

Regulatory Impact Analysis

Action for healthy waterways

Part I: Summary and Overall impacts

6 May 2020

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Section 1: General information

1.1 Purpose

The focus of this first part of the regulatory impact analysis for Action for healthy waterways is the change attributed to the package. Part II then details the 20 different policy interventions of the package.

The Ministry for the Environment (the Ministry) and the Water Taskforce have produced this analysis and advice to inform final decisions to be taken by Cabinet.

1.2 Overview

New Zealand has significant issues with freshwater quality and ecosystem health. To date we have not taken an integrated approach to address these issues.

The Action for healthy waterways Package is part of wider *Essential Freshwater* reforms which both contribute towards Government's reform towards a more sustainable economy. It addresses systemic issues with freshwater management, and aims to reduce undesirable levels of sediment and pollution in waterways.

Nationally, the estimated benefits of the changes greatly exceed the costs. The modelled cost for most regions is very low, but considerably higher for the dairy farming sector in certain regions.

1.3 Key Limitations or Constraints on Analysis

Level of confidence in modelling and analysis

In order to form a view on the likely impact of policies that address water quality issues it is necessary to consider to what degree the proposed policies differ from current practice, how freshwater environments will be impacted by the implied new actions and how land users may respond to the new policies. There is uncertainty about each of these elements.

Our understanding of the environmental impact was based on analysis conducted by New Zealand's leading environmental scientists, mostly from NIWA. This analysis employed widely-used modelling techniques to make assumptions about the impacts from available observed data. Some uncertainty arises here because modelled environmental attributes may depart from those that exist in reality due to limited on-the-ground data; scientific knowledge limitations; and practical simplifications made in the model. Modelling results were used to inform the final policy as accurately as possible, but not all attributes were represented by the modelling. There was also uncertainty about the degree to which the Action for healthy waterways policies depart from current policies because most regional councils have yet to finalise plans that respond to the NPS-FM (2017). Certain assumptions had to be made despite this limitation.

Information about current practices on farms, farming practices and farm profitability, and likely behavioural responses, was sourced, where available, from expert farm consultants and existing reports. However, we were unable to access more up to date and comprehensive data sets held by industry bodies, this was a limiting factor on the economic impact assessment. It should be noted that informational limitations such as these are not uncommon in environmental and economic impact analysis.

While the impact assessment was completed under a very tight timeframe, having more time would not have reduced these key uncertainties. The limitations to the analysis reflect the limited data available, not the omission of relevant available information from the analysis.

Inevitably judgements had to be made and the impacts reported in this paper reflect officials' best estimates of the key elements, based on the information available. Given these unavoidable constraints, the findings reported in this paper should be assumed to have a 'medium' level of uncertainty.

Other constraints

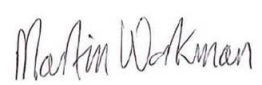
Understanding freshwater quality and ecosystem health and why they vary – from location to location as well as over time – is challenging. Changing water flows and modification to freshwater habitats from land use development can have significant effects, but information about the extent and scale of these impacts on our ecosystems is limited. The cumulative impact of these changes on our social and economic values is difficult to determine.¹

New Zealand has diverse geography, geology and climatic conditions, as well as diverse patterns of land use and land management practices. Pollutions load vary for different land uses, management practices, soil types, and by slope, weather and climate characteristics – even within the same farm.

There is no easy way to predict how councils will choose to exercise their discretion (such as in setting timeframes for achieving objectives to meet national bottom lines), nor what mitigation measures resource users might choose to put in place to meet limits and over what timeframe.

It is much more difficult to measure the value of environmental improvement than it is to estimate the financial costs of mitigating pollution or other adverse effects on fresh waters. So, while best efforts have been made to quantify the impacts of the Action for healthy waterways Package, it is likely that benefits are understated relative to costs.

Responsible Manager



Martin Workman

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Ministry for the Environment

¹ Ministry for the Environment & Stats NZ (2019). New Zealand's Environmental Reporting Series: Environment Aotearoa 2019. p.82.

1.4 Quality Assurance Statement

A review panel with representatives from Treasury's Regulatory Quality Team, the Ministry for the Environment and the Ministry for Primary Industries has reviewed the Regulatory Impact Analysis (RIA) that has been developed by the Ministry for the Environment for the action for healthy waterways package (dated 22 April 2019).

This is a complex package with twenty individual RIA corresponding to the sections in the package. An additional summary/synthesis section and implementation section was provided for the package as a whole.

The panel considers that overall, the package "partially meets" the quality assurance (QA) criteria. Within the individual RIA, twelve "meet" the QA criteria and eight "partially meet".

The "partially meets" rating for the individual RIA and the overall package, reflects information and data constraints. The Ministry's approach to the analysis is generally sound and is based on relevant available data.

The panel's view is that the case has been made for change. While the benefits of the preferred options within the package have been clearly demonstrated relative to the status quo, the comparison between some of the preferred options and the alternatives is less clear.

Since most regional councils have yet to finalise plans that respond to the National Policy Statement for Freshwater Management (2017), it is difficult to predict how councils will choose to exercise their discretion (such as where to set objectives above national bottom lines and the timeframes for achieving those objectives). Therefore, the degree to which some of the options in the package are likely to provide marginal benefits over and above expected outcomes under current policies remains unclear.

There is also uncertainty about the extent to which the package could impact on freshwater environments due to limits of available scientific analysis imposed by various lag times and soil composition and texture, as well as practical simplifications in the environmental modelling.

The ecosystem benefits, while difficult to quantify, appear very large relative to the costs for councils and regulated parties. The economic modelling indicates an impact on farm profitability that is likely to lead to land-use change in some regions. Some of that may be mitigated by farm specific responses that have not been captured in the modelling, but the economic and social impacts are going to be significant in some regions.

The adaptive management approach to implementation proposed in the RIA is key to managing the uncertainty and cumulative impacts of the reforms. It can provide flexible, iterative solutions that help to address implementation issues relating to capacity, capability and differing environmental situations across the country. It also provides for ongoing stakeholder consultation, which is important because there have been changes to some proposals in the package since public consultation occurred in 2019.

Given the complexity of the package, the governance arrangements need to be carefully designed and set-up to coordinate and oversee adaptive implementation of the healthy waterways package and linkages with other related government programmes.

Section 2: Problem definition and objectives

2.1 The context for Essential Freshwater – Action for healthy waterways

In October 2018, the Government launched the *Essential Freshwater: Healthy Water, Fairly Allocated*² work programme. The programme is the latest in a series of Government initiatives to address the effects of water use and land use on water quality and ecosystem health.

In September 2019, the Government consulted on Action for healthy waterways, a group of proposals to achieve a major part of the *Essential Freshwater* work programme. This consultation was accompanied by a discussion document, and by an interim RIA, which sets out the problem definition more comprehensively than this final RIA.

Around 7,500 people attended over 60 public meetings held across the country in September 2019. Approximately 17,500 submissions were made. The submissions provide a significant amount of detail, context, views and ideas.

The Water Taskforce has worked alongside four advisory groups to develop policy options:

- Kāhui Wai Māori (KWM: a Māori freshwater forum)
- a Science and Technical Advisory Group (STAG)
- the Freshwater Leaders' Group (FLG)
- the Regional Sector Water Sub-Group (RSWSG).

