
# Benefits and costs

This information sheet is one of a series outlining the requirements as part of a new approach to managing the health of freshwater in New Zealand. These actions will see us start making immediate improvements where needed and set us on a path to healthier freshwater within a generation.

These requirements have been developed following consultation with New Zealanders. In 2019, the Government consulted on new regulations and a new risk-based approach for improving farm environmental practices through mandatory farm plans in the document *Action for healthy waterways*. The Government asked for feedback on proposed regulations – an updated National Policy Statement for Freshwater Management, new National Environmental Standards for Freshwater, and regulations under section 360 of the Resource Management Act 1991. To support the decisions, officials carried out an extensive programme of impact analysis supported by dozens of expert reports from New Zealand's leading research institutes, universities, and private sector firms. As a result of this analysis, the more than 17,500 submissions, and in light of COVID-19, the Government has made several changes to what was proposed.

This information sheet summarises the benefits and costs of the new requirements. You can find more information, including Cabinet papers, the Regulatory Impact Analysis summary, and underpinning analysis on the Ministry for the Environment's website at www.mfe.govt.nz/action-for-healthy-waterways.

## Overview

The significant, lasting benefits of improvements to freshwater ecosystem health will exceed the costs of transition and implementation over the long term.

It is not possible to put a dollar value on all the benefits of healthy freshwater, such as the value of protecting taonga or ensuring endangered species do not become extinct. However, some benefits are more tangible and can be quantified. Below we report the estimated dollar value of these benefits – for example, the role of wetlands in reducing flood risk and filtering water, and reduced rates of sickness arising from polluted water.

It is also challenging to assess costs, because the actions required will be different in each urban area and on each impacted farm in different regions that are affected and due to the variability of catchments across the country. The costs are expected to be highest in areas that have experienced more agricultural intensification in recent years such as Canterbury, Waikato, and Southland.

The benefits and costs referred to here are the marginal impacts of the package. They are additional to the benefits and costs that accompany the existing requirements of the National Policy Statement for Freshwater Management (NPS-FM). For example, many urban councils need to invest significant amounts of ratepayers' dollars to upgrade wastewater systems to meet the 2017 NPS-FM. Many farmers have invested in, or will need to invest in, fencing and planting streams, erosion control, and other measures because of pre-existing requirements. These changes are underway already and will not be impacted by the package.

The Government has quantified the marginal benefits and costs to the extent possible using the best methods and publicly-available data. Critical aspects of the analysis have been independently peer-reviewed. The economic costs were peer reviewed by Sense Partners, Infometrics, and Star Economics (Australian-based). Star Economics also reviewed the benefits assessment. Details are set out in the Regulatory Impact Assessment and background reports found on the Ministry for the Environment's website.

The net benefit – that is the benefits minus the costs – is estimated at positive $193 million per annum over 30 years (or a total net benefit over 30 years of $3.8 billion measured as a Present Value or 'PV'). To put the annual net benefit in context, New Zealand's annual GDP is approximately $300 billion.

After careful consideration of the impact analysis work, the feedback provided in submissions, and in light of COVID-19, changes were made to the package since consultation. These changes have reduced the costs of the package by an estimated $3.4 billion (PV), while still achieving the major environmental benefits of the package.

Some of the timeframes for the new regulations have also been shifted – farmers, councils, and communities will be given an extra year to act on several important parts of this package. With most changes required from 2023 onwards.

## Benefits

Improving freshwater provides many benefits such as opportunities to achieve added value in consumer offerings for the primary sector and for tourism as that industry recovers from COVID-19 disruption, and enhanced human health and other benefits for New Zealanders' wellbeing. Recreational opportunities are enhanced and important cultural values are upheld.

Protecting wetlands means the valuable services, such as flood protection and water quality improvements provided by these waterbodies, are retained for current and future generations. Monetised benefits will come from reduced costs of floods, and less spending on engineering infrastructure such as flood barriers and dams. Excluding stock from waterways means reduced health risks for activities such as swimming, which are estimated to reduce public health costs by $138 million per year.

Improving water clarity and protecting freshwater species increases recreational opportunities. The value that people place on this, signalled through their willingness to pay for improved freshwater and freshwater recreation activities, is estimated as $79 million per year.

Taking action now will avoid higher costs in future, by stopping ecosystems passing tipping points.

The changes made from this package will also create a real step-change in farming practices to improve freshwater outcomes for all of New Zealand. As well as the ecological benefits, this will also increase the economic value of New Zealand's 'green' brand. This provides greater international recognition of New Zealand's food and fibre being produced with improved environmental outcomes and increases our value offer in international markets.

There will also be jobs created in rural communities to help support the changes required and improvements in freshwater. This can range from helping with riparian planting, fencing of waterways, substantive conservation projects, to farm advisory services. The Government has invested in creating jobs in the primary sector and rural communities, as well as improving environmental outcomes. For example, Budget 2020 announced significant funding which will help transform the primary sector workforce and create jobs which will improve environmental outcomes.

There are many benefits that cannot be given a dollar value or 'monetised' but the table on page 5 sets out benefits where a figure can be estimated.

## Costs

The costs that have been monetised differ from region to region and consist largely of costs borne by regional council ratepayers and direct farmer costs.

