



Performance audit report

Managing
freshwater
quality:
Challenges for
regional councils





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Managing freshwater quality: Challenges for regional councils

This is an independent assurance report about a performance audit carried out under section 16 of the Public Audit Act 2001.

September 2011

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Auditor-General's overview

Healthy streams, rivers, and lakes are important to our way of life. We want them to be clean enough to swim, play, and fish in, and to remain clean and healthy enough for our grandchildren to enjoy in years to come. Arguably, we have an obligation to protect ecosystems regardless of our own interests in them. We also need economic growth and development for our long-term well-being. Balancing these important matters is the essence of this report.

How our freshwater should be managed is characterised by many strongly held and potentially conflicting opinions.

The overall quality of the water in our rivers and streams rates well internationally but is deteriorating. My audit shows that we have reason to be concerned about freshwater quality in some parts of the country, particularly in lowland areas that are mainly used for farming.

Preventing further decline in freshwater quality is preferable to having to spend a lot of money to recover damaged water bodies. In some places (particularly in lakes, wetlands, and groundwater), recovery is not possible and damage to the ecosystem is irreversible.

Regional councils are responsible for managing the activities that affect freshwater quality. Regional councils have done this in the past by limiting and setting quality standards for discharging wastewater from industry and sewage treatment plants to streams, rivers, and lakes. Although the effects of these direct discharges are still apparent in some places, the cumulative effects of “non-point source” discharges are now the most difficult challenge for regional councils in managing freshwater quality.

Non-point source discharges include nutrients, chemical pollutants, sediment, and bacteria that run off land or leach through soil into surface water and groundwater. In urban areas, the source is largely stormwater. In rural areas, the sources are animal urine and dung, fertiliser, eroding soil, dairy farm effluent, and septic tanks.

Although people often cite other causes of declining water quality, many scientists are sure that freshwater quality is declining because land is being used more intensively – for example, the number of dairy cows on farms has increased. Although many members of the farming community are taking steps to reduce the effects of non-point source discharges, some are resistant to the need for individual farmers to take responsibility for the levels of nutrients applied to, and leaching off, their properties.

Scope of the audit

My aim was to provide an independent view of how effectively regional councils are managing land use (and the resulting non-point source discharges) for the purpose of maintaining and enhancing freshwater quality in their regions. We looked at four regional councils – Waikato Regional Council, Taranaki Regional Council, Horizons Regional Council, and Environment Southland. I have provided each of these councils with a detailed report on the results of our audit for their council. This report discusses matters arising from the audits of the four regional councils, and makes recommendations for all regional councils and unitary authorities.

Overall audit findings

Each of the four regional councils we audited had adequate systems for collecting data on, and had a good understanding of, freshwater quality in its region.

Based on my detailed audit findings and analysis of scientific monitoring data, I conclude that Waikato Regional Council and Environment Southland are not adequately managing the causes of non-point source discharges in their regions. In both regions, significant intensification of land use (dairy farming) has meant more pressure on freshwater quality. The current regulatory and non-regulatory methods, and how they are being implemented in these regions, are not enough to reduce the known risks to freshwater quality. Both councils are trying to tackle the challenges of non-point source discharges and their cumulative effects, and there are some signs of improvement, but there is still significant work to be done.

Horizons Regional Council is maintaining and enhancing freshwater quality in the Rangitikei and Whanganui river catchments, but not for the Manawatu River catchment. The overall state of water quality remains undesirable in a number of places. Horizons Regional Council has a well-designed set of regulatory and non-regulatory programmes targeted at reducing the known risks to freshwater quality. These programmes should support future improvements in freshwater quality in the region.

Overall, Taranaki Regional Council is maintaining and, in places, improving freshwater quality in its region. Several aspects of Taranaki Regional Council's management of freshwater are effective. However, scientific monitoring of freshwater quality in low-elevation areas suggests that there is some vulnerability in the region. I consider that Taranaki Regional Council is well positioned to address these risks to freshwater quality by adapting its existing methods.

Overall, there is still some way to go if we are to halt and reverse the declining trends in freshwater quality. Changes are needed sooner rather than later, because it takes time before improved policies result in improved freshwater quality.

Regional councils cannot manage freshwater quality alone. I was encouraged to see strong collaboration – from high-level policy at the central government level to regional councils and dairy sector representatives working together at a strategic and on-farm level.

Some regional councils are taking a more regulatory approach to managing non-point source discharges. Some of the activities and land uses that regional councils are regulating are the same activities that the dairy sector has set targets for improving.

All four regional councils are implementing programmes or policies to respond to areas of poor or declining freshwater quality. Although it can take many years to make changes to regional plans, some regional councils are starting to implement innovative, scientifically based policies that seek to manage freshwater quality within limits.

In the Taupo catchment, Waikato Regional Council has taken a “whole farm” approach to managing nutrient emissions within limits, but the other three regional councils have not regulated to control all nutrient emissions from all farms. The Government's new National Policy Statement for Freshwater Management now requires regional councils to set freshwater quality limits for all bodies of freshwater in their region. Non-regulatory approaches and permitted activity rules are not likely to be sufficient to manage freshwater quality within limits.

With regard to enforcing compliance with regional rules and resource consent conditions, I was concerned to note that councillors in all the regional councils had some involvement either in deciding whether the council should prosecute or in investigating a case once the decision to prosecute had been made. There are strong and longstanding conventions against elected officials becoming involved in prosecution decisions. All investigation and enforcement decisions on individual matters should be delegated to council staff for an independent decision.

One of the most notable challenges to managing freshwater quality is balancing the rural sector's economic contribution with everyone's desire for clean lakes and rivers.

Managing freshwater quality needs an integrated approach. I encourage those involved to consider:

- collaboration at all levels – central and local government, across local government, with the dairy sector, stakeholders, iwi, farmers, and communities;
- sharing knowledge and information – especially easy availability of nationally comparable, high-quality, scientific data and research;
- a holistic approach to managing freshwater that integrates land use, freshwater quality management, and the effects on the coastal marine environment; and
- strong links between freshwater management planning and using scientific monitoring to measure the effectiveness of the policies being implemented.

I thank the four regional councils for their willing co-operation with this audit, the National Institute of Water and Atmospheric Research Limited for its advice, and Fonterra, DairyNZ, the Ministry for the Environment, the Ministry of Agriculture and Forestry, the Ecologic Foundation, and the Office of the Parliamentary Commissioner for the Environment for their helpful comments.



Lyn Provost
Controller and Auditor-General

21 September 2011

Our recommendations

We have already provided Waikato Regional Council, Taranaki Regional Council, Horizons Regional Council, and Environment Southland with specific recommendations (see Appendix 1).

The recommendations that we make here are aimed at **all regional councils and unitary authorities**.

We recommend that all regional councils and unitary authorities:

1. review methods for reporting results of their freshwater quality monitoring to ensure that the methods:
 - compare the freshwater quality monitoring results with (ideally specific, measurable, achievable, relevant, and time-bound) plan objectives, limits, and standards where possible and with guidelines where necessary;
 - say whether freshwater quality is getting better or worse;
 - outline probable reasons why freshwater quality is in the condition that it is; and
 - discuss what the council and the community are doing, or can do, to remedy any problems;
2. set up stronger links between freshwater quality monitoring results and how they measure the effectiveness of their policies for maintaining and enhancing freshwater quality; and
3. meet the requirements of sections 35(2)(b) and 35(2A) of the Resource Management Act 1991 to monitor the effectiveness and efficiency of the policies, rules, or methods in their policy statements and plans, and to compile and make the results of this monitoring available to the public at least every five years.

We recommend that the Ministry for the Environment:

4. provide guidance on what is expected from regional councils to meet the requirements of sections 35(2)(b) and 35(2A) of the Resource Management Act 1991.

We recommend that all regional councils and unitary authorities:

5. include specific, measurable, achievable, relevant, and time-bound objectives in their regional plans and in their long-term plans under the Local Government Act 2002.

We recommend that the Ministry for the Environment:

6. seek input from regional councils and unitary authorities on whether they need information on:
 - the economic assessments required to implement the changes required in the National Policy Statement for Freshwater Management; and
 - what has been learned from limit-setting processes already carried out in New Zealand and internationally.

We recommend that all regional councils and unitary authorities:

7. be able to demonstrate that they are co-ordinating their efforts effectively with appropriate stakeholders to improve freshwater quality; and
8. review their delegations and procedures for prosecuting, to ensure that any decision about prosecution is free from actual or perceived political bias.