The advisory groups' reports on the Action for healthy waterways Package were available to the public during the consultation period. For some proposals, officials also worked with representatives from the hydro-electric generation industry and a Sediment Working Group (consisting of policy and technical experts from regional councils).

An Independent Advisory Panel (IAP) was established as part of the consultation process, to prepare a report and recommendations. The role of the IAP was to consider the national direction instruments. It was not tasked with considering the impact of the Action for healthy waterways Package.

Action for healthy waterways is part of a programme of reform towards a sustainable, low-emissions economy. This broader work programme also includes:

- the One Billion Trees Programme
- three other proposed national policy statements on urban development, highly productive land, and indigenous biodiversity
- changes to the Resource Management Act (RMA) to improve its operation and speed up freshwater planning
- a commitment to reduce our greenhouse gas emissions and transition to a low-emissions, climate-resilient New Zealand.

² Available at <https://www.mfe.govt.nz/sites/default/files/media/Fresh%20water/essential-freshwater.pdf>.

2.2 Existing national direction for fresh water

National direction on freshwater management is primarily provided in the existing National Policy Statement for Freshwater Management (NPS-FM).³ It sets out objectives and policies that regional councils must give effect to in regional policy statements and plans.

Regional councils have indicated that most plans are not likely to be implemented until after 2030. The Government considers this unacceptable.

A Bill introduced in September 2019 amending the RMA also included a new planning process that regional and unitary councils must use for all freshwater planning instruments. The Bill requires all councils to notify plans to implement the new (2020) NPS-FM no later than 31 December 2023.

A common theme from submitters was that meeting the notification date of 2023 would strain resources and be difficult to meet for both councils, communities and iwi. In recognition of these concerns, the Ministry is seeking to extend the notification date to 31 December 2024. That change would require the NPS-FM to be implemented by 31 December 2026 (or 2027 at the latest if the available time extensions are used). Along with the implementation package that is being developed, this extension will considerably address the concern raised by submitters, and allow sufficient time for the wider community to engage in plan development and enable a robust plan to be notified.

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

- safeguard the life-supporting capacity, ecosystem processes and aquatic life of fresh water, including their associated ecosystems
- establish systems to account for all fresh water 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 is to build on this and improve the current NPS-FM, including largely retaining the requirements listed above and the current framework for freshwater planning (see Figure 1 below).

³ The NPS-FM was first made in 2011. It was updated firstly in 2014 and then in 2017.

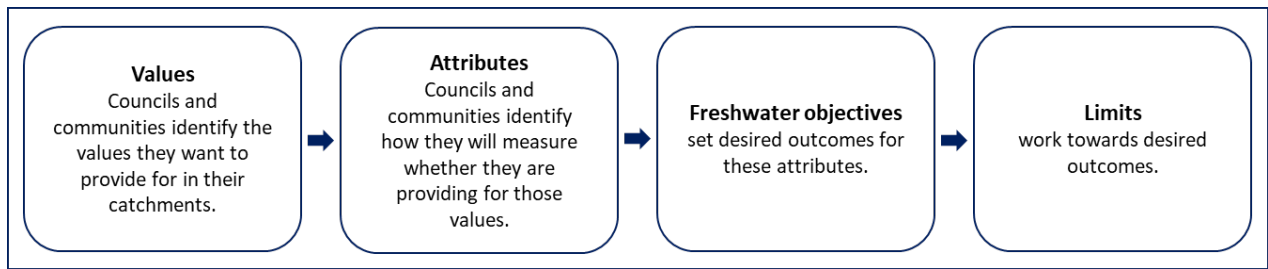


Figure 1. Framework for freshwater planning

2.3 Reasons for change

The way we live and make a living is harming our environment, including our water.

The Parliamentary Commissioner for the Environment highlighted freshwater challenges in the report *Growing for Good* in 2004, and we know that in some places water quality is still likely to be declining – as illustrated in Figure 2 (Source: LAWA).

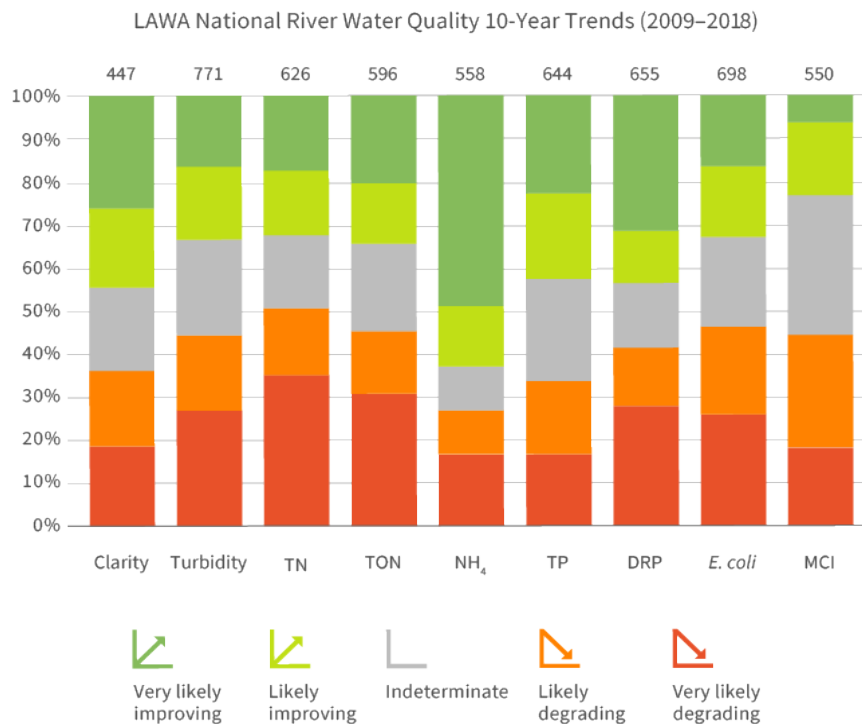


Figure 2. LAWA national river quality ten-year trends

Objectives for change

Cabinet has agreed [CAB-18-MIN-0296 refers] the following objectives for freshwater policy.

- **Stop further degradation** of New Zealand's freshwater resources and start making immediate improvements so that **water quality is materially improving within five years**.
- **Reverse past damage** to bring New Zealand's freshwater resources, waterways and ecosystems to a healthy state within a generation.
- **Address water allocation issues** having regard to all interests including Māori and existing and potential new users.

The regulatory package described in this analysis is intended to achieve the first two of those objectives. It aims to improve regulatory certainty so that decisions that affect fresh water may be taken more quickly and with confidence.

2.4 Consistency with the Resource Management Act 1991

The Resource Management Act 1991 (the RMA) sets out the legislative framework for managing our environment. Management of freshwater resources is largely the responsibility of regional councils.

Section 32 of the RMA requires an evaluation of whether the objectives of the Action for healthy waterways Package are the most appropriate way to achieve the purpose of the RMA (and whether the proposed policies are the most appropriate way to achieve those objectives). This regulatory impact assessment provides a level of detail that corresponds to the scale and significance of the proposals.

The purpose of the RMA is to promote the sustainable management of natural and physical resources. Overall, the set of preferred approaches contained within this regulatory impact analysis are the most appropriate in assisting local authorities to carry out their functions for the purpose of achieving the RMA's sustainable management purpose.

