innovation and a truly 'science driven' approach. STAG members felt that more structure, advance notice, information and context around the matters they were asked to consider was needed to support the science work. Provision of the criteria required for policy would also have been valuable. This would have deepened understanding of the policy needs and so 'the fit' and effectiveness of the science inputs. It would also have facilitated greater openness between officials and the STAG and the building of a relationship of trust.

There was a call for increased science inputs into the policy process at the front end (policy design) and end point (refinement and translation into policy) to enable a more integrated, science-informed process and policy. The approach adopted in relation to Aotearoa New Zealand's COVID-19 response was cited as an example of a more integrated science-informed approach. Greater openness between officials and the STAG would also have helped build more trust with officials, and deepen STAG members' understanding of the policy needs.

There were some notable gaps in the expertise on the STAG and the scope of its work. The primary areas identified were biosecurity and biodiversity, science for implementation and land-use change, and public-health expertise. These gaps raised concerns over the practical application and effectiveness of the resulting policy.

9.1.2 The line between science and policy

Clear boundary work was undertaken to increase the independence of the STAG's science advice. The requirement for the STAG to produce an independent report documenting areas of dissent and minority opinion, and to make its meeting nimutes publicly available, provided enhanced transparency and visibility of the science. Direction that the STAG should not consider the economic implications of measures set, also assisted the group to focus on the science, and reduced consideration of political matters that might have impacted on the advice provided. In addition, not requiring consensus made visible the diversity of views on the science, enabled the rationale for those differences to be explored, and facilitated more nuanced understanding of the science.

Increased presence and connectivity between STAG and MfE officials, especially in contrast to previous science workstreams, significantly increased the officials' understanding of the science and assisted with translation of the science into policy. However, the increased presence of officials at meetings brought awareness of the politics into the room, and had a chilling effect on free and frank conversations. A number of STAG interviewees felt provision of more space and flexibility for the STAG to meet alone as a team would have been valuable.

The allocation of 'science work' between the STAG, Ministry scientists and external contractors lacked transparency and generated distrust and division. More open communication and greater connectivity between all the scientists working on the NPS-FM would have enhanced both trust and the integration of science inputs.

Interviewees from the Freshwater Leaders Group and Te Kāhui Wai Māori sought greater connection with the STAG. This may reflect insufficient science support for other workstreams as a result of the separation of science and policy work. The model that was primarily relied on was for Ministry officials to act as a conduit between the groups. For example, officials would work on policy development with the Freshwater Leaders Group and then take any technical matters arising to the STAG. The comments from STAG members suggest that this link was not articulated or fully understood. The lack of context and rationale behind requests to the STAG was one factor that served to undermine trust and transparency at this interface.

9.1.3 Science is a social process

The views and approach of STAG members varied and was influenced by a wide range of factors including previous experience of the policy process, the institutional setting (eg Crown Research Institute, university, contractor/private consultant), institutional culture, professional relationships, history and field of study. Those with previous experience working on the NPS-FM with MfE had broader understanding of the policy needs of officials and the political context. They also had closer relationships with Ministry staff and more trust in the process than newer members.

Differences in approach created tensions and 'camps' within the group which were variously expressed as 'reductionist vs holistic', 'academic vs practitioner' and 'advocate vs purist'. Political complexities also existed between some STAG members, derived from their either defending or criticising previous NPS-FM settings in the media or at the Waitangi Tribunal.

Although diversity within the STAG created tensions, professionalism, common ground as scientists and the development of a practical and strongly evidence-driven approach in response to disagreement assisted the group to navigate these. It also served to deepen understanding of the variation of views and basis for the differences. The diversity was characterised as strengthening the process and strengthening the science. The value of an experienced Chair was underscored.

Despite the boundaries erected, political considerations impacted on the advice of the STAG. STAG members were aware of an implementation gap in the science and were cognisant that a decision to set, or not set, a national standard could (1) remove local flexibility to respond to natural variation, (2) leave important matters to regional councils (where there were concerns about the robustness of science capacity and a more politicised process), and (3) result in a de facto 'pollute up to this point' standard. By dipping into the realm of policy, the STAG was able to address the last of these three concerns (through recommending a requirement that councils must at least "maintain" attributes at their current state). This indicates that a range of procedural and practical implications clearly informed work and advice in this area.

9.1.4 Impact of external interests

A concern raised by interviewees across all policy workstreams was that conflicts of interest were dealt with in too perfunctory a manner. There was no real investigation of members' external interests or active management of interests that were declared. The system therefore operates on a trust basis. Interviewees noted that this is a systemic issue that is not unique to this policy stream, but which forms part of the institutional culture within the public service.

Many scientist interviewees raised concerns over pressures operating within the broader system to 'silence the science', from contractual confidentiality, sector/stakeholder influence, and the impacts on funding and careers of those speaking out on controversial matters.

A significant point of difference, and positive aspect of the current policy work, was that the process was far more inclusive, notably by including members who had been critical of previous freshwater policy ('freshwater advocates'). The Minister's request to see all advice, including dissenting or minority views, was a further positive change. All interviewees felt these changes increased the quality of the science and the science advice. The absence of industry/sector scientists on the STAG assisted to reduce political pressures arising within the group.

The private meetings that MfE officials held with sector groups ('back-stage performances'), outside of the formal policy process, led to a loss of trust in the process by many interviewees. Historical, institutionally embedded norms of developing policy in close consultation with sector groups risk elevating and 'privileging' their influence over policy, particularly where such processes lack transparency. Interviewees also considered that these inputs undermined the role of the Freshwater Leaders Group.