There is an estimated 32,000 km of waterways that will have to be fenced by 2025. The majority of this is on sheep and beef farms and will cost an estimated $61 million a year, made up of both the costs of fencing and the opportunity cost of setting aside three metres of land alongside waterways. Budget 2020 announced significant funding which will help support on the ground change, including riparian planting and fencing.

The regulations will over time require all farmers to have a freshwater module in a farm plan. Farmers will be required to have a suitably qualified person to sign off on a farm plan, and could hire professional help for planning if they choose. Farmers will also have to pay for regular audits.

Across New Zealand, meeting the strengthened nitrogen toxicity bottom line will mean costs to farmers to invest in mitigation or reduce output. In some cases land-use change could be used to reduce nitrogen output.

A small number of farmers will have to pay costs to obtain resource consents for winter grazing, stock-holding areas, feedlots, or intensification but because the number of consents needed are small and vary significantly between regions, these are not included in the national cost estimates set out in the table on page 5.

Some elements of the package require changes in farm practices only in some regions. The combined cost of requirements for nitrate toxicity, stock exclusion, and farm plans is estimated to be $114 million per annum by 2050 across all of New Zealand. Canterbury ($37 million), Otago ($18 million), Southland ($13 million), and Waikato ($11 million) will be the most affected over the next 30 years.

The primary sector may respond to the changes from this package by diversifying with new types of products and new land uses. Innovations and advances like this would lessen the impacts of the package that have been estimated.

These reforms impact both urban and rural areas. The package potentially impacts on new 'greenfield' urban development (rather than infill development). Urban and infrastructure developers and operators may face costs to comply with the regulations and long-term policies that emerge from regional council planning processes. For example, the stream loss and sediment policies will likely increase development costs for greenfield sites in regions that do not already have adequate protection measures. The cost of interventions to meet more stringent sediment reduction requirements has been estimated at approximately $2000 per section, in regions without adequate measures. Not all costs to urban centres have been monetised.

The 2017 NPS-FM also impacts on urban communities, meaning many communities face costs related to upgrading wastewater systems. For instance, upgrades to wastewater plants are expected to require capital expenditure of between $1.4 to $2.1 billion. In addition, the Government's ongoing Three Waters Review will contribute to ongoing improvements in urban freshwater and the provision of safe drinking water.

Costs for regional councils and unitary authorities have been estimated at $76 million a year, with the highest costs expected to come from river flows policies, enforcing the freshwater module of farm plans, and water-take measuring and reporting. The highest proportion of these costs is expected to fall on Canterbury, Waikato and Otago because of the higher level of activity required in those regions to address issues arising from intensive dairy farming.

## Benefits and costs

| Benefits | Annual impact by 2050 $million | Present value (PV) of cumulative impact by 2050, $million |
|---|---|---|
| Reduced risk of infection for swimmers | 138 | 2,366 |
| Water clarity benefits – value of clear water for recreation | 13 | 104 |
| Ecosystem health benefits of Macroinvertebrate index bottom lines (beyond improvement expected from the current NPS-FM) – assessed from research on willingness to pay for improved freshwater[1] | 79 | 661 |
| Wetland ecosystem benefits – assumes that replacing lost wetlands with infrastructure like flood barriers and dams would cost about $50,000 per hectare of wetlands lost per year | 450 | 3,900 |
| **Monetised benefits attributable to the package ($million)** | **359[2]** | **7,031** |
| **Costs** | **Annual impact by 2050 $million** | **PV of cumulative impact by 2050, $million** |
| Stock exclusion costs – cost of fencing and opportunity cost of land that cannot be grazed due to setbacks from waterways [3] | -61 | -1,092 |
| Farm plan costs – cost of plan development and regular audits; doesn't include actions arising from plan | -22 | -253 |
| Mitigation costs from reducing nitrogen pollution to meet toxicity bottom line (beyond costs expected from existing NPS-FM), includes opportunity cost of some land-use change[4] | -30 | -217 |
| Water measuring and reporting-related costs including telemetry systems | -10 | -196 |
| Additional costs for local authorities | -76 | -1,490 |
| **Monetised costs attributable to the package ($million)** | **166** | **3,248** |
| **Difference between monetised benefits and costs ($million)** | **193** | **3,783** |

[1] Essential Freshwater Package: Benefits Analysis by Resource Economics https://www.mfe.govt.nz/publications/fresh-water/essential-freshwater-package-benefits-analysis.

[2] The annual impact is not the sum of the individual benefit (or cost) values. The annual impact reported in the highlighted figures is the implied annual average net benefit (or cost) if net benefits (or costs) were received equally through time, based on the total PV being received over 30 years using a 3% discount rate.

[3] The $61 million annual cost estimate consists of the opportunity cost of the land lost to production (due to the 3 metre setback) plus the amortised cost of the initial capital expenditure incurred for fence construction. The $61 million annual cost arises each year the new fencing is in active use.

[4] These are the costs attributable to the Action for healthy waterways package. The costs of meeting the 2017 NPS-FM, some of which are yet to be incurred, will be in addition to these costs. For instance the costs of the 2017 NPS-FM relating to nutrient reductions have been estimated at $394 million per annum upon full compliance.

## Disclaimer

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Published in July 2020 by the
Ministry for the Environment and Ministry for Primary Industries
Publication number: INFO 943