Proposed changes that will come into effect quickly include:

- preserving the ecosystem services provided by wetlands and streams, such as flood protection, water quality, amenity, recreation, and habitat for aquatic life
- protection for the 28,934 ha of wetlands on fertile land that may not currently be protected, securing an annual value of ecosystem services of \$1.4 billion
- rules on risky agricultural practices, which will help to improve water quality and habitat quickly.

Proposed changes that will put us on a path to restore our waterways in a generation include:

- requiring councils to maintain or improve a wider range of aspects of ecosystem health, with new requirements for aquatic animals and plants, habitat, water quality and ecosystem processes
- new bottom lines to raise standards in freshwater ecosystems and allow aquatic life to flourish.

2.5 Treaty of Waitangi settlement obligations

Freshwater is a precious and limited resource, a taonga of huge significance, and is of particular importance to Māori. The Crown has a duty to protect Treaty settlements. It also has broad responsibilities to protect taonga, the exercise of tino rangatiratanga and kawanatanga, and the principles of the Treaty.

This package is about strengthening Te Mana o te Wai, and improving ecosystem health and water quality of our waterbodies, in order to provide further protection for freshwater taonga. Achieving this requires a balance between setting directive policies and rules nationally, and providing flexibility for matters to be addressed locally. There are policies in this package that will require and encourage further engagement between tangata whenua and councils and require further protection of Māori values. These policies may further contribute to upholding the intrinsic values, objectives and/or strategies associated within existing Treaty settlement commitments.

The Ministry has completed an analysis of Treaty Settlement arrangements relating to Environment obligations. We have also considered advice received from submissions.

We do not intend the proposed changes and these instruments to affect Treaty settlements and arrangements. Our analysis has identified no inconsistencies between policies and Treaty

settlements. Councils will continue to be required to comply with their Treaty Settlement obligations when implementing these policies, and the Crown needs to engage with iwi to assess if impacts may arise during implementation and, if so, manage them. However, we consider further engagement is necessary to establish conclusively that this is the case for the proposed vegetable growing exception.

Moving into the implementation phase, the Ministry must engage with iwi and hapū to ensure any potential impacts are identified early and managed appropriately. In particular, the Ministry and councils will need to engage with those iwi and hapū that have interests and settlements covering certain areas when implementing policies (for example, the exceptions for hydropower), so that implementation is not inconsistent with the settlements. Officials will also need to engage with iwi and hapū on the next stages of the Freshwater Farm Plans (FW-FP) policies, as these may result in delegation of decision-making functions under the RMA.

There are settlements that require specific consideration for how any policy changes may affect the settlement. These are the Waikato and Waipā River iwi settlements, Te Awa Tupua, and Ngāti Rangī.

Ngāti Rangai and Te Awa Tupua rohe together encompass the entire Whanganui River. Officials consider that the policies will not have direct impacts on these settlements. However, two policy areas will require ongoing engagement with iwi by the Ministry to ensure policy implementation meets settlement obligations: these areas are the hydropower exceptions and FW-FP provisions.

The FW-FP amendments to the RMA may result in delegation of decision-making functions, and the Ministry will need to ensure that this does not affect settlement arrangements. The hydropower exceptions will allow councils to set target attribute states for catchments, where there are power schemes listed, below the national bottom lines (while ensuring water quality is maintained or improved). If a council chooses to maintain the status quo permanently, this could result in a potential breach of settlement arrangements, which aim to restore the well-being and health of the river. When giving effect to the NPS-FM, however, local authorities will still have to comply with all relevant treaty settlement obligations that apply in their regions, including when considering setting a target attribute state below a national bottom line (for the purpose of an exemption).

Ngāi Tahu has statutory acknowledgements relating to three of the six proposed hydro scheme exceptions. These interests will need to be considered through implementation and engagement.

We have also assessed our policies as consistent with Te Ture Whaimana o te Awa o Waikato – The Vision and Strategy and settlements of the five Waikato and Waipā River iwi. The Vision and Strategy’s overarching purpose is to restore and protect the health and well-being of the Waikato and Waipā River. Te Ture Whaimana prevails over any inconsistent provision in the NPS-FM and prevails over a national environmental standard if it is more stringent than the standard. Therefore, potential inconsistent provisions or less stringent standards in the instruments would not apply to that catchment. We intend to engage directly with the Waikato River iwi at the implementation phase of the policies to ensure we do not undermine the intent of the strategy.

Many of the Treaty settlements also include forms of relationship redress, either within the Deed of Settlement or through a relationship agreement, which require the Ministry to engage on policy development or to operate with a “no surprises” approach. The Ministry is conscious of its ongoing obligations under those agreements, including in the next stages of implementation. Within these Deeds of Settlement, Crown Accords and Relationship Agreements, the Ministry has a commitment to monitor council performance. The Ministry will also need to consider through the implementation

processes how this can be monitored, and how councils can be held to account on their performance.

Waitangi Tribunal's report on its inquiry into freshwater and geothermal resources

On 28 August 2019 the Waitangi Tribunal issued a report on its inquiry into freshwater and geothermal resources (Wai 2358). This had a focus on whether the current law concerning fresh water and the Crown's freshwater reforms (both completed and proposed) were consistent with the principles of the Treaty.

The Tribunal's report does not comment substantially on the Government's current work programmes. The Government wants to take some time to fully engage with the Tribunal's recommendations so that it can provide a robust and well-informed response. We consider the Action for healthy waterways Package is consistent with Tribunal recommendations on a number of issues including: requirement to regional councils to 'give effect to' Te Mana o te Wai; introducing a compulsory mahinga kai value; introducing measures to protect wetlands; taking urgent action on stock exclusion and native fish habitat protection, including more stringent bottom lines; and introducing interim measures to halt degradation of waterbodies.

2.6 Policy problem and opportunity

Water quality is declining across a number of indicators in many parts of New Zealand. In providing the most recent assessment, *Environment Aotearoa 2019* found that:

"there is clear evidence that waterways in our farming areas have markedly higher pollution by nutrients (nitrogen and phosphorus), microbial pathogens, and sediment⁴ than waterways in native catchments."

Waterways are polluted by excess nutrients, pathogens, and sediment. Many have been physically changed, for example urban streams have been piped and other waterways have been dammed. Pathogens enter waterways in animal excreta, polluted stormwater and from aging, failing, sewage pipes.

Estuaries from Northland to Southland are being seriously damaged by sediment smothering the seabed and shellfish. Increasing sediment is also accelerating the expansion of mangroves.

Our freshwater fish and other species are under threat. Based on models, over 90 per cent of river length in urban areas and about 70 per cent in pastoral farming areas have nitrogen levels that may affect the growth of some aquatic species.

Land-use effects are now the dominant cause of freshwater degradation, yet there are few controls on agricultural land use to improve water quality.

Recreational water contact was cited in 2017 as a risk factor for campylobacteriosis (6482 cases), salmonellosis (1,119 cases), giardiasis (1,648 cases), and cryptosporidiosis (1,192 cases). Health professionals estimate the number of cases to be at least ten times higher than the notified cases.⁵

Our evidence, however, is limited. A recent prototype "report card" produced by the Cawthron Institute highlights the relative lack of information about aspects of water and ecosystem health

⁴ For a general description of nutrients, pathogens and sediment, see *Environment Aotearoa 2019*, p.47.