Appendix 2 of this report is a self-assessment audit tool for regional councils and unitary authorities to use to assess their own performance against the criteria we used for our audit and against the emerging issues and best practice that we identified during our audit.

Part 1

Introduction

- 1.1 In this Part, we discuss:
- the purpose of our audit;
 - what we looked at;
 - what we did not cover; and
 - the structure of this report.

The purpose of our audit

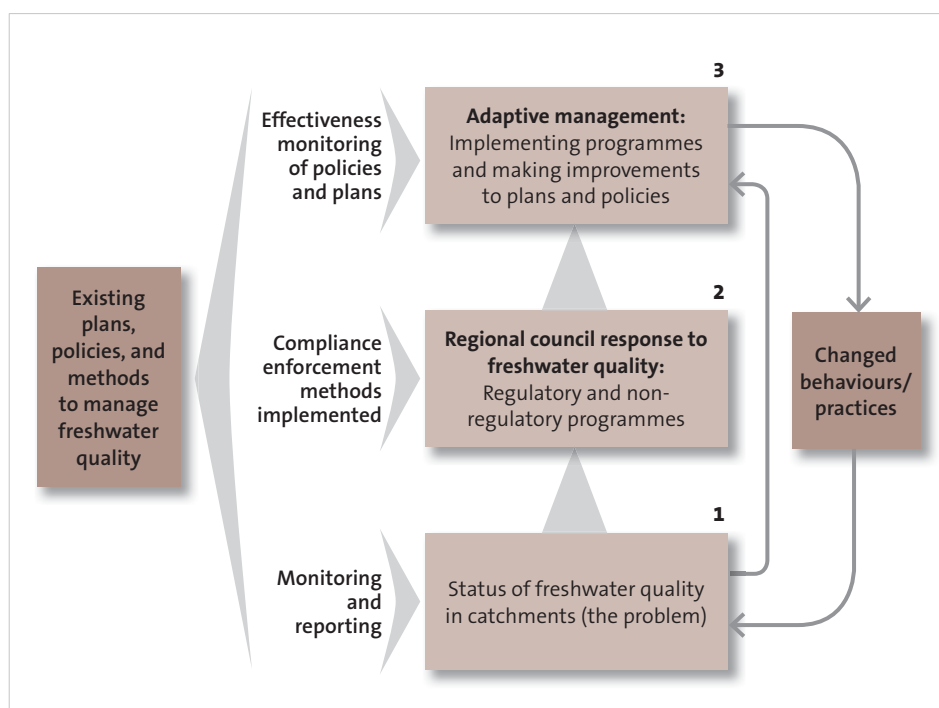
- 1.2 We carried out an audit to provide an independent view of how effectively four selected regional councils are managing and controlling land use and related activities for the purpose of maintaining and enhancing freshwater quality in their regions.¹ The applicable governing pieces of legislation are the Resource Management Act 1991 (the RMA) and the Government Act 2002 (the LGA).
- 1.3 There has been increasing Parliamentary and public interest in water during the last decade and concern about deteriorating freshwater quality – in particular about the cumulative effects of diffuse pollution, or “non-point source” discharges. Non-point source discharges contain nutrients (such as nitrogen and phosphorus), bacteria (such as *E. coli*), and sediment that reduce freshwater quality. When it rains, these contaminants are washed off land into lakes, rivers, or streams or absorbed into soil where they leach into groundwater. There are many sources of non-point source discharges (such as animal dung and urine, and fertiliser), which make them difficult to manage.
- 1.4 Given that non-point source discharges are a significant cause of declining freshwater quality, and that intensified land use is a significant source of those discharges, much of this report discusses how regional councils are managing the effects of intensified land use on freshwater quality. Although dairy farms are not the only source of non-point discharges (see Figure 3), we have largely considered how regional councils are managing non-point source discharges arising from dairy farming.
- 1.5 This latest audit builds on our 2005 audit,² which looked at how two regional councils (Horizons and Otago) implemented a framework to manage freshwater quality and quantity in their regions. Our 2005 audit found that the councils had made good progress in planning and implementing water allocation frameworks, but needed to improve their compliance monitoring and measuring whether policies were having the desired effect.

1 Throughout this report, we summarise this as how effectively councils are “maintaining and enhancing” freshwater quality.

2 Controller and Auditor-General (2005), *Horizons and Otago Regional Councils: Management of freshwater resources*, Wellington.

- 1.6 In this 2011 audit, we focused specifically on water quality rather than quantity, and also examined the state of freshwater quality in each of the four regions. Our focus was on the effectiveness of approaches rather than legislative compliance. Figure 1 provides an overview of our audit model.

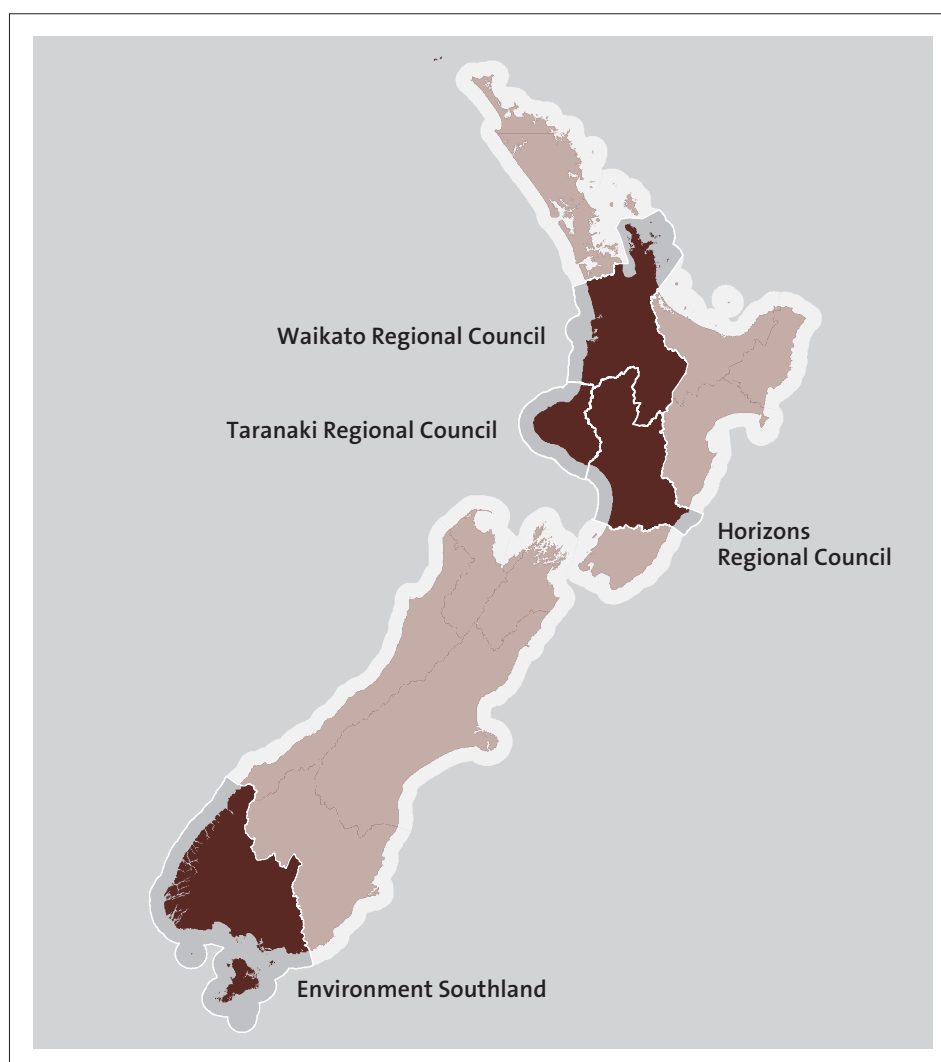
Figure 1
Assessing effectiveness of regional councils in maintaining and enhancing freshwater quality



What we looked at

- 1.7 We audited four regional councils: Waikato Regional Council, Taranaki Regional Council, Horizons Regional Council, and Environment Southland.
- 1.8 We selected the four regional councils based on:
- the extent and significance of surface water resources in the region;
 - water quality trends and pressures; and
 - whether there had been a regional water plan (either notified or operative) for a reasonable time (enabling us to assess progress towards the objectives and targets set in the plan).
- 1.9 Together, the four regional councils cover nearly one-third of New Zealand's total land area (see Figure 2).

Figure 2
The four regional council regions



Source: Land & Water New Zealand.