Recommendations

Based on strengths

- The NPS-FM 2020 policy stream incorporated some excellent boundary work that was praised by all interviewees and assisted to elevate the clarity and visibility of the science. Features that proved valuable, and should be more widely utilised, include the requirement for an independent report from a science advisory group; public availability of meeting minutes; removal of a need for consensus; the recording of minority views; and the exclusion of economic considerations from the science work and advice.
- Independent science advisory bodies, which are 'scientist only' in composition and free from industry representation, should be more widely utilised. A diversity of membership enhances robust debate and consideration of the science. Careful selection of the Chair is also important.
- An evidence-based approach was useful for resolving disagreement and is an approach which could be further developed and incorporated into policy processes.
- High connectivity between governmental officials and science advisory groups should be fostered, to deepen officials' understanding of the science and so increase its influence on their policy advice. This improves both the science content and accuracy of the policy.

Based on weaknesses

- The 'science fit' for policy, and its practical application, was reduced through separation of work on 'science for policy' and the 'science for implementation' (which took place afterwards) and these aspects should be more tightly integrated in future processes.

- More space for science inputs is needed at the front and back end of the policy process, particularly at the scope setting and final policy refinement stages.
- In order for highly controversial issues to be addressed, a high trust environment must exist to allow free and frank conversations. 'Back door performances' should be avoided. Greater transparency over MfE's engagement with sector groups, and policy inputs from them, is necessary to improve trust (including public trust) in future policy processes and ensure the integrity of policy outputs.
- Greater openness, transparency and connectivity between science advisory groups (such as the STAG) and Ministry scientists is needed to enhance trust and foster a more integrated (less oppositional) approach to the science. Greater context, advance notice of the workplan and more information on the policy needs, can also serve to strengthen science inputs.

9.2 Te Kāhui Wai Māori process

9.2.1 The role of Te Kāhui Wai Māori

Te Kāhui Wai Māori was a new advisory body established by the Minister to bring together a 'broad range of Māori expertise and perspectives' to enable collaborative development and analysis of freshwater policy. Members were appointed by the Minister. The Crown had previously worked directly with iwi representatives, through the Iwi Leaders Group, in a co-design process praised by the Waitangi Tribunal (which recommended that it become "standard practice"). Departure from this model was controversial and opposed by the Iwi Leaders Group.

Te Kāhui Wai Māori pushed back on the initial restricted scope of work, and the directed approach, renegotiating its terms of reference and setting a new kaupapa and principles on which the relationship would be based. From a Māori and Treaty perspective it was important to Te Kāhui Wai Māori members that they assert their mana, recognise the role, rights and interests of iwi/hapū, bring those rights and interests back into scope, and establish a more direct relationship and line of communication with the Minister/Crown.

The new terms of reference set out the context and overarching framework to be applied to the work of Te Kāhui Wai Māori. This recognised iwi/hapū rangatiratanga, the Māori relationship to freshwater as kaitiaki, principles of balance, and the centrality of well-being and the mauri of freshwater. A separate secretariat was established to support Te Kāhui Wai Māori in order to overcome the lack of Ministry capacity and capability in this area.

All these measures helped maintain the independence of the group and were necessary to prevent capture and co-option of Māori voices in the policy process. They also clarified that the core relationship of Te Kāhui Wai Māori was with the Minister, not Ministry officials.

The role of Te Kāhui Wai Māori was complex: it was neither an internal advisory committee nor an external and independent Treaty partner. It consisted of a mixture of iwi-centric members, stakeholders and specialists in areas such as law and freshwater science.

9.2.2 Benefits of adjusted terms of reference

A clear strength of Te Kāhui Wai Māori was the diversity and depth of experience, knowledge and expertise the group collectively brought together. MfE officials struggled to understand their role in relation to the group, which required a shift from a directive to a supporting one. This was a new way of operating. Interviewees spoke positively of MfE's openness to change, and the genuine efforts made to facilitate the work of the group, understanding that this presented a 'steep learning curve' for many.

The new approach shone light on the knowledge gap and lack of expertise within MfE on te reo Māori, te ao Māori, mātauranga Māori and te Tiriti o Waitangi more generally. While it should not be the task of Māori to upskill Crown agencies, the changed dynamic delivered a positive and deep learning experience for Ministry officials and assisted to strengthen the relationship and understanding between Te Kāhui Wai Māori and both the Ministry and the Minister.

Te Kāhui Wai Māori built its approach upon Te Mana o te Wai, a 'vehicle already in place' that resonated, and which brought through the work of the previous Iwi Leaders Group. The production of an independent report, and the public availability of meeting minutes, provided additional transparency and supported the independence of the work of the group.

9.2.3 Key interfaces

Capacity constraints hindered full engagement of Te Kāhui Wai members with the STAG and the Freshwater Leaders Group, highlighting the need for additional support to improve connectivity. Despite many synergies

in approach, there was limited scope for cross fertilisation between mātauranga Māori and the STAG. A number of interviewees across both groups felt that a broader science approach, that was more connected to the work of Te Kāhui Wai Māori, would have added considerable value to policy outputs.

The role of MPI was unclear and its work had little connectivity with the work of any of the advisory groups, including Te Kāhui Wai Māori. This reduced MPI's understanding of the approach adopted and increased tension within the policy cycle.

