Better freshwater management

A Land and Water Forum Report to the Minister for the Environment and Minister of Agriculture – December 2017

Introduction

1. Improving freshwater management is crucial to New Zealand's environment, economy and national identity.
2. The previous Government tasked us with identifying areas where further work was required for better freshwater management in New Zealand. The purpose of this report is to set out:
    - An assessment of key freshwater management challenges, including what more needs to be done
    - The value the Forum can provide to the current Government.
3. This builds on the earlier report provided to the previous Government which set some key observations that the Forum had about implementation of the National Policy Statement for Freshwater Management (NPS-FM).
4. The first part of this report is an overview of the Forum and its views on priorities for freshwater management. The rest of the report consists of more detailed appendices summarising our implementation report, and discussing some key issues for further work.

The Forum's design of a new freshwater management system

5. In the last eight years, the Forum has forged a detailed and durable consensus on many key issues that previously seemed intractable, especially the principle of managing water quality within limits. We have produced four reports, containing over 200 agreed recommendations on how the freshwater management system should be reformed, with detailed prescriptions on how key aspects of that system should be designed, transitioned to, implemented, and resourced.

6. The key elements of the Forum's agreed framework are:

    - Securing environmental, social and cultural values through setting and achieving objectives and limits in regional plans
    - National direction and guidance (including 'bottom lines') to frame regional objectives and limits
    - The control of effects on waterbodies, including cumulative effects, through the transparent and predictable application of, and compliance with limits
    - The use of collaborative approaches at a national and regional level
    - Acknowledgement of the relationships of tangata whenua with fresh water, and the involvement of iwi in freshwater management both as decision-makers and as participants in the plan-making process
    - A more agile and integrated plan-making process
    - Managing the allocation and transfer of fresh water (and nutrient discharges where possible and desirable) so that resources (including land) are used in the most efficient and productive way
    - Using a variety of tools to advance integrated catchment management – including regulation, industry good management practice and audited self-management, market instruments, technical efficiency, riparian management, targeting catchment 'hotspots', infrastructure – in an integrated way to manage within environmental limits
    - Iwi and the Crown resolving questions of iwi rights and interests in fresh water.

7. The previous Government picked up key elements of this framework, but important parts remain unactioned.

Priorities for action

8. The Minister for the Environment and the Minister of Agriculture attended the recent meeting of the Land and Water Forum Small Group on Wednesday 15 November. The Ministers presented an overview of the new Government's freshwater reform priorities and referred to their freshwater policy set out in the coalition agreements and in the Labour Party manifesto. This was followed by a discussion with Forum members. The Forum is grateful for the opportunity to have had this discussion.

9. Based on advice that the Forum has previously given, the Government and the Forum agree on many priorities:

    - **Ensuring that water quality does not deteriorate prior to the introduction of limits.** The Forum's previous reports discussed the importance of managing the transition until plans made to comply with the NPS-FM are completed. Appendix Two to this briefing sets out some of the possible tools that the Forum has previously recommended should be considered. The previous Government told the Forum that it did not see this as a high priority.
    - **Strong national water quality standards**. We think the best way of achieving this is through enhancing and/or supplementing the existing NPS-FM through adding values and attributes, and providing additional technical guidance and greater support to regional councils. Appendix Two of this document has a discussion on the way that the NPS-FM could be improved in the future, especially by addressing sediment, copper, zinc and dissolved oxygen and creating a spatial classification framework that takes account of hydrological modification. The existing mechanisms of the Science Review Panel and National Objectives Framework Reference Group with joint oversight from the Forum and MfE has worked well for providing advice on the policy framework and science issues, although not all of its advice has been accepted, such as the importance of populating Appendix 3. We would like to see it continued. Many regional councils are developing '1st generation' plans under the NPS-FM. Frequent changes to the NPS-FM risks disrupting this planning. Any alterations to the policy framework must be clearly signalled in advance to allow communities to plan and adapt to the changes.
    - **Measures to protect waterways from sediment**. In our commentary on implementation of the NPS-FM, the Forum noted sediment as the highest priority for consideration as a new attribute in the NPS-FM. MfE's work on sediment attribute development has made significant progress to the point where draft bottom lines for suspended and deposited sediment have been developed, although these still need further testing. In the meantime, we suggest that Ministers direct MfE to assist councils in setting freshwater objectives for sediment that reflect the best science currently available.
    - **Measures to protect waterways from nutrient leaching.** The Forum recommended that nutrient leaching be managed through a combination of Good Management Practice (GMP), allocative approaches, and other catchment management measures. These still need to be implemented in many regions. We also provided advice on preventing declines in MCI and prescribing a defined process for deriving in-stream nutrient concentrations necessary for managing periphyton. A crucial part of this was the development of technical support material to

assist councils with the derivation of appropriate in-stream nutrient concentrations. This work still needs to be completed.

- **Accountability for freshwater outcomes**. The Government proposes to require each regional council to report annually to MFE on whether, and how, city or district council rules within the region are adequate to protect waterways. We support the thrust behind this and had earlier recommended biennial reporting. The Government's proposal to require the Audit Office to audit annually every regional council as to whether they are properly carrying out their legal responsibilities to protect fresh water is similar to the Forum's recommendation that central government monitor and report on regional council performance with regard to freshwater management.
- **Requiring better farming practices**. The implementation of Good Management Practices (GMPs) in all catchments is the foundation of the Forum's proposed system for managing water quality. We are aware that officials have been working with primary sector groups at a national level on the promulgation of GMP, but that work has not yet been completed or discussed more broadly with other sectors. It needs to be.
- **Separation of sewage and stormwater in urban areas**. The Forum has previously advised that reducing the frequency of stormwater overflows is essential for improving urban water quality. More generally, the Forum believes that there is a need for further work on urban water issues. Appendix Two sets out the Forum's thinking on this.
- **Keeping stock out of waterways.** In 2015 the Forum developed a proposal for excluding stock from waterways. Officials have been working on this and it should be progressed. The Forum's proposal included a requirement that, where new permanent fences were erected, riparian margins would be required, the width of which would vary along the waterway as determined by an on-farm assessment.
- **Resolving iwi rights and interests in water.** This is an essential part of the Forum's consensus and also a necessary prerequisite to advancing the issues of allocating and transferring water and nutrient discharges. It must be progressed.
- **Policy on allocation, transfer and charging for water and nutrients.** This is needed as one of the tools that will lead to land and water being used for highest value uses within environmental constraints. A nationally consistent water accounting and registry system is a necessary prerequisite for this, as is standardising permits, including by splitting the consents for takes from those for uses. The Forum has made a number of recommendations on a framework for allocation and transfer but little has been done by government since the Forum's reports in 2012 and 2015. While we understand a royalty for fresh water will not be introduced in this parliamentary term, Ministers have indicated that policy work will continue in the background. The Forum is willing to play a role in this. Appendix Two sets out some more detailed thoughts on this area.
- **Protecting rivers, wetlands and estuaries**. The Government has proposed developing an NPS for estuaries, protection of free-flowing and braided rivers and wetlands, and better integration of Water Conservation Orders. The Forum has in its previous reports noted the importance of wetlands and estuaries. This could in part be achieved through better integration of the NPS-FM and the New Zealand Coastal

Policy Statement. We think further policy work is also needed to define outstanding waterbodies. Appendix 2 of this report contains further detail.

- **Providing greater central government direction, guidance and support to councils.** As both Appendices show, the Forum has identified some key issues that would assist implementing the NPS-FM. These include capability, capacity and funding shortfalls that are the major handbrake to implementing improved freshwater management. Strong central government involvement in regional processes is needed to ensure that water quality and allocation regimes are fit for purpose given the highly variable catchment circumstances that range from small localised waterbodies to large and complex catchments (such as Waikato). This is perhaps the greatest challenge in implementing the NPS-FM. We have included a two page summary (Appendix 1) of what the Forum recommended to the previous Government about what needed to be done.

10. A key point that the Forum has been keen to stress is the need to think about the way that clear regulation and non-regulatory measures should be integrated. Regulation is a key component of freshwater reform but there are a range of non-regulatory things that can be done by central and local government and industry and stakeholders that will make adjustment to that regulation easier. Our report on implementation notes that greater central government oversight, coordination and assistance is essential The Forum has recommended that central government provide many aspects of the framework (such as nationally consistent catchment accounting frameworks), coordinate information and science provision and consolidate freshwater funding to provide assistance to councils for clean-up, capability and capacity and science/research. Other important aspects of non-regulatory action are accelerating the uptake of good management practice in both rural and urban land uses and water management, catchment schemes such as erosion control practices, community riparian planting schemes, the provision of science and information, and public education campaigns.

11. In addition to the priorities that the Government and the Forum share, the Forum has identified a number of additional priorities. These include:

    - **Enabling regional collaborative processes**. The Forum recommended that regional and catchment freshwater management and objective setting would be done through regional collaborative processes and that central government should ensure that a legislative framework is in place to enable this The Forum does not think that the Resource Legislation Amendment Act provides a satisfactory legislative framework. It does not encourage collaborative processes while achieving the appropriate checks and balances over stakeholder and community input, and appeal rights.
    - **Investigating national regulations for brake pads and building materials**. Brake pads are a major source of copper and roofing materials a major source of zinc. Local government has relatively little power to manage these contaminants at source so national regulation may be necessary.
    - **Addressing exceptions for infrastructure in the NPS-FM**. Appendix 3 of the NPS-FM provides exceptions to national bottom lines for waterbodies affected by infrastructure where that infrastructure provides a significant economic benefit. The Appendix remains unpopulated. It needs to be.

12. Some of these priorities could be implemented relatively quickly. The Government has signalled its willingness to use the powers granted to the Minister for the Environment in the Resource Legislation Amendment Act to accelerate changes. Use of these powers may well help speed up implementation (which we see as one of the key issues that needs addressing). There is a need to consider however how any national regulation might affect the speed and dynamics of regional planning processes. We consider the following priorities could be implemented in the short-term:

    - Making necessary changes to clarify the requirements of the NPS-FM, including providing further clarification of how water quality should be "maintained or improved" under Objective A2 of the NPS-FM.
    - Populating Appendix 3 of the NPS-FM.
    - Taking steps to prevent environmental deterioration during the planning process before limits come into effect.
    - Ensuring freshwater management units (FMUs) are set appropriately.
    - Improving accountability to ensure national objectives are being met.

13. The Forum operates on the basis of collaboration, believing that stakeholder engagement and agreement is an important element in the durability of policy. In the longer-term we believe that it will be necessary to work collaboratively (at a national and regional level) to make sustainable progress on larger and more contentious aspects of freshwater reform. Medium- to longer-term issues include:

    - The resolution between iwi and the Crown of iwi rights and interests
    - Development of a nationally consistent freshwater accounting framework
    - Allocation, transfer and charging for water and nutrient discharges
    - Consideration of regulations on brake pads and building materials (to deal with copper and zinc discharges)
    - Better recognition of the importance of estuaries and wetlands
    - Development of measures to identify and classify aquifers
    - The development of additional decision-support material
    - The provision of extra central government funding for science, compliance monitoring, and capacity and capability.

The importance of integrated policy development

14. Successful freshwater management means thinking carefully about the combination of different policies that cross a range of areas. These need to be considered in an integrated way. Examples include:

    - Climate change policy including the need to consider the impact of climate change mitigations and adaptation on land use patterns. Different climate change policy settings will influence land use, affecting the type and quantity of particular contaminants and demands for water that regional councils will have to manage. There may be dual benefits from some initiatives (for example, on greenhouse gases and water quality from riparian planting) but there may also be more complex issues – for example, the role of storage in areas affected by significantly less rainfall, along with the effects on hydro-electricity generation.
    - The Dairy Industry Restructuring Act (DIRA), the latest review of which properly addressed itself to the regulation of competition in the New Zealand dairy and related markets but did not make any assessment of whether the Act influenced land use choices and the environmental impact of that land use.
    - Afforestation initiatives that replace existing land uses will see adjustments to the timing and extent of the impact of land use on water quality (depending of course on whether it is indigenous or exotic, permanent or harvested). Large scale afforestation may also affect water availability and allocation settings if there is significant canopy rainfall interception meaning less water being available for other water users. These effects must be considered and integrated with other aspects of water management and planning in catchments.
    - Urban expansion and changes to urban development will have water quality implications (not only stormwater and wastewater but also through soil disturbance and sediment), raises water allocation issues, and can intrude into lands with the most fertile and productive soils.
    - The Local Government Act and the way that it influences city and district councils' provision of infrastructure to address potable water, stormwater and wastewater.
    - Biosecurity management and water quality – for example, the management of koi carp and water quality in Waikato lakes.
    - The interface between the NPS-FM and the coastal marine area.
    - The interactions between the NPS-FM and the National Policy Statement for Renewable Electricity Generation (NPSREG).