⁵ ESR 2019. Notifiable diseases in New Zealand Annual Report 2017.

other than water quality. It suggests that, on average, the ecosystem health of New Zealand's rivers and streams is impaired.⁶

Water quality and ecosystem health

Ecosystem health is an overarching theme for the Action for healthy waterways proposals. It is a broad concept that includes habitat, aquatic life, and ecological processes – as well as water quality and quantity.

Collectively, ecosystem health can be described as a “regulatory backstop” to prevent further decline in water quality generally, with a particular focus on protecting freshwater habitats.

Waterways in pastoral areas make up a large proportion of New Zealand's rivers and lakes.⁷ There are significant issues with ecosystem health in urban areas as well. Urban waterways make up less than one per cent of New Zealand's rivers and lakes. While the Action for healthy waterways Package will address some issues with urban waterways, a Three Waters review will deal more specifically with urban water issues arising from wastewater and storm water infrastructure.

Public perceptions of freshwater

In the 2018 New Zealand General Social Survey⁸ 80.2 per cent of New Zealanders stated that there was a problem with the state of New Zealand's rivers, lakes, streams, wetlands, and aquatic life. Half of these people (49.3 per cent) thought farming activities were the main cause of the issue. The second most commonly-stated cause was sewage and storm water discharges (at 16.6 per cent).

Systemic problems with interpretation and implementation – insufficient integrated management

It is a function of regional councils to control land use for the purposes of managing water quality and quantity (section 30 of the RMA). With increased pressure on water resources, councils are struggling to apply rules to water users. There is slow adoption of quantitative enforceable water quality limits in most regional plans, and slow application of these limits to resource users.

The process for giving effect to the NPS-FM is long and complex. It requires input from multiple disciplines, and reconciliation of the community's sometimes conflicting values.

RMA mechanisms for Treaty partnership with Māori in freshwater governance have not been widely utilised. Direction to engage with iwi and hapū has been poorly implemented in some regions.⁹

⁶ 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.

⁷ 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.

⁸ Available at <https://www.stats.govt.nz/information-releases/wellbeing-statistics-2018>.

⁹ Ministry for the Environment. 2017. National Policy Statement for Freshwater Management Implementation Review: National Themes Report. Wellington: Ministry for the Environment.

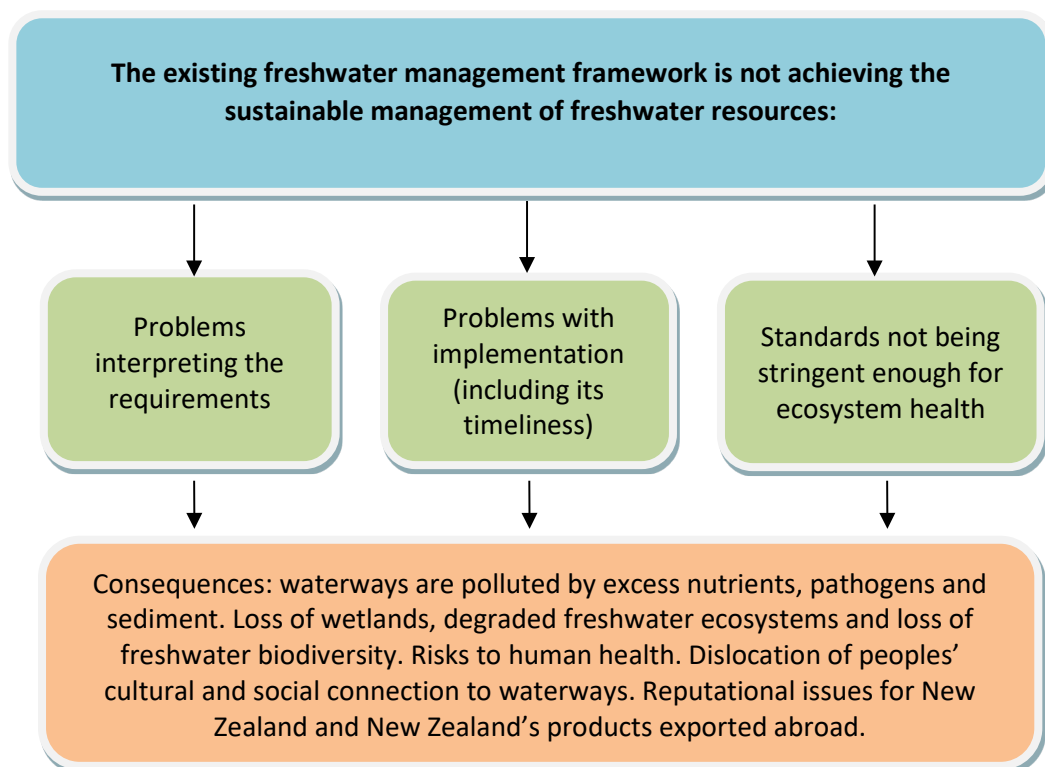


Figure 3: Overarching issues and their consequences

2.7 Objectives

The Government set the following objectives for improving freshwater management in its document *Essential Freshwater: healthy water, fairly allocated*¹⁰

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 fresh water, which affirmed that:

- fresh water 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
- 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

¹⁰ 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.

- 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.

2.8 Constraints on the scope for decision-making

Action for healthy waterways focuses on using existing tools rather than fundamentally changing the RMA. The Resource Management Amendment Bill will introduce a new planning process for freshwater which councils must use. This process will support the Action for healthy waterways programme by requiring plans to be notified by 2024 and, in normal circumstances, operative by 2026. The new planning process is also expected to improve practice in plan-making and encourage more national consistency in approach.

Freshwater allocation, both in terms of permissions to take water and to discharge contaminants to water, is not considered as part of this RIA.

Specific regulation of drinking water, stormwater and wastewater systems is also out of scope of this package. These matters are being considered through the Three Waters Review.

Some tools such as taxes on farm inputs have been ruled out by the Government in this term.

Section 3: Overall options identification

3.1 Four broad approaches were available to address the problem

Four broad approaches were available to achieve the objectives and address the problem.

Approach one: fundamentally overhaul the RMA systems to address systemic issues.

This was rejected as it would take many years to achieve the change. Also, much of what is in place and has already been developed can be built on rather than setting progress back further.

Approach two: develop a charging regime so that polluters face the true costs of polluting.

This is not feasible for most types of water pollution in most locations, as they are diffuse and highly location-specific. It is challenging to link an activity to a catchment-wide outcome and external cost.

Establishing such a regime would also likely take many years and, given the difficulty in setting accurate charges to reflect externalities, is unlikely to be widely successful at achieving the desired outcomes.

This approach may be appropriate in some locations for some types of contaminant (in particular nitrogen discharges), however, it was not considered a practical option to address the problems.

Approach three: provide Government funding to achieve the objectives.

This was rejected on the grounds of the cost to taxpayers, and the key principle that it should be polluters who pay to reduce their (unacceptable) levels of pollution in the environment – rather than transferring wealth from taxpayers to those polluters.

Experience has also shown that the approach of 'paying polluters not to pollute' can create perverse incentives and lead to unintended consequences that make such approaches unsustainable.

Approach four: work within the existing legislative framework to enhance regulatory responses and make targeted systemic changes where appropriate.

This is the preferred approach, as laid out in the Action for healthy waterways Package. It is discussed below, and in detail in the main body of the RIA. Many sub-options within specific policies addressing particular issues are assessed in relevant sections of the RIA.