9.2.4 Key Barriers

Historical power imbalances, and lack of partnership with iwi/hapū, mean that Māori have not adequately contributed to the design of the current policy system. Existing legal frameworks (eg the RMA) reflect the ideology and values of the Crown and operate as an inherent barrier to Māori engagement and inputs.

Systemic biases towards economic priorities, stakeholder input and private property rights restrict consideration of competing values such as balance and limits (tapu/noa/utu), guardianship (kaitiakitanga), and the well-being or mauri of water as well as Māori rights and interests and provision for rangatiratanga.

The Crown continues to maintain unilateral control over the scope of reform, creating an asymmetrical policy process where the Māori voice and role is diminished. As a nation, we lack the institutional structures and mechanisms to progress a more collaborative partnership-based policy system – such as is necessary for progressing 'hard' conversations.

The three-yearly electoral cycle, at both national and local government level, and high turnover of staff in government agencies, results in a constantly changing approach (and persons) that iwi/hapū must engage with. This environment undermines the ability to establish relationships of trust and foster deeper cross-cultural understanding. Māori must navigate a constantly changing political environment.

The task of incorporating te ao Māori inputs into policy is complex; knowledge translation and knowledge brokering expertise are currently under-supported. To engage, Māori need to accept existing frames, raising risks of co-option and capture of the Māori voice. Māori are highly aware of these power imbalances.

Recommendations

- More opportunity for connectivity between Māori and other working groups should be provided to cultivate a more holistic policy approach.
- Greater science support should be made available to iwi/Māori groups to support their work and bridge the gap between science and mātauranga Māori, building on the synergies that exist between the two knowledge systems.
- Involvement of more Māori scientists within science advisory groups (such as the STAG) would be valuable but there is a need to address capacity issues and provide resourcing for this.
- Terms of reference for Māori advisory groups should be developed in partnership rather than being set by the Crown.
- The approach of Te Kāhui Wai Māori should be built upon. It laid important groundwork for a less bounded and culturally constrained approach to freshwater protection. It also deepened the level of understanding of Māori worldviews and concepts in other groups involved in the policy process.
- The approach did, however, create political tensions between the Crown and iwi/hapū. Use of this approach should therefore be applied with caution and in greater consultation and direct partnership with iwi/hapū. There is a need to collectively explore and innovate more in this space.

Raewyn Peart

Ahuriri River

Part 2: Exploring the policy outputs

9.3 The regulatory process

At the start of the NPS-FM policy process, a decision was made to work within the existing regulatory framework and make adjustments to the NPS-FM and NOF framework, rather than pursue more significant changes. In order to proceed at pace, many important matters were excluded from consideration, including freshwater allocation, Māori rights and interests in freshwater and drinking water regulation. This was seen as necessary to complete the work within the three-year election/policy window. This highlights how timeframes limit the scope of reforms and what is possible.

The current statement of *Government expectations for good regulatory practice* continues to provide a strong economic focus, requiring a 'particularly strong case' to be made where a proposal has costs attached or impacts business, private property rights or market competition. This focuses the regulatory impact assessment process on considering the impact of reform on 'regulated parties', with no reference to the broader public good or interest. There is no recognition of environmental concerns or sustainability to balance this bias towards economic considerations, and although an evidence-based approach is referenced, there is no supporting detail or guidance as to how this is to be applied. The impact assessment requirements set by Cabinet at the time the NPS-FM 2020 was being developed align with this direction, encouraging a 'collaborative approach' to regulation and close engagement with stakeholders throughout, including during scoping stages. This means that officials 'sense check' options and ideas closely with sector groups to seek consensus.

There was a move away from a more collaborative approach, towards a more directed one, for the NPS-FM 2020. This was in order to progress more substantive freshwater reform than had previously been possible. However, tension is evident between that altered approach and the regulatory direction towards collaboration, which continued to influence the regulatory impact assessment process. Concern to obtain sector consensus likely exerts a chilling effect on reform when measures are opposed by the sector facing regulation.

Situated at the start and end of the policy process, regulatory impact assessments are a core gatekeeping device, determining what proposals go forward for public consultation and informing the decision-making process and final approval. The Ministry officials we interviewed considered that the regulatory impact assessment process undermined environmental protection and their policy goals for the NPS-FM, unreasonably elevating the evidentiary burden to justify reform.

A range of additional levers operated to prioritise sector interests and concerns, including the *Rural proofing* policy (which requires a 'rural lens' to be applied throughout the process), and the elevated role of MPI in the policy process with dual policy sign off for central decisions.

Positive levers supporting environmental protection also existed. Reference to evidence-informed decision-making in regulatory direction facilitated the application of environmental data, and state of the environment reporting. The reports and findings of bodies such as the Parliamentary Commissioner for the Environment were also influential, providing a strong voice for the environment. However, difficulties in accurately valuing environmental harms and benefits persist and these continue to undermine their influence in cost-benefit analysis.

Our review of the regulatory impact assessments and quality assurance checks undertaken for the NPS-FM 2020 revealed that the options scoring most highly against the criteria set did not always prevail. This undermines the utility and purpose of setting such criteria and represents a departure from the evidence-based approach set out in the regulatory direction.

The section 32 analysis required under the RMA constitutes a further economics-focused lever that requires more economically efficient options to be preferred. The cumulative impact of the various economically focused regulatory directions likely operates as a barrier against environmental reforms that have costs associated with them.