15. Developing good policy means thinking broadly about the impacts of the policy and how outcomes are influenced. It is not always clear that this occurs – the DIRA instance above is one example. The NPS on Urban Development is another where it is not clear how it relates to and influences water management given that the NPS itself and its guidance material make no mention of environmental (or hazard-based) constraints and the Regulatory Impact Statement makes no substantive comment on the NPS-FM.

The use of the Land and Water Forum to advance freshwater policy

16. Creating new directions for freshwater management is one of the toughest public policy challenges in New Zealand. There are a multitude of competing interests and values. Numerous efforts at reform in the 1990s and 2000s stalled, while water quality declined and in some areas water became increasingly scarce. There was an adversarial environment that prevented communication, compromise and mutually beneficial arrangements.

17. In response, the Land and Water Forum was established in 2009 in the belief that stakeholders needed to engage directly with each other if they were to find a way forward. The Forum was initially self-organising and self-mandating, but gained ministerial support and pulled in members as it gained momentum. The Forum's membership includes iwi, primary sector interests, environmental NGOs, electricity generators, universities, research and science institutions, and a wide range of other organisations with an interest in freshwater management. Central and local government participate as active observers. A list of Plenary and Small Group members is provided in Appendices Three and Four.

18. The Land and Water Forum is an innovation in natural resource policy development and implementation for New Zealand; but such models are used elsewhere, for example in Scandinavia. Overseas experience indicates that consensus driven collaborative processes can produce more durable solutions in cases where policy issues are a combination of high complexity, diverse stakeholder positions, and uncertainty about direction amongst decision-makers. Experience also shows that the engagement and consensus processes end up lifting the end-product to a higher plane than simple lowest common-denominator positions.

19. The Forum contains stakeholders with a wide range of interests, perspectives and areas of knowledge. The Forum's members are able to consider water policy in the context of the range of other issues that influence water management outcomes, and provide an integrated view. It may be helpful to test ideas with stakeholders through a mechanism like the Forum to gather and make use of the full range of interests, perspectives and knowledge.

20. By forging a consensus that stakeholders publicly support, the Forum-type consensus provides space for governments to make these difficult decisions in the confidence that there has been a genuine and in-depth engagement between otherwise entrenched positions. Furthermore, it reduces the risk of naïve or poorly crafted regulation. It provides a stream of advice that differs in perspective from that provided solely by officials (in this regard the Forum operates in a similar way to the New Zealand Conservation Authority in developing natural resources policy for public conservation land).

21. In the few instances where the Forum has been unable to reach consensus it has provided the reasons why views diverge and options that were considered. This goes beyond the views that stakeholders might express as part of a conventional consultation exercise where sectoral views might remain entrenched, and gives regulators and politicians valuable insight into the interests and positions.

22. While the previous Government did not implement many of the Forum's recommendations, the Forum created an impetus to make faster progress on freshwater policy development that would otherwise have happened. Now, for the first time, there is a national policy framework (the NPS-FM) based on clear environmental bottom lines, and an expectation of transparency and collaboration.

Specific issues for further work

23. In the Appendices of this report, the Forum has identified a number of specific issues that require further work and defined the problem in each area along with pointing out the nature of the work required. We have also provided some reasons why continued Forum involvement in these issues would be beneficial.
24. The Forum recently completed a review of implementation of the NPS-FM. It contained a number of recommendations. We have attached a 'snapshot' summary as Appendix One.
25. We do not discuss a number of issues from our previous reports on which we know the Ministry for the Environment is working and on which we have previously made recommendations. Examples include stock exclusion and riparian management, and Good Management Practice and technical efficiency standards.
26. The issues in Appendix Two are:

Appendix One: Summary of Land and Water Forum Commentary on Implementation of the NPS-FM

In June 2017, the Land and Water Forum provided the Minister for the Environment and the Minister for Primary Industries with comments on a number of key NPS-FM implementation issues. The Forum considered the way that the policy contained in the NPS-FM is being implemented and provided advice on necessary improvements.

- Considerable progress has been made on establishing a framework for freshwater objectives and limits, and many councils have established processes for implementing the NPS-FM in regional plans.
- Despite this, implementation has been slow, variable and uncoordinated.
- MfE needs to provide the leadership role needed within the freshwater management system.
- MfE needs to develop an implementation strategy that:
    - is clear, consistent and transparent about the timeframe, priority and sequencing of policy and implementation changes and action, and who does what
    - is clear about policy and its intent
    - actively coordinates resources to fill knowledge and capacity gaps
    - involves stakeholders in national policy design
    - includes their involvement in regional planning to support better implementation
    - results in more fit-for-purpose and timely technical support.
- Future NPS-FM updates must be transparent and signalled in advance to allow councils and communities to plan for them.
- Councils are using different approaches to involve their communities in setting freshwater objectives, policies and limits; some are more collaborative than others. Collaborative processes take resources but early indications are that the outcome is a more engaged community and a better quality plan.
- Getting the details of collaborative processes right matters. This includes membership, how decisions will be made, the role of collaborative groups in plan writing and implementation, and making sure that resourcing issues are addressed.
- Better opportunities for iwi engagement with councils and collaborative groups are needed
- While the Resource Legislation Amendment Act 2017 has a formal collaborative planning track, this varies in some crucial respects to that recommended by the Forum

– while councils may use a variety of hybrid community engagement/collaborative processes, the Forum does not think it is likely that the formal track will be widely used.

- More emphasis must be given to investing in information and improving how best practices are shared. The draft Water Information Strategy, coordinated by MBIE, MfE and MPI, addresses many knowledge priorities but it has stalled and MfE needs to finalise and implement it as a matter of urgency.

- The government needs to publish decision support material on how to identify values and translate them into freshwater objectives in plans.

- MfE must develop a standardised base freshwater accounting framework that can be adapted regionally.

- MfE needs to develop more of the fit-for-purpose technical guidance material to underpin the NPS-FM and improve the consistency and robustness of freshwater objective and limit-setting.

- MfE needs to work with councils to accelerate work on urban water quality, and to ensure they set freshwater objectives for sediment, copper and zinc where those issues are relevant in an FMU.

- Central government needs to consider a national regulation for vehicle brake pads as a way of controlling copper discharges. It must also identify the best way of managing sources of heavy metals from building materials.

Appendix Two – Specific Issues for Further Work

Amendments to the NPS-FM

Context

1. Possibly the most important freshwater reform in the past fifteen years is the introduction of the National Policy Statement for Freshwater Management (NPS-FM) and the National Objectives Framework (NOF). For the first time, freshwater values, numeric national bottom lines and defined attribute state levels are now outlined in a national regulatory instrument for many of the most important contaminants, along with a defined process for translating freshwater values into numeric freshwater objectives in each freshwater management unit. Development of this framework is ongoing.
2. While there will be debate around the pace of the planning process, how different values and attributes are defined and treated in the NPS-FM, and how the transition and implementation are being addressed, the basic architecture of the NPS-FM is sound. It should be used as the basis for further amendments and improvements.

Problem definition

3. The NOF is incomplete and/or unclear in several respects and this is causing problems:
    - Appendix 2 of the NPS-FM contains only some water quality attributes for the two compulsory values – ecosystem health and human health for recreation. Many important water quality attributes are not explicitly specified.
    - The absence of national requirements for important contaminants is, in some cases, skewing attention and diverting resources (e.g. by encouraging councils to focus on nitrogen where the bigger problem may be sediment, de-emphasising urban contaminants and encouraging a narrow view of swimmability centred on *E.coli*).
    - In the past MfE limited its consideration of potential attributes mainly to those for which a catchment load limit could be set directly. MfE's adoption of this view has constrained the scope of attribute development.
    - Limited use has been made of spatial classification to date. This makes it more difficult to develop numeric Appendix 2 attributes in some cases as spatial variability in climate, geology and hydrology result in different numeric values achieving the same ecological outcomes in different situations.
    - There is currently no recognition given to hydrologically modified catchments in the current framework.
    - Appendix 3 has not been populated. It is designed to provide exceptions where the benefits provided by some infrastructure would be lost if there was a requirement to bring water quality above the national bottom lines.
    - Policies CA1-4 of the NPS (the NOF process), and Appendices 1 and 2 (values, and attributes with national bottom lines) set out the overall process. There are some parts of the process that are not clear enough, and some individual steps within the process need to be better defined. This includes how the requirement to 'maintain or improve' water quality applies.

- There is very little technical guidance to support objective setting and what exists is not fit-for purpose.

4. There have been a series of incremental changes to the NPS-FM. They have occurred while communities and regional councils are in the process of implementing the NPS-FM. New or altered requirements can disrupt council planning and community discussions. While there is much to do, further changes should be transparent, signalled in advance, and clear about priority and sequencing so that councils and communities can carry out their planning and water management with a clear view about the timing of NPS-FM changes.

Previous Forum advice

5. The Forum has in the past provided a significant amount of advice on further changes to the NPS-FM and NOF. Much of this is yet to be implemented. These changes still need to be made, within the context of the planned programme discussed above.
6. The Forum's second report recommended national numeric bottom lines be included in a national instrument to support objective setting for:

    - Micro-organisms
    - Temperature
    - Dissolved oxygen
    - Salt water intrusion into aquifers
    - Algae
    - Habitat space.

7. We also recommended:

    - Development of national values to provide better national support for the objective setting process – the attributes for those values will not necessarily have national bottom lines, but technical guidance is still needed on them to support objective setting at a regional level. Fishing, swimming and mahinga kai were recommended by the Forum as priorities.
    - That a national objective setting framework posed some risks for consent of large-scale infrastructure such as hydro dams. The Forum recommended addressing this by treating these cases differently as part of a spatial classification framework, where specific attributes would be developed that would be suitable for these hydrologically modified catchments.
    - The framework would follow a consistent process to translate values into freshwater objectives and methods (including hard limits), while still allowing local tailoring.
    - Clear expectations and methodologies would be provided nationally with good technical support (especially how to express these things in plans).

8. The Forum's commentary on implementation of the NPS-FM identified that the most important things not included in Appendix 2 of the NPS-FM are sediment, copper and zinc. Sediment is a significant water quality problem in many catchments in New Zealand and has significant effects on downstream receiving environments such as

wetlands and estuaries. Copper and zinc are toxicants commonly found in urban stormwater. MfE has work underway on all three. Whether these are best addressed by adding attributes to Appendix 2, or through other means (such as the provision of technical guidance) will depend on how this work unfolds.

9. In addition, the Forum and NOF RG[1] have discussed the following issues as candidates for more work – either as inclusion as Appendix 1 values, Appendix 2 attributes, narrative attributes, or technical guidance to support regional objective setting:

    - dissolved oxygen
    - natural form and character
    - fishing, swimming and mahinga kai
    - cultivation
    - flood protection and drainage
    - wetlands and estuaries.

10. On 19 August 2016 the Forum provided a letter of advice to the previous Government on introducing new measures into the NPS-FM for MCI, nutrients and a framework for swimmability. These were largely implemented in the 2017 amendments to the NPS-FM. Some of these recommendations are outstanding:

    - The production of the guidance on how to derive in-stream nutrient criteria to manage periphyton.
    - We did not recommend the removal of a bottom line for *E.coli*. There is effectively no bottom line for *E.coli* in the current NPS-FM, just a requirement to *improve*.

Design of a spatial classification system

11. An important part of the Forum's original design of the NOF was a spatial classification system that allows for bottom lines and band levels to vary spatially including due to the effects of hydrological modification.

12. Appendix 2 attributes should have an overarching spatial classification system that, among other things, takes hydrological modification into account. This would allow band levels and bottom lines to vary for different types of rivers and lakes. This would facilitate the inclusion of a greater range of attributes that were more suitable in certain situations, and reduce the need for exceptions, thereby making the framework more robust. The government has not yet progressed this. Without it, the inclusion of more attributes in the NOF will be constrained.

13. There has been some discussion in the Forum and NOF RG of using the River Environment Classification (REC) system as the basis for developing a classification system. Work would also need to be done on how other types of waterbodies were factored in and how hydrological modification was accounted for.