- 1.10 The Waikato region includes the country's longest river (the Waikato River) and largest lake (Lake Taupo). The Taranaki region is dominated by Mt Taranaki, the slopes of which give rise to more than 300 short but fast-flowing streams and rivers. Horizons Regional Council's region includes three major river systems (the Whanganui, the Rangitikei, and the Manawatu). The wet climate in the Southland region has required the installation of significant artificial drainage on pastoral land. Southland is also home to an internationally significant wetland.

- 1.11 The four regions have different sizes, topography, landscapes, soils, and river gradients. The historical quality of their freshwater, the degree to which land use has intensified, and the funding available to manage freshwater quality also varies. Communities' desires guide actions taken by regional councils to respond to freshwater quality concerns. The approaches taken to maintaining and enhancing freshwater quality in one region may not be enough or needed in another region.
- 1.12 To form a view on whether freshwater quality is being maintained and enhanced, we looked at whether the four regional councils:
- had a good understanding of the state of, and trends in freshwater quality in their regions;
 - were responding appropriately and effectively to any deterioration in water quality;
 - were improving their plans and policies in a timely manner; and
 - whether their actions were improving freshwater quality.
- 1.13 We sought to identify examples of good practice to share with other regional councils and all those with an interest in managing freshwater quality.
- 1.14 To support our audit, we commissioned the National Institute of Water and Atmospheric Research Limited (NIWA) to advise us on the suitability of the scientific monitoring networks that the regional councils operate and on the state of, and trends in, freshwater quality in the four regions. NIWA's report, *Freshwater quality monitoring by Environment Southland, Taranaki Regional Council, Horizons Regional Council and Environment Waikato*, is available on our website (www.oag.govt.nz).
- 1.15 This report discusses matters arising from our audit of the four regional councils. It does not provide all our findings or a full discussion of all aspects of our audit. The audit covered the complete package of tools that regional councils use to manage freshwater quality – including the regulatory and non-regulatory programmes to manage soil erosion and riparian management to improve freshwater quality in rivers, lakes, wetlands, and groundwater.

What we did not cover

- 1.16 Although related to freshwater quality management and part of the context, we have excluded from the scope of this audit:
- central government policies on managing freshwater quality, because these were under review during the audit;

- water quantity issues, unless they relate directly to water quality in the selected catchments;
- the Canterbury region, because of the changing governance arrangements for freshwater quality management there; and
- the management of point source discharges and urban stormwater.

The structure of this report

1.17 In this report:

- Part 2 sets out the framework and context for managing freshwater quality.
- Part 3 discusses how regional councils monitor and report on freshwater quality and the pressures on it.
- Part 4 discusses how regional councils deal with the freshwater issues that arise.
- Part 5 discusses how regional councils take enforcement action under the RMA.
- Part 6 sets out examples of how regional councils share innovative practice.
- Appendix 1 provides a summary of our audit findings for the four regional councils.
- Appendix 2 is a self-assessment audit tool that councils can use to assess how well they are managing and enhancing freshwater quality.
- Appendix 3 sets out aspects of the RMA that councils use when managing freshwater quality.
- Appendix 4 sets out the freshwater quality variables, guidelines, and trigger values used in our freshwater quality analysis.

1.18 There is a Glossary at the end of this report.

Part 2

The framework and context for managing freshwater quality

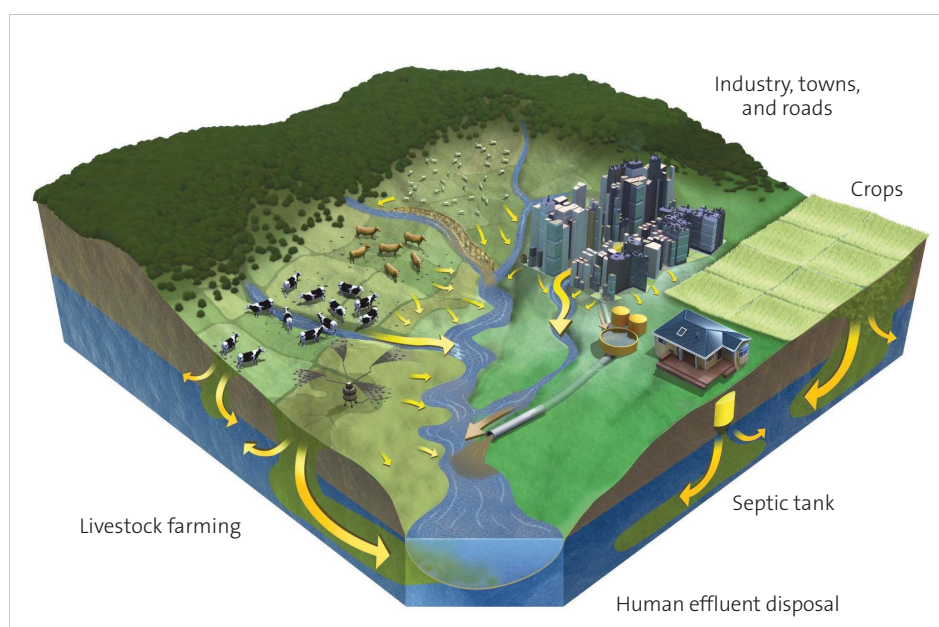
- 2.1 In this Part, we:
- describe freshwater quality;
 - outline how freshwater quality is managed, including:
 - the legislative framework;
 - the role of local government;
 - the role of central government; and
 - the role of the primary production sector; and
 - discuss the tensions between managing freshwater quality and contributing to the economy.

Freshwater quality

- 2.2 The quality of the water in our lakes, rivers, and streams is good overall and rates well internationally, but some aspects have been deteriorating in lowland, pastoral, and urban areas.³
- 2.3 In the past, it was common practice to discharge contaminants such as factory waste and treated sewage directly into waterways. This had effects on the quality of freshwater and the associated ecosystems. Generally, these point source discharges are being phased out, or the level of contamination in them has been reduced because regional councils set quality controls on the discharges and monitor compliance with those controls.
- 2.4 Although much has been done to improve some point source discharges during the last 20 years, a corresponding improvement in freshwater quality has not always been seen. At the same time as point source discharges were improved, there was an intensification of agricultural land use in some areas. This included conversion of land previously used for crops or sheep or beef farming to dairy farming, and an increase in the number of dairy cows on farms.
- 2.5 Figure 3 shows various sources of freshwater pollution, including point source discharge (for example, from a wastewater treatment plant) and non-point source discharges from:
- surface run-off of nutrients, chemical pollutants, and bacteria from rural and urban land areas to waterways;
 - farm animals in waterways; and
 - contaminants leaching through soil into groundwater from livestock farming, septic tanks, and agricultural crops.

³ Ministry for the Environment (2007), *Environment New Zealand 2007*, page 261 (available at www.mfe.govt.nz).

Figure 3
Sources of freshwater pollution



Source: Ministry for the Environment.

- 2.6 Monitoring data collected nationally and regionally show that non-point source discharges now exceed point source pollution, and that non-point source pollution from pastoral land use is now the main cause of water quality degradation. In July 2010, NIWA reported that:

Pastoral farming – which accounts for 40 percent of New Zealand’s land area – is undoubtedly the main source of [non-point source] pollution. Evidence from [national] and catchment studies generally show a gradient in water quality from excellent in native forest, to good in plantation forest, to poor in pastoral and urban streams. Streams in dairy land are among the most polluted.

There is no doubt that our declining river water quality over the last 20 years is associated with intensification of pastoral farming and the conversion of drystock farmland to dairy farming, particularly in Waikato, Southland, and Canterbury. For example, between 1992 and 2002, the number of cows in Waikato increased by 37 percent; during the same period nitrogen levels in the region’s streams increased by 40 percent and phosphorus levels went up by 25 percent.⁴

4 National Institute of Water and Atmospheric Research Limited (July 2010), *How clean are our rivers?*

- 2.7 Given that non-point source discharges come from many sources, and it is the cumulative effects of these discharges that affect water quality, regional councils need to have a range of policy interventions that work together to minimise these cumulative effects.
- 2.8 Sediment entering waterways is another issue that regional councils need to manage. Sediment in waterways reduces water clarity, and (because nutrients are bound to soil particles) also contributes to the amount of nutrients entering waterways. Erosion of deforested hillsides, gullies, and riverbanks, and the presence of cattle in or near waterways, are leading causes of sediment entering waterways.