9.4 Findings on the policy outputs

Te Mana o te Wai and the hierarchy it sets, and the direction for regional councils to "give effect" to Treaty principles, represent a significant strengthening of the NPS-FM for both environmental protection and mātauranga Māori. Together with new directions to maintain or improve water bodies, increased reporting requirements, and a significantly expanded NOF framework (increased from nine to 22 attributes) it is evident that substantial progress was achieved across a number of areas. This progress is greater than that evidenced in previous policy workstreams on the NPS-FM, and indicates that the new approach was more effective in progressing reform.

In most cases, our review of the regulatory impact assessments found that where science was contested, officials preferred the advice of the STAG, and the views of the STAG and MfE were substantially aligned. This demonstrates that the close working relationship between the parties led to a strengthened approach on the science.

MPI officials were more likely to depart from the advice of the STAG than MfE. This occurred for matters where there were elevated costs, and MPI's position largely aligned with that of industry groups, particularly DairyNZ. This demonstrates how different Ministry 'lenses', and their degree of connectivity with sector groups, impacts on their policy advice. It may also reflect the more distanced relationship between MPI and the STAG.

The more significant the costs attached to a reform option, the more likely officials would depart from the advice of the STAG. Delay in decision-making on the DIN attribute is an example of this. The DIN attribute was associated with the most substantial costs on industry and was therefore strongly opposed by industry groups. The opposition significantly heightened the evidentiary burden and therefore the focus on the science. This highlights the difficult position of decision-makers when there is scientific uncertainty or contested science, and there is a need for more regulatory support and guidance to assist in such situations.

In addition to the DIN, a number of other measures associated with the broader *Action for healthy waterays* policy package that imposed costs on industry were also withdrawn or delayed. The COVID-19 pandemic operated as a further lever to elevate economic considerations. Interestingly, where industry groups and MPI opposed a measure, but its costs were minimal, the advice of the STAG prevailed (eg when it came to the MCI attribute). This shows that economic considerations were a more powerful barrier to reform than stakeholder disagreement per se.

Lack of scientific review and input at the final refinement stages of the policy development process impacted on the clarity and practical application of some standards in the NPS-FM (for example, the definitions around wetlands). This created uncertainty and elevated legal risks.

Raewyn Peart

Pūkaki River entering Lake Pūkaki

Recommendations

- Government expectations for good regulatory practice and Cabinet directions for regulatory impact assessment remain heavily economic in their focus. There is a need to review current regulatory direction to create a more balanced, sustainability-focused lens to support environmental decision-making.
- More guidance and support needs to be provided for the application of an evidence-based approach to policy, including guidance for officials on decision-making in the context of scientific uncertainty or contested evidence. Consideration should be given to whether the precautionary principle should be included within the government's statement on regulatory practice and relevant Cabinet circular guidance for regulatory impact analysis.
- Where officials or the relevant Minister seek to depart from the findings of a regulatory impact assessment and quality assurance assessment, in order to pursue an option that scores significantly lower than the 'best' option highlighted, this should require additional justification as it will usually represent a departure from an evidence-based approach.
- Not all regulatory and quality assurance criteria are equal, and it would be valuable for more guidance to be provided in this area. Some criteria, such as 'effectiveness' could be strengthened to support a more science-based approach. Consideration should also be given to providing fundamental constitutional matters, such as compliance with te Tiriti o Waitangi principles, elevated status and weighting within these assessments in recognition their importance.
- More effective mechanisms for incorporating broader public priorities and concerns, and the public interest, into the regulatory process should be developed.
- Section 32 of the RMA should be reviewed to ensure that the focus of the analysis is on locating mechanisms that best ensure the purposes of the Act are met.

- Officials report ongoing difficulty in valuing environmental costs and benefits. More detailed guidance is needed to ensure these are not undervalued in the regulatory impact assessment process.
- Where agencies share decision-making, and a single science advisory group has been established, it is important that both agencies are highly connected to that science advice to avoid misunderstanding, enable conflicting science to be identified and tested at the earliest possible juncture, and ensure greater cohesion (and less division).
- Expert science advice should be sought when technical changes and adjustments are made to final policy outputs, even if these are minor in nature.
- Existing national policy statements are not always well aligned with each other. New regulations need to be more robustly checked and aligned with existing frameworks to ensure consistent terminology and sufficient connection at key interfaces so that they work together in harmony.

9.5 Lessons from the DIN

Our case study on the DIN took a more detailed examination of the decision-making process in relation to a proposed DIN attribute for ecosystem health: one of the few attributes that did not make it into the final NOF framework. It was a significant source of controversy in the development of the NPS-FM 2020. The DIN was also of interest because it is an example of a 'wicked' policy problem. The science was complex with a range of uncertainties, the evidence was hotly contested, and the measure was widely opposed by industry groups on cost grounds. A key question we asked was: what matters were considered, and on what basis did it fail? What we found was revealing.

First, the regulatory impact assessment reflects that four different options for addressing concerns around nitrogen were considered. Out of a possible score of 18, across six different considerations, the proposal for a limit setting DIN attribute scored 11, which was the highest of any option. It scored highest (3/3) on effectiveness and compatibility with Te Mana o te Wai, and was the only option to score a "3" for these two criteria. It also scored highest for compliance with Treaty principles and efficiency. The next closest contender, strengthening of toxicity attributes, scored an 8, yet was chosen as the final option by the Minister. The calculation system employed by the regulatory impact assessment did not add up the scores but calculated the 'average' score. That approach led to the characterisation of both options as having an average of '++' (2) giving the appearance that the race was closer than it was. Once construed to be broadly similar in their scores, the economic considerations became a more decisive factor.

