

Interim Regulatory Impact Analysis for Consultation: *Essential Freshwater*

Part I: Summary and Overview

08 August 2019

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Section 1: General information

Purpose

This is a summary document of the interim regulatory impact analysis done to date for the Essential Freshwater package.

This analysis and advice has been produced for the purpose of:

- informing Cabinet decisions on policies to consult on
- supporting consultation on the proposals contained within the discussion document *Essential Freshwater*.

Part 1 contains a summary of the policies and options being considered. Further details on each option are available on the Ministry for the Environment's website.

The Ministry for the Environment and the Water Taskforce¹ are solely responsible for the analysis and advice set out in this Regulatory Impact Statement, except as otherwise explicitly indicated.

Overview

New Zealand has major issues with freshwater quality and ecosystem health. The focus of initiatives to date has been on addressing water quality issues. This package, however, takes a more inclusive approach to encompass the wider aspects of water that contribute to ecosystem health.

The Water Taskforce have identified policies that would stop further degradation and loss, and reverse the past damage to, our freshwater resources, waterways and ecosystems.

This regulatory impact analysis covers 20 different policy interventions which we consider that, if implemented, would make significant progress to addressing issues of freshwater quality and ecosystem health.

Key Limitations or Constraints on Analysis

This draft regulatory impact analysis accompanies the Government's *Essential Freshwater* discussion document. The purpose of this consultation is to gather your views on the proposals and enhance the overall understanding of the impacts of the *Essential Freshwater* policies. In addition to this, further impact analysis is underway to better understand not only the economic and environmental impacts but also the social and cultural costs and benefits of the package. All of this information will then be included in the final regulatory impact analysis that will accompany the Cabinet paper seeking final policy decisions.

The consultation document has a mix of firm proposals, and policy areas where we have not conclusively identified a preferred option. In these areas we have provided a range of options. The *Essential Freshwater* policy proposals are presented as a package because of the interrelatedness of the proposals in addressing declining fresh water ecosystem health and this allows New Zealanders to consider the package as a whole.

Understanding water quality and ecosystem health and why it varies from location to location and over time is challenging. Part of the difficulty arises because rivers, lakes, and groundwater are parts of an interconnected freshwater system that receives inputs from the surrounding land and the

¹ This taskforce is led by the Ministry for the Environment and the Ministry for Primary Industries, with members from the Treasury, Te Puni Kōkiri, Māori Crown Relations Unit, the Department of Internal Affairs, the Department of Conservation, the Ministry of Business, Innovation and Employment, and expertise from local government.

water ultimately flows into estuaries and coastal environments. A reduction in water quality in one part of the system can affect water quality elsewhere and make it difficult to determine the sources of pollution.²

Changing water flows can have significant effects on habitats, but information about the extent and scale of these impacts on our ecosystems is lacking. Other water issues like pollution also have an effect, but the cumulative impact of these changes on our social and economic values is difficult to determine.³

It is inherently difficult to accurately quantify environmental costs and benefits (and arguably it is not always necessary when the intrinsic value of the environment is acknowledged). It is often easier to quantify the economic cost of a policy intervention to an individual, yet harder to quantify the environmental benefit in the same terms. So, while best efforts have been made to quantify the impacts of the *Essential Freshwater* package, these should be understood within this context.

Furthermore, estimating the fiscal costs and benefits of direction in the Freshwater NPS is difficult because there is no easy way of predicting:

- i. how councils may choose to exercise their discretion in several matters (such as the timeframes for achieving objectives to meet national bottom lines)
- ii. what mitigation measures resource users might choose to put in place to meet limits and over what timeframe.

Responsible Manager

Martin Workman

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² Ministry for the Environment & Stats NZ (2019). New Zealand's Environmental Reporting Series: Environment Aotearoa 2019, p.47.

³ Ibid., p.82.

Quality Assurance Statement

The Ministry for the Environment's Regulatory Impact Analysis Panel has reviewed the Regulatory Impact Analysis (RIA) developed by the Ministry for the Environment, and produced for the *Essential Freshwater* work programme (dated 8 August 2019).

Due to the size and complexity of the RIA, which contained 20 sections with separate analyses outlined in Appendices, the Panel has provided an assessment for each of the separate RIA. The Panel considers that all of the RIA meet the quality assessment criteria, except - Appendix 17: *Intensive winter grazing on forage crops*. This particular appendix partially meets the assessment criteria. How the issue can be a problem locally is described well. However, the RIA requires further analysis on the extent of the current situation nationally. We expect the consultation process will help to gather information to address the following issues:

- further detail of how the preferred option will work in practice; and
- whether the preferred option is the best solution to address the problem.

Overall the RIA are written clearly and concisely, and make the case for the recommended change, with the key elements of the proposal being clear and the most important impacts having been identified. The Panel considers that the RIA provides sufficiently robust analysis and information to support the proposed public consultation on the *Essential Freshwater* work programme.

Some of the individual RIA require further assessment of the impacts and costs on users and Local Government. However, we understand that this analysis is set to be undertaken during (but also informed by) planned public consultation. A final RIA will be developed following public consultation and when final policy decisions are being sought.

Though there is no overarching statement of the overall impacts of the package, we recommend that this be developed through and after consultation and included in the final RIA.

Section 2: Problem definition and objectives

The way we live and make a living is having a serious impact on our environment including our precious water resources. *Environment Aotearoa 2019*⁴ identified nine priority issues that matter most to the current state of our environment. Four of these priority issues reflect the pressure we are putting on our rivers, lakes, wetlands, estuaries and groundwater:

- Changes to the vegetation on our land are degrading our soil and water
- Our waterways are polluted in farming areas
- Our environment is polluted in urban areas
- The taking of water changes flows which affects our freshwater ecosystems

These are not new issues; as outlined in the document *Essential Freshwater* the pressure on our freshwater is the result of more than 150 years of population growth and changes in the way we use our land.

Regulatory uncertainty also slows action to addressing water issues. The *Essential Freshwater* package aims to address this as improving regulatory certainty means that decisions may be taken more quickly and with confidence.

2.1 What is the context within which action is proposed?

Government reform

Essential Freshwater

In October 2018, the Government published the *Essential Freshwater: Healthy Water, Fairly Allocated*⁵ work programme. The programme is the latest in a series of Government initiatives to address water use and the effects of land use on water quality and ecosystem health. Options to meet the objectives of that work programme⁶ are assessed in this regulatory impact statement and will inform the Government's decisions on regulatory interventions.

There will be costs of action but the costs of inaction are not zero. The freshwater issues currently facing New Zealand have significant costs (e.g. the costs of ongoing funding to remediate degraded waterways). In addition to improving our environment, one of the major benefits of the *Essential Freshwater* package is the avoidance of even greater future costs – generally, environmental interventions are cheaper and more cost-effective the sooner they are implemented. As noted above, there are also overarching benefits to providing regulatory certainty (such as enhancing New Zealand's international reputation, and the trade benefits that would arise as a consequence).

There are many examples of individuals and businesses who are already doing their bit to protect and improve freshwater ecosystems. These examples of good practice can be built upon by others to improve freshwater outcomes throughout New Zealand.

Related Government work

Essential Freshwater is part of a broader programme of reform towards a sustainable, low emissions economy. This broader work programme includes Te Uru Rakau One Billion Trees programme, which will reduce erosion, improve freshwater quality and promote diversity of land use and biodiversity; three proposed national policy statements on urban development, highly productive land, and

⁴ Available at <https://www.mfe.govt.nz/environment-aotearoa-2019>.

⁵ Available at <https://www.mfe.govt.nz/sites/default/files/media/Fresh%20water/essential-freshwater.pdf>.

⁶ The objectives of this work programme are outlined in section 2.4 below.

indigenous biodiversity; changes to the RMA to improve its operation and speed up freshwater planning; and a commitment to reduce our greenhouse gas emissions and transition to a low carbon, climate resilient New Zealand.

The other proposed national policy statements on highly productive land, urban development and indigenous biodiversity will also be consulted on between August and November 2019.

Water quality and ecosystem health

Environment Aotearoa 2019 provides the most recent assessment of the state of New Zealand's water quality using available indicators. It found that "there is clear evidence that waterways in our farming areas have markedly higher pollution by nutrients (nitrogen and phosphorus), microbial pathogens, and sediment⁷ than waterways in native catchments. Although all these pollutants occur naturally in freshwater systems, excess concentrations can cause harm."

There are significant issues with ecosystem health in urban areas as well: "river water quality in urban areas was much worse than expected for natural conditions...even poorer than in pastoral areas"⁸. While the Essential Freshwater Package does address issues with urban waterways, when considering the scale of the problems faced, it is important to consider that urban waterways make up less than one percent of New Zealand's rivers and lakes.⁹

Ecosystem health is an important metric that looks at a broader range of things than just water quality and quantity (i.e. habitat, aquatic life, and ecological processes). A recent report card produced by the Cawthron Institute provides an assessment of the country's freshwater ecosystem health. It highlights the relative lack of information we have on aspects of water health other than water quality. Overall, and in light of this lack of information, New Zealand river ecosystem health scored a B-.¹⁰

Environment Aotearoa 2019 assessed the state of freshwater against the Australian and New Zealand Guidelines for Fresh and Marine Water Quality.¹¹ These guidelines show what water quality indicators should look like under slight to moderate levels of human influence (default guideline values). Modelling in the report showed that "for most water quality variables, 50–90 percent of the total river length in the pastoral land-cover class exceeds the relevant default guideline value for 2013–17. In comparison, the models show that default guideline values are exceeded in less than 30 percent of the river length in the native land-cover class."¹² From 2013 to 2017, compared with rivers in the native land-cover class, the pastoral land-cover class had modelled median nitrate-nitrogen

⁷ More detail on nutrients, pathogens and sediment will be provided in the breakdown of policy interventions below. For a general description of these items, see *Environment Aotearoa 2019*, p.47.

⁸ see *Environment Aotearoa 2019*, p.65.

⁹ In total, 3,344 kilometres of New Zealand's river length is in the urban land-cover class, compared with 188,024 kilometres in the pastoral landcover class, and 198,126 kilometres in the native landcover class. see *Environment Aotearoa 2019*, p.65.

¹⁰ Clapcott J, Goodwin E, Williams E, Harding J, McArthur K, Schallenberg M, Young R, Death R, 2019, Technical Report on the Prototype New Zealand River Ecosystem Health Score, Cawthron Institute for MfE. In preparation.

¹¹ ANZECC & ARM CANZ 2000, Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra.

¹² A total of 188,024 kilometres of New Zealand's river length is in the pastoral land-cover class, whereas a total of 198,126 kilometres is in the native land-cover class.

levels that were 9.7 times higher, dissolved reactive phosphorus levels 3.4 times higher, turbidity 2.2 times higher, and *E. coli* levels 14.6 times higher.¹³

While farming is not the only source for these pollutants, it is a major contributor. From 1994 to 2017, the number of dairy cattle in New Zealand increased by 70 percent (from 3.8 million to 6.5 million). During the same period, the number of sheep decreased by 44 percent from 49.5 million to 27.5 million, and the number of beef cattle decreased by 28 percent from 5 million to 3.6 million. The increase in dairy cattle has been most pronounced in the South Island, notably in Canterbury, Otago, and Southland. This shift from sheep and beef farming to dairy farming is associated with increased leaching of nitrogen from agricultural soils. Cattle excrete more nitrogen per animal than sheep (cows produce more urine and the urine has a higher nitrogen concentration), so nitrogen from cattle is more likely to leach through soil than nitrogen from sheep.¹⁴

In the 10 years from 2008 to 2017, some river water quality monitoring sites showed improving trends and some showed worsening trends. The pastoral and native land-cover classes had similar proportions of sites with improving and worsening trends. Understanding the causes of these trends is difficult due to the complex interconnections between water bodies, variable lag times, climate influences, and the mixture of land cover, land use, and land management that occurs in any given catchment.¹⁵

Water Usage

New Zealand lakes contain approximately 320 billion cubic metres, aquifers store around 711 billion cubic metres, and about 440 billion cubic metres flow in rivers and streams each year.¹⁶ But New Zealand's water use is high. In 2014, New Zealand had the second highest volume of water take per person of OECD countries – 2,162 cubic metres compared with the OECD average of 815 cubic metres¹⁷. This usage has led to situations, depending on the area and time of year, where there is not enough water to meet demand, and results in some waterbodies being over-allocated (which in turn leads to issues with water quality and ecosystem health).¹⁸

Aside from hydroelectricity uses, there were 10,900 consents to take groundwater and 5,100 consents to take surface water in the 2013/14 water reporting year. The amount of surface water allocated was 74 percent of the total water allocated nationally, with the remainder from groundwater.¹⁹

The area of irrigated agricultural land almost doubled (a 94% increase) between 2002 and 2017 from 384,000 hectares to 747,000 hectares. Irrigated land area rose in every region during this time but the majority of this increase was due to the almost doubling of irrigated land in Canterbury (241,000

¹³ Environment Aotearoa 2019, p.49-51.

¹⁴ *Ibid.*, p.58.

¹⁵ Environment Aotearoa 2019, p.53.

¹⁶ Ministry for the Environment & Stats NZ (2017). *New Zealand's Environmental Reporting Series: Our fresh water 2017*. Retrieved from www.mfe.govt.nz and www.stats.govt.nz.

¹⁷ OECD. (2018). Water withdrawals (indicator). <https://doi.org/10.1787/17729979-en>

¹⁸ *Environment Aotearoa*, 2019, p.75.

¹⁹ *Ibid.* p.75.

to 478,000 hectares). In 2017, 64 percent of New Zealand’s irrigated agricultural land was in Canterbury.

Waitangi Tribunal Claims and the Treaty of Waitangi

In February 2012 the New Zealand Māori Council (NZMC) lodged Wai 2358 with the Waitangi Tribunal. This claim concerned the Crown’s resource management reforms, which the NZMC argued were proceeding without having first established a regime to recognise and provide for Māori rights and interests in freshwater.

One of the Waitangi Tribunal’s freshwater inquiry’s (Wai 2358) focus was on whether the current law concerning freshwater and the Crown’s freshwater reforms (both completed and proposed) were consistent with the principles of the Treaty. The NZMC argued that the answer on both accounts was ‘no’. Although it supported the recent provision for Mana Whakahono-ā-Rohe agreements in the Resource Management Act 1991 and the strengthening of Te Mana o te Wai in the National Policy Statement for Freshwater Management 2014 (amended 2017), the NZMC submitted that these changes had come too late and did not go far enough.

We are expecting the Tribunal to report back late in 2019. We hope to consider the report of the Tribunal alongside submissions as part of public consultation.

Public perceptions of freshwater

In the 2018 New Zealand General Social Survey²⁰ 80.2 percent of New Zealanders stated that there was a problem with the state of New Zealand’s rivers, lakes, streams, wetlands, and aquatic life. Of these people, half of them (49.3 percent) thought farming activities were the main cause of the issue. The second-most commonly stated cause was sewage and stormwater discharges (at 16.6 percent).

2.2 What regulatory system, or systems, are already in place?

Existing legislation/regulations

Instrument	Description
Resource Management Act 1991	<p>The RMA is New Zealand’s main piece of legislation that sets out how to manage our environment. The RMA is based on the principle of sustainable management which involves considering effects of activities on the environment now and in the future before making resource management decisions.</p> <p>As well as managing air, soil, freshwater and coastal marine areas, the RMA regulates land use and the provision of infrastructure which are integral components of New Zealand’s planning system.</p>

²⁰ Available at <https://www.stats.govt.nz/information-releases/wellbeing-statistics-2018>.