How freshwater quality is managed

The legislative framework for managing freshwater quality

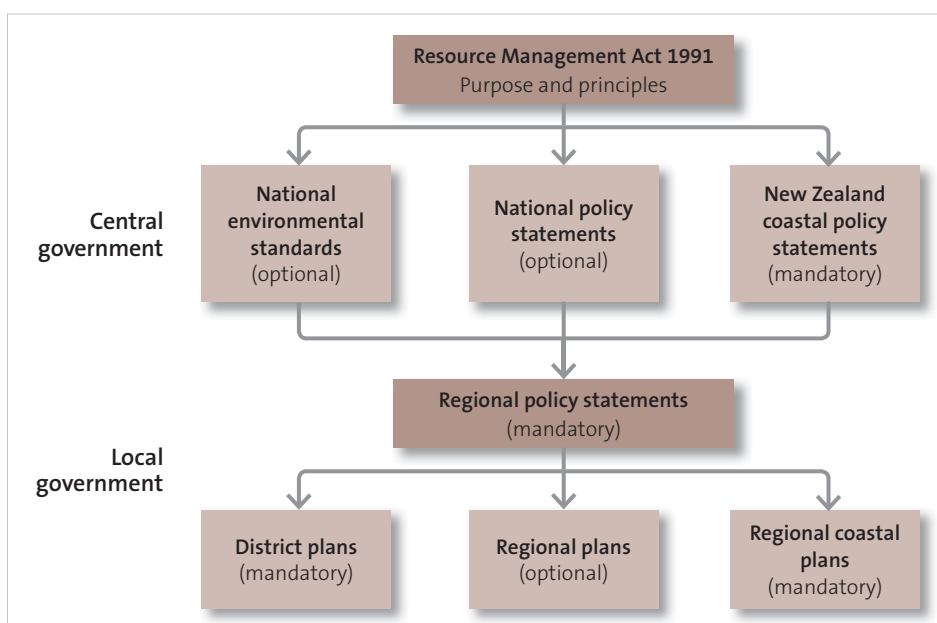
- 2.9 The legal framework for managing freshwater quality is set out in the RMA and supported by the LGA. Regional councils have the main responsibility for managing freshwater quality but cannot do this alone. Central government, district and city councils, iwi, the primary production sector, environmental groups, and recreational water users all have an interest and a role to play in managing freshwater.

The Resource Management Act 1991

- 2.10 The role of regional councils under the RMA includes a number of specific functions in managing freshwater. These include controlling land use for the purpose of maintaining and enhancing water quality and ecosystems in water bodies, and controlling the discharge of contaminants into water or onto land.
- 2.11 In exercising their functions, powers, and duties under the RMA, regional councils must consider its purpose – to promote the sustainable management of natural and physical resources. Section 5 of the RMA says that sustainable management means:
- ... managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—*
 - (a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
 - (b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
 - (c) avoiding, remedying, or mitigating any adverse effects on the environment.*

2.12 The RMA is implemented through a planning framework that has roles for both local and central government. Figure 4 sets out the high-level planning framework for local and central government under the RMA. The RMA provides regional councils with a variety of tools to manage freshwater, including regional policy statements, regional plans, and resource consents.

Figure 4
The Resource Management Act's planning framework



2.13 Appendix 3 sets out a more detailed discussion of the RMA and the framework for freshwater management.

The Local Government Act 2002

2.14 As local authorities, regional councils are also bound by the requirements of the LGA, which gives them the broad role of promoting the social, economic, environmental, and cultural well-being of their communities, taking a sustainable development approach. This approach is defined in the LGA, and requires local authorities to take into account:

- the social, economic, and cultural well-being of people and communities;
- the need to maintain and enhance the quality of the environment; and
- the reasonably foreseeable needs of future generations.

Freshwater quality objectives

- 2.15 The sustainable development approach in the LGA and sustainable management purpose of the RMA both require local authorities to look to the future when exercising their functions and making decisions, and to consider the social, cultural and economic well-being of people and communities as well as the environment. Both Acts refer to maintaining and enhancing the environment or freshwater quality, as do many regional policy statements and plans.
- 2.16 In carrying out their responsibilities under the RMA and the LGA, regional councils must follow the appropriate statutory processes, which include consulting with their communities. The objectives that regional councils set to guide freshwater quality management will be influenced by what their community values.

The role of local government

- 2.17 As set out in Figure 4, regional councils must produce a regional policy statement and can produce a regional plan to help them manage freshwater quality. These planning documents set out the issues with freshwater quality in the region and specify policies, methods, and (in the regional plan) rules for managing freshwater quality.
- 2.18 In setting policy, regional councils must consult with their communities and draw on a range of scientific and planning knowledge to come up with programmes to manage freshwater quality at a level acceptable to their community. These programmes may be:
- regulatory (usually regional rules and resource consent requirements); or
 - non-regulatory (which usually involve providing advice, education, or financial incentives).
- 2.19 Also, under the LGA, long-term plans and annual plans offer councils scope to set out actions, budgets, and time frames for delivering programmes to achieve freshwater quality objectives.

The role of central government

- 2.20 The RMA allows the Minister for the Environment to issue national policy statements to guide local authorities on matters of national significance. Until recently, there was no such guidance from central government on freshwater quality management, but the National Policy Statement for Freshwater Management (the National Policy Statement) came into effect on 1 July 2011.

- 2.21 The National Policy Statement is part of the Government's 2011 *Fresh Start for Fresh Water* package of reforms. The National Policy Statement requires all regional councils to make or change regional plans to set freshwater objectives and freshwater quality limits for all bodies of freshwater in their regions. The National Policy Statement is reasonably high level and might require more specific measures, such as technical methods for prescribing limits, to support its success.
- 2.22 National environmental standards are also set by central government and have the force of regulation. They can be used to set technical standards, methods, or requirements and can prohibit an activity, restrict the rules councils can make for an activity, or permit an activity.
- 2.23 There are currently four national environmental standards in effect, including one for the *Sources of Human Drinking Water*.⁵ This standard requires regional councils to consider the effects on drinking-water sources when deciding on relevant resource consents and setting regional plans.

The Land and Water Forum

- 2.24 The Government favours a collaborative approach to setting policy. The Land and Water Forum is a diverse group comprising primary sector representatives, environmental and recreational non-government organisations, some iwi, and other organisations with an interest in freshwater and land management. The Government invited the Land and Water Forum to recommend reform of New Zealand's freshwater management.
- 2.25 The *Report of the Land and Water Forum: A Fresh Start for Freshwater* was released in September 2010.⁶ It contains 53 recommendations. These include:
- setting standards, limits, and targets for water quality;
 - making changes in governance arrangements for freshwater, including setting up a non-statutory National Land and Water Commission; and
 - making government appointments to regional councils or their committees.
- 2.26 The National Policy Statement implements some of the Land and Water Forum's recommendations. The Government issued a further response to the recommendations in September 2011. The response outlined an ongoing role for the Land and Water Forum in New Zealand's freshwater reforms.

The role of the primary production sector

- 2.27 As well as contributing to the collaborative process for policy development as part of the Land and Water Forum, the primary production sector recognises the need to address the sector's effect on the environment. The primary production

5 Resource Management (National Environmental Standards for Sources of Human Drinking Water) Regulations 2007, which is available on the Ministry for the Environment's website (www.mfe.govt.nz).

6 The report is available at www.landandwater.org.nz.

organisations Fonterra⁷ and DairyNZ⁸ have each set targets for improving practice in the dairy sector to reduce the effects of non-point source discharge.

2.28 Fonterra acknowledges that one of the greatest challenges facing the dairy sector is the effect that leaching of nutrients and run-off of effluent can have on waterways. In 2003, the *Dairying and Clean Streams Accord* (the Accord)⁹ set targets to:

- exclude 90% of dairy cows from waterways by 2012;
- ensure that 90% of regular stock crossings over waterways are by bridge or culvert by 2012;
- achieve 100% compliance with effluent discharge regulations by 2003;
- ensure that all dairy farms have systems in place to manage nutrient inputs and outputs by 2007; and
- protect 50% of regionally significant wetlands by 2005 and 90% by 2007.