Inclusion of the DIN attribute was supported by the Freshwater Leaders Group, Te Kāhui Wai Māori, the majority of the STAG, most academics, science bodies and health providers, environmental organisations, the vast majority of public submissions, iwi/Māori and MfE – the agency leading the reform. From this perspective, its failure to pass muster was surprising.

9.5.1 Industry approach to increased regulation

When the agricultural sector's response to issues like the DIN was examined, it revealed that despite apparent broad agreement on the need to improve freshwater quality, and high stakeholder involvement in the NPS-FM 2020 development process, the degree of consensus was far shallower in practice. DairyNZ, for example, not only contested a wide range of matters, it also sought to have its data and analysis used as the basis for assessment of the DIN. Throughout the process, a competition over data was evident. DairyNZ claimed that it not only had the most comprehensive and accurate economic impact analysis and modelling, but also the best science and data.

MPI and regional councils appear to have been persuaded to employ DairyNZ's economic analysis and were also aligned on much of the science. In contrast, MfE favoured the science advice of the STAG and independent economic analysis. This created a disconnect between the parties and prompted debate over the basis on which the reform would proceed.

The competition over the analysis highlights that all parties understood the importance of the regulatory impact assessment process and its influence over the final outputs. Industry bodies had the advantage of better access to the necessary industry data in order to undertake the assessment. In this context, Ministry officials must determine whose data and whose analysis to prefer. The simple existence of multiple conflicting lines of evidence creates additional uncertainties.

Pressing forward in such contexts requires strong political leadership, and comes with legal and political risks as well as the risk of practical non-compliance where insufficient social licence has been established.

9.5.2 Impact of regulatory settings: link between effectiveness and cost

Current regulatory settings are not set up to enable decision-making in these contexts. Our regulatory levers operate to embed the status quo and to protect private property, stakeholders and free market interests. While the vast majority of attributes recommended by the STAG made it into the NOF, the DIN did not, despite being identified as the most effective response to the problem.

Many of the STAG scientists considered that the omission of the DIN would significantly undermine improvements to freshwater quality. Not all attributes are equal. To many, the DIN was considered as central (and the most central attribute for some) because of its potential to drive land use change and reduce intensive farming practices that are widely viewed to be the primary *cause* of poor water quality. Ironically, its potential effectiveness was also one of the factors driving its abandonment.

The regulatory impact assessment identified that, while the costs of applying the DIN were not considered to be significant nationally, the impacts would be concentrated in specific areas (eg Canterbury and Waikato). This localised impact would likely drive land use change and reduce industry profits. Perversely, because current regulatory settings prioritise economic considerations, they also operate as a barrier to the adoption of the most effective responses.

The final decision not to progress the DIN hinged on a mixture of scientific uncertainty and costs to the agricultural sector. Concern to support economic recovery through the COVID-19 pandemic was also a significant factor.

In addition to these overarching issues, the case study of the DIN highlighted a number of associated matters. First, that the narrowing of the STAG's scope weakened the science inputs on the DIN. This was evident in two main areas: human health and science for implementation.

- *The effect of silos and exclusion of health inputs.* Even though human health considerations are clearly relevant under the RMA, the separation of concerns about human health for recreation or contact recreation (eg safety of rivers for swimming) from other health concerns created a fragmented response and reduced consideration of the health concerns around nitrate. A lack of human health expertise on the STAG prevented these matters being directly examined, and submissions on human health were construed as going beyond scope. This meant that the evidentiary material considered in relation to the DIN was narrowed, weakening the science inputs.

- *Separation of the science for policy and science for implementation.* As part of the policy development process, an Independent Advisory Panel was established to take submissions on the draft NPS-FM 2020 and report with recommendations. Its members were selected for their knowledge and experience of the RMA and its operation in practice. This was reflected in the Panel's advice, which was heavily focused on practical considerations. Because implementation had been placed out of scope for the STAG, a disconnect between the advice of the STAG and the lens applied by the Panel is evident. The direction not to consider implementation likely detracted from 'the fit' of the science for implementation, and it is notable that the Panel struggled to locate a middle ground between the STAG recommendations and what bodies like regional councils considered would work on the ground. The separation of the science advice from implementation issues may have had the unintended consequence of weakening its influence over policy.

The second set of insights relate to scientific uncertainty and how this is dealt with.

- *Reasons for STAG dissent*. DIN was an area where the STAG was split, with a majority supporting the attribute but a minority in opposition. It may have been determinative that dissent also came from the government's chief science advisory agency: NIWA. Because of their roles, STAG members from NIWA (and regional councils) had more insights into political and practical implementation considerations. STAG interviewees considered that, if more time had been available, a solution to disagreement on the DIN might have been possible.

- *Contrasting MPI and MfE approaches*. MPI officials characterised the scientific problem as one of scientific uncertainty, seeking to delay decisions pending more information. That Ministry was also more focused on the economic impacts of including a DIN attribute. In contrast, MfE officials characterised the scientific problem narrowly as one of how to deal with natural variability, suggesting the issue could be navigated by providing an exemption where it could be shown that all other ecosystem health measures were being met. These positions highlight each agency's different construction of risk: the MfE focus was on protecting against environmental risk and the MPI focus was on mitigating economic risk. In line with this, MPI's position was that if the DIN was accepted, exemptions should be applied to minimise the localised impacts. MPI's positioning demonstrates how the centring of

economic considerations creates inertia in favour of the status quo, and can lead to exemptions for the biggest polluters.