[1] The National Objectives Framework Reference Group – a technical working group of council practitioners, scientists and sector experts that consider and provide advice on technical amendments to the NOF, particularly attribute development. The NOF-RG was originally independent of the Forum and reported to MfE, but subsequently its governance and oversight became shared between the Forum and MfE.

14. To account for hydrological modification, work needs to be done to identify catchments that are modified by significant infrastructure (there are lots of definitional issues here) resulting in substantial and long-term changes to the hydrological regime and fundamental change to the waterbody type (for example, from a river to a lake, or to a diverted river and canal). This work needs to include all types of large infrastructure that fit this definition (for example, flood control schemes) and to what extent the attributes that apply to the waterbody type under the current framework (and any under development) are appropriate or not.
15. In the interim, Appendix 3 needs to be populated as soon as possible.

Maintain or improve

16. The Forum's submission on Clean Water said that the proposed clarification of the 'maintain or improve' requirement was not sufficient, and that without further clarification the judicial system will be called on to settle disputes over its interpretation. This is not ideal, as it creates uncertainty and legal risk for councils and communities. We recommended further clarification of the 'maintain or improve' requirement within the NPS-FM.

Limiting the application of 'maintain or improve' to within an FMU

17. The Forum supports limiting the 'maintain or improve' requirement to within FMUs. This recognises the fact that it is not always possible to have every attribute 'maintaining or improving' at every site, everywhere, all of the time – some degree of 'overs and unders' is inevitable. It is currently impossible (for example) to always prevent urban development from resulting in localised deteriorations in water quality.
18. Allowing this flexibility within FMUs makes sense because it is at this scale that objectives are set. The problem is that FMUs are being defined in a variety of different ways. Some councils are setting very large FMUs, which gives them much more flexibility in allowing water quality deterioration in some places – i.e. the system can be 'gamed'. This could allow particular local communities to lose out from an 'overs and unders' calculation due to power imbalances.
19. The government needs to provide further technical support on how FMUs are set, including a process for determining how 'unders and overs' are managed within them. This should include the following clarifications:

    - That FMUs should reflect both the biophysical aspects of catchments and also be related to a coherent community that can decide for themselves the extent to which 'overs and unders' should be allowed – it is important that communities are not pitted against each other within FMUs so that one community's water quality is traded off in favour of another.
    - There should be more opportunity for local public engagement in how FMUs are defined and more consideration of the cultural and social unit(s) the FMU is relevant to, including hapū areas of interest.
    - The process for managing 'overs and unders' should explicitly cover how to engage with iwi and hapū and provide for their interests.

- Degradation of a single attribute at a sub-management unit scale should be acceptable provided it is balanced out by improvements elsewhere so that at the management unit scale - the point at which objectives are set and monitored – the water quality is at least maintained.
- 'Unders and overs' across attributes (attribute swapping), within values (i.e. ecosystem health), should be allowed, if and only if a more objective way of assessing it is developed. Further work should be undertaken on this.

Application of 'maintain or improve' to values

20. There is a problem with trying to apply 'maintain or improve' to all values, because values are often in conflict and requiring conflicting values to be maintained implies that the community has no option but to stick with the status quo.
21. To fix this problem, the Forum recommended that the NPS-FM be clarified to require that 'maintain or improve' only applies to some values. This should at minimum include the two compulsory values, and may include some other component values of Te Mana o te Wai, such as Mahinga Kai.
22. This advice was ignored by the previous Government.

Technical methods and decision support material

23. The NOF (i.e. Policies CA1-4 of the NPS-FM) merely sets out the high level process by which values are translated into freshwater objectives using attributes. However, Appendix 2 does not contain the full range of attributes that regional councils need to manage - they have to figure out these attributes by themselves. There is very little technical support material to guide councils and communities through the complex process of translating values into freshwater objectives and then into methods (including limits), and how to express all this in a regional plan.
24. In our commentary on implementation of the NPS-FM, we recommended that MfE, as part of its broader leadership role, must develop more decision support material for the NOF. It should cover the following steps:
    - How to identify values spatially.
    - Potential aspects to be managed for each value. These ought to be suggestions to help guide the process, but not be prescriptive.
    - How to decide whether the non-compulsory attributes in the NOF apply in certain circumstances or not, and how and when to use attributes that are not in the NOF.
    - How to assess the current state of values.
    - How to calibrate models to real catchments.
    - How to undertake scenario modelling.
    - How to narrow the list of attributes on which freshwater objectives are set from the longer list of aspects to be managed.
    - How to construct freshwater objectives that meet the 'maintain or improve' requirement Policies CA1-4 of the NPS-FM.
    - How to express freshwater objectives in regional plans.

25. Providing technical guidance nationally will support consistency and will mean each region doesn't have to start from scratch.
26. MfE needs to find more effective and efficient ways of developing the material to ensure it is fit-for-purpose and delivered in a more timely manner. While MfE has involved councils and experts in the development of guidance, the process has taken too long and produced guidance whose content and focus are not useful at an operational level.

Taking a whole of system approach

27. Freshwater management must consider ecosystems, not just individual attributes. Sustainable management of an ecosystem is different from managing individual attributes or stocks of individual freshwater species. This is because the elements in an ecosystem all affect each other – if one goes down, others will go down, or up as a consequence – due to interrelationships such as the food web.
28. Because of these relationships, we need to try to better understand ecosystems, and also realise that we live with imperfect information and so may need to be more risk averse in our management approaches.
29. Management must be integrative – i.e. consider the combined effect of multiple stressors. For this reason the numeric contaminant-by-contaminant objectives and bottom lines required by the NOF may not be sufficient. Integrative indicators, such as MCI and others are a necessary complement. Consideration should be given to whether MCI is sufficient, or what other 'integrative' indicators would be helpful.

A national freshwater accounting framework

Problem definition

30. Catchment accounting frameworks are essential so that all takes and source of contaminants are provided for, and for modelling the impacts of mitigations toward meeting freshwater objectives. They are also a prerequisite to being able to allocate water and discharge rights.
31. A consistent approach to accounting systems will reduce duplication and costs and ensure regional consistency.

Previous Forum advice

32. The Forum has on a number of occasions (most recently in its commentary on implementation of the NPS-FM) recommended that central government must develop a standardised freshwater accounting framework that can be adapted regionally.
33. The Forum's fourth report noted the importance of developing a national approach to freshwater accounting. While the NPS-FM defines a 'freshwater quality accounting system' and a 'freshwater quantity accounting system', and MfE has provided guidance on elements of an accounting framework, they miss some important ones, including:
    - Information required to assess and evaluate interventions, management options and tools. Examples include:
        - the impact of various contaminant management or good management practices for the various permutations of land use and terrain
        - catchment scale mitigations
        - various types of infrastructure, including urban infrastructure
        - water sensitive urban design.
    - Information so that co-benefits of interventions can be assessed (for example, biodiversity, economic impact)
    - Monitoring so that the actual as opposed to modelled impacts of interventions can be assessed.
34. An accounting framework would be more efficiently delivered nationally than by each individual region. The framework must be able to be tailored to local circumstances while retaining important common features to support consistent implementation of tools to manage within limits (standard core consent elements, for example). The framework must allow modelling of the impacts of GMP, allocation policies and all other mitigation efforts.

Outstanding freshwater bodies

Problem definition

35. There are two regimes for identifying and protecting water bodies with outstanding values – water conservation orders (WCOs) and the requirement in the NPS-FM that regional councils protect the significant values of outstanding freshwater bodies (OFWBs). There is no nationally agreed set of criteria that would help regional councils identify nationally, regionally or internationally significant freshwater bodies, despite considerable work by officials in the 2010s, 2000s and earlier. The way New Zealand recognises and gives effect to protecting waterbodies of national significance is less systematic and coherent than many other developed countries[2]. There is no clear relationship between the WCO regime and the NPS-FM requirements for OFWBs.

Background

36. In 1981, provisions were incorporated into the Water and Soil Conservation Act 1967 to provide for the protection of wild and scenic rivers in response to the increasing use of rivers for hydro-electric power generation and irrigation. These provisions were partially carried over into Part 9 of the Resource Management Act. A draft national inventory of wild and scenic rivers was created in 1984 by the National Water and Soil Conservation Authority but not finalised.

37. A WCO can be used to recognise and protect the outstanding amenity or intrinsic values that a water body provides, in either a natural or a modified state. Whether or not a value is "outstanding" is assessed on a national basis.

38. An order can be created to protect:

    - The habitat of terrestrial or aquatic species
    - Fisheries
    - Wild, scenic or other natural characteristics
    - Scientific and ecological values
    - Recreational, historical, spiritual or cultural values
    - Characteristics of outstanding significance in accordance with tikanga Māori

39. There are currently 15 waterbodies recognised by a WCO. There are two applications in progress. There is a high requirement for information to prove the need for a WCO, and it is a time-consuming process. Applications take many years before being withdrawn or accepted[3]. WCO applications have generally been made by environmental or iwi interests and opposed by the relevant regional and/or district councils. The costs involved to applicants, submitters and central government of this process, which generally involves a Tribunal hearing and then an Environment Court hearing, are significant.

[2] For example, Australia, Canada and the United States of America have Heritage River programmes.
[3] From application to Order has taken between 2 and 17 years - 7.6 years on average.

40. The previous Government, in its *Freshwater reform 2013 and beyond* consultation document, signalled its intent to improve the process for WCOs, to reduce costs and timeframes for decision-making on new orders and amendments, and to achieve better alignment with other reforms. There was opposition from a range of parties, as the proposals were perceived to reduce the protection for nationally significant rivers and lakes. There has been no further action on this.

41. Since 2011, regional councils have been required under the NPS-FM to protect the significant values of "outstanding freshwater bodies" - defined as those water bodies identified in a regional policy statement or regional plan as having outstanding values, including ecological, landscape, recreational and spiritual values.

42. The RMA and the NPS-FM use different terminologies of 'significant values', 'outstanding values' and 'outstanding freshwater bodies'. It is unclear whether this shows different policy intent, and has created confusion.

43. Despite many years of consideration by central government (and work carried out by ENGOs, councils and NIWA) there has been little guidance on how to identify an OFWB. The MfE 2017 review of implementation of the NPS-FM does not examine councils' progress on identifying and protecting OFWBs.

44. A few regional councils have progressed work on identifying the OFWBs in their region – Gisborne District Council has identified five OFWBs in its proposed Regional Freshwater Plan (others may be identified through catchment planning processes), Taranaki Regional Council has identified three in its draft plan (down from 42 classified as 'high value' in the current RPS), and others have begun research and consultation. The Canterbury Land and Water Regional Plan lists 29 'high naturalness waterbodies' but it is unclear whether this is intended to give effect to the NPS-FM requirements. Some are taking a 'common sense', quick approach while others are going through a rigorous, lengthy process.

Issues

45. The requirement for regional councils to protect OFWBs creates a number of issues. A report during the development of the NPS-FM 2011 recognised the need for an assessment framework to be developed but it is still in progress.

46. There are therefore no nationally accepted criteria (besides the very broad guidelines for WCOs which may or may not apply under the NPS-FM) that can be used to assess the specific values of freshwater bodies and determine whether they are outstanding.

47. Some of the matters that need to be resolved are:

- How the NPS-FM requirements integrate with the WCO regime
- Whether the WCO regime can be improved
- Whether 'outstanding' is judged on a national or regional basis
- Whether 'outstanding' is judged in the context of the overall characteristics of the water body, or if one outstanding value is enough
- The scale at which an OFWB designation should apply – site/reach or catchment
- Whether there needs to be regional consistency on the threshold or cut-off point for which waterbodies qualify as outstanding

- Whether past or potential outstanding values be considered, or only present state
- Whether the 'significant values' include use values such as tourism, game fishing, irrigation and hydro-generation. The recognition of such values in the National Objectives Framework seems to imply that this is the case.
- How much consistency there should be in regional council approaches to OFWBs
- How many OFWBs are expected to be identified throughout New Zealand
- Identification of individual OFWBs is inconsistent with the Māori view that all water bodies are important for spiritual, physical and customary reasons.

48. The consequences of identifying an OFWB are not clear. There is no guidance from central government about what practical steps might be taken to "protect the significant values of outstanding freshwater bodies" and how that relates to existing land use and existing (or potential) infrastructure.

49. Creation of a WCO is an oppositional national process which doesn't align well with regional processes or the move towards greater collaboration and community engagement in water management. However, it does create a permanent conservation instrument.