Instrument	Description
Section 360 regulations	<p>Regulations made under Section 360 of the RMA take immediate effect from commencement date. Section 360 (1) lists the matters regulations can be made for. The matters are generally administrative, but have been expanded to include exemptions related to:</p> <ul style="list-style-type: none"> • discharges (removing the need for specific discharges to be authorised by consent, rule or NES), • requirements for holders of water permits, • discharge permits, • coastal permits, • land use consents to keep records, and • measures to exclude stock from water bodies. <p>Current section 360 regulations relevant to freshwater include requirements to measure and report water takes (Resource Management (Measurement and Reporting of Water Takes) Regulations 2010). The powers to create regulations for excluding stock from waterbodies have yet to be used.</p>
National Policy Statement for Freshwater Management 2014 (amended 2017)	<p>National policy statements are instruments made under sections 45-55 of the Resource Management Act 1991. They state objectives and policies for matters of national significance.</p> <p>The Freshwater NPS provides direction on how local authorities should carry out their responsibilities under the RMA for managing fresh water.</p> <p>Local authorities must give effect to national policy statements in their regional and district plans.</p>
National Environmental Standards (NES)	<p>National environmental standards (NES) are regulations made under section 43 of the Resource Management Act and can apply to any specified part of the country or nationally (although all current national environmental standards apply nationally).</p> <p>NES are regulations that prescribe standards for environmental matters. The government sets standards where appropriate to ensure a consistent standard for an activity or resource use.</p> <p>They can prescribe technical and non-technical standards, methods or other requirements for land use and subdivision, use of the coastal marine area and beds of lakes and rivers, water take and use, discharges, or noise. Each regional, city or district council must enforce the same standard. In some circumstances where specified in the NES, councils can impose stricter or more lenient standards.</p> <p>An example is the NES for Sources of Human Drinking Water (2008). It sets requirements on regional councils for protecting sources used for water supply from becoming contaminated. Currently, there is no NES for freshwater management more generally.</p>
Regional Policy Statements	<p>Regional councils are required to prepare a regional policy statement for their region. RPSs provide an overview of the resource management issues of the region and policies and methods to achieve integrated management of the natural and physical resources of the region. Local authorities in the region must give effect to the RPS in their regional and district plans.</p>

Instrument	Description
Regional Plans	<p>Regional plans give effect to national policy statements, national planning standards and regional policy statements. They must also not be inconsistent with water conservation orders.</p> <p>In terms of freshwater, regional plans can cover issues within the functions of the regional council, including soil conservation, land uses that affect water quality and quantity, aquatic ecosystems, biodiversity, discharge of contaminants, taking, damming and diverting water, and allocation of natural resources.</p>
District plans	<p>A territorial authority (city or district council) must prepare a district plan for its district to achieve sustainable management. It must give effect to national policy statements and regional policy statements and must not be inconsistent with regional plans and any applicable water conservation orders.</p> <p>District plans cover issues related to the functions of territorial authorities, including the effects of land use and the control of impacts from activities on biodiversity, rivers and lakes.</p>

The Resource Management Act 1991 (the RMA) regulates the use and development of natural and physical resources of New Zealand. The purpose of the RMA, given in section 5, is to promote the sustainable management of natural and physical resources. The management of freshwater resources is largely the responsibility of regional councils, and is achieved through objectives, policies, rules and other methods adopted in regional plans. The Governor-General can make regulations (both national environmental standards and section 360 regulations), which prevail over regional rules (except where the regional rules are more stringent and the regulations allow stringency), and can approve national policy statements prepared by the Minister for the Environment. National policy statements state objectives and policies for matters of national significance that are relevant to achieving the purpose of the RMA.

National direction on freshwater management is primarily provided through the National Policy Statement for Freshwater Management 2014 (the Freshwater NPS), a national policy statement prepared under the Resource Management Act 1991. The Freshwater NPS came into effect in 2011. It was amended and replaced in 2014, and amended in 2017. It sets out objectives and policies that regional councils must give effect to in their regional policy statements and plans. It requires councils to fully implement the objectives and policies of the Freshwater NPS by 2025, or 2030 if they cannot complete the process to sufficient quality by 2025.

The Freshwater NPS requires regional plans to have objectives, policies and methods, including rules, that:

- Safeguard the life-supporting capacity, ecosystem processes and indigenous species of fresh water, including their associated ecosystems.
- Establish systems to account for all freshwater taken and contaminants entering freshwater bodies in the region.
- Maintain or improve the overall quality of fresh water within the region.
- Identify the values the community holds for all freshwater bodies in the region, and set freshwater objectives and limits to provide for those values.
- Establish systems to monitor the progress towards achieving freshwater objectives.

- Avoid over-allocation of freshwater resources, and phase out existing over-allocation. Where there is over-allocation, councils must set targets in the regional plan, including defined timeframes, to transition to sustainable allocation.
- Improve the integrated management of fresh water, land and the coastal environment.
- Reflect tāngata whenua values in freshwater management and take reasonable steps to include iwi and hapū in freshwater management.

The Government’s policy intention of how councils should do this is given in the Preamble of the Freshwater NPS as follows: “Setting enforceable quality and quantity limits is a key purpose of the national policy statement. This is a fundamental step to achieving environmental outcomes and creating the necessary incentives to use freshwater efficiently, while providing certainty for investment. Water quality must reflect local and national values. The process for setting limits should be informed by the best available information and scientific and socio-economic knowledge.”

Settlement Obligations

The Ministry has obligations under the Te Awa Tupua (Whanganui River Claims Settlement) Act 2017. This includes an obligation to recognise: Te Awa Tupua’s status as a legal person and as “an indivisible and living whole, comprising the Whanganui River from the mountains to the sea, incorporating all its physical and metaphysical elements”; and Tupua te Kawa, which are intrinsic values representing the essence of Te Awa Tupua (ss12 to 15 of the legislation). The effect of any regulatory proposals on Te Awa Tupua has not yet been assessed. If any regulations affecting Te Awa Tupua are progressed, the impact of those regulations on Te Awa Tupua will be assessed following public consultation.

2.3 What is the policy problem or opportunity?

Problem Definition

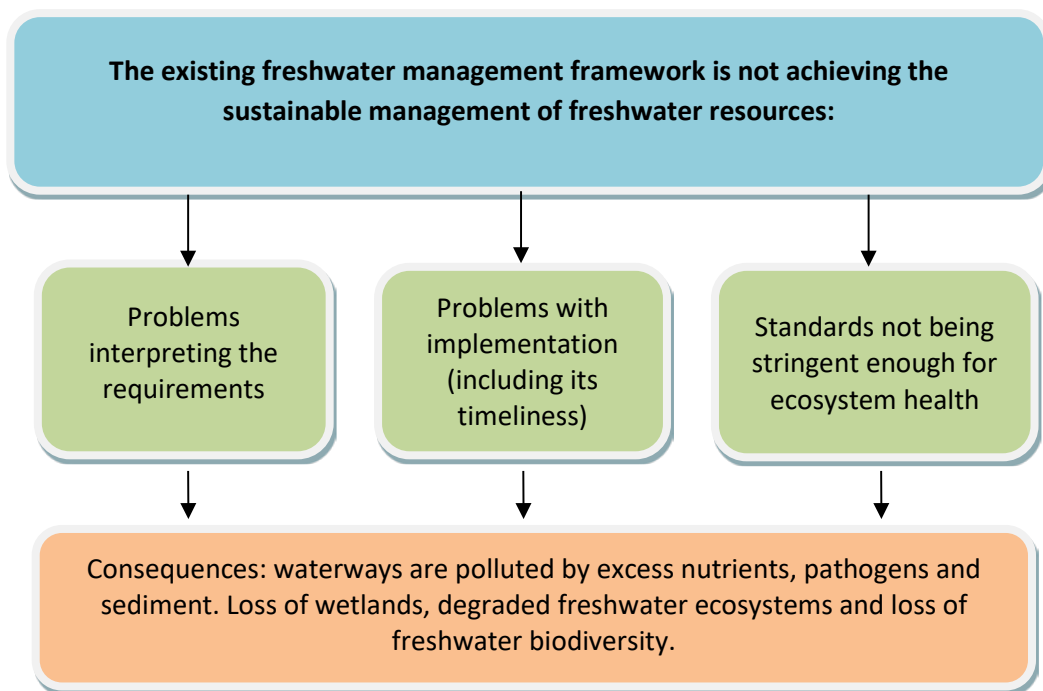


Figure 1: Overarching issues and their consequences

Figure 1 above sets out the overarching issue – the existing freshwater management framework is not achieving the sustainable management of freshwater resources.

Although the RMA provides a framework for good water management practice, there have been issues with implementation. The existing policy framework is currently incomplete (i.e. it currently focuses on water quality and quantity, but leaves out broader measures of ecosystem health). Furthermore, some of the existing standards are not achieving ecosystem health. With increased pressure on water resources, councils are struggling to apply tougher rules on water users, in particular on the primary sector in which land use has so far been relatively unregulated.

The process for giving effect to Freshwater NPS is long and complex (though this is largely inevitable when dealing with such a significant issue). There is a lack of regulatory certainty which can make it difficult for councils to implement the Freshwater NPS. Implementing the Freshwater NPS requires input from multiple disciplines including freshwater ecology, economics and te ao Māori, and a reconciliation of the community's environmental, economic, social and cultural values.

Problems with interpretation and implementation – Insufficient Integrated Management

Regional councils have as one of their functions the control of land use for the purposes of managing water quality and quantity (section 30 of the RMA). Yet despite the causes of freshwater degradation having moved from being dominated by direct discharges to water, to now being dominated by land use effects, there are few controls on agricultural land use designed to improve water quality.

Councils have expressed difficulty with the interpretation and implementation of parts of the existing policy framework. This compounds issues they already have with implementation like some of their decisions being subject to legal challenge.

Problems with interpretation and implementation – Variable Iwi/hapū involvement

The RMA provides mechanisms for Treaty partnership with Māori in freshwater governance, but these have not been well or widely utilised. Direction in the Freshwater NPS for councils to engage with Iwi and hapū has been poorly implemented in some regions.²¹

Standards not stringent enough – Degraded water quality

Water quality in many parts of New Zealand is declining across a number of indicators. The slow adoption of quantitative enforceable water quality limits in the majority of regional plans, and the slow application of these limits to resource users has meant that water quality is continuing to degrade in places.

Status Quo

Many councils are making progress on new policy and plan initiatives which will improve the management of our fresh water (particularly for water quantity). However, other regions are further behind and making much slower progress in managing the increase in demand.²² In addition to the Freshwater NPS, other actions by central government will also have an effect on water quality.

Costs of not acting

Furthermore, it is important to understand that the costs of not acting are not zero. The environmental issues currently facing New Zealand have immediate significant costs (e.g. the costs of ongoing funding to remediate degraded waterways and the cost of not supporting access to natural environments) as well as future costs (eg, decreased productivity due to soil erosion). In addition to improving our environment, one of the major benefits of the Essential Freshwater package is avoiding greater future costs – generally, environmental interventions are cheaper and more cost-effective the sooner they are implemented.

2.4 Objectives

The Government set the following objectives for improving freshwater management in its document *Essential Freshwater: healthy water, fairly allocated*²³

Stopping further degradation and loss – taking a series of actions now to stop the state of our freshwater resources, waterways and ecosystems getting worse, and to start making immediate improvements so that water quality is materially improving within five years.

Reversing past damage – promoting restoration activity to bring our freshwater resources, waterways and ecosystems to a healthy state within a generation.

The Government also set out a vision for freshwater. They affirmed that:

- freshwater is a precious and limited resource and a taonga of huge significance, and at the heart of what it is to be a New Zealander

²¹ Ministry for the Environment. 2017. National Policy Statement for Freshwater Management Implementation Review: National Themes Report. Wellington: Ministry for the Environment.

²² Ibid.

²³ A third objective: *Addressing water allocation issues – working to achieve efficient and fair allocation of freshwater and nutrient discharges, having regard to all interests including Māori, and existing and potential new users* is being considered separately. There will be a concurrent consultation on allocation issues as part of the broader *Essential Freshwater* that goes out for consultation.

- access to safe drinking water is a basic right, and drinking water sources must be safeguarded
- the life-supporting capacity of water is critical for the habitat of indigenous freshwater species, trout and salmon
- New Zealanders consider they have a birth right to swim safely in New Zealand's rivers and lakes and at beaches, and that waterways should be fishable and safe for food gathering
- Mauri must be restored to waterways subjected to pollution and practices that have compromised the relationship that Māori have traditionally had with these taonga
- if each of New Zealand's local rivers is clean enough to swim in safely and life supporting for freshwater species, then all New Zealand rivers will be.

2.5 Are there any constraints on the scope for decision making?

Allocation issues

Options to change freshwater allocation issues (both quality and quantity) are not considered as part of this regulatory impact analysis. Nitrogen discharge allocation will be consulted on as part of the *Essential Freshwater* policy package; however not at the same time as the rest of the package. Therefore, no decisions are sought in this area at this stage.

The purpose of the upcoming consultation process on Nitrogen discharge allocation is to begin a national conversation on this important issue.

Some other tools such as taxes on farm inputs (eg, fertiliser) have been ruled out by the Government in this term and are not considered in this analysis.

2.6 Stakeholder Engagement

The Water Taskforce within the Ministry for the Environment has undertaken work alongside four advisory groups to develop policy options. These groups are: Kāhui Wai Māori (KWM: a Māori freshwater forum established to allow for collaborative freshwater policy development between the Crown and Māori), a Science and Technical Advisory Group (STAG: to advise on scientific evidence for freshwater policy development), the Freshwater Leaders Group (FLG: a group to co-design policy solutions and provide a sounding board Water Taskforce ideas, input ideas, challenge analysis, and lead discussion in various sectors), the Regional Sector Water Sub-Group. Individual policy leads also worked with representatives from the hydro-electric generation industry and a Sediment Working Group (consisting of policy and technical experts from regional councils).

Public consultation is currently planned for late August 2019.

The views of advisory groups on the various policies of the *Essential Freshwater* Package will be discussed in the relevant sections below. In addition to this, the advisory groups have produced their own reports on the *Essential Freshwater* package, these will be available to the public during the consultation period.

Section 3: Overall options identification

3.1 What options are available to address the problem?

Of the regulatory tools listed in section 2.2 above, we have identified three regulatory tools that can be used to address the problem. These are:

1. changes to the Freshwater NPS (which has an existing implementation date of 2025);

2. the creation of a new National Environmental Standard (which would impose regulations quickly to limit potential further decline); and
3. the creation of new section 360 regulations (which can take immediate effect from their commencement date and are a more appropriate vehicle for some interventions).

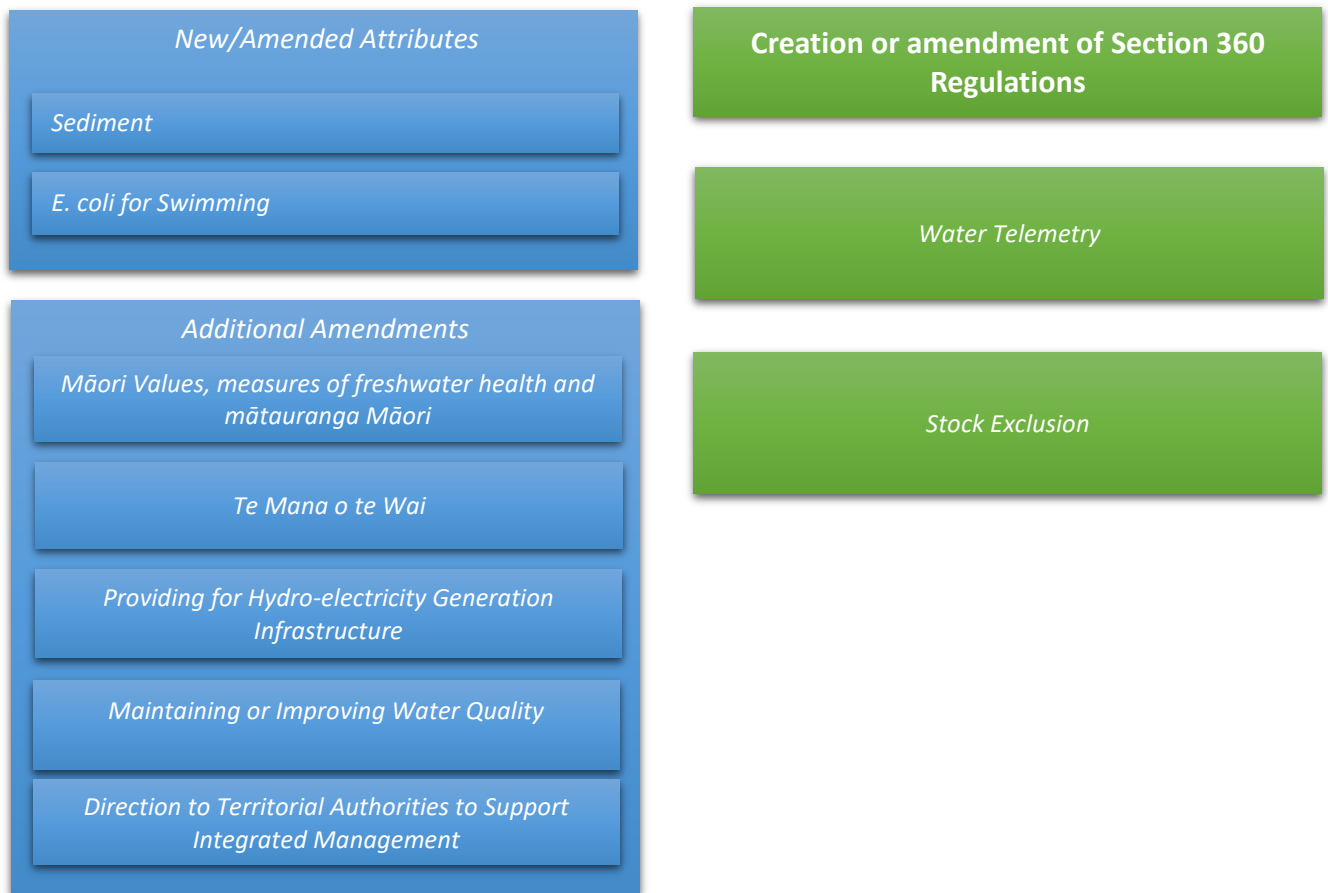
Together these tools are looking to improve policy direction; set thresholds or bottom lines; require adoption of good practice; improve monitoring and reporting on freshwater; and support people in implementing these changes.