Within the preferred broad approach, the Water Taskforce identified three regulatory tools to address the problem:

1. changes to the NPS-FM
2. the creation of a new NES
3. the creation of new section 360 regulations.

Together these can be used 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 balance the need for strong national direction while ensuring that councils have sufficient flexibility to adapt to local circumstances.

3.2 Criteria for assessing policy options

Each policy option considered was assessed using the following general criteria.

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

Timeliness: *prevents further degradation of fresh water in New Zealand in a timely fashion. Note: there may be a trade-off between the timeliness of an option and its efficiency.*

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

Efficiency: *is cost-effective. Achieves maximum benefits with minimum wasted effort or expense.*

Principles of the Treaty of Waitangi: *appropriately provides for the principles of the Treaty of Waitangi. Promotes partnership and protects Māori rights/interests and relationships with their taonga. Due to obligations imposed on the Crown by the Treaty, there is a minimum standard that must be met with this criterion.*

Te Mana o te Wai: *puts the well-being of the water first, and promotes values-based, holistic management to sustain the well-being of the people. Acknowledges mātauranga Māori.*

3.3 Key policy recommendations

As shown in Table 1 overleaf, key policy recommendations in the Action for healthy waterways Package can be divided up into 4 broad categories.

Table 1: Action for healthy waterways Package

1

Quick regulatory interventions

To prevent further loss and degradation of key fresh water habitats and to take immediate action on high risk farming activities

Until new regional plans are in place we need national regulation targeting high risk activities

Helps deliver: Stopping further degradation. Making material improvement within five years.

Key recommendations

New regulations for:

- Wetlands protection
- Streams protection
- Preserving connectivity of fish habitat
- Require stock exclusion on low slope land (mapped at 10 degrees)
- Control of risky winter grazing practices
- Provide interim intensification controls - amended to allow more flexibility and expansion of some irrigation
- Riparian setback - minimum 3 metres
- Set minimum standards for stockholding areas
- 200kg/year limit on nitrogen fertilizer per hectare on pastoral farms
- As farm plans are rolled out many consenting requirements driven by the proposed regulations will be removed

Amending existing regulations for:

- Requiring real-time telemetered data on significant water takes

2

Improved regional planning process

To amend planning processes so that freshwater plans will be developed more quickly

Current regional planning is too slow, and we need faster regional plan development to get action underway and restore waterways

Helps deliver: Restoring waterways within a generation

Key recommendations

- Expected report back in April 2020 (currently before the house)
- New faster, more consistent planning process
- Extend time-frames for councils to deliver plans to implement NPS 2020
- Councils must have new plans notified by 2024 (at which point they will have legal effect)
- Greater participation of Māori

3

Role of farm planning

To enable development of mandatory and enforceable freshwater farm plans in the future

Many farms need solutions tailored to the farm and landscape. Some key sources of contamination are not covered by regulation. Government consulted on mandatory and enforceable farm plans.

Helps deliver: Making material improvement within 5 years. Restoring waterways within a generation

Key recommendations

- Supplementary Order Paper to make freshwater modules of farm plans enforceable
- Clarify that as farm plans are put in place some of the quick regulatory interventions will no longer be required (reduce need for resource consent)
- Implementation phased over a longer time period, working closely with councils to prioritize

4

Firm direction for councils

To set up the system to restore waterways over a generation

Existing NPS-FM has big gaps (eg, sediment). We will prescribe environmental outcomes councils must incorporate in plans by 2025 and implement over time to restore waterways

Helps deliver: Restoring waterways within a generation

Key recommendations

Councils must give effect to:

- Maintain or improve water quality
- Preserve hydropower flexibility and output to maintain security or supply
- Strengthen and clarify Te Mana o te Wai
- Two new compulsory values: Mahangi Kai & protection of threatened species
- Other technical clarifications including direction on setting environmental flows

New or amended attributes:

- New Phosphorus attribute (DRP) - amended so it doesn't set one national bottom line
- N toxicity – strengthen bottom line to **95%** protection of species
- Require councils to manage nutrients as needed for all ecosystem health attributes, no national bottom line (other than toxicity) and concentrations can be tailored to local conditions
- Sediment - two new attributes
- Fish populations - new attribute
- New attributes for dissolved oxygen in rivers and lakes
- New attribute for lake plants
- MCI - strengthen current bottom line
- Swimming - strengthen current bottom line to protect people's health when and where people want to swim

All other existing attributes remain

Exemptions for matters of national importance:

- Hydroelectricity generation
- Fresh vegetable growing areas in Pukekohe and Lake Horowhenua catchments

Existing mandatory values remain (ecosystem health and human health)

Section 4: Impact analysis of the package

In order to form a view on the likely impact of policies that address water quality issues it is necessary to consider to what degree the proposed policies differ from current practice, how freshwater environments will be impacted by the implied new actions and how land users may respond to the new policies. There is uncertainty about each of these elements.

The environmental impact was based on analysis conducted by NIWA, using modelled data and well-known modelling techniques. The uncertainty here arises because modelled environmental attributes may depart from those that exist in reality (there are other sources of uncertainty too, for example, about biophysical processes). There was uncertainty about the degree to which the freshwater package departs from current policies because most regional councils have yet to finalise plans that respond to the NPS-FM (2017). A lack of information about current practices on farms, farming practices and farm profitability, and the inevitable uncertainty about behavioural responses, was a limiting factor on the economic impact assessment. Informational limitations such as these are not uncommon in environmental and economic impact analysis.

While the impact assessment was completed under a very tight timeframe, having more time would not have reduced these key uncertainties. The limitations to the analysis reflect a lack of data, not the omission of relevant available information from the analysis.

Inevitably judgements had to be made and the impacts reported in this paper reflect officials' best estimates of the key elements, based on the information available. Given these unavoidable constraints, the findings reported in this paper should be assumed to have a 'medium' level of uncertainty.

This overall impacts section describes:

- the baseline from which impacts are assessed, focusing on the marginal effect of the new policies (ie, other than what would have already needed to occur under existing requirements)
- the benefits expected: environmental, social, cultural, and economic
- the costs expected: for the rural sector, regional councils, and social and cultural impacts
- the overall net benefits compared to costs.

4.1 Baseline for the overall impact analysis

The key part of the baseline for this impact analysis is what is already required in the NPS-FM.

The Ministry has considered both the current environmental situation and the situation as if current legislative requirements (including the environmental outcomes required by the existing NPS-FM and recent changes to the Climate Change Response Act) are achieved.

An important issue is how time and the changing environment are reflected. The environment is not static – the required reduction in pollution load differs depending on when mitigation starts.

Councils are required to set target states that meet the requirements of the existing NPS-FM. However, regional councils and communities have discretion to decide:

- how they achieve desired outcomes
- when they achieve desired outcomes.

Where communities are aspirational for water quality, the marginal impact of the Action for healthy waterways package will be relatively low. Councils in these areas will already be working actively

towards meeting NPS-FM requirements and achieving bottom lines set as part of the Action for healthy waterways Package. In some parts of New Zealand (for example, the Tukituki River catchment in Hawke's Bay), engagement with the community has produced requirements for water quality that are more stringent than those proposed in the Action for healthy waterways Package.

4.2 Environmental benefits

Environmental benefits will not be immediate. It will be easier to achieve good ecological health if we take action now. Delaying action will mean more ecosystems will pass tipping points, locking in degraded conditions.