Work underway

50. There is work underway at national and regional levels but it is slow and has hit roadblocks much as earlier work did. Hawkes Bay Regional Council and Auckland Council with Golder Associates completed an Outstanding Freshwater Body Project in May 2017. This aimed to develop a set of criteria and thresholds for identifying OFWBs across New Zealand, but was unable to due to data limitations and a lack of assessment tools. The report still contains a lot of useful information and recommendations for progress. It also tried to answer the question of whether 'significant values' could include economic or consumptive uses.

51. MfE convened a stakeholder group in February 2017 to discuss the issues, which looked into some of the issues listed above and decided on some practical next steps for MfE to take to compile assessment tools, lead road testing of criteria and thresholds and ask national organisations to create lists of waterbodies which they consider outstanding to assist councils to identify the most obvious waterbodies, then later look at more borderline cases.

52. MfE is developing a table of existing criteria and thresholds used in WCO decisions, previously proposed assessment frameworks and international precedents.

Discussion

53. Progress needs to be made on getting a nationally-agreed set of criteria that regions can use in identifying their OFWBs and on guidance for freshwater managers on how to protect the significant values of the OFWBs that they have identified.

54. There also needs to be an assessment of the WCO regime, including how it relates to the OFWBs in the NPS-FM, and whether the process of arriving at a WCO can be improved to be faster and more efficient.

Allocation and transfer

Context

55. The NPS-FM facilitates the transition to a management regime that sets limits for water takes and contaminants in order to protect the identified values. By 2025 regional councils must set these limits and develop plans to phase out any over-allocation.

56. Limits for water takes have been set in many catchments, and there is a well-developed history of direct regulation, metering, and group or individual consents. Such consents are allocated using the first-in-first-served method. There is limited transfer of consents and the rights they imply between users.

57. In contrast the direct regulation of contaminants is still in process and it is still common for activities that result in diffuse discharges to be managed through land use controls under section 9 of the RMA rather than as discharges under section 15.

58. Modelling developments now enable discharges of nutrients from productive land to be modelled and accounted for at the catchment, property or entity level. Councils are grappling with how nitrogen limits are to be set and complied with, including the precursor steps set out in the Forum's 4th report. The issues of how to allocate to users to manage down to a limit, in a way that encourages the most efficient use of water, land and nutrients, and addresses issue of equity, are being worked through in differing ways.

Iwi rights and interests

59. Recognition of iwi rights and interests is a critical part of the overall outcome of the allocation of water and discharges. Over the past several years the Government has expressed its intention to the Freshwater Iwi Leaders Group (ILG) and to the Waitangi Tribunal to develop options for changes to the freshwater allocation regime which recognise iwi rights and interests.

60. The Crown has stated to the Courts that the recognition of rights and interests in fresh water must, by definition, involve mechanisms that relate to the ongoing use of those resources, and may include decision-making roles in relation to care, protection, use, access and allocation, and/or charges or rentals for use.

MfE's allocation work programme

61. The Government has been investigating allocation policy (and discussing with iwi the related rights and interests questions) since at least 2009. More recently the Government has set up a Technical Advisory Group (TAG) to provide advice to the Ministry for the Environment's Allocation Team, as well as test the practicality of policy proposals.

62. The objective of the Government's allocation work programme is to identify and develop options for the allocation of fresh water and discharges which, when implemented, will

increase the sustainable economic and social benefits to New Zealand within environmental limits.

Problem definition

63. First-in first-served is administratively simple and is an appropriate mechanism when a resource is not under pressure.
64. Many catchments are approaching, at, or over the limit set for water takes or have not made specific allocations of assimilative capacity/discharge rights. Once demand for these resources starts approaching limits, there are insufficient means by which water and discharges can shift to higher value uses.
65. Limited amounts of water and nutrient discharges need to be used as efficiently as possible within limits. Allocation and transfer systems are among the tools that can be used to do this. New approaches to allocation need to be explored to support efficient economic use of water in catchments that currently have few or no additional freshwater resources available for use.
66. Key questions that arise are:
    - How allocations are made – which raises a variety of measurement, efficiency and equity issues.
    - Can allocations be transferred between resource users, and, if so, what rules should apply?
    - How does any allocation and transfer system fit with accelerating industry good management practice?
    - What methods should be used to manage down to a limit/reduce over-allocation?
    - How to transition to the new regime.

Previous Forum advice

67. The Forum in its third and fourth reports in particular set out an extensive agreed framework for water allocation, and discussed and reached agreements on important aspects of allocating nutrients.

Allocation of water

68. The Forum saw a need to define a quantum of water that is able to be used productively for each catchment or sub-catchment. This is referred to as the allocable quantum.
69. The limits-based regime recommended by the Forum requires:

    a. Users to manage within those limits – or manage down to those limits within agreed timeframes if in a context of over-allocation.

b. Councils to generate and share information about the state of a waterbody and the activities of users, and to take actions to preserve a limit and protect the entitlements of users.
c. Existing entitlements to be translated into the new regime in a way that provides clear entitlements and certainty to users and the environment and preserves their value, aside from reductions to address over-allocation or paper over-allocation - this may include reducing the quantum of water available but increasing its reliability – and applying a reasonable technical efficiency test.
d. Takes authorised under section 14(3)(b) of the RMA to be brought within the management regime. This will help maintain abstraction within limits and protect the entitlements of users from derogation.
e. Consents to be designed so they are responsive to hydrological change (e.g. seasonal and climatic variation) and will specify reliability bands and low-flow, dry-year and drought provisions.
f. Consents are able to be transferred or traded on a voluntary basis to other parties.

70. The Forum was unable to reach a consensus on consent length and expiry.

Allocation of nutrients

71. A key tension in setting limits on discharges of contaminants is allowing those landowners with lower discharges to have an element of flexibility (described in the Fourth Report as the ability to increase up to an agreed threshold and not be required to make reductions) and the expectation that those with higher discharges will make a greater contribution to any reduction in discharges. In practice this is a challenging dynamic to achieve and further discussion on how it might be achieved may be of assistance.

72. The Forum did not reach a full agreement on how initial allocation of nutrient discharge allowances should be decided in its fourth report. It recommended that the regime for water quality be broadly similar to the regime for water quantity in that it should be based on clearly defined rights and standard consent formats. It did however outline several points of agreement:

- Decisions on how discharge caps will be set and/or how allowances distributed should be taken at the outset of the regime. The way in which this is done will have to take account of catchment circumstances. It should be reviewed at regular intervals.
- All rural land which could be used for productive purposes should get a minimum allocation for catchment accounting purposes that is equivalent to what would be discharged from natural cover. The purpose of this allocation is to account for nutrient discharges that would have occurred if no productive activity were occurring on this land.
- Existing users should receive an initial transitional allocation based on their current level of discharges over a period agreed through a collaborative planning process.
- This amount would be set based on the assumption that they are operating at the level of catchment specific GMP decided in the catchment plan.
- Land and water users discharging above an agreed threshold would reduce their discharges over time to achieve the limit as specified in the catchment plan.

- Land and water users discharging below an agreed threshold would not be obliged to make reductions other than the implementation of GMP discussed above, and could increase their discharges up to the agreed threshold.
- These adjustments would be scheduled in a plan, and the higher dischargers would make the larger contribution.
- To prevent an intensification of emissions prior to transition in order to secure a higher initial emissions allowance, persons who intensify land or water use in a manner that increases abstractions and/or contaminant loads should do so at their own risk - until such time as councils have clear rules in place in their plans to ensure that diffuse discharges do not exceed specified limits or will achieve reductions required to meet targets.

73. The details around how the individual thresholds and timeframes for reductions would be set and shared amongst different land-users were not agreed.

Attenuation

74. A key issue in the design of any nutrient allocation scheme is how attenuation, or what happens below the root zone, and in the water itself, is factored into the regulatory framework.
75. Allocating nutrients (and other contaminants) requires understanding attenuation below the root zone and in the water. Our scientific knowledge of this is still limited but the Our Land and Water Science Challenge has a programme addressing how natural processes limit the impact of contaminants resulting from land use, and linking knowledge of these processes back to land use and land management decisions.
76. OVERSEER, the nutrient budgeting tool which is touted as what will be used in regulation only calculates farm leaching above the root zone. Other models are needed to calculate the rest.
77. Attenuation varies spatially. This means that the same amount of discharge to the root zone results in less nutrients in the waterway in different places. Further work also needs to be done to understand the best way of incorporating this information into the regulatory framework.

Charges and taxes for water use

78. The Forum did not reached a consensus position of the issue of charges and taxes on fresh water – members have strongly opposing views. However, a range of possible objectives for charging or taxing have been discussed, including:

    - Cost recovery – Councils sometimes do this in other areas and it is commonly used for fresh water. Any measures to do it for fresh water should make sure it is the best way to recover costs. The beneficiaries should pay their appropriate share of the costs. It should be done transparently, in accordance with existing guidelines and in consultation with those affected.
    - Promoting efficient use – How much charges promote efficiency will be dependent on the circumstances in each catchment. In fully allocated catchments, where water consents can be traded they will over time migrate to the highest value use – a charge will not necessarily assist. Where trading/transfer does not operate efficiently, a charge might provide an incentive for those with rights to water to use that water efficiently, or to free it up for others to use.
    - Community return – Some members think that issuing resource consents for water involves a wealth transfer to the holder of the consent from the community at large, and that the community should share in the economic benefits of water use in the same way that the community receives some benefit from charges for access to other resources such as minerals and petroleum. Others do not accept this argument, arguing that the right to use water is included in the land price and that the community benefits in many ways from current water users.
    - Funding restoration projects – This is not a polluter-pays argument. That is because those who are using water may not be the parties responsible for the degradation of waterbodies (this is especially likely to be true for legacy issues). It is argued by some however that those who benefit from the use of water should pay at least some of the costs of water-related clean-up activities.
    - Increasing taxation efficiency – A minority of members argued that resource taxes are more efficient than other forms of tax. They argue that a shift in the balance of revenues from income taxes toward resource rent taxes (such as on water) would improve the efficiency of the overall economy and release a growth dividend. Others note that capital value increases due to the availability and use of water are already taxed through rates. They note the economic benefits from the productive use of water and suggest that there is a range of investments that have been made in water-related infrastructure in a variety of sectors that would be adversely affected by such a tax.
    - Design of charging systems is technically difficult – and measures which are poorly designed or badly implemented can have a negative overall effect even if their rationale is sound.

79. While the Labour-NZ First coalition agreement precludes the introduction of water charges in this term of government, policy work will be ongoing. The Forum is willing to play a role in policy development, and in work on royalties for bottled water exports.

Soil and land management

Context

80. New Zealand's economy is underpinned by its primary industries, and its national identity and international brand is dependent on maintaining a high-quality environment. The management of soils, erosion and sediment is critical to both.

81. Soils are a fragile, finite and precious resource that are essential to life on earth. They provide a number of ecosystem services, such as regulating water quality and quantity, nutrient cycling and carbon storage, and hosting biodiversity. They are also essential to New Zealand's primary industries.

82. Erosion results in the loss of soil and the deposition of sediment into waterways. Human activity accelerates erosion, particularly if soils are not conserved properly.

83. Soils, erosion and sediment are not explicitly regulated at a national level.

Problem definition

84. Accelerated soil erosion in urban and rural environments results in the loss of the valuable soil resource and results in sediment being deposited into waterways. Sediment has one of the most significant adverse impacts on freshwater values throughout New Zealand (arguably the greatest). It is an issue in both urban and rural environments, and it can have significant impacts on wetlands, estuaries and coastal marine areas.

Previous Forum advice

85. The Forum has commented extensively on sediment, but less so on erosion and soil conservation:

    - The Forum's Second Report stated that sediment needed to be reflected as freshwater state objectives in regional plans.
    - In its commentary on implementation of the NPS-FM, the Forum said that the absence of explicit requirements to set objectives for sediment is, in some cases, skewing attention and diverting resources (e.g. by encouraging councils to focus instead on nitrogen).
    - The Forum advised that MfE must expedite work on attributes for sediment, with the aim of introducing new requirements for sediment, be they Appendix 2 attributes or something else in the next round of NPS-FM updates. MfE must publically signal this intention so that councils and communities can plan for it.
    - Even if numeric Appendix 2 attributes prove not to be feasible or desirable, it is likely that either other measures would be implemented or the science and

economics work completed can be used to support councils as they set regional objectives.