We consider that these are the best policy tools for the kind of intervention required by this problem. They provide sufficient flexibility in balancing the need for strong national direction while ensuring that councils have sufficient flexibility to adapt to local circumstances.

Figure 2 shows what tool the analysis recommends for each policy area.

Figure 2: Essential freshwater policy areas by recommended instrument





The recommended options for each of the policy areas are summarised separately below. A full analysis of each of these options is available in Part II of this regulatory impact analysis.

3.1 Options not considered

RMA Reform

The Essential Freshwater work programme has focussed on utilising existing tools available under the RMA rather than changing the RMA itself. However, there is currently a bill to introduce a new planning process for freshwater which councils must use. This will require plans to be operative by 2025. This new planning process will support the changes included in the *Essential Freshwater* programme by enabling these to come into effect in a timely way.

3.2 Criteria

Each of the policy options considered have been assessed using the following general criteria. For certain sub-options some criteria were deemed not to be relevant or additional criteria were used. The criteria used to assess each option along with the list of options considered can be found within the full regulatory impact analysis in the chapter associated with the specific policy area.

Effectiveness: *The option provides a solution to the problem. The problem has been completely addressed.*

Timeliness: *The option prevents further degradation of fresh water in New Zealand in a timely fashion.*

Fairness: *The option treats all stakeholders (rural, urban, future and current generations) equitably. The costs fall on those that contribute to the problem and not other parties (ie, on central or local Government).*

Efficiency: *The option is cost-effective. The option achieves maximum benefits with minimum wasted effort or expense. This criterion should consider impacts, either negative or positive, on the wellbeing of people (individuals and communities).*

Principles of the Treaty of Waitangi: *The option appropriately provides for the principles of the Treaty of Waitangi. The option promotes partnership and protects Māori rights/interests and relationships with their taonga.²⁴*

Te Mana o te Wai: *The option puts the well-being of the water first, and promotes values-based (based on the needs of the community), holistic management to sustain the wellbeing of the people. The option acknowledges mātauranga Māori.*

²⁴ You can read about the principles of the Treaty here: <https://www.waitangitribunal.govt.nz/treaty-of-waitangi/principles-of-the-treaty/>

Section 4: Summary of Preferred Options

Our current preferred options (which will be reviewed following consultation to incorporate views expressed in submissions) contain:

- proposals to set policy direction (taking a holistic view of managing land and water resources and enable regional councils to move more quickly)
- proposals to raise the bar on ecosystem health (strengthen focus on ecosystem health, set more stringent bottom lines, and stop further loss of wetlands and streams)
- a proposal to improve monitoring of water use
- proposals to improve farm practices (require farmers and growers to meet new standards and improve practices for high-risk activities)

In this section, summaries of the impacts of the proposals are discussed. More detail is available on specific proposals in Part II.

4.1 Recognising all components of ecosystem health

Recommendation

We recommend a suite of complementary options aimed at managing biophysical freshwater ecosystems holistically, by better recognising and providing for all aspects of ecosystem health in council planning. These options would be delivered by amending the National Policy Statement for Freshwater Management, and making new regulation in a National Environmental Standard. The recommended options are as follows:

- Amend the description of the compulsory value for Ecosystem Health to clarify that aquatic life, water quality, water quantity, habitat, and ecological processes must all be managed.
- Require regional councils to implement practices described in the New Zealand Fish Passage Guidelines for any consent for a structure in the beds of rivers, accounting for any operative Fisheries Management Plans.
- Require regional councils to collect and maintain records of potential fish passage barriers, and implement a rehabilitation strategy to achieve fish ecology objectives.
- Require councils to set objectives to manage threatened species, by including a new Threatened Species compulsory value in Appendix 1.
- Amend the requirements for setting objectives, so that there is a clear distinction between desired environmental outcomes for values as a whole, and those associated objectives with attributes that are specific measurable aspects of the value.
- Add new attributes for ecosystem health (fish, macroinvertebrates, dissolved oxygen in rivers, ecosystem metabolism in rivers, dissolved oxygen in lakes and aquatic plants in lakes), with requirements for monitoring and triggers for action.

Additional detailed options to address other particular aspects of ecosystem health (flows and levels, preventing stream loss, preventing loss of wetlands, managing nutrients, sediment, dissolved oxygen, and reporting on ecosystem health) are analysed separately.

Problem being addressed

Freshwater ecosystems are not being adequately recognised and safeguarded. To date, national direction and local authority freshwater management effort has tended to be focused on water quality and quantity. But ecosystem health has three more components – physical habitat, the presence (or absence) of aquatic life, and the interaction between all these components (ecosystem processes). All five components are necessary for a healthy functioning ecosystem.

Reasons for recommendation being preferred

The recommended options bring additional recognition and focus to managing all aspects of ecosystem health. By recognising all aspects of ecosystem health, councils and communities will be able to make more informed decisions which should encourage effective safeguarding of freshwater ecosystems.

Impact on affected parties

Regional councils will need to review and amend their regional plans to give effect to the new direction on how to manage ecosystem health. They may need to fill technical gaps in their competency or management programmes, and undertake additional monitoring. Government investment has been made in some tools to assist, such as MBIE Envirolink Grants aimed at managing fish passage, collecting data on fish barriers, and national environmental monitoring standards (NEMS) for dissolved oxygen.

The above recommendation requires regional councils to manage fish passage in a way informed by the New Zealand Fish Passage Guidelines. An increase in consenting or design costs is expected for new structures, but it is more cost effective to provide for fish passage at the design and construction stage, than to remediate once built. Councils are free to decide how they prioritise remediation of existing fish barriers, and to whom the cost falls.

Additional monitoring requirements will result in one-off capital costs to councils for monitoring equipment, and ongoing monitoring costs which they may recoup via consents from resource users. Landowners and businesses may incur costs to adapt their practices to the proposed policies on ecosystem health and fish passage, or actions that councils choose to put in place to achieve community objectives for freshwater ecosystem health.

Our wellbeing is underpinned by healthy freshwater ecosystems. Examples of on-going cultural, social and economic benefits include supporting our heritage and a sense of identity, mahinga kai, clean drinking water, recreation, positive branding for tourism and exporters, and the social licence to operate for those sectors that rely on exploiting freshwater resources.

4.2 Preventing further loss of streams

Recommendation

We propose that the Freshwater NPS will require councils to maintain the extent and ecosystem health of rivers and streams, and to monitor and report on losses and gains in river and stream habitat. The policy will direct councils to avoid reclamation of the bed of a river or stream unless certain exemptions apply relating to nationally significant infrastructure, flood prevention or erosion control, restoration, or where no other practicable alternative exists. Councils will be required to ensure that piping and permanently diverting streams or rivers do not result in a net loss of extent or ecosystem health.

Regional councils will be directed to ensure adverse effects of development on streams and rivers are offset where they can't be avoided.

Problem being addressed

Habitat loss in streams and rivers happens because the cumulative effect of multiple instances of piping or reclaiming stream or river beds is not adequately accounted for in development. The ecology of rivers and streams (particularly small contributing waters) is under-valued when compared to the economic value from developments and transporting runoff from rainfall as quickly as possible. Effects of piping or infilling a stream are often not adequately offset or compensated for by common approaches, such as riparian planting, in another location.

Reasons for option being preferred

These options will ensure that a minimum standard is applied, providing fair and consistent outcomes across the country. They will clarify the requirements for resource consent applications and minimise the time spent negotiating mitigation requirements, a process that can be costly and impose delays.

The recommended options encourage a more holistic view of streams and rivers rather than focusing on water quality and quantity, consistent with direction in the Essential Freshwater package to consider all the components of ecosystem health.

Impact on affected parties

While this would apply to streams in both urban and rural areas, we anticipate the biggest impact of the proposals would be on greenfield urban development.

Preventing the loss of an urban stream within a new development can reduce the amount of land available and result in less land being available for purchase (by land area). This could result in higher costs per property being passed on to purchasers, or a reduced return for the development as a whole, impacting decisions about the feasibility of the project.

The design of new development can mitigate these higher costs and reduced return. Incorporating stream corridors into green open space networks and reserves, providing more compact development using smaller lot sizes and higher density, and providing green alternatives to piped stormwater infrastructure can make urban development more cost-effective. These types of design approaches are consistent with the urban development outcomes the National Policy Statement for Urban Development (NPS-UD) is seeking to encourage.

Design-based solutions for development would be unlikely to mitigate the full cost impacts, and overall this policy would be likely to increase property prices in new greenfield developments where there are streams. Where housing yield cannot be maintained in a development (eg, through design

or increased density) the reduction in land available could also mean that more land is required to accommodate the same number of dwellings.

Reduced return to developers could be mitigated in part by the premium that properties close to urban streams would be likely to attract due to the amenity provided by the stream; however this would further add to the cost passed on to property purchasers.

The costs would be mainly borne by developers and passed on to property purchasers, while benefits would mainly be enjoyed by the wider community and environment. They are likely to include amenity, shared space for recreation and active transport, resilience to natural hazard risk, reduced pressure on stormwater infrastructure outside of the development, improved water quality in downstream receiving environments, benefits for biodiversity and ecosystem health, and opportunities for people to be better connected to the natural environment, and for tangata whenua to express kaitiakitanga. These benefits can be difficult to quantify in financial terms, and can be highly site-specific.

4.3 Directing clearer ecological outcomes for river flows and water levels

Recommendation

We recommend amending the Freshwater NPS to:

- require freshwater quantity objectives for ecosystem health to set out the intended environmental outcome for flow variability in the Freshwater Management Unit,
- require that minimum flows and water allocation limits allow for flow variability to meet the needs of the ecosystem, manage the effects of the allocation limit on the frequency and duration of lowered flows, and provide for the life-cycle needs of aquatic life,
- require groundwater levels and allocation limits to achieve freshwater objectives for the groundwater body and for any connected surface waterbody, and
- encourage councils to review existing water permits to comply with rules about water quantity, and for plans to set out how and when new rules would affect permit holders.

We also recommend preparing guidance on appropriate methodologies for setting ecological flows, and other technical matters.

Problem being addressed

- Regional plans often have no clear connection between the flow or water level where takes or diversions are restricted or must stop (minimum flows), and the ecological or environmental outcome those restrictions are intending to achieve. This means councils have no transparent way to assess the effectiveness of their minimum flows. This problem becomes critical in areas where the total amount of water allowed to be taken is over-allocated, and in areas where the effects of climate change are increasing pressure on increasingly scarcer water resources.
- Some minimum flow regimes do not adequately recognise connections between water bodies, including between surface water and groundwater, meaning that surface water ecosystems become stressed.
- Few regional councils require existing water permits to be reviewed to comply with new regional rules, meaning abstractions can continue at the rate allowed by the permit, potentially causing environmental effects that would not be allowed by the new rule.

Reasons for recommendation being preferred

With most councils already managing flows and levels in rivers and aquifers, the amendments will provide a clearer basis for councils to use when reviewing the effectiveness of their existing rules in terms of safeguarding ecosystem health. The benefits of these amendments will accrue over the next five-ten years. Having clearer environmental outcomes will help direct community choices about appropriate minimum flows and allocation limits. Encouraging councils to require existing water permits to comply with updated rules about minimum flows and allocation limits will mean the sustainable limits set in regional plans are achieved.

Nationally set minimum flow methodologies were not adopted because setting flows and levels regionally makes better use of locally specific information about the aquatic ecosystems and the needs of the communities.

Impact on affected parties

Affected parties will have greater certainty about the intended effects of minimum flows and water levels proposed in regional plans, and will be able to make more informed decisions to meet the needs of indigenous fauna in their waterbodies.

4.4 Nutrient attributes for managing ecosystem health

Recommendation

The Ministry's preferred option is to consult on new attribute tables for dissolved inorganic nitrogen (DIN) and dissolved reactive phosphorus (DRP), noting that further analysis is needed to understand their implications and achievability.

Problem being addressed

Between 1998 and 2017, concentrations of nitrate-nitrogen worsened at 54.7 per cent of river monitoring sites, and concentrations of DRP concentrations worsened at 30.2 per cent of sites²⁵.

The existing periphyton attribute in the Freshwater NPS protects the ecosystem health of hard-bottomed rivers and those with a lake or estuary downstream. The existing national bottom lines for ammonia and nitrate toxicity are not sufficient for protecting ecosystem health, and there is a risk that they could be applied as such in some soft-bottomed rivers. There are concerns that the periphyton attribute could be inappropriately applied by setting incorrect instream nutrient concentrations.

Reasons for recommendation being preferred

Nutrient enrichment of fresh and marine waters can impose economic costs by affecting ecosystems, recreational and amenity benefits, spiritual values, and recreational and commercial fisheries²⁶. It is more cost effective to prevent degradation of waterways than to restore them after degradation has occurred, particularly in systems that have passed ecological "tipping points" due to ongoing degradation²⁷. For example, remedying the effects of ongoing degradation on lakes, estuaries and groundwater can be difficult, expensive and can take generations.

The Ministry considers that there is justification for introducing a more stringent bottom line or threshold for nitrate compared to the current nitrate toxicity bottom line to provide for ecosystem health, especially based on the new definition of ecosystem health and the consideration of Te Mana o te Wai. The proposed DIN and DRP attributes would have effect in soft-bottomed rivers that do not have an estuary or lake downstream. Currently, objectives in these waterways can be set using the nitrate toxicity attribute that does not provide for ecosystem health. For hard-bottomed (stony) rivers and those with an estuary or lake downstream, the existing periphyton and lake water quality attributes will be stricter than the proposed N and P attributes. Where there is more than one applicable nutrient attribute, the more stringent attribute will apply.

Reducing DIN and DRP will contribute to improvements in ecosystem health by potentially reducing the prevalence of excessive macrophytes and periphyton. It will help maintain fish and invertebrate communities, the structure and function of ecosystems, and their resilience to negative impacts.

Impact on affected parties

Government only received finalised advice on science informing this proposal on 24 June. Up until then there had been considerable discussion amongst the scientists. More work is required to

²⁵ Ministry for the Environment & Stats NZ (2019). New Zealand's Environmental Reporting Series: Environment Aotearoa 2019. Available from www.mfe.govt.nz and www.stats.govt.nz.

²⁶ OECD. Publishing, & Organisation for Economic Co-operation and Development Staff. (2012). Water Quality and Agriculture: Meeting the Policy Challenge. OECD publishing.

²⁷ Rohr, J. R., E. Bernhardt, M. W. Cadotte, and W. Clements. (2018). The ecology and economics of restoration: when, what, where, and how to restore ecosystems. *Ecology and Society* 23(2):15.

quantify the benefits and costs of the proposed options but below we summarise what we know to date on the impacts of this proposal.

The proposed DIN and DRP attributes will mean that for some soft-bottomed streams and rivers (where the nitrate toxicity bottom line would set the minimum requirements) the bottom line will change from DIN of 6.9 mg L⁻¹ to 1.0 mg L⁻¹. Approximately 27 per cent of the length of streams and rivers in New Zealand are soft-bottomed and unlikely to support periphyton (for example the Piako River across the Hauraki Plains) meaning the new attribute would change the bottom line for these streams.

The phosphorus attribute will apply to approximately 0.1 per cent of rivers, because rivers that are naturally high in phosphorus would be exempt. However, this figure assumes that regional councils will set their phosphorus objectives at levels low enough to manage periphyton as per the existing requirements in the Freshwater NPS. Incorporation of a DRP attribute ensures there will be an upper limit in place to guide where councils set their phosphorus objectives.