It takes time for nutrients and pathogens to work their way out of freshwater sources. We are aware of analyses of lag times in the Waikato, Horizons, and Southland regions.¹¹

Sediment

Lower levels of sediment will result in clearer waters and the recovery of freshwater ecosystems that have been smothered.

In monetary terms, the quantifiable benefits of reduced sediment are estimated to outweigh the costs when calculated over 50 years, even accounting for the fact that many benefits are difficult to quantify but could be large. The ratio of monetary benefits to costs is estimated to be between 1.02 and 4.5 to 1, depending on the discount rate and carbon valuation measure used.

Action for healthy waterways benefits will complement benefits from climate change mitigation actions

Work by Landcare Research found that reductions in greenhouse gas emissions, and phosphorus, nitrogen and sediment levels in water are greater if greenhouse gas emission strategies and those to reduce phosphorus, nitrogen and sediment in water are implemented together.¹² This is partly because action to reduce emissions or pollutants can be targeted to where there is most benefit. Any increases in forestry will have significant benefits for both water and climate change objectives.

4.3 Social benefits

The Action for healthy waterways Package is likely to improve New Zealanders' well-being and life satisfaction while protecting a strong cultural identity associated with a high-quality natural environment.

Positive social impacts for the well-being of New Zealanders

Expected positive social impacts include:

- **reduced risk to human health** through improved drinking water quality, and reduced exposure to pathogens when swimming, boating, rafting or kayaking. The value New

¹¹ For more information on known lags, please refer to:

- *Estimating Time Lags for Nitrate Response in Shallow Southland Groundwater:*
<https://www.es.govt.nz/repository/libraries/id:26gi9ayo517q9stt81sd/hierarchy/environment/science/science-summary-reports/estimating-time-lags-for-nitrate-response-in-shallow-southland-groundwater.pdf>
- *Groundwater lag times in the water discharges from the Whanganui, Rangitikei and Manawatu catchments:*
<https://www.envirolink.govt.nz/assets/Envirolink/1419-HZLC103-Groundwater-lag-times-in-the-water-discharges-from-the-Whanganui-Rangitikei-and-Manawatu-catchments.pdf>
- *Estimation of lag time of water and nitrate flow through the Vadose Zone: Waikato and Waipa River Catchments:*
https://www.waikatoregion.govt.nz/assets/PageFiles/37532/3%20-%20Final%20Draft%20LincolnAg_Unsaturated%20Lag%20time%20in%20the%20Waikato%20catchment.pdf

¹² Landcare Research (2020) *Impacts of climate and freshwater policies: Literature review*

Zealanders place on the improved swimmability resulting from *E. coli* reductions from fencing out stock has been estimated at \$883 million.¹³ The value of avoiding drinking water contamination can be significant. As an example of the types of costs, a study of the Havelock North outbreak estimated costs to be \$21 million, or over \$4,100 per household¹⁴

- **improved environmental amenity** (the human enjoyment of the natural environment, including visual appearance, smell and sense of appreciation of naturalness) which assists with human mental and physical well-being and can promote a sense of identity or belonging. A Mental Health Foundation of New Zealand survey found that 95% of respondents said that spending time in nature during the week made them feel good
- **increased opportunities for social and recreational purposes** through more rivers being safe for recreation (boating, kayaking, rafting, fishing, swimming), and better fishing opportunities from improved prevalence of fish species. A survey estimated that if algal blooms were eliminated there would be a 650% increase in recreational activity (in terms of days spent) at Lake Rotorua and a 237% increase in the rest of the Bay of Plenty¹⁵
- **improved cultural opportunities** arising from water quality and ecosystems being maintained or restored to levels more consistent with Te Mana O Te Wai, cultural uses of water and water-based resources (such as mahinga kai), and greater recognition of kaitiakitanga and mātauranga Māori. The policies in the package promote greater participation of Māori in freshwater management. More involvement allows for Māori to provide input and inform councils about their values, measures of well-being and mātauranga, which is critical to actively protect Māori interests and support intergenerational transfer of knowledge
- **improved social licence for farming**, as this package assists other measures to restore farming to being seen as an environmentally responsible industry in the eyes of the wider community, and farmers sound managers of natural resources (which could alleviate some of the mental pressure faced by farmers)
- **increased demand for a higher-skilled and larger rural professional workforce**, which over the long term is likely to contribute to a net positive impact on employment.

4.4 Impact on Māori values

Upholding Te Mana o te Wai will mean placing a higher value on our waterways. This involves better recognition of the range of values that freshwater ecosystems provide, including Māori values and attributes. New threatened species and mahinga kai compulsory values will mean that these aspects are managed more deliberately.

A Te Ao Māori Framework was used to assess the cultural impacts of the Action for healthy waterways Package on Māori. The findings were that the proposals overall enhance Māori values. A key qualifier is that this outcome is reliant on councils enacting participation and providing support for partnership arrangements.

¹³ Grinter J and White J (2016) National Stock Exclusion Study: Analysis of the costs and benefits of excluding stock from New Zealand waterways. MPI.

¹⁴ Moore D, Drew R, Davies P and Rippon R (2017) The Economic Costs of the Havelock North August 2016 Waterborne Disease Outbreak. Report prepared for the Ministry of Health. Sapere Research Group.

¹⁵ Bell B and Yap M (2004) The Rotorua Lakes: Evaluation of less tangible values. A report prepared for Environment Bay of Plenty. Nimmo-Bell.

The Action for healthy waterways Package's proposed strengthening of Te Mana o te Wai supports the whakapapa between tangata whenua and the environment, by requiring fresh water to be first managed for its inherent qualities before it is shared for other uses.

The policies to strengthen the Māori value of mahinga kai promote greater participation of Māori in freshwater management. Greater involvement allows for Māori to provide input and inform councils about their values, measures of well-being and mātauranga, which is critical to actively protect Māori interests and support intergenerational transfer of knowledge. Te Ao Māori Framework assessment found that, in comparison to the NPS-FM, the proposal provides direction compelling regional councils to manage freshwater for its mahinga kai value.

4.5 The benefits for New Zealand's "green" premium

New Zealand's "green credentials" are important to our global competitiveness (access to particular markets and the ability to charge or uphold a "green premium" on products sold to eco-conscious consumers) across both the primary and tourism sectors.

The Ministry for Primary Industries has identified that Action for healthy waterways proposals will likely reinforce existing consumer views, both foreign and domestic, about the 'clean and green' reputation of New Zealand and New Zealand products, and thus support willingness to pay a freshwater regulation premium.

Lincoln University's Agribusiness and Economics Research Unit conducted a series of willingness-to-pay studies in key export markets looking at the value of certain aspects of key export commodities. The findings indicate that consumers are willing to pay a premium for environmentally-sustainable production, and water quality protection. For instance in the key United Kingdom lamb market, consumers were willing to pay an additional 6% for production that minimised water pollution, while dairy consumers in China were willing to pay an additional 16%.

Reviews of recent research reports by New Zealand Trade and Enterprise shows countries that have taken distinct steps to improve their environmental performance have as a result seen improved brand performance and preference among consumers. Place brands have to be realistic and accurate in order to be successful, and government action and governance play a crucial role in supporting and maintaining the truth and authenticity of our country's reputation and brand.