- *Deferral of decision-making*. A common policy output witnessed in response to uncertainty and lack of consensus is to defer decision-making pending more information. This was the outcome for the DIN. At the time of writing it remains unclear whether the next iteration of the NPS-FM will address this issue or not.

- *Treatment of form submissions*. A final ancillary issue raised by the case study is the impact of form submissions. Through the public consultation on the NPS-FM 2020, it is evident that approximately 85 per cent of submissions supported the DIN, with the majority of these being form submissions. In contrast, 70 per cent of the substantive submissions were opposed. There is a lack of clarity around how form submissions are weighted and considered. It has been noted that different approaches to counting, weighting and clustering submissions will deliver different outcomes, making them more or less influential. There is no guidance at present to assist with these situations. Overseas research has highlighted that, in the weighting process for most policy considerations, the interest of economic elites tend to take priority over that of the 'average' person.[1] It was certainly the case that the 'public voice' remained undefined as a category in the summary of submissions on the public consultation.

Recommendations

- It is important not to sever, too completely, 'science for policy' from 'science for implementation', as these aspects are intimately connected. Greater communication and free and frank discussion between scientists working at regional councils and scientists working on national policy (such as those on the STAG) would likely strengthen the science inputs.

- Science work should not be too siloed or fragmented, so that highly interconnected areas can be dealt with together. This enables the science on one issue to inform and support the science on another (eg nitrate considerations for water quality and drinking water).

- In line with previous recommendations, the study of the DIN highlights the need to adjust our regulatory settings, to ensure that a drive to reduce economic impacts does not act as a barrier to effective policy. More guidance is required to assist officials when dealing with contested information, to determine the validity and quality of different information sources, and address issues of bias and conflict of interest that might affect its quality.

- The methodology employed for regulatory impact assessment requires critical review to ensure that it accurately represents the strengths and weaknesses of options and that important detail is not lost so that some options are undervalued.

- Significant departure from the findings of the regulatory impact assessment process should be discouraged, as it constitutes departure from an evidence-based approach. A requirement for additional justification would raise the bar for such deviation in approach.

- Greater guidance is needed to inform the consideration and weighting of form submissions in contrast to more substantive ones. Prioritisation of substantive submissions is likely to privilege more highly resourced submitters, and a more equitable approach that recognises public interest concerns may be needed.

9.6 Te Kāhui Wai Māori and mātauranga Māori outputs

Freshwater is an important taonga to Māori. The Waitangi Tribunal has been critical of the adequacy of existing frameworks, particularly their failure to recognise Māori rights and interests in freshwater and the narrow scope of previous policy work on the NPS-FM. These gaps remained in the approach adopted for the development of the NPS-FM 2020, which placed issues of key importance to iwi/hapū (such as freshwater allocation) out of scope. This increased the legal risk and resulted in legal action being launched by Ngāi Tahu against the Crown.

Despite the avoidance of some core issues, the strengthening of Te Mana o te Wai, including through the establishment of the hierarchy of obligations under it (and placing the health and well-being of freshwater at the apex), is widely viewed as the most significant improvement achieved in the policy process. The direction for regional councils to "give effect" to Te Mana o te Wai, the recognition of Māori freshwater values and introduction of mahinga kai as a compulsory value in the NOF framework, and greater incorporation of mātauranga Māori, all demonstrate that substantial

progress was made in this area. This reflects the effectiveness of Te Kāhui Wai Māori through its broadened terms of reference, the independence of its work, the quality and expertise of its members, its direct linkages with the Minister and its ability to communicate its vision effectively and in a way that resonated widely. The changes made to the NPS-FM also represent an ideological, potentially paradigm shifting change in approach that may provide an important lever to improve environmental well-being. These changes were widely supported by the interviewees we spoke to.

Reservations remain over how the policy changes will be implemented in practice. Industry groups opposed many of these changes, particularly the prioritisation of freshwater health and well-being through Te Mana o te Wai. This reflects the shift in approach that this change represents and its implications for the sector. Industry may well challenge its application in the courts.

Incorporation of Treaty principles and Te Mana o te Wai into the regulatory impact assessment process, as assessment criteria, was an important addition that likely strengthened progress in this arena. Our review of the findings of the regulatory impact assessment highlighted that, even where options scored very highly in relation to these criteria, they were not necessarily adopted.

There remains a lack of NOF attributes within the NPS-FM 2020 to implement Māori freshwater values. However, this reflects (at least in part) that core decision-making for Māori is most appropriately left to iwi/hapū to exercise their tino rangatiratanga and kaitiakitanga role within their rohe.

Recommendations

- The effectiveness and value added by Te Kāhui Wai Māori underscores the need to bring more Māori-led expertise into policy processes.
- The work of Te Kāhui Wai Māori deepened broader understanding of a te ao Māori perspective and helped build the social licence for reform. The model could usefully be built on to increase cross cultural understanding and enhance partnership.
- Regional councils and iwi/hapū require greater support to implement Te Mana o te Wai at the local level.
- Given the constitutional significance of te Tiriti o Waitangi (and compliance with its principles), consideration should be given to making this a standard criterion for all regulatory impact assessments, and for it to be given more prominence and priority in the regulatory impact assessment process.

Raewyn Peart

Lake Ōkareka

Part 3: Exploring the policy supports

9.7 Exploring the science for policy supports

Of all the areas canvassed in this report, inadequacies in our policy support framework are amongst the most concerning. We found that there is a systemic lack of support for 'science for policy' and mātauranga Māori inputs for policy. These deficiencies create barriers to evidence-informed decision-making and policy development across the board.