Where there is more than one relevant attribute for managing the effects of nutrients, the more stringent one would apply. In hard-bottomed rivers (for example the Manuherikia River in Otago) managing nutrients to prevent excessive periphyton growth under the current Freshwater NPS provisions would likely require tighter restrictions on nutrient run-off than the proposed new bottom lines.

The proposed DIN and DRP attributes will introduce stricter objectives in soft-bottomed rivers in some lowland agriculturally-dominated areas. While there would be a small impact when viewed as a national average, it would require over 50 per cent additional nitrogen load reductions in some catchments, compared to what is already required under the Freshwater NPS. This will likely require change from dairying to less intensive land uses in some catchments.

4.5 Reporting on the five components of ecosystem health

Recommendation

We recommend amending the National Policy Statement for Freshwater Management to include requirements for councils to report on the five defined components of ecosystem health - water quality, quantity, physical habitat, aquatic life, and ecosystem processes (the interaction between the other four components). It is recommended Councils are directed to:

- Report collected data on an annual basis, explicitly under the five mandatory components of ecosystem health. Where there is no data collected for a component or indicator, this must be shown.
- Produce a synthesis report card integrating the five components of ecosystem health as a single ecosystem health score. This will be produced, at a minimum, every five years.
- Report in a way that is publicly accessible and understandable.

Problem being addressed

Current reporting on ecosystem health is inadequate to inform communities and planning decisions because it focusses disproportionately on water quality at the expense of the other critical components of ecosystem health (ie, aquatic life, physical habitat, water quantity, and ecological processes). Systematic under-reporting of ecosystem health, and inability to communicate effectively where improvements or declines on overall ecosystem health have occurred, limit public understanding of problems and the management interventions required to halt declines.

Reasons for recommendation being preferred

Reporting on the five components of ecosystem health will mean that:

- decisions about resourcing interventions are supported by meaningful evidence-based knowledge
- effectiveness of policies to improve ecosystem health can be assessed
- the public better understands the extent that the information represents the freshwater ecosystem, and where information gaps exist.

Impact on affected parties

Regional councils will be required to either amend their existing reporting, or undertake new reporting to include the five components of ecosystem health. This may require updates to database templates, re-configuration of summary statistical outputs, re-configuration of graphical displays to convey the information into websites (e.g. LAWA) and development of report cards. Additional narrative will also be required to provide the context of information presentation and website linkages.

Greater understanding of the information will allow more informed decisions which can then be targeted towards specific areas of concern for each community.

4.6 Sediment

Recommendation

We recommend the inclusion of a suspended fine sediment attribute with a requirement to set resource use limits in the Freshwater NPS. The proposed attribute bottom lines and bands reflect the negative effect of elevated suspended sediment levels on freshwater macroinvertebrates and fish. The attribute bottom lines and bands differ between waterways to account for the high natural variability of in-stream sediment and ecological responses to it throughout New Zealand.

We also recommend the inclusion of a deposited sediment attribute with an action plan requirement in the Freshwater NPS. This requirement includes direction for councils to develop methods to respond to specific indicator thresholds or degrading trends, similar to the current macroinvertebrate monitoring requirement. Again, thresholds differ between waterways.

Problem being addressed

Levels of suspended and deposited fine sediment in rivers and streams have reached ecological tipping points in many parts of New Zealand. While some of the problem is due to historical practices and management approaches, current management does not sufficiently reduce ecosystem health degradation due to sediment. Councils do not require maintenance of specific, region-wide in-stream sediment thresholds to provide for overall ecosystem health, which is a policy gap. To address this policy gap, we have developed in-stream sediment thresholds for the protection of ecosystem health.

Reasons for recommendation being preferred

Inclusion of a suspended sediment attribute will require regional councils to take proactive planning measures to improve water quality above identified ecological thresholds across the country. Setting the thresholds through the Freshwater NPS provides national clarity on required outcomes. A deposited sediment attribute will ensure councils collect the information needed to assess the interventions available to improve that component of ecosystem health.

Impact on affected parties

Across the majority of the country, some parts of rivers currently would not meet the proposed suspended sediment bottom lines. To improve water quality above bottom lines, we must reduce erosion across the landscape. We have modelled potential interventions – including afforestation or erosion and sediment controls on farms in highly erodible areas – to achieve bottom lines at the catchment scale. Where it is feasible using modelled scenarios, interventions are required on at least 600,000ha.

Estimated monetary benefits of the interventions outweigh costs over a 50-year period in all scenarios. The estimated monetary benefits to costs vary between approximately \$31.2 billion : \$7.1 billion (ratio of about 4.5 : 1) and approximately \$5.4 billion : \$5.3 (ratio of about 1.02 : 1) depending on the discount rate and carbon value used.

The interventions, and resultant reduction in erosion, will have many benefits aside from protection of ecosystem health. For instance, they will reduce landslide and flood damage to property and critical infrastructure, sequester carbon, reduce nutrient discharges, protect aquaculture and fisheries' productivity, improve the availability of mahinga kai, and improve individuals' and communities' ability to connect to waterbodies. The values of many of these benefits could not be monetised, but they are certainly significant.

Many groups of people – farmers, housing and infrastructure developers, foresters, infrastructure operators, and others – will ultimately have to change current practices or otherwise implement mitigations. Where and when changes in practice or specific interventions are required depends on councils' limit-setting processes. High-risk erosion areas, particularly in the hill country, and high-risk sediment generation activities, such as earthworks or land clearance, will likely be the focus of new controls as well as local and central government support programmes like the Hill Country Erosion Fund and 1 Billion Trees programme.

4.7 *E. coli* for Swimming

Recommendation

We recommend amending the Freshwater NPS to add a new attribute table for *E. coli* with attribute states in line with the 2003 Microbiological water quality guidelines for marine and freshwater recreational areas. Councils would be required to set target states for *E. coli* above a national bottom line of 550 *E. coli* per 100 ml for primary contact sites during the swimming season, and set actions to achieve these in an action plan.

Problem being addressed

The high levels of *E. coli* in rivers and lakes indicate an unacceptable risk of infection or illness to people who are in contact with the water, particularly where there is a high incidence of ingestion or inhalation of water and water vapour. This situation is getting worse in some rivers and current direction in regional plans and the Freshwater NPS is not driving sufficient improvements.

Reasons for recommendation being preferred

Requiring reductions in *E. coli* concentrations in places where people swim will reduce their risk of infection and illness. The improvements would be targeted at sites with the most human contact and therefore the greatest health risk. This approach will have a greater overall public health benefit than targeting all water bodies, where the exposure is lower (the existing *E. coli* table and the direction to improve the quality in terms of human health would still apply for the remaining water bodies). The monitoring results, which councils report on Land, Air, Water Aotearoa (LAWA), show that many of these bathing sites present a health risk under current management approaches.

Impact on affected parties

Regional councils regularly monitor 292 bathing sites (see LAWA), 109 of which are likely to not meet the recommended national bottom line. Of these, 26 sites have a wastewater treatment plant upstream which discharges (either always or sometimes) to freshwater. Pastoral land uses (with stock) comprise more than half the land upstream of the sites exceeding the national bottom line.

The total cost of illnesses associated with contact with recreational water (coastal and fresh water) could be \$25M - \$175M annually (based on the economic impacts of disease). With nearly half New Zealand's population living within 20 km of a river or lake currently identified as a recreational site, the benefits of reducing the risk of infection at those sites could have a benefit of \$10M – \$80M.

The total costs of meeting the national bottom line depends on the actions regional councils choose to take. Reducing *E. coli* at bathing sites may be achieved by stopping runoff from cattle laneways and yards, and/or by excluding stock from rivers upstream of bathing sites. Fencing costs to exclude all stock (including sheep – unlike the Stock Exclusion proposal) from all upstream rivers with pastoral land uses is estimated at \$654M. In practice, there is substantial fencing already done, or required in regional plans, and councils will take more targeted interventions, such as focussing on areas identified using faecal-source tracking, so a more realistic estimate is \$300 million. Improving wastewater treatment to reduce pathogens could deliver significant improvements to *E. coli* levels in 26 catchments and is a very small component of wastewater treatment plant upgrade costs.

The cost of the mitigation measures would largely be imposed on the communities who will also benefit from safer use of rivers and lakes for outdoor activities (swimming, kayaking etc, but also picnicking and tramping). Rivers and lakes with high water quality help New Zealand's tourism reputation, particularly for international trout fishers. Mitigation measures to meet *E. coli* targets have substantial co-benefits in reducing nutrients and sediment (see Stock Exclusion).

4.8 Providing for Māori values and attributes of freshwater health

Recommendation

We recommend consulting on two options to amend the Freshwater NPS to place stronger requirements on regional councils to incorporate Māori values and attributes into regional freshwater planning. These options are:

- creating a 'mahinga kai' compulsory value for the National Objectives Framework, equivalent to ecosystem health and human health for recreation,
- creating a new value category for 'tangata whenua' values in the National Objectives Framework.

We also recommend non-regulatory measures, such as guidance and funding to support regional council and hapū/iwi capacity and capability to implement the Freshwater NPS.

Problem being addressed

At a national scale, Māori values and attributes of health are not being adequately identified, reflected or incorporated by regional councils into regional freshwater planning instruments and processes. This suggests that there are barriers in place that prevent meaningful Māori participation in these processes. It also suggest that the Freshwater NPS has failed to provide strong direction to regional councils requiring them to prioritise and incorporate Māori freshwater values and attributes more effectively into freshwater planning processes. The major causes of this problem are a lack of strong regulatory direction requiring regional councils to incorporate Māori values into regional freshwater planning, and a lack of resourcing (capacity, capacity, financial) faced by regional councils and hapū/iwi.

Reasons for recommendation being preferred

The intent of this policy is to provide a clear avenue for Māori values and attributes to be expressed, and to place strong requirements on regional councils to incorporate Māori values into freshwater planning. This will improve Māori involvement in freshwater management and freshwater planning processes, and assist regional councils with implementing Part D of the Freshwater NPS and delivering on Part 2 of the RMA.

Improving Māori involvement in freshwater planning will have greater outcomes for freshwater and upholding Te Mana o te Wai, as traditional Māori practices have an inherently integrated and holistic approach to resource management. Integrating Māori knowledge into freshwater management allows for us to understand more about freshwater systems in New Zealand, improving the information available to regional councils. Consulting on two options allows us to test the impacts of this approach, and to understand what the best policy intervention might be in a complex policy area.

Impact on affected parties

We anticipate there will be implementation costs for regional councils due to strengthened requirements that are applicable in every Freshwater Management Unit in New Zealand, and increased engagement expectations. Māori values are inherently integrated and holistic and would add to upholding Te Mana o te Wai, which will benefit the entire community. There will be positive benefits associated with improving connection with waterbodies, intergenerational knowledge transfer, greater understanding of different cultural perspectives in the community. Furthermore, involving Māori in freshwater management will improve mātauranga-Māori based freshwater data, which is difficult to source due to ad-hoc approaches to data collection based on available funding/opportunity.

4.9 Te Mana o te Wai in the Freshwater NPS

Recommendation

We recommend reframing Te Mana o te Wai in the current Freshwater NPS by clarifying current provisions, further embedding the concept, and requiring an approach that prioritises the essential value, health, and wellbeing of freshwater bodies.

Our proposals are:

1. Clarify the description of Te Mana o te Wai so that it more clearly underpins the whole framework of the regulation. Since expanding the description of the concept in 2017, we've been working further to understand better how the concept fits within the overall Freshwater NPS.
2. Clarify how new and existing components of the Freshwater NPS relate to Te Mana o te Wai.
3. In addition to managing freshwater in a way that is consistent with Te Mana o te Wai, regional councils will be required to, in discussions with communities and tangata whenua:
 - a) Determine local understanding of Te Mana o te Wai for local waterbodies.
 - b) Establish a long-term vision and trajectory (ie, multi-generational) for the waterbody to be articulated in regional policy statements. This step would involve:
 1. Understanding what communities and tangata whenua want their waterbodies to look like in the future.
 2. Understanding of the history of and current pressures on local waterbodies.
 3. Assessing whether the waterbodies can sustain current pressures and meet the aspirations communities and tangata whenua hold for the water.
 - c) Report on whether freshwater management (including freshwater objectives and limits) move towards the long-term trajectory established by communities and tangata whenua.

Problem being addressed

Regional councils are uncertain regarding what is expected for Te Mana o te Wai in freshwater management. Some councils have raised the concern that the role of Te Mana o te Wai and how it relates to, or adds to, other requirements in the Freshwater NPS is unclear. There is an opportunity to strengthen and clarify the role of Te Mana o te Wai in the Freshwater NPS and require an approach that prioritises the health and wellbeing of the water.

Reasons for recommendation being preferred

This option provides clearer and more specific direction to regional councils regarding Te Mana o te Wai in the Freshwater NPS by promoting an approach that prioritises freshwater bodies and provides a long-term trajectory.

Impact on affected parties

We have not conducted an in-depth impact assessment of these options due to time constraints. We will conduct further impact assessment on these options, including social and cultural impacts, before the Government makes final policy decisions. However, we anticipate this option will result in long-term cultural, environmental and social benefits, including civic engagement and subjective wellbeing. It will make community aspirations clearer and highlight where freshwater management decisions are inconsistent with these aspirations. We anticipate this option may impose additional costs on regional councils as a result of perceived greater expectations for engagement as well as on regulated parties if more environmentally protective freshwater management approaches are required.

4.10 Providing for Hydro-electricity Generation Infrastructure

Recommendation

We recommend allowing Regional Councils to set objectives below national bottom lines in the National Objectives Framework for waterways impacted by significant hydro-electricity generation infrastructure. We intend to do this by listing New Zealand's six largest hydro-electricity schemes by generating capacity in Appendix 3. The six largest hydro-electricity schemes in New Zealand are the:

- Waitaki Scheme (including infrastructure operated by both Meridian Energy and Genesis), in the Canterbury Region;
- Waikato Scheme in the Waikato Region;
- Manapouri Scheme in the Southland Region;
- Clutha Scheme in the Canterbury Region;
- Tongariro Scheme in the Manawatu/Whanganui, and Waikato Regions; and
- Waikaremoana Scheme in the Hawkes Bay Region.

We also recommend clarifying the relationship between the National Policy Statement for Renewable Electricity Generation and the Freshwater NPS.

Problem being addressed

The maintenance of New Zealand's hydropower baseload will be very important in meeting New Zealand's renewable electricity generation goals as it will operate in conjunction with increased wind electricity generation – hydro is of particular strategic importance as it can complement wind generation which is unable to store its potential energy.

Some regional councils will not be able to achieve certain national bottom lines without potentially reducing the amount of renewable electricity produced by a hydroelectric scheme.

Exceptions are allowed for waterways affected by infrastructure listed in Appendix 3. Appendix 3 is currently empty. Therefore no regional council is able to set a freshwater objective below a national bottom line in a water body affected by infrastructure, even if it is in the national interest for a regional council to do this.

Reasons for recommendation being preferred

The six largest schemes account for approximately 89% of New Zealand's hydroelectricity. This option strikes a balance between the interests of freshwater quality and ecosystem health, security of electricity supply, affordable electricity, and New Zealand's international obligations to reduce our carbon emissions.

Impact on affected parties

This option will provide greater certainty to the generators who own the six largest schemes. It will also provide certainty to regional councils and resource users of the expectations for water quality in areas not covered. The option will however leave the 11% of generators who will not be listed in Appendix 3 facing a different regulatory environment and risk. There is a risk that this may create a competitive advantage in favour of the larger generators.

This exemption will not affect the requirement to maintain or improve water quality. It means that councils will not be required to set objectives better than national bottom lines (if a waterway is already below national bottom lines) for aspects of ecosystem health in waters affected by the six largest hydro-electricity schemes. Not having to improve to meet bottom lines may also reduce the impacts on the catchment community that they would otherwise have felt from the requirement to meet bottom lines.