The RepTrak Index – which surveys G8 countries – also tells us that the environment was the most important factor for consumers in 2019. New Zealand's strong reputation continues to be underpinned by excellent perceptions within the 'Appealing Environment' dimension (top ranked of 55 largest countries by GDP).

A study from the National Bureau of Economic Research notes that "...a 1% net increase in perceived positive influence raises exports by around 0.8%." So how people feel about a country, its values and approach to key global issues, determines where they spend their money, which directly impacts on New Zealand's prosperity.

4.6 Costs to the rural sector

The estimated impact on farm profits of the Action for healthy waterways Package (excluding a net positive profit impact due to the sediment policy and costs to councils) is a reduction in farm profits of \$113 million per annum when full compliance occurs.¹⁶

Of the three areas that contributed to this adverse impact, stock exclusion costs dominate.

Nitrogen toxicity

It is important to note that although there are two different proposed options for levels of nitrogen toxicity, evidence indicates the difference in costs to the rural sector will be insignificant.

The Ministry consulted on its preferred option, which is for a dissolved organic nitrogen (DIN) level of 1, with exemptions where councils are meeting bottom lines for other ecosystem health attributes. The Ministry is also recommending strengthening the national bottom lines for nitrate and ammonia toxicity to provide 95% protection.

After discussions at ministerial level, a level of 2.4 for DIN has been proposed as an option.

Independent research was commissioned on the impacts of the Ministry's preferred option. The findings of independent economic modelling of the impact of on-farm mitigations to achieve the proposed nitrogen requirements indicate that these could be met without requiring land-use change in most regions. Land-use change was indicated primarily for Canterbury and Waikato.

In terms of impacts on farm profits, which includes mitigation costs and reduced profits from changing land use, the most affected regions were Canterbury, Waikato and Otago. Due to the likelihood of variability in impacts for individual catchments, some catchments within relatively unaffected regions could also be materially affected.

One key limitation for this research is that it is not able to reflect the unique solutions available to individual farms. The effectiveness and cost of available options to each farm are likely to be very farm-specific.

The other limitation for this research is that it does not reflect the option preferred by Ministers. However, the Ministry does not consider this to be a key limitation, on the basis that we understand the difference in impacts between the two options would be minimal.

Impact of nutrient reductions on commercial horticulture

It is also important to note the implications of a new proposed exemption following consultation.

Concerns were raised during consultation about the potential negative impacts on domestic vegetable production.

Evidence indicates that it will not be practicable for growers to reduce nutrients to meet national bottom lines in areas such as Pukekohe and Horowhenua without compromising vegetable production in those areas. On this basis it is being proposed that regional councils be allowed to maintain freshwater below national bottom lines in catchments where the bottom lines would require nutrient reductions and compromise vegetable production.

This proposed exemption is not the Ministry's preferred option. The main benefit would be that vegetable production will not be compromised in established areas of horticulture. One cost would

¹⁶ We omit the positive impact on profit from the sediment policy because the land use changes that drive this result may have occurred as a result of recent carbon-emissions related legislative change.

be that waterways in established areas of horticulture would not be protected from high levels of nutrient contamination from ongoing intensive vegetable growing. Another cost would be a lost opportunity to encourage the spread of less intensive vegetable growing across different regions of New Zealand. Notwithstanding these costs we note that, where the exemption applied, the regional council would still be able to set other requirements to achieve ecosystem health.

Impact on the rural sector of three key policies: nitrogen toxicity, stock exclusion and farm plans

Modelling the impact of the Action for healthy waterways Package on New Zealand's economy shows that costs will generally be very low across regions – the impact on aggregate farm profits is 0.0% for 13 out of 16 regions for dairy, and 0.0% for all 16 regions for sheep and beef. The modelled impacts show considerable regional variation. The key points are shown in Table 2 overleaf.

Table 2: This table shows the impact on the rural sector of three key policies in the Action for healthy waterways Package - nitrogen toxicity, stock exclusion and farm plans					
	Impact on aggregate farm profits million \$ per annum	Impact on aggregate farm profits in two sectors % p.a.		Change in land-use % change	
		Dairy	Sheep and Beef	all sectors	estimated direction of change
All NZ	-113.9	0.2%	0%	-0.3%	
Northland Region	-5.1	0.0%	0%	0.0%	
Auckland Region	-1.3	0.0%	0%	-0.1%	S/B to forestry
Waikato Region	-11.3	0.3%	0%	-0.4%	Dairy to forestry
Bay of Plenty Region	-1.7	0.0%	0%	0.0%	
Gisborne Region	-1.5	0.0%	0%	0.0%	
Taranaki Region	-3.4	0.0%	0%	0.0%	
Manawatu-Wanganui Region	-8.6	0.0%	0%	0.0%	
Hawke's Bay Region	-4.5	0.0%	0%	0.0%	
Wellington Region	-3.1	0.0%	0%	0.0%	
Tasman Region	-0.8	0.0%	0%	0.0%	
Nelson Region	0.0	0.0%	0%	0.0%	
Marlborough Region	-1.4	0.0%	0%	0.0%	
West Coast Region	-1.7	0.0%	0%	0.0%	
Canterbury Region	-36.9	0.9%	0%	-1.7%	Dairy to arable
Otago Region	-18.4	0.2%	0%	0.0%	
Southland Region	-13.1	0.0%	0%	0.0%	

4.7 Costs to regional councils

Councils currently spend \$310 million per annum on freshwater management.

The total per annum cost of implementing all new freshwater requirements (both NPS-FM and Action for healthy waterways) is estimated at \$135 million. The policies with the greatest cost to councils are shown in Table 3 below.

Table 3: Estimated annual costs of all new freshwater requirements for regional councils nationally

New freshwater requirement for Regional Councils (both current NPS-FM and proposed)	Additional national annual cost
Directing Clearer Ecological Outcomes for River Flows	\$31,500,000
Measurement and Reporting of Water Takes	\$20,200,000
Improving Water Quality through Better Farm Practice	\$19,100,000
Maintaining or Improving Water Quality	\$8,300,000
Sediment Management	\$7,600,000
Agricultural Intensification	\$6,500,000
Intensive Winter Grazing on Forage Crops	\$5,600,000
Stock Exclusion	\$5,000,000

The \$31.5 million cost of directing clearer ecological outcomes for river flows comes largely from higher staffing costs for the planning and monitoring exercises relating to improving ecological outcomes from river flows and water levels. Improving water quality through better farm practice is estimated to cost \$31 million per annum nationally, which reflects the costs of auditing farm plans.

We expect that some councils will face higher costs than others – particularly Canterbury, Southland and Waikato.

Financial pressures are likely to be offset over time by the benefits of erosion management. Modelling of Action for healthy waterways Package sediment proposals estimates benefits of erosion reduction at \$51-154 million, and the benefits of avoided dredging of hydropower reservoirs are estimated at \$19-22 million annually. The improved visual clarity of waterbodies is estimated at \$334 million.

4.8 Economic impacts on Māori

Economic impact assessment used Māori collective land holdings (post-settlement land holdings and Māori trust land holdings) as proxy for the Māori economy. Impacts for Māori collective landowners in the rural sector are similar to those set out above in the Costs to the rural sector section.