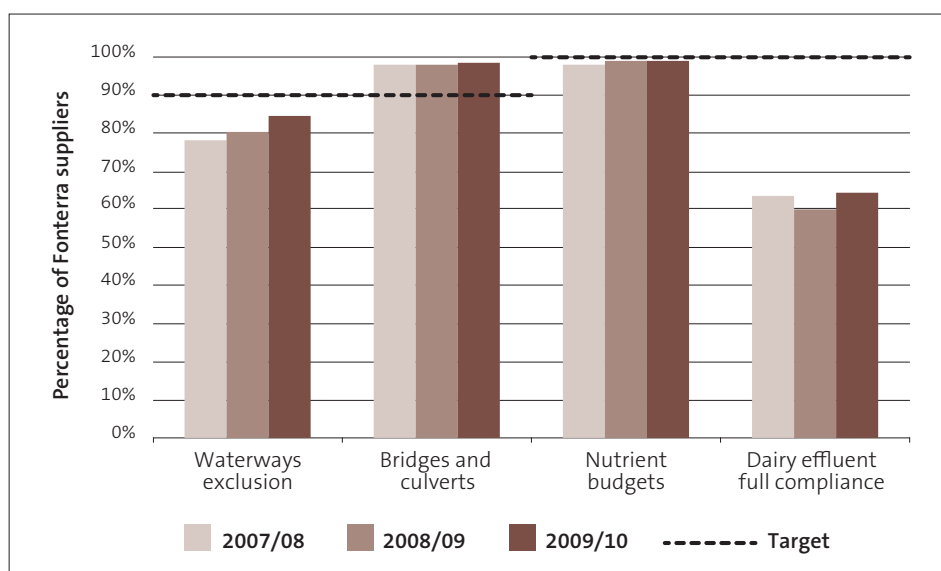
2.29 Progress toward the Accord targets is shown in Figure 5.

7 Fonterra is a New Zealand based co-operative company owned by 11,000 farmer shareholders and is the world's leading exporter of dairy products. It is responsible for collecting milk from farmers and producing most of the dairy products made in New Zealand.

8 DairyNZ, an "industry good organisation" with an annual budget of about \$78 million derived from a levy on milk solids and government investment, has a purpose to secure and enhance the profitability, sustainability, and competitiveness of New Zealand dairy farming. Sustainability is one of three investment areas for DairyNZ.

9 The *Dairying and Clean Streams Accord*, signed in 2003 by Fonterra, regional councils, the Ministry for the Environment, and the Ministry of Agriculture and Forestry set targets for reducing the effect of dairy farming on freshwater quality.

Figure 5
Progress toward the *Dairying and Clean Streams Accord* targets, from 2007/08 to 2009/10



Source: Data provided by the Ministry of Agriculture and Forestry, from *The Dairying and Clean Streams Accord: Snapshot of Progress 2009/10*, page 3.

- 2.30 With the wetland protection component of the Accord, about two-thirds of regional councils have identified wetlands that need to be protected. The 2005 target for protecting wetlands has been met in two regions, and the 2007 target in one region.
- 2.31 Fonterra was disappointed with the figures for compliance with effluent discharge regulations. In August 2010, it began a programme to check every farm's dairy effluent systems as part of an annual farm assessment. Fonterra is working with farmers to help them comply. We discuss monitoring and compliance further in Part 5.
- 2.32 There has been criticism of the success of the Accord. Fish and Game New Zealand's concerns include that the Accord does not cover small streams where Fish and Game New Zealand considers some of the most significant effects on freshwater quality are seen, and that the Accord requires nutrient management budgets to be in place but not necessarily to be used.
- 2.33 As well as the Accord, Fonterra is also part of the Primary Sector Water Partnership,¹⁰ which set a target to manage 80% of nutrients applied to land

¹⁰ The Primary Sector Water Partnership is made up of Fonterra, DairyNZ, the Foundation for Arable Research, HortNZ, Meat and Wool NZ, New Zealand Forest Owners Association, NZ Farm Forestry Association, Irrigation New Zealand, Fertiliser Manufacturers Research Association, and Federated Farmers. The group aims to work in partnership with central and local government to ensure the sustainable use of freshwater resources in the primary sector.

nationally through quality-assured nutrient budgets and nutrient management plans by 2013.

- 2.34 DairyNZ has a *Strategy for New Zealand Dairy Farming 2009/2020* that is underpinned by specific targets aimed at (among other matters) reducing the effect of dairy farming on freshwater quality. The targets include:
- 90% of dairy farms implementing nutrient management plans that reduce their nutrient footprint by the end of 2012;
 - reducing effluent non-compliance to less than 15% by June 2011 and to less than 10% by June 2012, with no serious offences;
 - excluding dairy cows from 90% of streams, rivers, and lakes by June 2012; and
 - improving the public perception of dairying by 2015.

The role of farmers

- 2.35 As well as the steps taken by the primary production sector bodies, some farmers are investing in management practices that help reduce the effects of intensive farming activities and non-point source discharges on freshwater quality.
- 2.36 These practices include:
- Fencing and planting river and stream banks – this prevents cattle from damaging stream and river banks (which causes erosion) and prevents effluent from entering water bodies directly from cattle when they stand in streams. Planting a strip alongside stream and river banks also offers shading (which is beneficial for native fish habitats because of lower water temperature) and reduces nutrient run-off and leaching through the soil from adjacent land (because the plants take up nutrients before they enter waterways).
 - Building bridges and culverts – this prevents river bank erosion and effluent entering water bodies while cattle cross streams and rivers.
 - Managing nutrient inputs and outputs – this involves considering all sources of nutrient inputs (such as fertiliser, dung and urine, and supplementary livestock feed) and nutrient outputs (for example, nutrients lost through erosion or taken off a farm in products). Implementing nutrient management planning helps farmers maximise the efficiency of nutrient use, which in turn avoids or minimises adverse environmental effects and increases overall production efficiency.
 - Engineering appropriately sized and sealed effluent storage ponds – effluent ponds are used to collect dairy effluent from milking sheds, herd homes, and feed pads. Stored effluent from these ponds can be applied to pastures as a nutrient source when soil conditions are suitable for applying more moisture. This practice is known as deferred irrigation. Deferred irrigation is instrumental in preventing surface run-off or direct drainage of effluent to waterways.

- 2.37 Many of the above interventions are beneficial to the farmer and the environment. Research has shown that one poorly timed application of dairy effluent to pastures when soils are too wet to take up the effluent can lead to significant quantities of nutrients entering freshwater. These losses from a single poorly timed effluent application to the land can be equivalent to up to 40% of the annual expected nitrogen loss and more than twice the annual expected phosphorus loss from grazed dairy pasture.¹¹ Suitable pond storage and deferred irrigation can halt this adverse environmental effect and provide nutrients to the land when the pasture can use the water and nutrients in the effluent. This helps the environment and reduces farmers' costs.

Managing freshwater quality while contributing to the economy

- 2.38 Dairy farming makes a significant contribution to the economy. The dairy sector directly accounts for 2.8% of the nation's gross domestic product, which is about \$5 billion.¹² It also contributes indirectly through employment and is an important factor in regional economies. For example, in some rural areas as many as one in four jobs are in the dairy farming and processing sectors. Projections to 2020 suggest that the pastoral and related food industries will remain at the core of the New Zealand economy.
- 2.39 Freshwater is vital to our economic, social, and cultural well-being, but our water management is getting increased scrutiny from:
- New Zealanders concerned at declining water quality;
 - tourists, and the pressure to maintain our international image to support our tourism sector, which is also a major contributor to our economy; and
 - overseas buyers of meat and dairy products driven by their customers' expectations that their suppliers follow good environmental practices.
- 2.40 There is tension between increasing the economic contribution of the primary production sector and maintaining our "clean green" image. The mix of people elected to regional councils can reflect the range of strongly held views in the community about this issue.
- 2.41 Much of the public debate about the effects of the dairy sector on freshwater quality centres on whether we can have clean water and a profitable dairy sector. We considered whether it was possible to have both.

11 Section 42A report of Dr David John Houlbrooke on behalf of Horizons Regional Council, page 17.

12 New Zealand Institute of Economic Research (December 2010), *Report to Fonterra and DairyNZ*, which is available on www.fonterra.com.

- 2.42 The *Best Practice Dairy Catchments Study*¹³ selected five predominantly dairy farming catchments (located in Waikato, Taranaki, Canterbury, Southland, and the West Coast of the South Island), and identified and tested a range of management practices to minimise effects on freshwater quality.
- 2.43 The research indicated that implementing targeted best management practices is likely to deliver significant improvements in the environmental performance of dairy farms within the catchments. Improvement in catchment water quality has been observed, indicating significant success given the ongoing intensification of farming systems that has occurred during the project.
- 2.44 A 2006 study looked at dairy farming systems and the relationship between economic development and the environment. This study concluded that, within the specific context of the New Zealand dairy sector, “there are major practical and political problems in internalising all the environmental effects of dairying, and off-setting the consequences of intensification”.¹⁴
- 2.45 We asked staff at each of the four regional councils for their views on whether it was possible to maintain freshwater quality while intensifying land use. Figure 6 shows that their responses reflected a range of views.