4.11 Maintaining or improving water quality

Recommendation

We recommend the following changes to the Freshwater NPS to maintain freshwater quality and ecosystem health:

- (a) Requiring regional plans to set specific, measurable and time-bound freshwater objectives to maintain water quality at its current state (rather than within attribute bands).
- (b) Defining “existing freshwater quality” as the quality of fresh water on the date the amended Freshwater NPS is proposed, unless councils have already set freshwater objectives to implement the Freshwater NPS.
- (c) Setting clearer reporting requirements that specify what information should be used to assess whether water quality has been maintained. This includes accounting of takes and sources of contaminants, implementation progress, predicted changes in quality, climate influences, and information needed to assess the overall state values like ecosystem health. We recognise that this is complex and will involve interpretation and the exercise of judgment by regional councils.
- (d) Delete the word “overall” from Objective A2, to avoid situations where this is interpreted to mean something other than (a)-(c) above.

Problem being addressed

Currently objective A2 of the Freshwater NPS directs that the “overall quality of fresh water within a freshwater management unit is maintained or improved...” while protecting or improving other specified matters. Policy CA2(e)(iia) provides further direction when setting freshwater objectives to maintain, requiring that they be set within the same band as existing freshwater quality. “Existing freshwater quality” is further defined as the quality of water at the time freshwater objectives are set, including future planning processes.

This means regional plans can permit freshwater quality to decline by: setting freshwater objectives that allow for declines within band ranges (which are currently defined for all compulsory attributes); and allowing water quality to decline prior to setting freshwater objectives in their regional plan. Any declines prior to setting freshwater objectives can be locked in by maintaining change from a future state that is more degraded.

Under the Freshwater NPS it is also unclear how regional councils are expected to demonstrate whether water quality has been maintained over time. This may cause debate and litigation when they review their plans.

Reasons for recommendation being preferred

These changes will mean that regional plans cannot allow water quality to decline, and will provide regional councils with clearer direction about how they should assess whether water quality has been maintained.

Impact on affected parties

The costs of the recommended changes are small – they build on existing requirements to maintain or improve water quality. There are opportunity costs associated where changes will prevent additional resource use or require mitigations that were not previously necessary. There are also costs for regional councils to comply with additional reporting requirements.

4.12 Direction to Territorial Authorities to Support Integrated Management

Recommendation

We recommend adding content to the Freshwater NPS that directs territorial authorities (TAs – city and district councils) to manage the effects of land use for urban development on fresh water in their district plans. This would widen the scope of the Freshwater NPS to direct both regional councils and TAs, whereas up until now it has only directed regional councils. It would create an obligation for TAs to use district plans (eg, through objectives, policies, rules, consent conditions, or other methods) to manage the effects of urban development on fresh water.

Problem being addressed

There is a lack of integration between decision-making by regional councils (who have primary responsibility for environmental management of water) and territorial authorities (who have primary responsibility for managing the environmental effects of urban development). An outcome of this lack of integration is that city and district councils view their role in freshwater management as limited to complying with water and discharge permits, leaving the bulk of the responsibility to plan for, and manage effects on urban water with regional councils.

City and district councils are, however, uniquely placed to promote better integrated management, particularly in urban areas, due to their role in managing infrastructure and land use activities.

Reasons for recommendation being preferred

This option would likely drive more integrated management of the effects of urban land use on fresh water than exists under the status quo. It would help to fill a current gap where insufficient action is being taken by TAs.

Adopting the preferred option would mean that decisions about managing urban water would be made in the context of wider decisions on urban development (eg, decisions about urban form and subdivision design), which means there would be opportunities for TAs to look at the most effective ways of achieving multiple objectives (eg, amenity, recreation, and water management).

Impact on affected parties

The direct costs would be due to increased analysis requirements for TAs (eg, through section 32 analysis) and potential for plan provisions to be appealed to the Environment Court. Also, where capacity and capability does not currently exist within TAs (eg, in terms of knowledge of freshwater management) this would need to be developed.

The proposal would not add greater requirements than what the Freshwater NPS already anticipates; freshwater is already required to be managed in urban areas to meet freshwater objectives and limits that are set for freshwater bodies. This policy is intended to make it more likely that these requirements would be met, by ensuring that when urban growth occurs it is accompanied by decisions about how to manage the effects of that growth. The indirect costs and benefits of the proposed option would depend on the types of planning provisions TAs chose to use to give effect to the policy. The costs associated with the types of interventions that could be expected (eg, Water Sensitive Design) can be difficult to quantify and can vary significantly depending on the circumstances; some elements can be cheaper than traditional infrastructure, while others may add to development costs but provide a range of environmental and social benefits. Decisions about which interventions to adopt would be made by individual TAs, informed by the same cost/benefit evaluation processes they use for other planning decisions to ensure they are the most appropriate for the situation.

4.13 Wetlands

Recommendation

The Ministry recommends amendments to the Freshwater NPS and new rules within the proposed Freshwater NES to prevent further loss and degradation of our remaining natural wetlands.

Strengthened Freshwater NPS direction includes:

- avoid loss and degradation of inland wetlands
- require the identification, mapping and maintenance of a register of inland wetlands
- provide for activities necessary for the construction of wetlands
- monitor inland wetland condition
- encourage inland wetland restoration.

Freshwater NES rules include restricting specific activities in and around inland and coastal wetlands relating to:

- new drainage
- alterations of wetland water levels through draining, damming, diversion, and water takes
- earthworks (ie, reclamation or disturbance of the wetland bed)
- clearance of indigenous vegetation.

More enabling provisions will be given where these activities are required for wetland restoration, consented hydro-generation and flood control schemes, and nationally significant infrastructure.

The avoid, remedy, mitigate, offset effects cascade would apply for nationally significant infrastructure with the expectation of a 'net-gain' approach for any offsetting.

Problem being addressed

Historically the value of wetlands was not recognised, and extensive drainage of wetlands to create 'productive land' was incentivised. We are still experiencing a high rate of wetland loss in some regions. Current national policies are inadequate for inland wetlands, and consequently the strength of regional plans varies considerably between local councils. Also, lack of data and resources can make implementation of rules difficult.

Reasons for recommendation being preferred

This option is preferred because it provides the most immediate and nationally consistent action to protect our remaining natural wetlands. The new regulations are restrictive and represent a 'no loss' approach to preserving natural wetlands regardless of ecological state because: critically few remain; it is difficult to re-create the function and value of lost wetlands; and wetlands that appear degraded often retain some level of value and provision of ecosystem services. This aligns with the stated objective of stopping further degradation and loss of our freshwater resources.

Impact on affected parties

The proposals will provide significant benefits to the public by protecting the values of ecosystem services that wetlands provide such as natural hazard resilience, nutrient cycling, and biodiversity and amenity values. The proposals will impose costs on councils and resource users: resource users will be required to avoid wetland loss and degradation by limiting some activities, and councils will have to implement regulations and undertake wetland mapping and monitoring. The regulations will have minimal impact on the potential to convert further wetlands to other land uses such as farming or urban development because nationally less than 1% of non-protected natural inland wetlands occur on land classes most likely to be affected. Few coastal wetlands are privately owned and therefore proposals are unlikely to affect many landowners.

4.14 Freshwater modules in farm plans

Recommendation

Freshwater modules in farm plans (FW-FPs) will be required through the NES-FM for farms over 20 hectares (with a lower 5 hectare threshold for horticulture). The first tranche of FW-FPs will be required by 2022 and all farms will be required to have one by 2025 or 2030. FW-FPs will have to meet minimum requirements relating to content, including addressing local ecosystem health issues and planning requirements; mapping of water and risks to its quality (eg, critical source areas); a risk assessment of on-farm activities like irrigation and effluent application; and a schedule of actions to mitigate risks. A suitably qualified and experienced practitioner will need to certify the FW-FP meets all requirements. An independent audit of implementation will also be required. Regional councils will enforce compliance with the NES, including any FW-FP prepared in accordance with the NES. The above requirement will be accompanied by financial support from government to promote effective implementation.

Problem being addressed

Mandatory FW-FPs are intended to promote the up-take of tailored actions to manage risks to ecosystem health. Mitigating the adverse environmental effects of farming often requires location-specific responses that are tailored to farm type and location. FW-FPs are intended to be enduring tools that promote a foundation for continuous improvement in environmental performance.

Reasons for recommendation being preferred

If well-resourced, mandatory FW-FPs could help deliver significant improvement in ecosystem health and promote continuous improvement in farming practice and help farmers become more resilient. Making FW-FPs mandatory is likely to help drive the development of institutional capacity (eg, adequate numbers of suitably qualified and experienced practitioners) to deliver high quality FW-FPs. FW-FPs could also be integrated with modules for greenhouse gas mitigation, biodiversity enhancement and water-use efficiency.

We are also consulting on a voluntary approach to FW-FPs, with plans required only where necessary to meet specific regulatory requirements like those relating to defined high-risk land use activities. Such an approach is less likely to help deliver a significant improvement in ecosystem health or help build the institutional capacity that may enable a more devolved model for improving farming practices to be considered in the future.

An alternative approach of prescribing good practice standards to cover a comprehensive range of day to day farming activities is likely to be cumbersome; may preclude more cost effective solutions; and is unlikely to help farmers be more resilient and focussed on desired outcomes.

Impact on affected parties

The requirement for FW-FPs will impact on all farms (above minimum size thresholds) through costs of preparing FW-FPs, implementing the actions in FW-FPs, and auditing of FW-FPs. There will also be impacts on regional councils and central government associated with administering a mandatory FW-FP regime and building the supporting institutional capacity. At the same time, there will be significant positive impacts. These will primarily be associated with improving water quality and ecosystem health outcomes, as well as strong potential to help the primary sector to become more resilient and sustainable. These impacts are summarised below.

Financial costs to farms of preparing an FW-FP will vary depending on the complexity of the farm system and will essentially be a one-off cost, with an average estimated cost of around \$3500. If we assume 28,000 more farms need FEPs, the cost would be approximately \$100M. The costs of

implementing actions in an FW-FP also vary depending on what is required. Irrigation schemes in Canterbury suggest farmers budget \$10-\$30 K per annum for FW-FP implementation (excluding one-off infrastructure investments like an effluent treatment system upgrade (\$100K) that may be required irrespective of the FEP Policy). An average cost for a FEP audit is estimated to be \$1500.

There is the potential for negative effects on farmer wellbeing if the financial costs of preparing and implementing FW-FPs will, or are perceived to, affect farm viability and/or if farmers are concerned they do not have the necessary skills to prepare and implement FW-FPs and/or do not believe the requirements are relevant or correct.

If FW-FP delivery is well-resourced, the policy has potential to provide significant benefits not only in contributing to improved ecosystem health, but also building a more sustainable and resilient primary sector. Capability and capacity building of farmers and rural professionals is particularly important and a tailored 1-1 approach of farm planning with follow up/auditing, has been shown to be critical for helping to drive capability building and continuous improvement.

Modelling has shown that good management practice, such as what FW-FPs would entail, could lead to a 5-20% reduction of nitrogen leaching and a 47-70% reduction in sediment loss. A tailored FW-FP process provides the framework to engage farmers and promote implementation of management practices that can identify and address key risks to freshwater outcomes.

The impact on tangata whenua and the wider public of improved water quality and ecosystem health will be significant. This will include enhanced mahinga kai; recreational values; and public health benefits. Also significant is the potential contribution to Brand NZ, such as tourism, market access and/or market premium benefits. There is also general pride and contribution to New Zealanders' cultural identity and values associated with a high quality natural environment.

For farmers, the process of developing a FW-FP (especially with tailored one-on-one support) may promote some farmers' wellbeing through helping them feel more equipped and resilient in facing the environmental challenges ahead and confident in their role as environmental stewards. In some cases the FW-FP process may identify farm system changes that may improve profitability and provide environmental benefits (eg, soil testing could suggest less fertiliser is needed). The FW-FP framework has potential to be used for other priority environmental themes (eg, GHG, biodiversity) promoting co-benefits (integrated farm planning).

Costs to regional councils to administer the FW-FP regime will be significant, and include compliance monitoring and enforcement costs. Monitoring costs can be recovered where consents are used. However, other monitoring costs will fall on ratepayers. There are also significant costs associated with administration, data management, farmer extension, education, reporting; and primary industry and central government liaison. FEPs should help deliver on council RMA obligations and contribute to better environmental outcomes in region and enhance ecosystems' ability to provide for cultural and recreational values of citizens.

4.15 Reducing excessively high nitrogen leaching (nitrogen cap)

Recommendation

We recommend two options for a short-term (2020 to 2025) policy to address excessive nitrogen losses while councils set long-term objectives and limits under the Freshwater NPS: per-hectare nitrogen leaching thresholds (option 1) and a national fertiliser cap (option 2). The preferred option may be one option or a combination of the two.

Under option 1, all low-slope pastoral farms²⁸ in identified high nitrogen-impacted catchments would need to provide an audited OverseerFM budget to the regional council. The regional council would use the Overseer results to determine the threshold at the percentile specified in the NES [to be determined, but between the 70th and 90th]. All those above the threshold would be required to reduce their nitrogen leaching to below the threshold within 12 months, or apply for a time-limited consent. A freshwater module in a farm plan (FW-FP) would specify and schedule the actions that will reduce the Overseer N loss estimate to the threshold within a defined period. Those farms under the threshold would need only a FW-FP.

Under option 2, Central Government would set thresholds for the maximum rate of N fertiliser use per hectare. There would be one threshold for the pastoral sector, and a higher rate for some crops. It would be prohibited to exceed the application rate. Councils would need to monitor fertiliser rates, and FW-FPs would need to record fertiliser use.

The Government is proposing consulting on an alternative option: setting requirements to reduce nitrogen leaching in highly N-impacted catchments through freshwater modules in farm plans (FW-FPs). This option will allow greater flexibility to farmers to reduce nitrogen. A similar option is assessed as Option Five in Appendix 15 of Part II.

Problem being addressed

Not all farmers are managing nitrogen efficiently, resulting in higher nitrogen leaching losses compared with the levels that could be achieved following good practice. Farms that are at the upper end of the spectrum have an unnecessarily high impact on water quality. Longer term, this policy gap will be addressed in regional plans, but until regional rules are in place that give full effect to the Freshwater NPS, degradation of freshwater quality may continue unabated.

Reasons for recommendation being preferred

The preferred option should:

- be able to be implemented quickly, which is critical for a short-term policy
- be targeted at catchments where high nitrogen losses from farming sources matter most
- provide a clear set of actions for each farm that will reduce nitrogen losses
- provide data for councils to assist with limit setting, and/or for future nutrient allocation
- prepare farmers and growers for longer term policies that will reduce nitrogen leaching.

²⁸ See section 4.20 Stock Exclusion for definition of low slope. High-leaching horticultural and arable land uses are excluded from this proposed requirement, because of the difficulty of defining an appropriate threshold for diverse crops and rotations.

Impact on affected parties

The reduction in nitrogen discharges will improve the ecological health of receiving waters and benefit recreational water users²⁹.

The modelling to date of the economic impacts on farms has been very limited, so the following data is illustrative only:

- Reducing discharges to the 75th percentile was modelled to change annual profit by +\$106 to -\$541 per hectare on 10 case-study dairy farms in the Waikato, with an average of -\$143³⁰.
- Modelling of the impacts of a 9 percent drop in nitrogen losses from a single case-study Canterbury dairy-support farm, indicated an 8 percent fall in earnings before interest and tax (EBIT), and an 84 percent fall in disposable surplus (earnings after depreciation, interest, and tax)³¹. This reduction in disposable surplus is partly driven by the significant debt levels on the case study farm. Management changes included reduced fertiliser and stocking rate, and changes in crop types grown.
- Modelling of the impacts on a single case-study Waikato dairy farm currently leaching 76 kg N/ha, costed the impacts of reducing discharges to 60, 50 and 40 kg/ha resulted in reductions in EBIT of +14%, -13% and -26% respectively³². Management changes included discontinuing part of an expensive and high-leaching pasture renewal method, reducing fertiliser and stock numbers, and increasing purchases of supplementary feed.

Farmers in the specified catchments will also face increased costs of preparing and implementing an FW-FP and Overseer budget, and for those over the threshold, a consent application.

Option 2 has not been fully evaluated. It is likely that some farmers would substitute bought-in feed for nitrogen fertiliser to maintain feed supplies on pastoral farms.

²⁹ This outcome will be achieved so long as the reductions in nitrogen losses from farms above the threshold are not eroded by increasing nitrogen losses from those farms below the threshold. This is achieved in part by the Intensification and FW-FP proposals (sections 4.14A and 4.18).

³⁰ Ledgard et al; 2017. Understanding nutrient losses on Waikato case study farms and effectiveness of selected mitigation options. AgResearch report for Fonterra and Dairy NZ, cited in Allen, J; 2019. Statement of evidence of James Kenneth Allen for Fonterra Cooperative Group Ltd (at the hearing of submissions on proposed Plan Change 1 and variation 1 to the Waikato Regional Plan (Healthy Rivers)).