- In the interim, the Forum has advised that government must direct MfE to work with councils to ensure appropriate objectives for sediment are set in regional plans where relevant in an FMU - this will help ensure objectives are set in plans in a way that is consistent with the ongoing science and policy work.

Background

Soil[4]

86. Soils are a fragile, finite and precious resource that are essential to life on earth. They are fundamental for the provision of food, they provide fibre and fuel, and provide a number of ecosystem services, such as regulating water quality and quantity, nutrient cycling and carbon storage, and hosting biodiversity.
87. If the condition of soils deteriorates, and/or land with productive soils is used for non-productive purposes, like urban housing, the ability of soils to provide services to people, the economy and the environment will be impaired. It is therefore important that the soil resource is appropriately managed.
88. The inherent values of soils and the ability to optimally use the resource are at risk from the following pressures:

    - Irrigation - both because of the rapid expansion of application on soils with little natural capital (such as stony soils or hilly terrain) and because very little is known about the long-term implications of irrigation on soil function.
    - Addition of chemicals as more of our pasture systems intensify. This possibly poses a significant threat to freshwater quality (e.g. through the application of fertilizers resulting in increased nutrient leaching) or human health (e.g. if cadmium builds up in the soil).
    - Fragmentation of land and spill-over from urban expansion reducing the availability of versatile and elite soils. The rate of urban expansion (estimated at 5% per annum), the irreversible nature of the impact and the knock-on effect triggering intensification elsewhere make this an important pressure.

89. New Zealand's current policy and planning framework provides protection of soils through a range of national level regulatory instruments. However, these policies tend towards regulating activities rather than ensuring outcomes. They also do not recognize the finite nature of soils.
90. At the regional level, New Zealand has rules and regulations to address pressures but these vary from region to region. Intensification pressures are most recognised and climatic pressures least well identified or addressed.

[4] The bulk of this section summarises information from the report: "Future Requirements for Soil Management in New Zealand" by Landcare Research New Zealand Ltd.

91. There are a range of non-regulatory initiatives and approaches, including schemes, education programmes and partnerships. To date most non-regulatory efforts have focused on addressing pressures of intensification, land-use change, and climate as they relate to erodible hill country. Collectively these non-regulatory efforts have had the effect of taking fragile land out of agricultural use and into exotic or indigenous forestry; but uptake is susceptible to market forces (such as carbon prices or sector profitability).
92. Our regulatory framework is not currently geared towards ensuring soil functional capacity, or recognising the importance of matching of land use to inherent capability, and limiting fragmentation due to urban expansion.
93. In general, New Zealand is not well-equipped to deal with fragmentation of land and spillover from urban expansion and its impact on the availability of versatile and elite soils. This is due to the overriding influence of land prices, government response to liberate land for housing supply and little to no regulation. It is also difficult to address the pressures of poor matching of land use to inherent capability or realise the full potential of soil, given the complexities of land ownership, governance and day-to-day decision-making (e.g. market conditions, regional rules, and farmer knowledge and risk tolerance).
94. While New Zealand is not behind its international peers, a more co-ordinated approach to soil governance is needed. Landcare's (Manaaki Whenua's) report on future requirements for soil management in New Zealand suggests the following:
    - Ensuring the 'knowledge infrastructure' or 'capability system' as a whole is primed to address key pressures on the soil resource. This includes building an enduring supply of scientists, advisors and skilled land managers with key competencies and with aspects of 'soil literacy'.
    - A set of clear national priorities for soil research with the explicit link to social, economic and environmental goals, together with a comprehensive database of investments and projects to evaluate.
    - Stable investment to upgrade and enhance nationally-agreed resource information to ensure an evidence-base that can be called upon to address emergent issues and systemic change to make that information more easily accessible to a range of users.
    - Long-term trials to generate temporal datasets that can be used to test hypotheses and look for changes in state or trends.
    - Foresight projects to identify tractable problems and explore possible trends and solutions. Asking the 'what if' questions has the advantage of highlighting alternative futures to better prepare for changes and unexpected events.
    - A suite of research that is specifically focused on the New Zealand context, includes long-term and future perspectives and gives due attention to areas previously considered 'outside of calibration'.

Erosion

95. Erosion results in the loss of soil and the deposition of sediment into waterways. Most erosion in New Zealand is natural. However, human activity can accelerate erosion,

particularly if soils are not conserved properly. Major human-caused sources of erosion include:

- Erosion of hill country land.
- Stream bank erosion and
- Earth disturbing activities; for example forestry, agriculture and urban earthworks.

96. Erosion in New Zealand is exacerbated by:

    - Inadequate vegetation cover, particularly in vulnerable hill country and on fragile lowland soils under cultivation. An estimated 1.14 million hectares of hill country is classified as erosion-prone in New Zealand, with erosion estimated to cost $100-150 million per annum in loss of nutrients, production, damage to infrastructure and aquatic habitat (MfE, 2007).
    - Poor land use to inherent suitability is a widespread problem with cropping on fragile or sloping land or production forestry on steep, highly erodible land. 65% of soils have a physical limitation to pastoral agriculture and 95% are unsuitable for horticulture and yet the pressure to develop these soils is increasing.
    - Past deforestation. The cost of erosion together with likelihood of increased erosion with climate change suggests this as one of the highest priority pressures.

97. Considerable investment has gone into policies and actions to manage erosion across New Zealand. Non-regulatory approaches are common. For example:

    - Use of catchment management groups.
    - Subsidies for planting trees on erosion prone land,
    - Subsidies for riparian management initiatives including fencing (for stock exclusion) and planting.
    - Education about good management practices, including extension services, support for whole farm plans or provision of technical and/or operational material related to urban activities such as infrastructure management or earthworks.

98. Regulatory responses, in the form of consent requirements, are also placed on some (but not all) activities that increase erosion. These include forestry management (especially harvesting) and earthworks associated with property developments and infrastructure projects. In some cases, consent conditions can involve a requirement that certain in-stream outcomes be met at specific monitoring points downstream.

Sediment

99. Sediment has one of the most significant impacts on freshwater values throughout New Zealand (arguably the greatest). Although most sediment loss in New Zealand is natural, the discharge of fine sediment arising from land disturbance (soil) into fresh water is a key problem – fine sediment has the greatest environmental impacts. It is a significant issue in both urban and rural environments, and it can have significant impacts on estuaries and coastal marine areas. The legacy effects of sedimentation in spring-fed streams is a particular problem – it is difficult to see how this can be cleaned up except through dredging. Sediment in urban areas can be particularly problematic as

toxicants can accumulate in it, rendering it a risk to both the environment and human health. There is significant spatial variation in sources of sediment and its impacts in the environment. Legacy effects from the past are still being observed.

100. Despite this, sediment is currently not included in Appendix 2 of the NPS-FM. It has so far proven too complex and variable for scientists to be able to recommend national bottom-lines and band levels, although work is ongoing. The absence of explicit requirements in the NPS-FM to set objectives for sediment is, in some cases, skewing attention and diverting resources (e.g. by encouraging councils to focus on nitrogen where the bigger problem may be sediment).

101. Some councils have either set, or intend to set, numeric objectives associated with sediment (e.g. siltation, clarity, suspended sediment loading). Some have set objectives for ecological measures that are affected by sediment such as QMCI. Some councils have not set or do not appear to be considering setting numeric sediment related objectives. Some councils are anticipating that sediment will be added to the NOF and so are holding off setting numbers that they might later have to change.

102. Typically there is not a clear line of sight between existing regional policy responses and whether they will deliver the in-river outcomes (attribute levels) to support particular values (such as ecosystem health). This is due to the current lack of information, especially science, to set numeric sediment objectives regionally.

103. Sediment has negative effects on ecosystem health in four ways:

    i. **Reduced visual clarity** impacts processes such as foraging efficiency of visually hunting fish and birds.
    ii. **Reduced light penetration** can inhibit growth of aquatic plants and algae.
    iii. **Suspended sediment** can have physical effects on animals such as gill clogging and abrasion, effects on some migratory fish species, food quality and quantity
    iv. **Deposited sediment** on the beds of rivers, lakes and estuaries degrades habitat.

104. The development of attribute tables involves determining ecological thresholds across the four modes of impact for sediment, then developing attribute states (bands). The development of a spatial classification system would make this work easier as it would allow the bottom lines and band levels to vary spatially.

105. There are co-benefits associated with managing sediment. Phosphorus and heavy metals bind to sediment particles and are transported together into the water. The co-benefit arises when sediment mitigations also reduce these other contaminants flows. Practices for managing sediment sometimes have other co-benefits such as providing biodiversity and possibly carbon and amenity benefits.

106. The next step is to develop ecological thresholds for the four potential attributes that would form the basis for the attribute tables. MfE's sediment work programme has progressed to the point where draft bottom lines for both suspended and deposited sediment have been developed. These should now be tested further and included in the NOF once found to be robust.

107. A reliable link between measures of fine deposited sediment and catchment sediment load has not yet been established. This means it is difficult to set limits for managing deposited sediment. Work on this should also be progressed.

Urban water management

Background

108. Urban water management is multi-faceted and complex, operates across long timeframes and delivers crucial services to urban areas. It is asset-rich – estimates are that replacement costs for three-waters infrastructure (drinking water, stormwater and wastewater) exceed $45 billion.

109. There is considerable work being carried out on aspects of improving water management in urban areas. Currently and over the last few years a number of reviews on different aspects of urban water management have been and are being carried by a variety of organisations, with different perspectives. These include:

- The National Infrastructure Unit's 2015 Thirty Year New Zealand Infrastructure Plan.
- The current review led by the Department of Internal Affairs of three waters services. This initially involves a focus on financial incentives (practices and incentives that might detract from appropriate financial management); asset management practices; and compliance and monitoring.
- The formal Inquiry into the Havelock North drinking water supply contamination.
- The November 2014 report by the Controller and Auditor-General into the funding and management challenges for water and roads, which is being followed up by a much broader assessment of how well publicly funded organisations are managing water resources and delivering water-related services, including three waters management.
- The Productivity Commission's inquiry into Better Urban Planning.
- A large amount of technical work including that being carried out by Water New Zealand, the development of metadata standards, and National Science Challenge work on resilience to climate change and natural hazards.
- Local Government New Zealand (LGNZ)'s review of three waters which now allows it to:
    - identify and promote best practice for agencies providing water services to encourage innovation, efficiency and effectives;
    - develop tools for assessing service design (Council Controlled Organisation or in-house business unit) and sector design (scale and scope matters) in a consistent way, such as measuring return on investment; and
    - facilitate engagement and discussion on the nature of stormwater problems and the creation of a local government stormwater work programme.
- The Ministry for the Environment is developing policy around urban water good management practice, and urban contaminants such as copper, zinc and sediment.
- Local Government New Zealand is carrying out work under the Water 2050 project, which aims to scope the costs of maintaining and improving water quality and its continued supply, raising the cost implications of investment in drinking, waste and stormwater assets and services to meet increased standards for water quality, and outlining the need for a national conversation on costs and new funding tools.

- The development through LINZ, MBIE and Treasury of metadata standards for three waters infrastructure.

Issues

110. These reviews have identified problems and issues that have both water quality and quantity implications.

111. Urban waterways face substantial water quality problems. 'Our Fresh Water 2017'[5] found that:

- By land class cover, nitrate and phosphorous concentrations at monitored sites for urban areas from 2009-2013 exceeded those of pastoral and native cover sites, but more are improving than getting worse
- *E.coli* concentration over the same period was 22 times higher in urban areas compared with areas of native cover, and higher than areas with pastoral cover
- MCI scores were fair or poor in all urban cover monitoring sites
- Zinc and copper concentrations are elevated in some urban streams

112. In addition, a recent analysis of freshwater quality indicators showed that while a number of measures of water quality (including clarity, ammonia, nitrate, phosphorus) were improving in urban waterbodies during 2003-14, this had not prevented observable declines in ecological health.

113. While urban waterways are a small percentage of the total length of New Zealand's waterways, most of the New Zealand population live in urban areas, and many New Zealand urban waterways also influence the water quality in downstream rural areas, and in coastal marine environments.

114. Potable drinking water quality and the cost of treatment is influenced by both urban and rural water quality and management, and by the roles of both regional councils and territorial authorities.

115. In some catchments where water is scarce, there is a wider range of competing uses for water – for example, urban water use (including industrial uses) and horticultural and agricultural water use. An inconsistent approach to water use efficiency in urban areas and growing urban water demand can exacerbate this issue.