13 AgResearch (June 2009), *Best Practice Dairy Catchments Study*.

14 Jay, M. and Morad, M. (2006), “Crying over spilt milk: A critical assessment of the Ecological Modernisation of New Zealand’s Dairy Industry”, *Society and Natural Resources*, Vol. 20, No. 5.

Figure 6
Regional council officers' views about feasibility of maintaining freshwater quality while intensifying land use

Hope is given by the dairy sector starting to take responsibility for its effects and central government setting stronger policy direction.

The costs of mitigating environmental effects through managing nutrient inputs could mean that it might not be economically viable to sustainably intensify land use.

The evidence for worsening water quality in areas of intensive land use is simply too great to believe that it can be offset by good management practice.

We are driving the land too hard.

Intensive farming creates a potential for there to be effects on water quality values. However, it is not a given. It is a case of understanding the soil-water interface and ensuring that the movement of contaminants does not overwhelm the assimilative capacity of the water systems they enter. There are parts of New Zealand where recent changes of land use to intensive dairy farming have been in advance of the ability to manage those interfaces, but that is not the situation universally.

Compared with where we were in the 1970s-1980s, both our water quality and our management interventions have improved, alongside the intensification of dairy farming.

There are limits to the total emissions that the dairy sector can make without affecting freshwater quality, but this does not need to limit productivity. The sector needs to become more efficient, and market-based instruments can drive this change.

Our work on how farms take up new technologies and change behaviour suggests that farmers and the sector do not have the same fundamental goals as the regional councils. We have, and will continue, to work closely with our rural sector groups, but we have to recognise that there always will be divergence in the priority placed on productivity and profitability versus longer-term sustainability and the environmental standards expected by the community. The reality is that the sector challenges regional councils in the Environment Court on proposed policies that have economic implications for the farming community.

We can't have our cake and eat it; we cannot continue to intensify land use without better managing nutrient losses.

Conclusion

- 2.46 Dairy farming is important for our economic well-being, but there are concerns about its effects on freshwater quality. Although some research and opinions support the view that we can maintain water quality at a level expected by communities while increasing the productivity of the agricultural sector, other research and opinions do not.
- 2.47 The diverse range of research conclusions and opinions held by those responsible for managing this challenging issue reflect the different physical characteristics of the environments that the regional councils are operating in. In our view, the economic viability of farming sustainably while protecting ecosystems and allowing communities to enjoy freshwater recreational activities is more achievable in some parts of the country than in others.

Part 3

How regional councils monitor and report on freshwater quality

- 3.1 In this Part, we:
- discuss how freshwater quality is measured;
 - outline how freshwater quality is monitored and the state of, and trends in, freshwater quality in the four regions we looked at;
 - review the public reporting of freshwater quality results; and
 - discuss how regional councils are monitoring and reporting on the effectiveness and efficiency of their policies and methods.

Our overall findings

- 3.2 There is no single set of freshwater quality variables or monitoring methods that regional councils use to measure freshwater quality, and no nationally agreed guidelines, standards, or methodology for analysing and reporting regional freshwater quality data at the national level.
- 3.3 The Ministry for the Environment and regional council representatives are working together to get better national data on freshwater quality. We support this initiative. In particular, we consider that regional councils could improve the consistency with which biological variables are monitored. The information derived from monitoring these variables can be useful for determining whether the regional plan objectives for freshwater quality are being achieved.
- 3.4 All four regional councils had adequate systems for collecting data on freshwater quality and had a good understanding of freshwater quality in their region.
- 3.5 Each regional council's data showed that there were areas where accepted guidelines, "trigger values", or standards were not met. Each region had some freshwater quality trends that were deteriorating and some that were improving. Overall, freshwater quality trend results show that water quality declined during the 10-year period (2000-2009) in low-elevation areas (generally used as pastoral land) and some hill areas.
- 3.6 All four regional councils reported freshwater quality information to their councillors and to communities. A number of innovative methods are in use, but some improvements could be made.
- 3.7 Taranaki Regional Council and Waikato Regional Council were completing the monitoring required under the RMA to measure and report on whether their freshwater quality policies and methods are having the desired effect. Environment Southland and Horizons Regional Council were not meeting these requirements.

- 3.8 The ultimate measure of whether policies and methods for freshwater quality are working is whether freshwater quality objectives are being achieved and, if not, whether freshwater quality is improving. Including specific, measurable, achievable, relevant, and time-bound objectives in planning documents provides a strong basis for measuring and reporting on whether policy outcomes are being achieved.

Measuring freshwater quality

Where is freshwater quality monitored?

- 3.9 Regional councils and NIWA regularly monitor the water quality at more than 800 river and stream sites throughout New Zealand. NIWA's National River Water Quality Network includes 77 of these sites, which are located on 35 rivers.
- 3.10 The remaining sites are part of monitoring networks operated by regional councils. These networks include reference sites in catchments with little development, where water quality is typically good, and sites where water quality is likely to be affected by human activities.
- 3.11 The Ministry for the Environment is running a project to improve national water quality statistics. The project aims to create a National Freshwater Monitoring Network that will mainly use existing regional council and NIWA sites. This larger national network should enable more robust conclusions to be made about freshwater quality from different river types and land uses. Regional councils support this project. Staff from a range of regional councils are part of the technical steering group for the project.

What is measured?

- 3.12 The most common variables that regional councils and NIWA measure and report on include:
- **Bacteria** – Faecal coliforms, E. coli, and enterococci indicate the presence of human or animal faeces and the associated risk of infectious disease for people swimming in or drinking the water, and for livestock from drinking the water.
 - **Nutrients** – Increased levels of various forms of nitrogen and phosphorus in water bodies can cause excessive plant growth rates, which can lead to blooms of algae and nuisance weeds. These can then reduce the recreational and aesthetic value of water bodies and affect fish and other aquatic animals.
 - **Visual clarity** – A river or lake with low clarity can indicate significant erosion in the catchment or algal growth in the water. Low clarity affects fish feeding and spawning habits, plants' growth rates, and recreational uses.

- **Macroinvertebrate Community Index (MCI)** – This measures the composition of the invertebrate animals that live on the river beds. The MCI gives an overall indication of river health and water quality.
- **Periphyton** – The algae that grow on the beds of rivers, streams and lakes turn dissolved nutrients into nutritious food (periphyton biomass) for invertebrates, which are themselves food for fish and birds. Elevated levels of nutrients can cause periphyton blooms – long filamentous growths or thick mats that cover much of the streambed. Too much algal growth can be a nuisance for swimming, fishing, and kayaking and adversely affect fish and insect life in rivers.

- 3.13 Regional councils' monitoring programmes generally provide good coverage of physical, chemical, and microbiological water quality variables (nutrients, visual clarity, and bacteria). These are particularly useful for analysing trends and for assessing the causes of environmental problems.
- 3.14 Regional councils can monitor other variables, such as the type and abundance of fish and water plants, herbicide and pesticide residues, and heavy metals. The analysis carried out by NIWA as part of our audit of the four regional councils showed that the consistency of monitoring of biological variables (for example, invertebrates and periphyton) could be improved. These types of variables provide potentially useful information for determining whether the regional plan objectives are being achieved.

How are the variables measured?

- 3.15 There is no standard method that all regional councils and other entities use to sample and monitor each variable. The Ministry for the Environment and a group of regional council science officers are working to set up standard methods for all regional councils – and, ideally, other entities doing this work (such as NIWA) – to use.

How are water quality results interpreted?

- 3.16 As well as no standard set of variables or methods, there is no nationally consistent set of guidelines or standards that regional councils, the Ministry for the Environment, and NIWA use to assess whether water quality is within acceptable limits. Instead, agencies that report on freshwater quality use various guidelines or targets, including:
- Australian and New Zealand Environment Conservation Council (ANZECC) guidelines;¹⁵

¹⁵ Australian and New Zealand Environment Conservation Council (2000), *National water quality management strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.

- Ministry for the Environment water quality guidelines for clarity;¹⁶
- Ministry for the Environment and Ministry of Health microbiological water quality guidelines for recreational use;¹⁷ and
- targets, limits, or standards set by regional councils.