9.7.1 Policy timeframes

Reactive policy development, narrowed in scope and undertaken at pace in order to fit within tight political windows of opportunity in response to our three-yearly election cycle, is a significant barrier to more strategic and substantial policy work. This undermines the establishment of the research base necessary to properly inform policy and makes highly complex matters more difficult to resolve. It places our science system under significant pressure.

The science advice inputs of the STAG were not adequately compensated. This may reflect a systemic undervaluing of the science work being out of step with how economic and legal advice were valued in the policy process.

9.7.2 Science for policy funding

Despite attempts to take a more strategic approach to undertaking science for policy, through the development of the *Water research strategy* and mechanisms like the *New Zealand conservation and environment roadmap*, the research priorities established within these documents are not adequately linked to research funding mechanisms. Individual government agencies, such as MfE, do not receive sufficient funding to support their research requirements. They are therefore overly reliant on the broader science funding system, which is not aligned to ensure delivery of science for policy. This means that policy currently moves ahead of the science necessary to craft solutions and effective policy responses.

Current science system funds are primarily allocated by MBIE, and this is to support two core pillars: research impact and excellence. These pillars prioritise high level academic excellence and innovation ('smart ideas') but fail to ensure that the often far more fundamental research and monitoring work to inform policy takes place. The focus of both MBIE and the *National statement of science investment* are heavily weighted towards research that supports productivity and economic growth. These settings impact on the research allocation decisions of core science funds such as the Endeavour fund and the Strategic science investment fund. Neither fund was considered fit for purpose in terms of supporting science for policy. The Parliamentary Commissioner for the Environment has also noted that these funds are not adequately resourced, so acute funding shortages also exist.[2]

Scientists seeking funding for the basic research needed to underpin policy and its implementation struggle to obtain it, and have called for funding to prioritise the 'must have' science needs ahead of the 'good to have' ones.

MBIE's 'Vision Mātauranga' initiative is failing to direct funding to Māori scientists and to support mātauranga Māori for policy. Like other funds, allocation prioritises economic considerations and academic excellence but does not support the science needs of Māori. There is insufficient knowledge and understanding of te ao Māori by those administering the fund, leading to inconsistencies in allocation and even box ticking approaches.[3] There has also been a failure to measure and map the Māori science sector to identify capacity and resource needs.

9.7.3 Environmental monitoring and reporting

Aotearoa New Zealand's environmental monitoring and reporting system remains passive and fragmented with responsibilities spread across multiple agencies. Large data gaps remain, undermining the information base for policy development and environmental decision-making. Data accessibility is a problem, and inconsistencies in measures and methodologies applied around the country complicate the use of data collected for policy. Documents such as the NPS-FM are mechanisms for driving greater data collection and consistency and the NOF framework constitutes an important lever to assist in this area. However, much data collection remains ad hoc, with the data contained in our national databases and portals remaining patchy.

A lack of environmental data and information undermines the quality of environmental impact analysis, leading to undervaluing and increased uncertainty surrounding environmental costs and benefits. In contrast, our increased understanding and collection of economic data and information means that economic considerations are much more reliably informed. This contributes to a broader imbalance in favour of the economic over environmental imperatives.

9.7.4 Capacity and capability

Science and mātauranga Māori expertise is in high demand and there has been a historical lack of support to build capacity and capability

across both these areas. This impairs both policy development and implementation.

Capacity and capability issues are evident within MfE. They are exacerbated by high staff turnover, reducing the degree of experience and institutional knowledge held by staff. Staff turnover complicated science communication from the STAG to officials, and a lack of knowledge and understanding of te ao Māori meant that the Ministry struggled to support Te Kāhui Wai Māori.

MfE is insufficiently funded and resourced to undertake its work, particularly in contrast to the other departments such as MPI. It has far less staff and capacity, and this contributes to power imbalances when the agencies work collaboratively. MfE's latest Performance Improvement Framework review identified a need for the Ministry to reconceptualise itself and take an unapologetic lead in the natural resources sector.

Existing capacity and capability to support mātauranga Māori was a significant concern of Te Kāhui Wai Māori, given the increased expectations that Te Mana o te Wai places on iwi/hapū under the NPS-FM. It noted that inequalities exist between iwi, particularly between settled and non-settled groups. A Freshwater Implementation Group has been established to oversee implementation and to set up a network of technical advisors, including Māori technical specialists. Training and guidance to lift capacity and capability to deliver Te Mana o te Wai will be a priority. However, the increasing need for and use of mātauranga Māori for policy, requires more extensive support.

9.7.5 Science and knowledge communication

Science communication was identified as a core weakness in our current policy system, impacting on the translation of science to policy, the communication between STAG and officials, and the building of broader understanding of the science underpinning policy amongst stakeholder groups and the public. The latter is crucial to policy socialisation, to address issues like science misinformation, and to help build the social licence for reform.

Although many government departments (including MfE) now have chief science advisors, and this was a measure designed to enhance science communication, their role within the NPS-FM 2020 policy development process was unclear. The deployment and role of chief science advisors in the policy process remains highly variable, and the value added hard to measure. The role is one that was widely supported by interviewees – primarily for its potential. There was a call for similar development of Māori chief science advisors to support the incorporation and use of mātauranga Māori.