116. Local Government New Zealand in 2014 noted three core issues facing councils that presented real risks to current levels of performance by three waters infrastructure:

- A relatively high level of future investment is needed to maintain existing infrastructure, and funding such investment programmes may be challenging for some councils;
- Future performance standards and greater customer expectations will place additional pressure on councils' performance;

[5] Ministry for the Environment and Stats NZ (2017). *New Zealand's Environmental Reporting Series: Our fresh water 2017.*

- Only a small number of councils have implemented ways of providing better incentives to end-users of water, even though they would be beneficial where there is increasing demand for water, limited knowledge of network performance, scarce supply, or high treatment costs.

117. Various other reviews have noted a range of other problems:

- The quality of infrastructure data is suboptimal
- A sea change is needed in capability, asset management maturity and alternative governance and service provision arrangements
- There are multiple agencies with water responsibilities that are not always well coordinated
- Compliance with regulatory standards is an issue of significant scale with well under 50% of three waters providers always complying with consent conditions for waste and storm water.
- Affording renewal of three water infrastructure will be a challenge for those councils with declining populations and/or an ageing demographic.
- How urban infrastructure is funded matters to its efficient provision, but also to the way that cities develop. How new urban infrastructure is funded (for example, development contributions versus targeted rates) has efficiency implications, but could also impact on the relative attractiveness of water sensitive urban design. There are implications to how infrastructure is funded that go beyond service levels.
- Decentralised models of water infrastructure (for example, re-use of water) are not easily integrated with existing planning, infrastructure provision and institutional frameworks.
- How to better engage urban populations in taking responsibility for managing their own water use more effectively.

118. It is likely that the final report from the Havelock North Inquiry will also highlight further issues with managing potable water.

119. Anecdotally, there is concern by some stakeholders that territorial local authorities and their three waters management practices and planning are not sufficiently cognisant of the NPS-FM.

120. Many of the above reviews do little to explicitly discuss the challenges posed by the NPS-FM, and the possible ways that community expectations for water quality and efficient use, and efficient and effective affordable infrastructure, can be met. Few of the reviews discuss to any great depth (with respect to water management) whether there are particular and distinctive issues for iwi that need to be addressed.

121. Urban water management is also of course influenced by a broad range of other policy areas that need to be integrated – for example, how to respond to climate change and extreme weather events, housing and urban development, population growth and decline, and appropriate land and water use in peri-urban areas.

Previous Forum advice

122. While the Forum's recommendations on limits setting applied to all waterbodies, including urban contaminants and related land use, it is fair to say that the predominant focus about managing within limits has had a rural focus.

123. The Forum has periodically addressed urban water issues in the past, recognising three things:

- Often rural and urban water issues are integrated - for example, cities are often in the same catchment as rural areas and sources of contaminants and access to water if it is scarce must be addressed in an integrated way.
- Urban and rural water should be treated equally in terms of addressing water quality issues.
- Equal treatment does not imply that the same solutions will apply across urban and rural (or even across different urban catchments). Urban water quality is influenced to a large extent by factors that are urban specific – stormwater, wastewater and reticulated potable water infrastructure, and the effects of impervious surfaces. Resolving particular issues will need both urban-specific and catchment-specific solutions.

124. In its four reports, and advice on the National Objectives Framework and NPS implementation, the Forum has made some urban-specific water management recommendations. These have addressed:

- Water use efficiency and urban users' place in an allocation system so that drinking water is available when needed;
- Water Sensitive Urban Design;
- The wastewater/stormwater interface, and trade waste;
- The way that urban water demand might be addressed in an allocation system through volumetric charging.

125. The Forum has not yet however considered all urban water issues in a coherent integrated way.

Discussion

126. The various reviews set out above each address, often in some detail, particular elements of urban water issues. None of them however provide a completely integrated assessment of urban water problems and possible solutions or a framework for addressing the problems. This needs to occur. There is a need to integrate the findings of all of this work to develop a more coherent, strategic and integrated framework.

127. It is important for two reasons. First, fresh water needs to be managed in an integrated way, recognising the importance of integrated catchment management, ensuring that national 'standards' are met, and having coordinated implementation between different arms of government, and with land users and stakeholders.

128. Second, there is a need to address urban water management policy and practice in a way that also considers the underlying management philosophy and incentives at play in urban environments. This includes the governance, planning and funding system for urban infrastructure, and how to accelerate innovation, in addition to enhancing capability and knowledge about the range of tools and practices that are available for better water management in urban areas.

Preventing environmental deterioration during the planning process

Problem definition

129. There will be occasions when a catchment is judged to be over-allocated or close to being over-allocated for water quantity or quality. In this situation further environmental degradation before limits are fully implemented is undesirable. Resource management agencies need to "hold the line" so that policy interventions to deal with resource allocation issues can be implemented in a measured way and without triggering sudden additional demand which risks compromising policy effectiveness.

Issue

130. The new NPS-FM framework of limits, together with an effective accounting framework and allocation system, will force councils to consider cumulative effects of permitted and consented activities. However, the processes for limiting resource use (e.g. regional plans, national instruments and legislation) can take years to put in place, and demand for access to resources can continue or accelerate in the meantime, compounding any problem. Previous Forum reports have discussed the importance of managing the transition until plans are operational. There may be some catchments where, for example, there is a risk of over-allocation occurring before objectives and limits are set, or where known water quality problems become worse. This has environmental consequences, but also means that investments might be made and land practices change that will be costly to unwind. Action must be taken to 'hold the line' so that problems and the costs of fixing them do not become larger.

131. There is a risk that, for example, normal first-in first-served consenting practice, section 104 of the RMA requiring only that applications for resource consents 'have regard to' regulations, national policy statements and regional plans, rather than 'give effect' to them, legal 'workarounds', the use of certificates of compliance[6], or tactical behaviours might lead to a goldrush and over-allocation. The range of tools to address this needs to be considered, including moratoria, funding, the way that rights are allocated, grandparenting policies, the relationship between regional and district plans and institutions, the use of national regulation under the RMA, and industry initiatives. The uncertainty over which tool(s) to use is exacerbated without clear national policy around allocation.

[6] If an activity could be lawfully carried out in a particular location without a resource consent (under the operative and any proposed plan) a person may request a certificate of compliance from the relevant consent authority. A certificate of compliance is treated as if it were an appropriate resource consent that contains the conditions specified in an applicable national environmental standard and plan. A certificate of compliance lasts for five years and is aimed at protecting the activity against future plan changes. It can be used as a way to gain advantage when a council has signalled that tougher rules are coming.

132. When a number of processes relating to the same “at-risk” waterbody are underway simultaneously (e.g. regional planning processes, Water Conservation Order applications and resource consent applications), such processes could arrive at different conclusions.

Why is this issue important?

133. It’s not much use designing the perfect regulatory regime if water quality continues to deteriorate significantly before you can implement it. Extra measures may be needed to hold the line in the meantime. While the Forum has in the past commented on the importance of this issue, and discussed some of the possible tools, there has not been any government guidance on possible tools or the circumstances in which they might be used.

134. The previous Government advised that this is an area where regulatory change is not a priority and the focus is on non-regulatory guidance products. We are not aware of the development of any guidance in this area and continue to assert that government action is needed.

135. These are issues that have previously been considered by the Forum. The Forum’s second report covered interim limits and the third report covered interim regimes (including when moratoria might be used). This was also addressed briefly in our commentary on implementation of the NPS-FM. It may be timely to review how councils are addressing this, consider previous proposals to see if they are still relevant, and evaluate the full range of tools that could be applied.

Possible tools to examine

Interim limits

136. In its Third Report, the Forum recommended that interim limits be put in place where a catchment is under pressure but not prioritised for limit-setting. An interim regime would include specification of a scarcity threshold, and once that had been reached, the need to explicitly manage all new water takes and discharges, including the cumulative effect of small takes and diversionary activities, and translating existing water authorisations into consents. A mechanism that allowed interim limits to be determined quickly would be required otherwise it would still take time. MfE officials did not see the need for an interim regime, as councils are getting on with their limit-setting processes.

Moratoria

137. Moratoria are one tool resource managers could use to buy time to put effective policy frameworks in to place and to provide a re-set by which allocation processes can be properly sequenced.

138. Regional councils do not have the power to impose moratoria. The Environment Canterbury (Temporary Commissioners and Improved Water Management) Act 2010 provided for the imposition of moratoria in Canterbury, subject to ministerial approval,

and this power was used in the Hurunui catchment, in relation to all applications to take water from July 2010 to October 2011. Four statutory processes were underway in this catchment: a Water Conservation Order application, the Proposed Natural Resources Regional Plan, the Hurunui Flow and Allocation Plan, and the Hurunui Water Project Consent Application. An additional moratorium was then placed on the Waiau catchment to align with the Hurunui processes.

139. The Forum has promoted collaboration in freshwater management processes, from national and regional strategy preparation to site specific project development. A moratorium is a blunt instrument that may be antithetical to the concept of working together co-operatively to accomplish common goals for water resources. However, the prospect of an imposed moratorium can be an incentive to find inclusive solutions. And where there are parallel statutory processes underway in a catchment, a moratorium provides an opportunity to hold the line, and restart or reconfigure those processes in a more collaborative context.

140. The process of deciding on moratoria would need to be constrained by rules which provide clarity and certainty to all stakeholders. When the Forum worked on this in 2010, it considered a list of matters that should be taken into account when considering a moratorium:

- The extent to which fresh water in the catchment is subject to:
  - high or increasing demand
  - diminishing water quality
  - is fully allocated, nearing full allocation, or over-allocated
- The extent to which a moratorium promotes an integrated catchment-based planning framework as the basis for allocation decisions
- The requirement to reduce or avoid duplication of processes
- A commencement and termination date
- The certainty of delivering the outcomes sought during the moratorium timeframe
- The avoidance of capture of processes that are unrelated to the issues the moratorium is intended to resolve
- The existence of a plan for exiting from the moratorium, which includes certainty for those caught by its imposition as to how they and their processes will be dealt with after its conclusion.

Requiring consents for intensification

141. The draft Sheppard NPS proposed that any increase in intensity or scale of land use would require a resource consent. Consideration of consent applications would be based on the extent of the adverse effect on fresh water. The effect would be to slow, and in some cases halt, intensification across the country. This would occur where a resource is under pressure and in ‘under-allocated’ catchments. This would need to be implemented through a mechanism that superseded normal council planning rules for it to be effective. Even then, there is a risk that section 104 of the Resource Management Act (which says applications for resource consents must only ‘have regard to’ regulations, national policy statements and regional plans, rather than ‘give effect’ to them) could allow resource consent approvals to be issued.

Urban growth

142. There are particular challenges involved in ensuring that further deterioration of urban waterbodies does not occur due to further development and intensification. It takes place in an environment where there are few constraints on population growth, an established consenting regime, and long-lived and expensive infrastructure. Particular solutions would need to be developed for urban areas, recognising in particular population trends and funding issues.

Governance and accountability

Problem definition

143. Since the passage of the RMA, regional councils have not always fulfilled their freshwater management responsibilities to the satisfaction of all members of the community. Performance also varies between different councils. Possible reasons for this, suggested by stakeholders in the Forum are:

- That councils can be subject to capture by those with strong interests and that citizens are not as engaged with local government as they should be.
- Lack of knowledge and skills.
- Lack of resources.
- Insufficient mechanisms to hold councils accountable for their environmental performance.
- That the benefits from improved freshwater management are diffuse, but the primary funding source for councils comes from landowners through rates. This influences perceptions of equity and priorities at a local level.

144. Territorial Authorities (TA's) are responsible for three-waters management. There is a perception that they have been slow to recognise their enhanced responsibilities to contribute to water management outcomes.

Previous Forum advice

145. The Forum's original recommendations were for central government appointees on regional councils to bring the knowledge, skills and drive needed for freshwater management. Recommendation 43 of the Forum's first report (in 2010) talked about national appointees on regional councils. These appointments would aim to: "…strengthen the links between regional councils and central government agencies; fill in gaps in skills and perspectives; and strengthen the capacity of councils to provide leadership on the complex issues of intergenerational responsibility and legacy environmental remediation." However, this recommendation has not been implemented by Government (perhaps with the exception of Canterbury).

146. The Forum also recommended the establishment of a Land and Water Commission to oversee the implementation of the NPS-FM.