3.17 Revised in 2000, the ANZECC guidelines include numerical “trigger values”. These values can be used to assess whether there is cause to investigate water quality issues further or whether a result suggests that the water quality supports ecological values.

Freshwater monitoring in the four councils’ regions

3.18 We commissioned NIWA to help us assess whether the Waikato, Taranaki, Horizons, and Southland regional councils have effective methods to gather information about and monitor the physical, chemical, and microbiological quality of freshwater.

3.19 Because there is no single set of variables, monitoring methods, guidelines, or standards that regional councils use to measure freshwater quality, and no agreed methodology for analysing and reporting freshwater quality data at the national level, NIWA had to design a methodology to analyse regional data and report conclusions at a national level. This methodology involved nominating trigger values for physical, chemical, and microbiological freshwater quality variables and comparing the regional freshwater quality monitoring data against these trigger values.

3.20 The trigger values are not national standards but have been nominated to assess whether the levels of physical and chemical stressors might have adverse biological or ecological effects. They are not specifically designed for each region. Rather than implying that increased levels of physical and chemical stressors will cause adverse biological or ecological effects, values above the trigger levels call for further investigation of water quality.

3.21 NIWA’s methodology to assess the state of, and trends in, freshwater quality included:

- assessing the methods used to monitor the freshwater in each of the four regions;
- obtaining information from the regional councils that described physical, chemical, and microbiological water quality monitoring programmes for rivers, lakes, and groundwater (including the locations and the details of monitoring sites, the frequency of monitoring, the variables analysed, and the quality assurance/quality control and data storage procedures);

16 Ministry for the Environment (1994), *Resource Management Water Quality Guidelines No. 2: Guidelines for the Management of Water Colour and Clarity*, which is available at www.mfe.govt.nz.

17 Ministry for the Environment and Ministry of Health (2003), *Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Areas*.

- evaluating whether the monitoring networks in each region included enough sites; and
 - determining that the scope of the freshwater quality state and trend analysis would include 10 physical, chemical, and microbiological variables in river water quality data supplied by the councils and the National River Water Quality Network.¹⁸
- 3.22 The state and trends in lake water and groundwater was not analysed because there is less consistency in how that information is collected.
- 3.23 The four regional councils also monitor biological characteristics in rivers, including periphyton and macroinvertebrates, as measures of ecological health. However, NIWA did not analyse the state of, and trends in, these biological variables because the councils assessed different variables, at different sampling frequencies, and over different periods. These differences reflect differing regional focuses for biological monitoring programmes.
- 3.24 NIWA used the River Environment Classification system (REC), which is a tool that organises and maps information about New Zealand’s rivers. The REC groups rivers with similar characteristics based on the climate, topography, geology, and land cover of their catchments. The groups used in this study were based on the dominant catchment topography. Four topographic categories were defined: low-elevation, hill, mountain, and lake. The REC assigns sections of rivers (and therefore the water quality monitoring sites) to one of these categories using “rules” that are mainly applied to data that describes the elevation at which most of the catchments annual rainfall occurs. For example, if most of a catchment’s rainfall occurs above 1000m above sea level, the catchment was categorised as “Mountain”.
- 3.25 NIWA used the median value of each of the variables at the sites (or the 95th percentile for E. coli) as a measure of the state and compared these with guideline trigger values (where available) for water quality (see Appendix 4).
- 3.26 Finally, NIWA analysed trend direction and strength for the 10 physical, chemical, and microbiological variables over the 10-year period from 2000 to 2009. The strength and direction of trends were quantified using statistical methods for estimating trends in data that are subject to appreciable seasonality, such as water quality data. The freshwater quality trend data were adjusted for river flow or a flow estimation method was applied before the data were analysed.

18 Appendix 4 sets out the 10 variables assessed for this analysis.

Monitoring networks, range of variables monitored, and quality assurance

- 3.27 The results of NIWA's analysis showed that each of the four regional councils:
- has well-planned and well-operated networks for assessing the current state and long-term trends in the physical and chemical quality of freshwater;
 - has monitoring networks with sites that are distributed throughout their regions reasonably representatively;
 - is monitoring a comprehensive suite of relevant physical, chemical, microbiological, and biological variables suitably often; and
 - generally has adequate quality assurance, quality control, and data storage procedures.
- 3.28 This analysis indicated that each of the four regional councils had access to good quality information about freshwater quality, which it could use to inform freshwater quality management.
- 3.29 NIWA considered that no region had too few sites to adequately describe regional patterns in water quality, but Environment Southland and Waikato Regional Council had many more sites than Taranaki Regional Council and Horizons Regional Council that met NIWA's criteria for trend analysis.
- 3.30 The data for 12 physical, chemical, and microbiological monitoring sites in Taranaki were enough to detect patterns. Horizons Regional Council's dataset was barely adequate to describe large-scale patterns in water quality state and trends in the region. This is because Horizons Regional Council had previously used a system of "rolling sites". Horizons Regional Council significantly improved its monitoring network between 2007 and 2009, which will now support more comprehensive trend analysis.
- 3.31 The large differences between regions in the total number of active monitoring sites partly reflects the size of the regions.
- 3.32 To provide more meaningful commentary about the freshwater quality trends in Horizons Regional Council and Taranaki Regional Council's regions, we have also considered additional analysis carried out within these regions (see paragraphs 3.43-3.46).

Freshwater quality state

- 3.33 Figures 7 to 10 summarise the results of the freshwater quality state and trend analysis for each of the four regional councils, compared to the trigger values and guidelines discussed in paragraph 3.20 and shown in Appendix 4.

- 3.34 When the freshwater quality is shown as “Fail” in these Figures, there is cause for further investigation. A “Pass” is given where the results are below (or above, for Clarity) a guideline trigger value. A “Pass” suggests that the water is ecologically healthy. “NS” means there are no significant trends, and “NA” means there are no monitoring sites in the topographical category.
- 3.35 NIWA’s analysis shows that water quality varied considerably between and within regions. In general, sites classified as being in the “mountain”, “lake”, and “hill” topographical categories had the best water quality. Low-elevation sites usually failed water-quality guidelines, trigger values, and standards. Hill sites sometimes failed.
- 3.36 Poor water quality (high nutrients and faecal pollution, and low visual clarity) was associated with pastoral land use areas. Water quality was even poorer in urban streams. These patterns match findings of other studies.¹⁹

Freshwater quality trends

- 3.37 NIWA analysed freshwater quality trends in the four regions between 2000 and 2009.
- 3.38 Overall, water quality declined during the 10 years in low-elevation areas (which are usually dominated by pastoral land) and some hill areas.
- 3.39 Most regions showed a mix of improving and deteriorating trends. Overall, phosphorus levels showed improving trends.²⁰ This might be related to the increased cost of phosphorus fertiliser and active managing of soil phosphorus, or because of better managing of point source discharges.
- 3.40 The most concerning trends were in Waikato and Southland. In Waikato, six of the nine assessed variables in low-elevation sites, three of nine variables in hill sites, and four of nine in lake sites showed deteriorating trends (see Figure 7).

19 For example: Davies-Colley RJ, Nagels JW (2002), “Effects of dairying on water quality of lowland streams in Westland and Waikato”, *Proceedings of the New Zealand Grassland Association* Vol. 64, pages 103–205; Smith CM, Wilcock RJ, Vant WN, Cooper AB (1993), *Towards Sustainable Agriculture: Freshwater Quality in New Zealand and the Influence of Agriculture. NIWA ecosystems report for MAF Policy and Ministry for the Environment*; Larned ST, Scarsbrook MR, Snelder TH, Norton NJ, Biggs BJF (2004), “Water quality in low elevation streams and rivers of New Zealand: Recent state and trends in contrasting land cover classes”, *New Zealand Journal of Marine and Freshwater Research*, Vol. 38, pages 347–366; and Ballantine, D.; Booker, D.; Unwin, M.; Snelder, T. (2010), *Analysis of national river water quality data for the period 1998–2007. NIWA Client Report CHC2010-038*. Prepared for the Ministry for the Environment.

20 Specifically, total phosphorus and dissolved reactive phosphorus levels improved. Figures 7-10 do not reflect the detailed NIWA data on phosphorus.