9.7.6 Socialisation of policy

The area receiving most criticism was science communication to stakeholders and the public in order to build the social licence for reform. Tight policy timeframes undermined the degree of policy socialisation possible, and a lack of planning and strategy was evident in the policy roadshow events associated with the NPS-FM 2020 policy process. There was a call for a more strategic, planned and targeted approach, and for more time to be put into this crucial part of the policy process. Scientists and science communicators need to be more heavily involved in these events. Interviewees highlighted the strong science communication response for COVID-19 as a model to employ more.

Science misinformation was also a problem during the NPS-FM policy process. 'Scaremongering' amongst some industry groups through claims that the impacts of the policy were more significant than they actually were, led to heightened opposition, particularly in the farming community. We were told that policy roadshow events became reactive and they were dominated by special interest group concerns. They focused on argument rather than explanation and building understanding.

Raewyn Peart

Ōrere River

Recommendations

Policy timeframes

- Given the tight 'policy windows' there is a need to undertake more preparatory science work and to apply a more long-term and strategic approach to policy (and science for policy) development. An extended electoral cycle may assist in this regard (but is not yet on the cards) so other options for overcoming this issue will need to be explored.
- Movement away from the use of ad hoc science advisory groups towards more structured standing advisory groups in priority policy areas, such as freshwater, should be considered. These could provide greater continuity and a more strategic approach to the science for policy work.
- Science and mātauranga Māori inputs to policy are crucial and need to be more appropriately valued and compensated.

Science for policy funding

- Greater bridging work is needed to connect research priorities for policy with effective funding mechanisms. A more directed fund designed to support research for environmental decision-making and policy would help, as this would avoid research for policy having to complete with other science needs. Core science needs should be serviced first, ahead of other work, to ensure the basics are covered.
- The science system, more broadly, requires more funding support.
- Vision mātauranga needs to be more Māori-led and designed to support the science needs of Māori.

Environmental monitoring and reporting

- Environmental monitoring and reporting forms the backbone of environmental policy-making and needs to be strengthened. The Parliamentary Commissioner for the Environment has set out ways in which this can be achieved in its 2019 report: *Focusing Aotearoa New Zealand's environmental reporting system*.

Capacity and capability

- MfE's policy capacity and capability needs to be strengthened, so it can play a stronger leadership role on environmental matters when working with other governmental agencies.
- Greater support for 'mātauranga Māori for policy' is needed: our regulatory settings and direction need to prioritise and provide more guidance for these inputs.
- There needs to be greater resourcing to increase expertise in knowledge translation, and greater involvement of skilled Māori in influential roles at the science-policy interface.[4]

Science knowledge and communication

- Science communication capacity and capability requires more resourcing and training, with provision for upskilling scientists and training specific science communicators through specialist courses at the tertiary level.
- The role of chief science advisor requires greater development, including clarifying the role within the policy system. The appointment of chief science advisors in priority policy areas, such as freshwater, should be considered. This may help breach existing silos and foster greater collaboration across ministries.
- More Māori science advisor roles within government departments would help strengthen the broader science support ecosystem.
- The establishment of a Mātauranga Māori Commission could be considered, sitting outside the public service, with autonomous governance and baseline funding. It could provide leadership over mātauranga Māori and set Māori knowledge priorities.

Socialisation of policy

- There needs to be more focus on science education and policy socialisation within the policy process, with scientists and science communicators engaging more with stakeholders and at public meetings.

- More planned, strategic and targeted messaging systems need to be developed to build broader understanding of the science underpinning (1) the problem addressed by the policy, so need for reform, (2) the policy itself, and (3) the impacts of policy implementation and requirements put in place.

- Science misinformation and disinformation (misinformation that is deliberately spread) are becoming increasingly widespread and serious phenomena with the ability to significantly undermine policy. There is an urgent need to identify effective strategies to combat them and to build these into government's policy delivery and science communication work.

Institutional reform

- Gaps and defects in the current science advisory ecosystem collectively point to a need for structural reform, in order to build a more cohesive, resourced and strategic science advisory system to support the plethora of environmental related policy currently under development.

- Consideration should be given to the establishment of a national, independent science advisory body to work on environmental policy. Such an entity could help ensure continuity of science work and advice, assist to reach across existing silos and provide a valuable oversight role. One option is an entity such as the Environmental Research Council recommended by the Parliamentary Commissioner for the Environment.

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2 Parliamentary Commissioner for the Environment, 2020, 26

3 Rauika Māngai, 2020, 71

4 Kukutai et al, 2021, 30

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Freshwater policy is a quintessential example of a ‘wicked’ policy problem. Over the last forty years or so a series of reports has documented the declining state of freshwater quality in Aotearoa New Zealand. But despite this decline, government has struggled to develop an effective policy framework in response.

The country’s first National Policy Statement for Freshwater Management was introduced in 2011. It was further refined in 2014 and 2017. But freshwater policy and regulation continued to remain controversial and a matter of constant political debate, with degradation of freshwater bodies ongoing. This led to the 2020 iteration which was the focus of the EDS’s ‘Better Linking Science with Policy’ project.

The project investigated the role of science in the policy-making process, and in particular, the science inputs into the National Policy Statement for Freshwater Management 2020. Through an in-depth investigation of the documents sitting behind the policy development process, and in-depth interviews with 35 people directly involved in the process, the report provides a rare ‘behind the scenes’ view of how policy is developed in Aotearoa New Zealand and how science and mātauranga Māori can help support more robust responses.

Our intent is to learn from and build on past experiences to ensure that environmental policy-making in Aotearoa New Zealand is more strongly evidence-based and as a result more effective in achieving positive environmental outcomes for the country.

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