147. The Forum's fourth report also made some relevant recommendations – recommendation 10 required councils to produce a two-yearly report card on progress with water management, and recommendation 11 required central government to monitor and publicly report on the performance of regions.

148. A major finding from the Forum's report on implementation of the NPS-FM was that central government needs to take a more active role in implementation of the NPS-FM. This could involve:

- the development of an implementation strategy for the NPS-FM
- review and oversight of regional plan development and implementation

- coordination of resource-allocation and information-sharing between councils and other institutions
- identification of skills gaps in councils and other organisations and processes, and the necessary actions for filling them
- prioritisation of nationally important waterbodies for restoration
- prioritisation of science funding
- enabling greater agile planning in regional freshwater management.

Considerations

149. The Forum recognises that a tension can exist between local values and interests, and implementation of national priorities. This tension is reflected in the following considerations:

- The powers granted to Environment Canterbury's government-appointed Commissioners enabled them (under the RMA) to oversee the preparation of proposed planning documents, hear submissions and make final decisions. This improved ECAN's ability to implement national priorities.
- Local values and interests are paramount to collaborative processes and regional decision-making. This notion is central to the Forum's consensus (i.e. a national framework and bottom-lines, but with objectives set through local collaborative processes).
- Ensuring national policy is implemented requires regulatory organisations have enough resources to do so. These resources largely come from local ratepayers, who may have different priorities than the implementation of national regulation. This creates a conflict.
- How local rate setting can occur in a mixed governance model when rates should be set by those accountable to ratepayers.
- If there is a deficit of knowledge, skills and drive with respect to freshwater management, this could be addressed at the level of the executive rather than at a governance level.
- MfE are increasingly trying to partner with councils and establish and maintain good relationships with them. Juggling this role with one of holding councils accountable for poor performance is difficult, particularly if MfE has a lack of capacity and capability.
- Councils are democratically accountable to their communities, but are also obliged to take on tasks assigned to them legislatively by central government. As a result:
    - Central government pass regulatory tasks on to local government without funding.
    - Councils can unfairly take the blame for centrally imposed costs, but also blame central government for their own poor performance.
    - There are questions about who pays for what, and who benefits (for example, the almost exclusive use of ratepayer money by councils for water management). This is not always clear, and may influence decision-making.

- Whether part of the problem and solution are the strength (or not) of the feedback loops after regulation is implemented going back to the regulatory agency and them being able to adjust the regulation based on what is working and what isn't.

150. We need to consider ways of improving the governance and accountability regime that better address these tensions, resolve resourcing questions, and improve accountability.

Compliance, monitoring and enforcement

Problem definition

151. Effective compliance, monitoring and enforcement (CME) systems are essential to ensure that laws and rules, once set, are adhered to. There are some flaws in New Zealand's freshwater management CME which mean that national and community objectives may not be met.

Background

152. MfE has oversight of RMA, but the responsibility for water management has been devolved from national to regional government. The new Government is considering giving MfE or the EPA a more active task of prosecuting breaches of the RMA where regional government has not.

153. Best practice CME is to encourage compliance through education and awareness-raising, discourage and penalise non-compliance. This is demonstrated in the Braithwaite Compliance Triangle, the basis of which is widely used by compliance agencies.

154. The RMA does not prescribe how councils should carry out their CME function, so a wide variation has evolved in council practice and capability.

155. National guidance on CME is provided by MfE and LGNZ through the Quality Planning website, which includes advice on best practice and an RMA Enforcement Manual. However, this has not been updated since 2013, so does not include recent changes to the RMA.

156. Councils have broad discretion over which consent types and what proportion of consents they will monitor, and how they monitor, for example, whether or not they give advance notice of inspections to consent holders and when investigating complaints.

157. Councils are adopting strategic targeted approaches to choose which consents and which permitted activities to monitor, such as focussing on consent holders with a history of non-compliance and high-risk activities. There is merit in this when resources are limited, as long as cumulative effects of low-level non-compliance are addressed.

158. A range of enforcement actions are available to councils under the RMA, allowing them to tailor their response to the nature and severity of the offending. Non-statutory and statutory options are: verbal or written direction; formal warning letter; infringement notice; abatement notice; enforcement order; and prosecution.

159. The annual National Monitoring System (NMS), run by MfE since 2014, requires local authorities, the Environmental Protection Agency and MfE to provide detailed data on the functions, tools, and processes that they are responsible for under the RMA. Earlier biennial surveys had a number of limitations such as lack of clarity, specificity, strategic purpose and national comparability, which the NMS will need to address.

160. The extent of non-compliance with environmental law and the scale and impact of that non-compliance is hard to ascertain. Many consents are not monitored, and there is no data on the extent of permitted activity monitoring. Regional council data shows an average of 19% of monitored consents were non-compliant in 2014/15.

161. DoC has a role in the protection of freshwater biodiversity which overlaps that of regional councils. For instance the Freshwater Fisheries Regulations requires protection of freshwater fish passage, but DoC does not appear to monitor or enforce this aspect of the regulation, leaving it to councils.

162. Fish & Game NZ has a statutory role which includes the protection of freshwater ecosystems. It has a network of rangers and honorary rangers with limited powers to take action in the field, but their focus is on poaching rather than pollution or other impacts on ecosystems. It has rarely-used powers under the Conservation Act to protect spawning sites.[7]

163. Support from industry bodies has been important in achieving outcomes without regulation – e.g. the requirements set out in the Clean Streams Accord and then the Sustainable Dairying: Water Accord. Significant non-compliance against these non-regulatory accords by the dairy industry decreased from around 11 percent in 2010/11 to 5.8 percent in 2014/15.

Issues

164. Regional variations in CME approaches, combined with a low level of monitoring and enforcement, can lead to high levels of non-compliance, which has a negative impact on environmental outcomes.

[7] In November 2017, Central South Island Fish & Game Council brought a prosecution against ECan for damage to a spawning stream.

165. Turning a blind eye to offending erodes confidence in the system and implicitly encourages others to try to get away with poor practices. Councils can be reluctant to take enforcement action, or unsuccessful when they do, for a number of reasons:

- lack of resources including money and trained staff
- significant costs of investigations and taking prosecutions
- insufficient ability to recover costs
- difficulties in collecting sufficient evidence to build a strong case
- political involvement or interference in enforcement decisions
- wanting to support the community and be seen as positive
- personal relationships in small communities
- relationships with territorial authorities over three-waters management
- lack of clear guidelines about proper compliance framework
- lack of adequate regulatory tools
- the shift in focus from point source to diffuse sources of contaminants makes drawing a line between cause and effect more difficult to prove
- limited timeframes in which to take a prosecution - charges must be laid within six months.

166. There are a range of issues where councils are not performing their CME role well:

- CME activities are not adequately resourced. Lack of time and resources for this work can result in lower quality investigations, and failed enforcement actions that waste time and ratepayer money.
- Under-resourced CME staff tend to be overly responsive to complaints rather than taking a proactive risk-based approach.
- Some are reluctant to recover costs of monitoring and enforcement work, particularly incident response actions, placing the burden on ratepayers.
- Poor IT infrastructure for tracking non-compliance instances and enforcement actions taken
- Some give advance notice of inspections and when investigating complaints – this helps build relationships with consent holders, but can lead to non-compliant activities being tidied up for the inspection.
- Issuing of retrospective consents for activities already completed can be a pragmatic approach, but there is a risk that it subverts the CME regime by legitimising unlawful activity.

167. There are limitations of what is allowed by the RMA:

- Cost-recovery mechanisms for taking prosecutions do not fully cover the costs of doing this work. The fines recoverable through prosecution are sometimes less than the cost of taking a prosecution.
- The lack of cost-recovery mechanism besides targeted rates for checking compliance with permitted activities is a barrier to doing this work.
- The consequence of non-compliance under the RMA could be made greater, including the cancellation of a consent and more consideration of past behaviour when granting a consent.
- Infringement fines are effective and efficient, but the maximum of $1000 for RMA infringements is too low to be an effective deterrent.

- The ability to take out insurance against fines imposed through prosecution is inconsistent with other legislation imposing criminal penalties. Being able to insure against fines undermines the deterrent effect and reduces the seriousness of offending, seeing it as a cost of doing business.

Work underway

168. MfE has developed a draft Compliance Strategy which seeks to address many of the criticisms made of the Ministry and strengthen its role in ensuring the effectiveness of the legislation it oversees. The Strategy is for MfE to transition over the next five years from 'passive observer' to 'system steward' and includes an implementation path for this. However, no additional resources have been allocated to this work in the short term, nor does it address wider resourcing issues in the regional sector.

169. MfE, with input from councils and LGNZ, is currently developing comprehensive best practice guidance for the full spectrum of CME (where existing guidance such as the RMA Enforcement Manual focuses on enforcement only). These are due to be released around April 2018.

170. Regional and unitary councils, through the Compliance and Enforcement Special Interest Group (CESIG), have developed a Regional Sector Strategic Compliance Framework 2016-2018 (SCF), which is a positive move towards a more coordinated and consistent risk-based compliance approach. The SCF includes principles to guide compliance operations and advocates the development of a consistent approach to monitor compliance, encourage compliance, deal with non-compliance and review each of these components. The CESIG network intends to carry out voluntary audits of council CME activities to identify opportunities for strengthening practice.

171. Compliance officers need better, ongoing training opportunities and career paths. Appropriate training for enforcement staff can reduce stress on individuals and increase the likelihood of successful prosecution. There is work underway through G-REG and NZQA, and the Waikato Regional Council has developed a 'Basic Investigative Skills' course that is available to all councils.

Discussion

172. The work underway does not address underlying issues around resourcing of agencies to more effectively carry out their CME role, or of whether the regulatory tools available to councils are sufficient.

173. It may also be timely to look at the relative roles of agencies with front-line, regulatory and policy and oversight responsibilities to assess whether and how effectively each is carrying out their roles.

174. Assessing the benefits and risks of assigning a new prosecution role to MfE or the EPA is an urgent task.

The science funding system

Problem definition

175. We need better knowledge for more effective freshwater management. Work should be done to consider the science funding system holistically (across central government, local government, and sector groups) and provide advice on how it could be improved to provide better outcomes for fresh water. Research effort should be properly identified and directed and retain relevance and applicability.