³¹ MRB, 2019. Impact of possible environmental policy interventions on case study farms. Report for MfE.

³² Journeaux, P; 2019. Modelling of Mitigation Strategies on Farm Profitability. Report for MfE.

4.16 Stock Holding Areas and Feed Lots

Recommendation

We recommend introducing a National Environmental Standard (NES) with permitted activity standards for land use, and where required consent requirements are supported by the adoption of Freshwater Modules in Farm Plans. This option involves confirming definitions, minimum standards and consent requirements, for all existing and future feedlots and intensive stock holding areas at a national scale.

Problem being addressed

At a regional level, significant variation exists in defining and regulating stock holding areas and feedlots. Stock holding areas are a commonly used farming practice in the dairy and red meat sectors that can economically benefit farms by improving productivity, but they present a high risk to water quality degradation if inappropriately designed and/or managed. Feedlots are much less common but involve increased risks due to holding stock for longer periods of time and at higher stocking rates approximately five are estimated.

- **Stock holding areas** can be covered or uncovered and includes management practices such as feed pads, wintering pads, standoff pads, loafing pads and sacrifice paddocks but excludes stock yards, milking sheds, shearing sheds and woolsheds.
- **Feedlots** are farming system where stock are held in covered and uncovered areas for an extensive period of time and fed almost exclusively on feedlots.

When risks are managed appropriately, stock holding areas can be a useful tool for reducing farm-scale contaminant discharges to water. There are a number of measures that can be implemented by the operators of stock holding areas and feedlots to reduce the risks of water quality degradation. Industry groups have developed guidance for farmers to help them implement such measures voluntarily. However as the cost to water quality is external to the operator, there may be little incentive for operators to invest in these measures.

Some regional councils have regulated the use of land for, or the contaminant discharge from, these activities under the Resource Management Act 1991. However there are significant gaps. Only two of the 16 regional councils directly regulate the use of land for stock holding areas and or feedlots. There is also a lack of consistency in definitions and approaches, and significant gaps exist in ensuring that nationally, these activities are operated in a way that reduces the risk for further water quality degradation.

Reasons for recommendation being preferred

A NES can set standards, rules, activity status and other requirements for land use. The NES could specify definitions for these activities, establish permitted activity standards, resource consent requirements, classes and conditions for the activity. A NES can establish consent requirements that enable site specific constraints and opportunities to be addressed in conditions of the consent, whilst still enabling the activity for the benefit of farmers.

An NES can also be applied nationally, be more equitable and has an immediate effect on resource management decisions, allowing the water quality impacts to be addressed in a timely manner. This builds on the existing good work of councils and industry in developing minimum standards. This means that where good practice is already adopted, there will not be an undue burden to the farmer.

The high level of risk associated with these activities means both monitoring and compliance of stock holding areas and feedlots is enabled by clear and specific permitted activity standards or consent requirement rather than relying on voluntary adoption of mitigation measures, or through a less prescriptive approach.

The consent requirement for stock holding areas and feedlots could impose restrictions on the use of land. Addressing land use would allow for up-front reductions in contaminant discharges, without the cost and complexity of having to develop national standards for contaminant discharges. Design and management measures for land use are available and relatively easy to implement, and consent conditions could be designed to ensure that these measures are implemented.

The NES would be prescriptive in setting activity classes and consent conditions. This would provide clarity to regional councils and farmers as it does not rely on council interpretation. The prescribed minimum standards and consent conditions should codify proven good design/management practices to reduce the risk of undertaking these activities, so that risks are mitigated as a matter of course.

The proposal for Freshwater Modules in Farm Plans³³ could be used in conjunction with this approach, to better support implementation and compliance. Freshwater Modules in Farm Plans can provide a useful tool for farmers to align their activity to the proposed regulatory limits, and consent requirements for stock holding areas and feedlots, and to help farmers plan for improvement.

Impact on affected parties

The regulations will primarily affect farmers and regional councils. Discharges to water from stock holding areas would be reduced with positive impacts on the environment. Good quality stock holding areas may also improve productivity. The regulations will impose costs on farmers if they are required to build or amend infrastructure to meet minimum standards and or undertake a consent process. Infrastructure costs are estimated at \$72 per cow,³⁴ and costs for consents are approximately \$3000 per application. There are currently estimated five feedlots in New Zealand, all of which will require resource consent. Estimating the number of consents required for stock holding areas will be done before regulations are finalised.

Regional councils will have increased workloads and costs to monitor compliance with the regulations, although these costs may be recovered from landowners carrying out the activity. The NES would specify that regional councils could recover costs for compliance, monitoring and enforcement of permitted activities.

Benefits could be realised by industries that support farmers to meet minimum standards in particular the building of infrastructure. With increased work opportunities there would also be an increased demand for a higher skilled larger rural professional workforce to support farmers to meet minimum standards and consent requirements.

³³ Refer to Freshwater Modules in Farm Plans detailed analysis in Part II.

³⁴ [Design of a low cost winter stand-off pad for reducing nutrient losses to water from winter forage crops grazed by dairy cows](#), Chrystal et al. 2016.

4.17 Intensive Winter Grazing on Forage Crops

Recommendation

We recommend that good management practices for winter forage crop grazing wherever it occurs are specified in a National Environmental Standard. The proposed regulation will permit intensive winter grazing on forage crops subject to technical standards that are based on industry minimum standards and level of risk. If the standards cannot be met a consent may be required to be applied for or the activity may be subject to enforcement action by councils.

The new controls on intensification also relate to this proposal as they require that there is no increase in winter forage crop grazing in addition to areas that were in crop from 2013 – 2018.

The Government is also proposing to consult on a variation of Option Four. This option has a regulatory framework with technical standards for slope to graze crop on, pugging depth and set back from water. Supplemented by industry minimum standards for size of area to be cropped, management of critical source areas, grazing management ([strip grazing](#)) and timing for resewing bare ground, all managed through FW-FPs. Components of this option are addressed within Option Four (and parts of Option Two) within Appendix 17 of Part II.

Problem being addressed

The activity addressed in this regulation is characterised by intensive winter grazing of annual forage crops at high stocking densities under closely controlled grazing systems (compared to extensive grazing on pasture or similar perennial crops). While it only covers a small percentage of farmed pastoral land, it is a high profile³⁵ activity with concern³⁶ being widely expressed about the environmental consequences of contaminant losses³⁷ impacts on animal health and the extent to which good management practices meet industry minimum standards to reduce contaminant loss is being adopted. The scale of forage cropping is set out in the table below which shows hectares of forage crops grown per region in 2018.

Table One Forage brassicas³⁸ (Hectares during the year ended 30 June 2018)

Region	Forage brassicas (Hectares during the year ended 30 June 2018)	Region	Forage brassicas (Hectares during the year ended 30 June 2018)
Northland Region	2225	Wellington Region	6357
Auckland Region	724	West Coast Region	3480
Waikato Region	15368	Canterbury Region	77133
Bay of Plenty Region	2850	Otago Region	52860
Gisborne Region	1458	Southland Region	43658
Hawke's Bay Region	10716	Tasman Region	1379
Taranaki Region	3923	Nelson Region	3
Manawatu-Wanganui Region	16168	Marlborough Region	1574
Total New Zealand			239,875

³⁵ For example; https://www.nzherald.co.nz/the-country/news/article.cfm?c_id=16&objectid=12180124

³⁶ For example; <https://www.odt.co.nz/rural-life/dairy/vets-open-pan-industry-initiative-grazing>

³⁷ Belliss et al. 2019 Manaaki Whenua Land care: Identification of high-risk agricultural activities: national mapping of the location, scale and extent of winter forage cropping and intensive grazing on hill country land” paragraphs 9 -16.

³⁸ Data from Agricultural Production Survey June 2018 (Statistics NZ 2019)

As set out in Table one this activity is most common in Otago, Southland and Canterbury where about 80% of the winter grazing in 2018 occurred. In addition the inadequate management of sediment has resulted in the death of over 90% of macroinvertebrates in some streams in Southland.

Grazing of forage crops during winter is an activity identified as having a high risk of contaminant loss associated with it. The risk of contaminant loss is coupled with; an increase in the prevalence of this activity, rapidly changing farm systems, especially farm grazing systems, not all councils having developed a regulatory response that manage contamination effects from this activity and lags in the development of regional plan provisions. Regional plans try to address these problem but they can sometimes follow a lengthy process.

Reasons

We consider this option provides the most practical, enforceable and timely way to prevent further degradation to surface and ground water bodies from intensive winter grazing of forage crops. The proposal enables winter forage crop grazing to be specified in a consistent and timely way irrespective of where the activity is carried out.

This proposal also contributes to reducing risks of litigation in regional plan processes.

The national regulation can be gazetted and take effect rapidly –and could apply as soon as winter grazing in 2020. However, as planning for winter (including seed purchase and contracting services) commences well in advance of the winter season, it is recommended that farmers be given a year to become familiar with the new regulations to enable them to plan ahead to meet them in 2021.

Impact on affected parties

Landowners grazing winter forage crops will be required to adopt several, low cost, industry good practice grazing management measures to halt water degradation from effluent and sediment loss. However, new restrictions on the scale and location of intensive winter forage crop grazing and a restriction on the extent of severe treading (pugging) damage may result in consent costs or changes to a farm grazing system being necessary.

There will be a financial impact on any landowners who will require a resource consent. If current practices do not change, the intensive winter grazing requirements may trigger in the order of 1500 resource consents, on top of those already required by existing regional plan rules (at about \$3,000 per consent). Additional costs may result from consent requirements to reduce contaminant loss, including wider buffer areas from water bodies and requirements for monitoring and reporting.

Councils are able to be more stringent than the NES or develop additional discharge activity rules that might be more stringent. This approach means Councils will be able to recover costs of monitoring the activity. (A national environmental standard may empower local authorities to charge for monitoring any specified permitted activities in the standard). Compliance will be by regional councils and enforcement action may be taken or consents required.

There is a relationship between this regulation and other parts of the proposed NES. In order to avoid adverse effects from forage crop grazing, stock holding infrastructure may be required and the setback requirements for stock exclusion will overlap if the intensive winter grazing on forage crops is near water.

4.18 Agricultural intensification

Recommendation

We recommend interim regulations in an NES that require resource consent for high-risk intensification activities:

1. that increase the area of land in irrigated pastoral, arable or horticultural production (above a minimum land-area threshold)
2. that increase the area of forage cropping/intensive winter grazing (aligned to intensive winter grazing regulations – see section 4.17)
3. where land use changes to higher-risk land use (above a minimum land-area threshold): arable, deer, sheep, beef to dairy support; arable, deer, dairy support, sheep, or beef to dairy; woody vegetation and forestry to any pastoral use.
4. where land use changes to commercial vegetable growing, if the activity would increase the applicant's net area in commercial vegetable growing in the sub-catchment (above their highest extent in the past year).

The interim regulations would only apply to regions/catchments that do not have fully operative regional plan provisions (objectives, limits/targets and rules) giving full effect to Part CA of the current Freshwater NPS. Once plan provisions are in place, these regulations will no longer apply.

All regulations would require applicants to have a freshwater module in a farm plan (FW-FP) and demonstrate no increase in nitrogen, phosphorus, sediment or pathogen discharges. The activities listed would be prohibited if they increase discharges. Consents will be time-limited to 2030. For 4 above, we are also considering a second option for consent requirements, requiring applicants to have a FW-FP and be operating above good management practice.

Problem being addressed

New Zealand has seen significant agricultural intensification³⁹ in recent years. This has contributed to water quality degradation and ecosystem loss. Councils are still developing objectives, limits and rules to give effect to the Freshwater NPS, which will ultimately address the risk of further intensification. However, further intensification may take place in the interim.

Reasons for recommendation being preferred

The recommended approach ensures rules are in place while councils carry out the limit and objective setting process. We consider this the most practical, timely and enforceable way to prevent further degradation of waterways caused by intensification. Other options will either take too long to implement (due to the need to collect baseline data) or would be too uncertain in delivering the desired outcome.

Impact on affected parties

Restrictions on intensification will prevent additional pressure on freshwater ecosystems caused by increased contaminant discharges. Costs will fall primarily on farms and regional councils, with benefits for all water users.

Quantifying the total expected cost for farms is difficult as it relies on predicting the number of farms that will intensify over the next five years. These decisions are influenced by a range of factors, including commodity prices, technology, and other Government policies.

³⁹ Defined as increases in agricultural inputs (eg, stock, fertiliser, crop area) per hectare of land either through changing to a higher intensity land use or through intensifying an existing land use.

With the regulations in place, farms that wish to intensify will incur costs for resource consents (about \$3,000 per consent) and environmental assessments to inform the consent (tens of thousands of dollars). There will also be an opportunity cost for farms that either wish to intensify during the interim period but cannot without increasing contaminant discharges.

Regional councils will have increased costs to monitor compliance with the regulations. Recreational water users will benefit by ‘costs avoided’ from water quality degradation that may have taken place had the regulations not been introduced. There will be benefits for land-owners with under-developed land, as headroom will be maintained until councils have ways to manage nutrient limits.

Modelling in the Ruamāhanga catchment (Wellington region)⁴⁰ shows that some land use change can still go ahead without increasing contaminant discharges. The table below shows the opportunity cost (in net revenue) and associated water quality benefits for different intensification scenarios.

Scenario	Impact of regulations in Ruamāhanga catchment on:			
	Net revenue	Nitrogen loss	Phosphorus loss	Sediment loss
All sheep and beef farms on LUC1-4 land convert to dairy	\$20 million (9%) lower with controls in place, but still about 10 percent higher than current net revenue	~7 percent lower	~2 percent lower	minimal difference
All dairy support convert to dairy	\$14 million (7%) lower with controls in place, but about the same as current revenue	~6 percent lower	~2 percent lower	minimal difference
All forestry convert to dairy	\$15 million (8%) lower with controls in place (can't convert)	~6 percent lower	~3 percent lower	~20 percent lower
All forestry convert to sheep and beef	No change - higher revenue from not converting	~3 percent lower	~4 percent lower	~20 percent lower

The opportunity cost to an individual farm depends on whether it is intending to intensify, and the production potential of the farm. Modelling for a single sheep and beef farm in the Waikato converting to dairy⁴¹ showed that with the regulations in place:

- Earnings before interest and tax (EBIT) would be about \$250/ha lower (~\$74,000 for the entire farm) (due to lower milk solid production and additional mitigation costs) but still much higher than if it had stayed in sheep and beef (~\$2,000/ha vs. ~\$600/ha)
- The net present value (NPV) of the farm after 20 years would be ~\$1million lower (~\$500,000 compared to ~\$1.5 million)
- The internal rate of return (IRR) would still be attractive at 6.8% (compared to 8.3%).

While intensification regulations will reduce flexibility for farms in the short term, and increase compliance costs for councils, this approach is likely to be less costly than no regulation. New Zealand is transitioning to a low-emissions sustainable economy. This will include regional water quality limits, and land use change over the medium-long term to meet those limits. Restricting intensification now will prevent lost investment in unsustainable intensification that has to be reversed/abandoned, and will halt water quality degradation to make the transition to tougher water quality limits less complex/costly.

⁴⁰ Although this is a highly rural catchment, we cannot assume that it is representative of all catchments across New Zealand.

⁴¹ These results indicate how the regulations could affect a single farm. Farm systems vary depending on a range of factors (eg, location, size etc.). We cannot assume that a single farm is representative of all farms.

4.19 Updating the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010 to require real-time reporting of water use

Recommendation

We recommend mandatory daily electronic transmission of data for all water take consents captured by the current Regulations (ie, consented water takes over 5 litres per second). This would require amending the Regulations to mandate that

- measurements occur every fifteen minutes (or daily via written council approval); that
- water take records are kept in a form suitable for electronic transmission and storage; that
- consent holders provide daily electronic records to the council that granted the consent; and
- that these daily electronic records are provided to the council no later than one day after the end of the day in which the water was taken.

These requirements would be staggered, being first applied to consents of 20 litres per second (l/s) or more who must meet this requirement within two years of the Regulations come into force; applied to consents of 10 l/s up to 20 l/s within four years of the Regulations come into force; and applied to consents of 5 l/s up to 10 l/s within six years of the Regulations come into force.

Transmission may occur via a third-party provider who handles the data on behalf of the consent holder and regional council.