The findings indicate that the Action for healthy waterways Package may restrict Māori economic development in regard to intensification of current land use. They also indicate there are economic development opportunities in horticulture and forestry (particularly tree crops, vines and tree plantations). It will be important to ensure the regulations are flexible enough to enable whenua Māori to be brought into more productive uses, in a way that doesn't worsen water quality.

As Māori are disproportionately the holders of underdeveloped land, interim intensification controls are likely to have a disproportionate effect. However, allowing a 'gold rush' of change before new council plans come into effect is likely to increase over-allocation and make it harder to provide for Māori development aspirations. The controls create some short-term impediments, but in the long term are considered to protect Māori development interests better than the absence of controls.

4.9 Negative social impacts associated with short-term change

Although there are some negative social impacts associated with Action for healthy waterways, these should all be seen in the context of existing requirements and proposed changes in other policy areas (for example, climate change). In other words, much of the change attributed to the package is due to other initiatives or programmes (for example, the One Billion Trees programme).

The main negative social impacts, which are all associated with short-to-medium term change, are:

- **job losses** – these are not expected to be significant at a regional or national scale, but may be significant in some catchments as land use changes. Communities affected by job losses may experience a reduction in total population numbers and, over time, in local services available (eg, schools, health services, self-organised community activities)
- **mental health pressures**, particularly for the dairy sector – from uncertainty about change, including financing arrangements
- **stress levels for regional council staff** – due to the likely increase in workload.

4.10 Overall net benefits of the Action for healthy waterways Package

The overall theme of this impact analysis is that the Action for healthy waterways Package has a net benefit.

The significant, lasting benefits of the Action for healthy waterways Package over the long term will exceed the costs of transition and implementation.

The Action for healthy waterways Package is designed to deliver on the Government’s objectives of halting further declines in freshwater and ecosystem health, making material improvements in five years, and restoring past damage over a generation.

It does so by ensuring long-term direction for regional planning is adequate to protect ecosystem health, by regulating harmful activities, and introducing a requirement for mandatory freshwater modules in farm plans.

The Action for healthy waterways Package will improve New Zealand’s environmental outcomes, by:

- speeding up the implementation of freshwater reforms and bringing in rules to address particularly high-risk practices
- requiring councils to manage a wider range of impacts on waterways, and to work with their communities to develop long-term objectives for their waterways.

Improvements to water quality and ecosystem health will have benefits for New Zealanders’ well-being generally and for Māori values, as well as economic benefits for tourism and the “green” premium.

When assessing the net impact of the Action for healthy waterways Package, the cost saving to future generations of healthier freshwater ecosystems and access to clean water must also be taken into account.

As shown in Table 4 overleaf, which looks at net impacts of key proposals, the Action for healthy waterways Package has a large estimated net benefit.

Table 4: Net impacts of the Action for healthy waterways Package

Monetised impacts	Annual impact by 2050 \$m p.a.	PV of cumulative impact by 2050, 3% discount rate \$m	Comments or key assumptions
Difference between monetised marginal benefits and costs \$m	193 [^]	3,783	This is the net benefit of the package
Monetised marginal benefits attributable to the package \$m	359 [^]	7,031	These are the marginal benefits of the package
Swimmability benefits from stock exclusion	138	2,366	Reduced human health risks
Water clarity benefits from stock exclusion	13	104	
Ecosystem health benefits of macroinvertebrate bottom lines	79	661	This estimate assumes Action for healthy waterways provides 50% of total benefits with the 2017 NPS-FM providing the rest
Wetland ecosystem services	450	3,900	
Monetised marginal costs (profit impacts) attributable to the package \$m	-166 [^]	-3,248	These are the marginal costs of the package
Costs for farmers			
Stock exclusion costs:	-61	-1,092	Outlays begin in 2023 and marginal impact ceases by 2050
- of which capital expenditure (amortised over 25 years using a 3% real interest rate)	-44	-788	
- of which opportunity cost (foregone profit due to land from which stock is excluded)	-17	-304	
Farm plan costs (amortised purchase price over ten years)	-22	-253	assumed marginal impact from 2025 to 2035

Mitigation costs from reducing nitrogen pollution due to toxicity policy	-30	-217	Includes the net opportunity cost of land use change. This is in addition to the cost of reducing N for the 2017 NPS, estimated to be \$3,579 million
Telemetry-related costs	-10	-196	
Costs for local government			
Additional costs for local authorities	-76	-1,490	
Sediment policy (if assessed in isolation from carbon emission reforms) \$m^[1]	297	5,869	This is the net benefit of the sediment proposals
Water clarity benefits from sediment policy	46	451	
Savings from reduced dredging	20	392	
Avoided erosion cost	4	68	
Net profit impacts assuming land use change and carbon revenues	253	4,958	This is the upper limit of net benefits.

^ this value is the average annual impact implied by the PV, assuming a 3% discount rate and an assessment period to 2050

^[1] The sediment policies will likely result in some land-use change (hill country pasture to forestry), but amendments to carbon emission-related legislation will incentivise this to occur already. Because it is difficult to differentiate the effects of these two policies, the benefits of sediment policies – if they are considered in isolation from carbon legislation – are shown in the table but are not included in the net benefit assessment of the package.

Section 5: Overview of implementation approach and operation

The Ministry is developing an implementation support strategy for the Action for healthy waterways Package.

Gazettal of these policies is anticipated in mid-2020. Successful implementation will require:

- substantial investment and action by a range of stakeholders over the next five years
- support to address capacity and capability constraints for councils and Treaty partners
- targeted support for landowners and infrastructure managers making changes to improve freshwater outcomes on the ground.

Regional councils will need to begin implementing the provisions in the new NPS-FM. They are required to have notified their plans by 2023. While some provisions will simply clarify existing requirements (eg, clarification about the treatment of hydroelectric infrastructure), other changes will require regional councils to modify their planning approaches in consultation with local iwi and communities (eg, to give effect to Te Mana o te Wai).

The new NES-Freshwater, section 360 regulations and other RMA amendments will take immediate effect following gazettal. However, people will need to comply with different policies at different times. In some cases, requirements will be phased in over time, starting with certain priority catchments or groups of land users (eg, a phased approach to stock exclusion requirements).

Implementation support funding has been allocated through the 2019 Sustainable Land-Use budget package. Of the \$24 million allocated directly to freshwater implementation over the next four years, \$12 million will support councils and other stakeholders to implement the new NPS-FM and \$12 million will support the successful implementation of farm plans and uptake of good management practices. Additional funding from this package will support targeted efforts in specified at-risk and exemplar catchments and other complementary initiatives more generally related to sustainable land use.

The Ministry is developing engagement processes with councils, Treaty partners and the primary sector. This involves scoping and prioritising support initiatives to assist successful implementation. It is an ongoing and collaborative process that will allow problems to be identified as they arise, and will be adaptable to changes in stakeholder needs. The Ministry is also developing plans for monitoring and evaluation that will allow an adaptive management approach to be taken regarding implementation support. We will also continue to look for appropriate opportunities to engage with, and provide communications material for these audiences to ensure that they are well-informed on how the Action for healthy waterways Package is being put into practice.

Adaptive management underpins our approach to implementing the package. This approach is essential to successful implementation due to varying issues of capacity, capability and differing environmental situations across the country. An adaptive management approach allows us to be flexible, work iteratively and collaboratively to ensure outcomes are achieved in the most effective and efficient ways possible.

Part II of this analysis provides more detail on the Package's proposed implementation.