Background

176. New Zealand's science system is complex, with multiple funding sources and science providers.

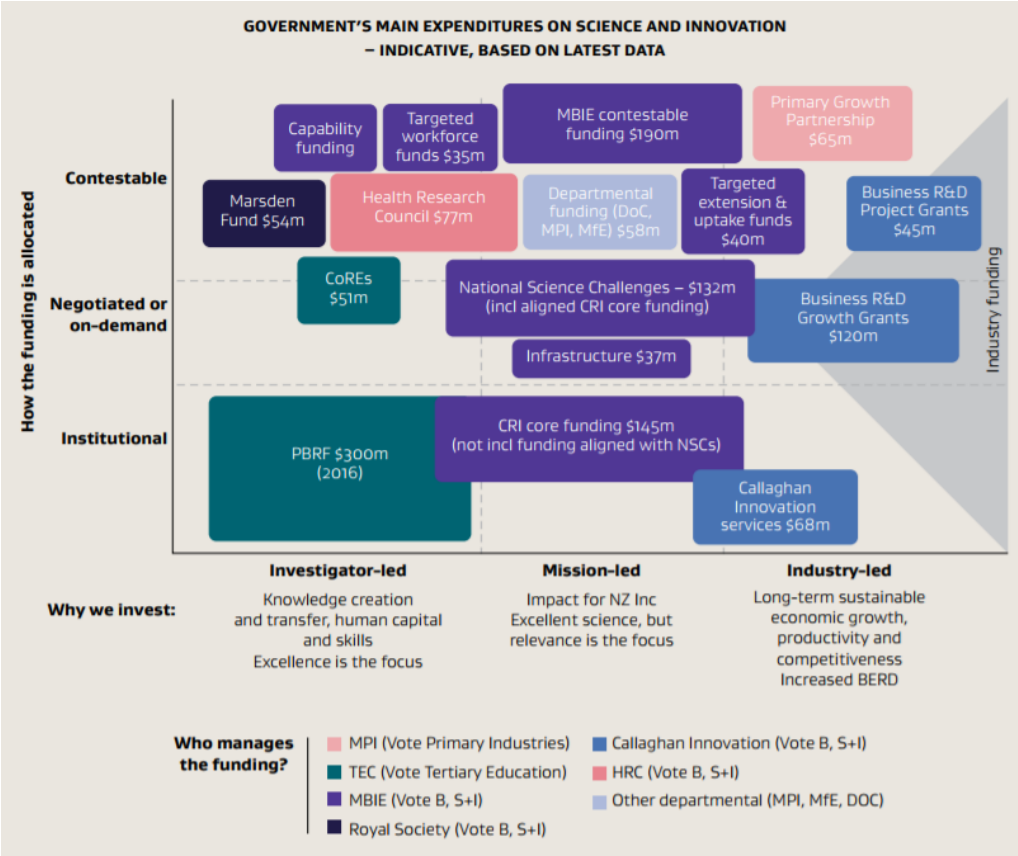

Figure 1 Source: National Statement of Science Investment 2015-2025

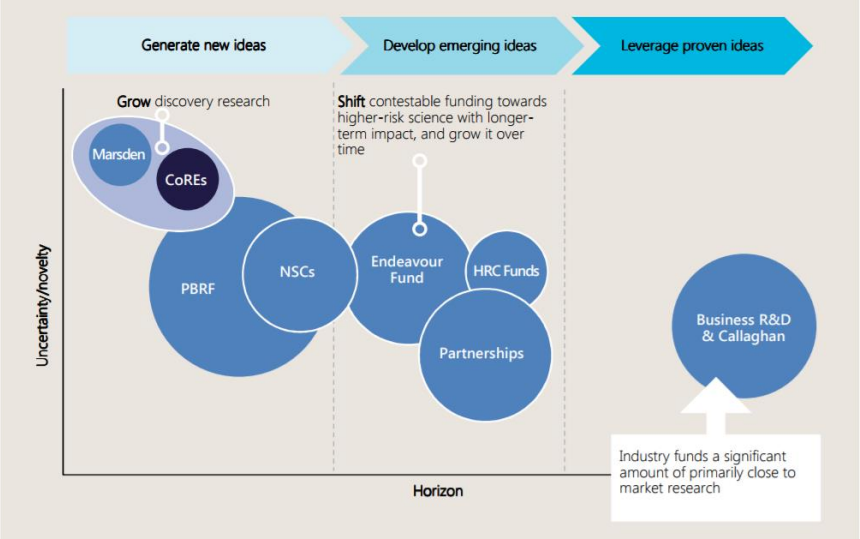

Figure 2 Some of Government science and innovation investments by allocation method and type of investment. Source: Partnership Scheme 2017

177. The diagrams above show central government funding. There is also research undertaken by regional councils and by industry groups such as DairyNZ.

178. Our Land and Water Challenge has called for "new research strategies that focus on the joint efforts by researchers from the natural and social sciences, and practitioners and policy to contribute to the co-design, co-development and implementation of solutions relevant to society's needs". This ideal of collaboration between scientists, researchers and the users of research has yet to be realised, but is improving in situations where funding bodies require it.

179. Regional councils are working more effectively through Special Interest Groups (SIGs) to pool resources and prioritise their research needs. Several SIGs have developed science strategies including for surface and groundwater, and the regional sector has a Research, Science and Technology Strategy, currently in its third edition. A key purpose of this strategy is "to ensure that the councils provide a united, influential, and well-regarded front to funding agencies and research providers both for identifying research priorities and also capability requirements for the present and future."

180. MBIE has made progress on getting a whole-of-system approach to science funding through the National Statement of Science Investment 2015-2025 (NSSI), which aims to create a simpler and more strategic framework. It removes ring-fenced funding such as for environmental research, with just one contestable pool to cover all research areas, open to all providers. It signals a shift away from investing in applied science to more higher risk/higher return 'discovery' science, which has implications for long-term research programmes run by CRIs and Cawthron that councils draw on to test effectiveness of council policies.

Issues

181. The Forum has identified in its first, third and fourth reports that science, research and information needs are very important, and recommended improvements, including for better strategic direction and an integrated freshwater management information

framework. A review is needed of the way that science funding and prioritisation is working and whether the system is meeting the needs of those involved in freshwater management. Consideration should also be given to the mechanisms for delivery and implementation of science.

182. New Zealand's science system is complex, with numerous organisations and processes involved either directly or indirectly with fresh water, and there has been no analysis of whether the current system is producing optimal outcomes.

183. It is very difficult to get a national picture of funding provided by councils, businesses, industry sectors and others including charities. There is no central repository of knowledge and no indication that NZ as a whole is spending the right amount on the right research.

184. There are numerous strategies for investment by central and regional government into science in general and freshwater science in particular. These strategies need to be assessed for consistency and redundancy.

185. The pressures of contestable funding are creating suboptimal outcomes due to time and effort eaten up by funding proposals and a lack of oversight and commissioning of what the country needs. At most, only one in four projects get funded. CRIs are spending a significant proportion of their budget and staff hours on funding bids rather than on doing the work.

186. There is a lack of understanding and acceptance of Mātauranga Māori as an important part of New Zealand's science system. This is especially relevant to fresh water, where hapū have deep connection to and knowledge of the state of their waterbodies that could, for example, enhance national datasets.

187. With the trend to involving communities more closely in freshwater planning and management, including but not limited to collaborative plan-making, citizen stakeholders need to understand complex technical details including hydrology, biophysics, scenario modelling, economic and social impact analysis, Te Ao Māori and Mātauranga Māori and social sciences. More knowledge brokers (cross-disciplinary individuals) who understand and can explain the connections between science, social science and policy are vital for knowledge to be used effectively.

Discussion

188. There is a need to ensure that research is being prioritised so that the science and research spend across the board is optimised. Any review would need to recognise that sectors have their own drivers for the sort of research they do (e.g. a levy-based organisation such as DairyNZ has to be responsive to the needs of its members) but better coordination should be possible.

189. Funding and training systems need to ensure that New Zealand has sufficient capability and capacity for future challenges.

Capability, capacity, and resourcing

Problem definition

190. The resources, capability and capacity needed to effectively implement the NPS-FM are significant. We have identified several specific resourcing, capability and capacity pressures:

- Regional councils have varying levels of capacity. Some are large and comparatively well-funded while others are not. Their level of capacity and capability is not always appropriate for and proportionate to the water management challenges facing them.
- There are staff turnover issues that affect the quantum and quality of resource available - consenting and extension staff for example.
- Meaningful iwi participation in freshwater planning is difficult, even for well-resourced iwi.
- Sectoral groups face large challenges - involvement in plan making is time and resource intensive. Some sectors are not well placed to assist their members to upskill and improve management practices, but for all groups the scale of sector extension is challenging.
- Environmental NGOs spend a proportion of their available capacity in court as the "environmental police" when part of this role, arguably, could be carried out by stronger regulatory stewardship by central government in ensuring its policy is well reflected in plans.
- Capacity issues in the science sector are restricting their ability to support limit-setting processes in all regions, and to develop the additional information and tools the system needs.
- The extension system is going to come under pressure as implementation effort ramps up.
- Central government also has limited capacity. Staff turnover in the relevant Ministries is high - few of the staff with institutional knowledge dating back to the beginning of the reform process remain. It also lacks capability in some areas but tends to use traditional ways of filling those gaps, which are sometimes not as efficient and effective as they could be. In the face of these issues, it is constrained in its ability to coordinate, explain and lead the reforms in a strategic way.

Previous Forum advice

191. In our report on implementation of the NPS-FM we recommended that MfE develop an implementation strategy that among other things would *"…identify priority capability and capacity gaps by region, sector and skill areas and how to address those gaps. While all stakeholder groups have responsibility for improving shortfalls in knowledge, skills and capacity, the Forum sees MfE playing the key facilitation and coordination role. This includes using existing capacity and capability in a better way – for example, resource sharing arrangements, the use of mobile teams, and secondments. The strategy must identify the size of the problem and whether special arrangements are needed to grow capacity in particular areas."*

Discussion

192. Central government should work systematically to improve resourcing, capability and capacity across the freshwater management system.

193. Various ad-hoc projects to improve capability and capacity in freshwater management are being progressed but overall the scale is too small and gaps are not being addressed systematically.

194. A more systematic approach would enable resources and assistance to be efficiently targeted where it is needed the most. While all stakeholder groups have responsibility for improving shortfalls in knowledge, skills and capacity, the Forum sees central government as having a key facilitation, coordination and leadership role to ensure constraints are addressed across the board. Without central government leadership in this area, in some places limit-setting programmes risk falling behind schedule as regions compete for limited resource pools.

195. Central government should work with local government, sector groups and iwi to identify resourcing, capability and capacity gaps across all areas of freshwater management. Gaps should be identified by region, sector and skill area, and compared to what is needed to implement the NPS-FM effectively. An overall direction and some priorities should be identified, and central government should provide appropriate levels of resourcing to these priorities.

196. Where appropriate, mobile teams, secondments, twinning arrangements, apprenticeships, sponsorship of interns and scholarships should be used to address capability and capacity gaps. Central government, local government, iwi and sector groups should also work together to share best practices and to improve extension functions – including by finding ways of rationalising and simplifying the information dissemination functions currently undertaken by multiple organisations with multiple aims. At a minimum those functions should improve the consistency of the messaging they are delivering to land managers.

197. Opportunities to capitalise on existing pockets of capacity/capability should also be identified. There are a range of groups that share information and best practices in different sectors and across different levels (technical/operational, policy and leadership levels). Some groups achieve better outcomes than others. It would be useful to look at the most effective groups and understand what features have led to their success, so that those learnings can be applied to other groups. If done well, this exercise will result in the identification of existing initiatives that could deliver greater benefits if given the right support and/or leadership. Efficiency improvements could also be made in some areas that could free up existing capability to be used more effectively elsewhere.

Appendix Three: Plenary member organisations

Aqualinc Research Ltd, Ballance Agri-Nutrients, Beef + Lamb New Zealand Limited, Business NZ, Contact Energy, DairyNZ, Ecologic, Environmental Defence Society, Federated Farmers, Fertiliser Association, Fonterra, Foundation for Arable Research, Genesis Energy, Horticulture New Zealand, Ihutai Trust, Institute of Public Works Engineering Australasia, Institution of Professional Engineers New Zealand, Irrigation New Zealand, King Country Energy, Lincoln University, Massey University, Mercury, Meridian Energy, MWH (now part of Stantec), National Institute of Water and Atmospheric Research, New Zealand Farm Forestry Association, New Zealand Forest Owners Association, New Zealand Institute of Forestry, NZ Landcare Trust, New Zealand Winegrowers, Ngati Kahungunu, Oceana Waihi Gold, Oji Fibre Solutions; Opus International Consultants Ltd, Our Land and Water National Science Challenge, Pioneer Generation, Rural Women New Zealand, Spiire, Straterra Inc, Sustainable Business Council, Te Arawa Lakes Trust, Te Rūnanga o Ngāi Tahu, Tourism Industry Association, TrustPower, Tuwharetoa Māori Trust Board, Waikato River Authority, Waikato-Tainui, Water Action Initiative New Zealand, Water New Zealand, Water Rights Trust, Watercare Services Ltd, Whitewater New Zealand, Wood Processors Association of New Zealand, Zespri.

Active Observers to the Plenary - Auckland Council, Bay of Plenty Regional Council, Christchurch City Council, Department of Conservation, Department of Internal Affairs, Environment Canterbury, Hawkes Bay Regional Council, Horizons Regional Council, Ministry for the Environment, Ministry for Primary Industries, New Zealand Conservation Authority, Tasman District Council, Treasury, Waikato Regional Council.

Chair, Land and Water Forum – Hugh Logan.

Appendix Four: Small Group member organisations

Auckland Council, Bay of Plenty Regional Council, Beef + Lamb New Zealand, Christchurch City Council, Contact Energy, DairyNZ, Ecologic, Environment Canterbury, Environmental Defence Society, Federated Farmers, Fonterra, Hawkes Bay Regional Council, Horizons Regional Council, Horticulture New Zealand, Irrigation New Zealand, Mercury, Meridian Energy, Ministry for the Environment, Ministry for Primary Industries, National Institute of Water and Atmospheric Research, New Zealand Forest Owners Association, Ngati Kahungunu, Oji Fibre Solutions, Our Land and Water Science Challenge, Tasman District Council, Te Arawa Lakes Trust, Te Rūnanga o Ngāi Tahu, Treasury, Waikato Regional Council, Waikato-Tainui, Water New Zealand, Whitewater New Zealand.