Problem being addressed

The current Regulations are relatively permissive as they only require data to be reported to councils once a year at minimum and allow a wide range of reporting methods. In practice, this reporting method varies from hand-written records being posted to the council to real-time time data being sent electronically directly to councils. This has raised fundamental issues of data quality and timeliness for regional councils as they end up with missing water-use records, suspicious looking totals (eg, exactly the same amount of water being taken every day) and tardy reporting by some users. As a result councils are often not able to use this data effectively for compliance, monitoring and enforcement work and for the management of minimum flows in rivers and groundwater levels. Data currently collected is not of sufficient quality to provide robust national estimates of water use.

Reasons for recommendation being preferred

The recommended option will deliver data on water use which is consistent and timely, and meet the original policy objectives of the Regulations as intended in 2010. The staggered approach will provide time for regional councils, water users and industry providers to adapt and solve implementation issues that will arise, manages the demand for the installation of telemetry units and is likely to make electronic transmission cheaper for those with smaller water takes as result of higher demand and market competition for telemetry units.

Impact on affected parties

This option strikes a balance between costs on users (new telemetry units) and regional councils, and the provision of good quality, timely information (which will also save users time preparing and sending data to councils). Stakeholders consulted to date have unanimously supported changing the Regulations to mandate telemetry. Adopting this recommendation would significantly enhance the government's ability to promote greater water-use efficiency, enforce regulations and low flow restrictions, improve reliability of access to data for users, and achieve Te Mana o te Wai. Associated costs are estimated at \$14.3M annually.

4.20 Stock Exclusion

Recommendation

We recommend section 360 regulations and NES regulations requiring farmers to exclude all cattle, pigs and deer from rivers, lakes, wetlands and drains across low-slope New Zealand (generally the more intensively farmed parts of the country). Outside of low-slope areas, cattle, pigs and deer will be excluded where the type and intensity of farming poses a similar risk to that of low-slope farming. Wherever stock exclusion is required, there must be a five metre setback from the river or lake bed (no setback would be required from drains).

Stock exclusion must be achieved within five years of gazettal, phased according to farm type and stream size. Applications can be made to regional councils for exemptions. Existing fences that do not provide a five metre setback may remain in their existing positions until 2035.

The Government is also proposing an alternative option, that for drains and streams that are less than 1m wide, there would be a mandatory requirement for FW-FPs to determine what fencing and setbacks are required. If this option was progressed, we would aim to develop standards to direct FW-FP development, and ensure stock are being excluded wherever it is appropriate. The FW-FP option provides more flexibility to take account of individual farm conditions and the best value investment to improve the health of waterways, but less certainty about what stock exclusion and set backs will be put in place. This option is analysed as Option One of Appendix 20 of Part II.

Problem being addressed

Cattle, pigs and deer physically damage the beds and banks of streams, adversely affecting habitat for fish spawning and other aspects of ecological health. Bank erosion and de-vegetation allows contaminants to be more easily washed into the water leading to sedimentation of river and lake beds and reductions in water clarity. Disease-causing organisms in dung present health risks to people in contact with the water. Nutrients in dung and urine promote weed growth.

Bankside erosion in Waikato tributaries was estimated as contributing approximately 60% of the instream sediment. On average across catchments in Hawke's Bay, Waikato, Northland, and Manawatu-Wanganui, streambank erosion contributes 18% of total suspended sediment loads.

Soil compaction near streams caused by stock grazing and trampling leads to reduced infiltration, followed by erosion of the bank surface by overland flow, rilling and/or gullyng. Vehicle and animal stream-access tracks can create breaks or gaps in otherwise continuous stream bank systems where overland flows concentrate and thereby create points of weakness.

Although regional councils are restricting stock access to some rivers and lakes in their regional plans, there is little uniformity in their approaches, and the lengthy plan making process makes getting effective and consistent rules in place across the country costly and difficult.

Reasons for recommendation being preferred

The recommended approach provides national consistency for cattle, pig and deer access to waterways on "low-slope" land (less than five degrees). Clear and consistent regulations will provide certainty to farmers. The regulations build on the work the dairy industry has achieved in excluding dairy cattle from 97.5 % of "Accord waterways" (greater than one metre width, and 30cm depth), and extend good practices to other stock farmers on low-slope land within achievable timeframes.

Excluding stock on non-low-slope land only where stocking rates are high recognises that fencing on these farms is difficult and costly, and that the benefit of exclusion is lower if there are fewer stock.

Smaller streams and drains are included because they cumulatively contribute a significant proportion of contaminants. Setbacks from streams are important for ecological health and to future-proof streams for the riparian plants often critical for stream shading.

Impact on affected parties

This proposal will reduce health risks to people in contact with the water (see *E. coli* for swimming for more information), and improve ecosystem health for aquatic life by reducing nutrients and sediment in the water.

The highest cost would fall on owners of low-slope farms with no fencing (likely to be beef farms), with additional costs for lost pasture in the setbacks. Other costs may include providing culverted or bridged stock crossing points and controlling weeds within setbacks. These costs will be highly variable across the country depending on the length of rivers and lakes within farms, the extent of existing fencing and compliant stock crossing points, and the existing regional rules that would apply regardless of this national intervention. Phasing in the requirements will help manage the impact of these costs.

Some indicative costs to farmers based on modelled farms with stock not currently excluded from streams and a five-year implementation timeframe are (opportunity costs are based on EBITD per hectare over ten years, fencing costs include alternative water):

- A 125 ha Waikato/Bay of Plenty dairy farm would incur fencing costs of \$19,229 and \$67,414 opportunity cost in lost land from a 5m setback (or \$16,853 for a 3m setback)
- A North Island 281 ha intensive (lowland) beef farm and stocking rate of 9.6 SU/ha would incur fencing costs of \$75,131 and \$14,018 opportunity cost in lost land from a 5m setback (or \$3,505 for a 3m setback)
- A 571 ha central North Island hill country sheep and beef farm and stock rate of 8.7SU/ha would incur fencing costs (based on 10% of the farm triggering exclusion) of \$15,252 and \$1,899 opportunity cost in lost land from a 5m setback (or \$475 for a 3m setback)

Nationally, the total estimated costs for farmers based on the kilometres of streams to fence and excluding the streams on dairy farms already fenced is \$400M (this differs from the cost estimate for reducing *E. coli* for swimming because it does not assume that all streams in the non-low slope land are fenced, and it does not include sheep). This comprises \$128M for low-slope land (or \$116.5M for a 3m setback), and \$272.8M for non-low-slope land (or 270.8M for a 3m setback). These costs are likely to be an over-estimate because the calculation of stream lengths included all rivers flowing through low-slope (less than or equal to 5 degrees) and non-low-slope (more than 5 degrees) land parcels with grassland and annual cropland and includes the regions where regional rules require stock exclusion. Including the ongoing lost costs over the next ten years (\$170M for low slope land and \$29M for non-low slope, brings this to \$600 million.

Putting these costs in perspective, the Survey of Rural Decision-makers reported that 75% of farmers found no change in profit after excluding stock from waterways, 8% reported increased profits and 17% had lower profits. This goes against their expectations for stock exclusion where 51% believed they would have lower profits.⁴² In addition, farm performance and environmental performance were both higher than expected after excluding stock from waterways on their farms (52% and 65% respectively compared with their expectations of 20% and 41%).

⁴² www.landcareresearch.co.nz/science/portfolios/enhancing-policy-effectiveness/srdm/srdm2017/farm-plans-and-land-management/management-stock-exclusion-from-waterways

Furthermore, against these costs are the significant benefits to improved ecosystem health, in particular, reducing sediment input to streams (and the co-benefits reduced nutrients and pathogens) by reducing streambank erosion and surface erosion near the stream. See “*E. coli* for swimming” for more information on the benefits to human health from improving water quality by reducing contamination from stock dung.

Section 5: Impact analysis of the package

5.1 What option, or combination of options, is likely best to address the problem, meet the policy objectives and deliver the highest net benefits?

The Water Taskforce recommend a combination of:

- amendments to the Freshwater NPS
- a new Freshwater NES
- amendments to existing section 360 regulations
- new section 360 regulations.

This combination of interventions is required to address the complex and multi-faceted issues with freshwater management in New Zealand.

Sections 4.1-4.20 above provide recommendations for individual policy areas. Specific analysis for each policy area are provided in appendices 1-20.

In general, we recommend amendments to the Freshwater NPS where variation between regions is greater. A nuanced solution that takes into account community values and local circumstances is required. These issues are best resolved over the medium-term through regional freshwater planning processes, which the Freshwater NPS can direct and guide.

We recommend new or amended regulations where an issue is more uniform across the country, a single consistent solution is preferred or where immediate action is required. These issues are best resolved through more prescriptive direction that does not need to be translated into regional plan content.

The choice between making regulations through a National Environmental Standard (NES) or section 360 of the RMA largely depends on the topic being considered.

NES regulations cannot prevail over existing consent conditions (but they can trigger a review of a regional resource consent). However, they have the advantage of being able to address a wider range of environmental issues, and therefore can be delivered without needing an RMA amendment.

Regulations under section 360 have the advantage of prevailing over existing consent conditions. However, they are limited to very specific topics listed in section 360(1) of the RMA. Adding new topics to the list requires an amendment to the RMA. Where section 360(1) allows regulations on a specific issue considered in this policy package, we have opted for this option.

5.2 Summary of costs and benefits of the preferred approach

Table 1 Summary of work to date on costs and benefits of the preferred options.

Changes to the Freshwater NPS	
Proposal	Benefits/Costs
Sediment	<p>Benefit: Estimated monetary benefits of the interventions to meet the proposed bottom lines at the catchment level over a 50-year period vary between approximately \$31.2 billion and approximately \$5.4 billion depending on the discount rate and carbon value used. This does not include a range of other anticipated benefits that could not be monetised in the analysis. The benefit and cost ranges provided here are indicative because they represent only one potential implementation pathway and ultimate benefits and costs will depend on how the proposals are actually implemented.</p> <p>Costs: These will be borne by resource users, local and central government, proportionally, according to future policy choices (especially funding of works). Estimated monetary costs of the interventions to meet the proposed bottom lines at the catchment level over a 50-year period vary between approximately \$7.1 billion and \$5.3 billion depending on the discount rate used.</p>
Wetlands	<p>Benefits: Non-protected inland wetlands on fertile land provide \$1.4b a year of ecosystem services. These are the wetlands that are likely to be drained under the status quo.</p> <p>Costs: Less than 28,933 ha impacted, most in Canterbury, West Coast, Otago, Southland and Waikato. There will be a lost opportunity for development in and around these sites (e.g. conversion to pasture, or urban development).</p>
<i>E. coli</i> for swimming	<p>Benefits: A benefit of avoiding disease (could be between \$10M and \$80M annually based on the costs of people getting sick). Improved water quality at the non-compliant swimming spots (153 sites, approximately half of tested sites)</p> <p>Costs: Fencing will be required. Costs will ultimately depend on the actions regional councils choose to take, and the timeframes over which they want improvements made. Some fencing is already in place and will be required for stock exclusion regulations. Cost of improved infrastructure at wastewater treatment plants. 60% of all wastewater treatment plants nationally are currently going through, or will go through, a resource consenting process in the next 10 years. But the biggest proportion of these costs will be for improving nutrients and oxygen demand. Disinfection is usually by UV treatment and is not a significant proportion of wastewater treatment costs.⁴³</p>
Attributes for nitrogen and phosphorus to provide for ecosystem health	<p>Benefits: Reducing nitrogen and phosphorus will contribute to improvements in ecosystem health by potentially reducing the prevalence of nuisance aquatic plants and slime. It will help ensure that river ecosystems more closely resemble those in unimpacted systems. These improvements will also benefit people's use of waterways for food gathering, recreation and amenity. Reducing nutrient inputs at their source is more cost effective than restoring freshwater and marine ecosystems after degradation has occurred.</p> <p>Costs: This proposal will have the most effect on soft-bottomed rivers in some lowland agriculturally-dominated areas. Achieving the proposed nutrient reductions will be achievable in some areas using best management practice, in these cases a reduction in nutrient loss can result in an economic benefit.</p>

⁴³ Department of Internal Affairs, 2018. Three Waters Review – cost estimates for upgrading wastewater treatment plants to meet objectives in the Freshwater NPS.

Changes to the Freshwater NPS	
Proposal	Benefits/Costs
	However in some catchments, changes in land use will be required to reduce losses of nutrients from the land. Councils can determine the appropriate timeframes for achieving target attribute states. This means councils have the ability to mitigate cost impacts by spreading costs over time.
Providing for hydro-electricity generation infrastructure	Benefits: The benefits are largely avoided costs and regulatory uncertainty from the status quo. The avoided costs are higher operational and investment costs to meet expected electricity demand over the forecast period. These were assessed in a 2015 report looking at the impact of reduced flows on hydro generation in seven separate reduced flow scenarios in different catchments, as well as a further scenario which combined the effects of the seven separate scenarios. In this 2015 modelling the impact was most visible in the combined scenario which significantly increased minimum flows across several catchments, and resulted in an average annual increase in short-run marginal cost of \$15 to \$31 per MWh. ⁴⁴ This modelling however was based on MBIEs 2013 mixed renewables scenario and included thermal generation that has since retired and at least 600 MW of new thermal generation by 2025. New generation investment is now more likely to be wind and geothermal, with the latter increasing the reliance on hydro generation to cover when intermittent wind is unavailable. Consequently, \$15 to \$31 per MWh is likely to be an underestimate of the potential cost of reduced hydro flexibility, and the risk to security of supply may be greater from reduced inflows.
Recognising all components of ecosystem health	Benefits: Improved fish passage. Greater protection of freshwater ecosystems. Costs: One-off capital costs of \$2M for councils for monitoring equipment, and ongoing monitoring costs which they may recoup via consents from resource users. Approximately \$20M to mitigate the lack of fish passage through existing structures.
Clearer ecological outcomes for river flows and water levels	Benefits: The major benefit is that all fauna in an ecosystem will be considered when setting minimum flow thresholds and allocation limits. It will also provide improved clarity of process. Costs: Costs include council assessments of the needs of the ecosystem for flows. The impacts that this clarification would have on users having reduced access to water has not been estimated.
Reporting on the five components of ecosystem health	Benefits: Better recognition and understanding of freshwater ecosystems. Increased understanding of freshwater ecosystems leading to improved decision-making. Costs: Impacts limited to additional council resource for the additional monitoring burden.
Maintaining or improving water quality	Benefits: This policy will prevent regional councils from reducing water quality, this will help to protect the ecosystem services provided by waterways. Costs: Low implementation costs
Te Mana o te Wai in the Freshwater NPS	Benefits: Clarifying and strengthening framework so councils are clear about expectations of Te Mana o te Wai. Clearly defined aspirations for freshwater ecosystem health should lead to council decisions that set higher objectives for fresh water.

⁴⁴ Halliburton. March 2015. Assessment of the Impact of Flow Alterations on Electricity Generation.

Changes to the Freshwater NPS	
Proposal	Benefits/Costs
	Costs: Costs to councils due to increased community engagement and increased costs for communities who choose higher environmental standards.
Preventing further loss of streams	<p>Benefits: Will encourage more efficient use of land and infrastructure, and strategic consideration of locations for housing intensification. Benefits to ecosystem health of maintaining habitat and connectivity. Social and cultural benefits to general public including increased public awareness of urban stream ecosystems, corridors for cycling, walking, and traffic-free routes.</p> <p>Costs: Developers may pass lost profits onto house purchasers. This will depend on development design, topography of land, amount of streams present, and the ecological values that need to be offset. Will increase consenting, monitoring and compliance costs for some councils. Using the cost of restoring a piped stream as a proxy for the ecosystem services provided, a Greater Wellington Regional Council study concluded a 31% probability that social benefits to the community would outweigh the lost income of the developer.⁴⁵ The <i>Stream Retention Through Subdivision Design Alternatives</i> report concluded that “the retention of streams within urban developments will not unduly hinder the provision of additional housing capacity within the Wellington region”.⁴⁶</p>
Direction to territorial authorities to support integrated management	Costs: The cost is minimal and limited to staff resources at territorial authorities.
Improving Māori involvement in freshwater management: Better incorporation of Māori values and measures of freshwater health	<p><i>Consulting on 2 options.</i></p> <p>Benefits: Improved outcomes for freshwater, connection with waterbodies, intergenerational knowledge transfer, and greater understanding of different cultural perspectives within the community. This would also improve mātauranga Māori based freshwater data (subject to adequate intellectual property protections).</p> <p>Costs: Higher costs for regional councils due to strengthened implementation requirements and engagement expectations.</p>

⁴⁵ Greater Wellington Regional Council’s Proposed Natural Resources Plan (notified in 2015).

⁴⁶ Stream Retention Through Subdivision Design Alternatives. Prepared for Greater Wellington Regional Council by Morphum Environmental Ltd, McIndoe Urban and Wraight + Associates July 2018.

Improving farm practices	
Proposal	Benefits/Costs
Freshwater Modules in Farm Plans ⁴⁷ (FW-FP)	<p>Benefits: Tools to help farmers manage environmental risks. Tracking action towards addressing risks in a coordinated way. In some cases the FW-FP process may identify farm system changes that may improve profitability and provide environmental benefits (eg, soil testing could suggest that less fertiliser is needed).</p> <p>Costs: About 28,000 more farms will need a FW-FP by 2030, councils will need to monitor compliance. Estimate \$3,500 per farm plan - \$100M total. \$38m to audit FW-FPs.</p>
Reducing nitrogen	<p>Benefits: Reductions in excess nitrogen entering water ways (may also be cost savings to farmers depending on source of nitrogen).</p> <p>Costs: In addition to the cost of a FW-FP above, additional auditing costs of \$1,500 per year per applicable farm (additional audit required for applicable farmers in high N-impacted catchments).</p>
Addressing high risk land use activities: stock holding areas and feedlots	<p>Benefits: Will reduce discharges to water from stock holding areas. Good quality stock holding areas may improve productivity.</p> <p>Costs: Builds on existing work by councils and industry in developing minimum standards. This means that, where good practice is already adopted, there will not be an undue burden to the farmer.</p> <p>Approximately \$3,000 per consent, and an estimated \$72 per cow to meet infrastructure costs⁴⁸.</p>
Intensive winter grazing of forage crops	<p>Benefits: no further degradation of freshwater and soils from these activities.</p> <p>Costs: Intervention will be focussed so as to maximise the benefits at a minimal cost. We estimate that about 2,000 additional consents will be required costing approximately \$3,000 per consent.</p>
Agricultural intensification	<p>Benefits: Benefits include restricting a rise in contaminants entering waterbodies and the avoidance of increased costs of future mitigations. Halting further damage to waterways resulting from this intensification. The opportunity to develop 'under-developed land' in future is maintained.</p> <p>Costs: Costs are mostly opportunity costs (ie, revenue foregone from intensification if a farmer is unable to obtain a consent). \$3000 per consent plus cost for expert opinion/evidence to support a consent application to intensify.</p>
Stock exclusion	<p>Benefits: 77% of the nutrients in water ways were contributed by streams less than 1m wide⁴⁹, inclusion of those streams will result in a larger beneficial environmental impact.</p>

⁴⁷ Analysis from Landcare Catchment Case Study for the Ruamahanga, Macfarlane Rural Business (MRB) Farm Case Studies, and AgFirst Farm Case Studies.

⁴⁸ Landcare Catchment Case Study for the Ruamahanga

⁴⁹ McDowell, R.W, Cox, N and Snelder T.H. 2017. Assessing the Yield and Load of Contaminants with Stream Order: Would Policy Requiring Livestock to be Fenced Out of High-Order Streams Decrease Catchment Contaminant Loads.

Improving farm practices	
Proposal	Benefits/Costs
	<p>Estimated benefits of \$983m for excluding stock from flat and rolling land.⁵⁰ This analysis didn't include streams <1m wide so the benefits of this proposal would be greater.</p> <p>Costs: Estimated cost of \$400m for fencing and lost opportunity cost of retiring land within fences. This assumes none of this is currently fenced (and unlike the <i>E. coli</i> mitigation costs, is not targeting sheep farming).⁵¹</p> <p>Potential to become weed/pest plant colonised. This impact can be managed by supporting regional councils to further develop riparian management programmes. See <i>E.coli</i> for swimming below for estimates of fencing costs (which is one method of stock exclusion).</p>

Improved information for managing freshwater	
Proposal	Benefits/Costs
Updating the Resource Management (Measurement and Reporting of Water Takes) regulations 2010 to require real-time reporting of water use	<p>Benefits:</p> <ul style="list-style-type: none"> • water use efficiency • setting allocation and low flow restriction policies and operational practices. • efficient use of council resources, particularly regarding compliance, monitoring and enforcement. • greater ability for integrated surface and groundwater management. <p>Costs: Cost estimated at \$14.3m annually (upper bound), this includes cost to regulators, wider government and those with water consents for more than 5 L/sec. The cost of purchase and installation of a telemetry unit will be \$600 - \$1,800.</p>
Social impacts of the <i>Essential Freshwater</i> Package	
Social impacts of the <i>Essential Freshwater</i> Package	<p>Benefits: The positive social impacts associated with improved water quality, ecosystem health and providing for Te Mana o te Wai are likely to include:</p> <ul style="list-style-type: none"> • reduced risk to human health (through improved drinking water quality) • improved environmental amenity • increased opportunities for cultural purposes and recreation. <p>Proposals would likely contribute to improved physical and mental wellbeing, particularly at the local scale, and contribute to New Zealanders' cultural identity associated with a high quality natural environment. These positive impacts are likely to be felt by New Zealanders at large, including Māori and local farming communities.⁵²</p>

⁵⁰ MfE and MPI. 2016. National Stock Exclusion Study - July 2016.

⁵¹ Journeaux, P. 2019. Modelling of Mitigation Strategies on Farm Profitability: Testing Ag Package Regulations On-farm.

⁵² Austin, 2019. Social impact analysis of Essential Freshwater.

Costs: Negative social impacts include reprioritising of council resources away from providing other projects.

The number of proposed regulations facing the agricultural sector, is likely to have an immediate negative impact on farmers' wellbeing (anxiety/mental health).

5.3 Summary of social and cultural impacts

Social impact

To date social impacts have only been assessed against a selection of the proposals (Sediment, Mandatory Freshwater Modules in Farm Plans, Reducing Nitrogen Surpluses, Intensification, and Stock Exclusion). Analysis of the social impacts of the other proposals is expected to be expanded over the coming months.

The positive social impacts associated with improved water quality and providing for Te Mana o te Wai are likely to include:

- reduced risk to human health (through improved drinking water quality)
- improved environmental amenity
- increased opportunities for cultural purposes and recreation.

This will likely contribute to improved physical and mental wellbeing, particularly at the local scale, and contribute to New Zealanders' cultural identity associated with the high quality natural environment. These positive impacts are likely to be felt by New Zealanders at large, including Māori and local farming communities.

The number of proposed regulations facing the agricultural sector, including areas other than freshwater quality (eg, climate change), is likely to have immediate negative impacts on farmers' wellbeing (anxiety/mental health). Alternatively by contributing to the improvement of freshwater quality across the country this may improve the public's perception of the farming community as stewards of the land (and building a social licence to operate). This may have a positive impact on the social cohesion of local communities, farmers' mental health (and as a result physical health), and overall satisfaction of life. Additionally, farming within environmental limits may also have positive impacts on our New Zealand brand overseas (eg, opportunities for higher added value farm products and eco-tourism), and protect New Zealand natural capital on which future generations depend upon.

Many of the proposed policies are likely to increase demand for a higher-skilled and larger rural professional workforce. Building rural professional capacity and capability will likely require investment from government and industry alike, higher demand is likely to result in more job opportunities.

The *Essential Freshwater* package will also impact on councils, through increased workload. Councils may need to de-prioritise other projects/programmes to resource the implementation of the package resulting in some dissatisfaction for council staff. Inversely, if councils are not able to de-prioritise enough other programmes, this may result in overworked staff with associated impact on their physical and mental health. Councils may increase rates in order to resource the extra workload, with potential negative impacts for wider communities.

Impact for Māori

While we have not specifically modelled the impacts on Māori at a local level (whānau, marae, hapū, Māori owned businesses), we have done a high-level indicative cultural impact assessment of some of the proposals. An in-depth impact assessment will be conducted in the coming months.

It is important to consider the unique characteristics, governance and collective ownership of Māori land, cultural values, and rights under the Treaty of Waitangi in addressing water issues.

Māori identity is intrinsically linked to the environment including freshwater bodies, hence why Māori hold a responsibility of kaitiakitanga or stewardship of the environment. This relationship is described in different whakatauki and pepeha such as the one commonly used by Whanganui River Māori – *Ko au te Awa, ko te Awa ko au* (I am the river and the river is me).

We anticipate that our efforts to halt further degradation and reverse past damage will have a positive impact on the mauri and wairua of our waterways. Halting degradation would also help restore the wellbeing and mana of Māori and the wider communities, and support Māori in strengthening their identity and connection to the water while still exercising their role as kaitiaki.

Strengthening the role of Te Mana o te Wai and the ability of tangata whenua to express their values and knowledge of freshwater management will help ensure Te Ao Māori is further recognised. Furthermore, ensuring that a holistic and integrated approach is adopted that puts the essential value of the water as the first priority. In addition, it will further help ensure that tangata whenua are able to practice tikanga over the management of freshwater values, such as mahinga kai. These changes will influence local decisions, ensuring these values are managed and incorporated in freshwater planning, and for tangible actions to occur on the ground to protect these values.

We also acknowledge that some policies of the Essential Freshwater work programme may not meet the possible higher expectations of water quality that Māori hold in relation to their freshwater bodies or that are inconsistent with Te Ao Māori. These particular proposals aim are '*maintain or improve water quality*' and '*providing for hydro-electricity generation infrastructure*'. Additionally, while reduced timeframes (regional councils to give effect to the Freshwater NPS by 2025) would ensure more rapid action to halt degradation, this may also impact on engagement timeframes with iwi and hapū and their capability and capacity to participate in the process. This risk will be mitigated by a new process introduced through a new resource management bill.

It is important to note that our efforts to stop further degradation and loss and reverse past damage will also affect Māori enterprises, particularly in the agriculture industries and where land may be underdeveloped.

Consistency with Treaty of Waitangi settlements

We are intending on undertaking broad consultation with iwi as part of the Essential Freshwater consultation. We will ensure that where there are existing legislative or settlement requirements, we engage with the related iwi directly, on whether the proposals are consistent with these, eg, the Whanganui River Iwi with respect to Te Awa Tupua (Whanganui River Claims Settlement) Act 2017.

We will procure legal advice as to whether the *Essential Freshwater* package is consistent with existing historical Treaty of Waitangi settlements, or broader Crown obligations.

Risks with rights and interests issues not addressed

There is a risk that through the public consultation, iwi and Māori will continue to raise certain rights and interests issues (such as governance and allocation) which are outside of the current proposals.

5.4 What other impacts is this approach likely to have?

The policy proposals in this analysis are part of a wider Government approach to transitioning to a sustainable, low-carbon and resilient New Zealand. This transition includes policy proposals for biodiversity, climate change, and highly productive land. At this stage we are not able to provide detailed information on the co-benefits, impacts and costs across these policies and the cumulative effect of policy change on the primary sector and other sectors. This work is planned to be completed by the end of 2019.

To help mitigate these impacts, the proposed regulatory interventions will be accompanied by non-regulatory support. This will include whole-of-government place-based investment in targeted at-risk catchments, and government support to assist councils and the primary sector to implement these changes. For more information see Section 6 below.

Section 6: Implementation and Operation

6.1 How will the new arrangements work in practice?

A new, revised Freshwater NPS, a new Freshwater NES, amended section 360 regulations and new section 360 regulations will be gazetted in early-mid 2020.

Regional councils will need to begin implementing the directions in the revised Freshwater NPS, and are required to be fully compliant by 2025.⁵³

Overall, the new changes will not substantially alter existing freshwater planning processes. In many cases, new directions will simply clarify existing requirements (such as the clarification around the treatment of hydroelectric infrastructure). However, other changes will require regional councils to modify their existing approaches (such as the new sediment attribute).

While the Freshwater NES and section 360 regulations will take immediate effect, individuals will need to comply with the requirements of the regulations at different times for different policy areas. In many cases, the requirements will be phased (eg, the three-tranche approach to freshwater modules in farm plans and phased introduction of stock exclusion requirements).

⁵³ Note that currently the Freshwater NPS allows for Regional Councils to extend the implementation deadline to 2030 if an attempt to meet 2025 would result in lower quality planning or if it would be impractical. This will be changed to 2025. This is part of a broader RMA change proceeding through a separate process – that change will have its own regulatory impact analysis and the change to the timeframe will be analysed as part of that package.

Figure 3 below shows how the *Essential Freshwater* policy package will be rolled out over time.

Figure 3: implementation of *Essential Freshwater* policy package.

	2020	2021	2022	2023	2024	2025	2030+
NPS	Amended NPS gazetted	Regional councils give effect to NPS requirements (set objectives and limits)				Councils give full effect to NPS	
NES	Regulations come in to force, councils must begin processing resource consents		First tranche of freshwater modules in farms plans complete			Second tranche of freshwater modules in farms plans compete Interim regulations no longer apply	Third (final) tranche of Freshwater Modules in Farms Plans complete by 2030
S360 regulations	Regulations come in to force, councils must begin processing resource consents	First tranche of stock excluded		Second tranche of stock excluded		Third tranche of stock excluded	Existing fences moved to comply with 5m setback by 2035

- Where the regulations require resource consent (eg, the agricultural intensification and intensive winter grazing regulations) regional councils will need to process the consent when an individual applies.
- Where the new NES requires resource consent and the activity was permitted under the regional plan, the individual will have up to 6 months to obtain consent for the activity. An individual with consent to carry out an activity that now has more stringent requirements set by the NES will be able to continue as originally consented (an NES cannot prevail over an existing consent).
- Where the section 360 regulations require specific actions, these actions will prevail over any existing consented activity where the section 360 regulations are more stringent.

6.2 What are the implementation risks?

A key risk to the policy package is that regional councils will not have the resources required to:

- hold meaningful engagement with tangata whenua
- carry out thorough consultation processes to set objectives and limits
- amend regional plans and policy statements by 2025 (or in exceptional cases 2030) given the imposition of new attributes and new requirements for ecosystem health

- monitor compliance with the new Freshwater NES and section 360 regulations
- process resource consents where these are required by the Freshwater NES or section 360 regulations, and
- administer new functions, such as freshwater modules in farm plans.

Another risk is a lack of industry capability and capacity to implement the proposed changes within the specified timelines. For example:

- Implementation of freshwater modules in farm plans relies on there being a sufficiently-sized pool of suitability qualified persons to prepare and audit the plans. This pool of qualified persons will need to be built up over time.
- Wide-spread fencing of waterways may increase demand for fencing materials and labour, leading to shortages in some parts of the country.

These risks will be mitigated through guidance and non-regulatory support.

Section 7: Monitoring, Evaluation and Review

7.1 How will the impact of the new arrangements be monitored?

The Environmental Reporting Act 2015 requires the Ministry for the Environment and Statistics New Zealand to provide six-monthly reports on the state of New Zealand's environment over a three-year cycle. The reports are a valuable source for monitoring the environmental impact of policies from across environmental domains.

The three-year cycle includes five 'domain reports': air, atmosphere and climate, freshwater, land, and marine, and a synthesis report covering all five domains (two reports a year, over three years). The next report will be published in April 2022.

The last freshwater domain report *Our fresh water 2017* was published in April 2017. The next report is due in April 2020 (the time the policy package will come into force) then in April 2023.

Both the 2022 synthesis report and 2023 freshwater domain report will give some indication of the overall trends in water quality since these policy proposals come into force. However, trends in freshwater quality and ecosystem health take a long time to change. In some areas, water quality and ecosystem health may decline before it improves, and improvements may not be evident in other areas for decades (due to the lag of nutrient loads working their way through soils into freshwater systems).

In addition, the website Land Air Water Aotearoa (www.lawa.org.nz) compiles environmental information from across the 11 Regional Councils and five Unitary Authorities. These organisations regularly publish their water quality data in a consistent format on this website. The website is designed for a public audience to be able to interpret scientific information correctly. Over the long term this will be a useful resource for allowing people to monitor the effectiveness of the interventions contained within the Essential Freshwater package.

7.2 When and how will the new arrangements be reviewed?

The Freshwater NPS itself requires a review of its implementation and effectiveness. The date of this review is currently 1 July 2020. Due to the close proximity to these amendments, it is proposed to extend the date of this review to a date within the next five years. That will allow for a better picture as to how the proposed interventions are functioning.

Furthermore, a comprehensive implementation support programme will allow us to monitor how councils are going with implementation and if further changes or refining is needed.