Figure 7
NIWA's analysis of water quality – Waikato Regional Council

Variable	Low-elevation (57%)		Hill (25%)		Lake (16%)		Mountain (2%)	
	State	Trend	State	Trend	State	Trend	State	Trend
Clarity	Fail	↓	Fail	↓	Fail	↓	Pass	NA
Conductivity	NA	↓	NA	NS	NA	↓	NA	NA
Ammoniacal nitrogen	Pass	↑	Pass	NS	Pass	NS	Pass	NA
Oxidised nitrogen	Fail	↓	Pass	↓	Pass	↓	Pass	NA
Total nitrogen	Fail	↓	Pass	↓	Pass	↓	Pass	NA
Dissolved reactive phosphorus	Fail	↑	Fail	↑	Fail	NS	Fail	NA
Total phosphorus	Fail	↑	Fail	↑	Fail	NS	Pass	NA
Escherichia coli	Fail	↓	Fail	NS	Pass	NS	NA	NA
Faecal coliforms	Fail	↓	Pass	NS	Pass	NS	NA	NA

Note: The data has been compared with nominated water quality trigger values and grouped using REC categories (see Appendix 4). The value in brackets is the proportion of rivers (by length) that belong to each REC category in this region. Upward arrows indicate improving trends; downward arrows indicate deteriorating trends.

- 3.41 The results for Southland show deteriorating trends for three of nine variables in low-elevation sites and two of nine in hill sites (see Figure 8).

Figure 8
NIWA's analysis of water quality – Environment Southland

Variable	Low-elevation (43%)		Hill (33%)		Lake (10%)		Mountain (13%)	
	State	Trend	State	Trend	State	Trend	State	Trend
Clarity	Fail	NS	Pass	NS	Pass	NS	Pass	NA
Conductivity	NA	NS	NA	↓	NA	NS	NA	NA
Ammoniacal nitrogen	Fail	↓	Pass	NS	Pass	NS	Pass	NA
Oxidised nitrogen	Fail	↓	Pass	↓	Pass	NS	Pass	NA
Total nitrogen	Fail	↓	Pass	NS	Pass	NS	Pass	NA
Dissolved reactive phosphorus	Fail	NS	Pass	↑	Pass	NS	Pass	NA
Total phosphorus	Fail	NS	Pass	NS	Pass	NS	Pass	NA
Escherichia coli	Fail	NS	Fail	↑	Pass	NA	Pass	NA
Faecal coliforms	Fail	NS	Pass	↑	Pass	NA	Pass	NA

Note: The data has been compared with nominated water quality trigger values and grouped using REC categories (see Appendix 4). The value in brackets is the proportion of rivers (by length) that belong to each REC category in this region. Upward arrows indicate improving trends; downward arrows indicate deteriorating trends.

- 3.42 NIWA's analysis for Taranaki showed two deteriorating trends in low-elevation sites and no improving trends (see Figure 9).

Figure 9
NIWA's analysis of water quality – Taranaki Regional Council

Variable	Low-elevation (83%)		Hill (16%)		Lake (0%)		Mountain (1%)	
	State	Trend	State	Trend	State	Trend	State	Trend
Clarity	Fail	↓	Pass	NS	NA	NA	NA	NA
Conductivity	NA	NS	NA	NS	NA	NA	NA	NA
Ammoniacal nitrogen	Pass	↓	Pass	NS	NA	NA	NA	NA
Oxidised nitrogen	Fail	NS	Pass	NS	NA	NA	NA	NA
Total nitrogen	Fail	NS	Pass	NS	NA	NA	NA	NA
Dissolved reactive phosphorus	Fail	NS	Fail	NS	NA	NA	NA	NA
Total phosphorus	Pass	NS	Pass	NS	NA	NA	NA	NA
Escherichia coli	Fail	NS	Fail	NS	NA	NA	NA	NA
Faecal coliforms	Pass	NS	Pass	NS	NA	NA	NA	NA

Note: The data has been compared with nominated water quality trigger values and grouped using REC categories (see Appendix 4). The value in brackets is the proportion of rivers (by length) that belong to each REC category in this region. Downward arrows indicate deteriorating trends.

- 3.43 We also considered MCI data in Taranaki. Taranaki Regional Council's MCI monitoring is carried out at 51 sites on 22 rivers twice a year, and covers near-pristine waters and those in intensively farmed catchments. NIWA concluded that the data provide a good picture of the biological status of the rivers.
- 3.44 The MCI data show fair-poor biological health in low-elevation pasture areas. Upper catchments are healthier. Taranaki's MCI data trends show that the biological health of surface water is being maintained, is improving in some places (primarily in the mid-catchment areas), and has not demonstrably deteriorated at any sites.

- 3.45 NIWA's analysis of trends in Horizons Regional Council data showed no significant improvement or deterioration in freshwater quality (see Figure 10).

Figure 10
NIWA's analysis of water quality – Horizons Regional Council

Variable	Low-elevation (52%)		Hill (39%)		Lake (0%)		Mountain (9%)	
	State	Trend	State	Trend	State	Trend	State	Trend
Clarity	Fail	NS	Fail	NS	NA	NA	Fail	NA
Conductivity	NA	NS	NA	NS	NA	NA	NA	NA
Ammoniacal nitrogen	Pass	NS	Pass	NS	NA	NA	Pass	NA
Oxidised nitrogen	Fail	NS	Pass	NS	NA	NA	Pass	NA
Total nitrogen	Fail	NS	Pass	NA	NA	NA	Pass	NA
Dissolved reactive phosphorus	Fail	NS	Fail	NS	NA	NA	Pass	NA
Total phosphorus	Fail	NS	Pass	NA	NA	NA	Pass	NA
Escherichia coli	Fail	NS	Fail	NS	NA	NA	NA	NA
Faecal coliforms	NA	NA	NA	NA	NA	NA	NA	NA

Note: The data has been compared with nominated water quality trigger values and grouped using REC categories (see Appendix 4). The value in brackets is the proportion of rivers (by length) that belong to each REC category in this region.

- 3.46 Because of the previous limitations of Horizons Regional Council's water quality monitoring networks (discussed in paragraph 3.30), we have also analysed a 2009 NIWA report for Horizons Regional Council on trends in freshwater quality.²¹ This report concluded that there were long-term declining trends in visual clarity and nutrients,²² but analysis of more recent data suggested that water quality was stabilising or even improving at some sites.

Reporting the results of freshwater quality monitoring to communities

- 3.47 Section 35 of the RMA requires regional councils to monitor:

- the state of the environment (section 35(2)(a)); and
- the effectiveness and efficiency of policies, rules, or other methods in their policy statement or plans (section 35(2)(b)). The results of this monitoring must be compiled and made available to the public at least every five years (section 35(2A)).

²¹ *Water Quality State and Trends in the Horizons region*, June 2009, prepared by NIWA for Horizons Regional Council.

²² Specifically turbidity, dissolved reactive phosphorus, and nitrate.

- 3.48 We assessed the four regional councils' State of the Environment reports and other reports on freshwater quality to determine whether they:
- clearly told the reader the state of, and trends in, freshwater quality;
 - explained the information in a way that could be easily understood;
 - were consistent between reports and documents; and
 - identified whether action was needed in response to what the information showed and summarised what was being done to address any issues.
- 3.49 All four councils had reported their State of the Environment monitoring results in varying formats and frequencies. As well as State of the Environment reports, Waikato Regional Council and Environment Southland reported freshwater quality through regular "report cards". Since 2009, Horizons Regional Council has operated the *WaterQualityMatters* online water quality database, which makes freshwater quality monitoring results quickly available to the community.
- 3.50 In many ways, the four regional councils clearly reported information about freshwater quality to communities – particularly where the councils' overall judgements on the information reported made it easy for readers to understand (for example, "water quality is poor"). Summaries in Environment Southland's *Our Health*²³ report were clear and answered the questions most relevant to many readers – "Is it safe to swim and play and collect kai from the waters?"
- 3.51 However, each of the four regional councils could improve their State of the Environment reporting (whether in a report, report card, or online database) to allow the reader to fully appreciate the implications of the information. Ideally, freshwater quality information for the public should:
- compare the freshwater quality monitoring results with plan objectives, limits, and standards where possible, and with freshwater quality guidelines where necessary;
 - say whether freshwater quality is getting better or worse;
 - outline probable reasons for the quality of the freshwater; and
 - discuss what the council and the community are doing, or can do, to remedy problems.
- 3.52 In our view, regional councils could clarify what freshwater quality monitoring results mean for communities and resource users. For example, reporting on bacteria levels might clearly show that they are above guidelines but, for a member of the public to see the relevance of this, the corresponding potential outcome needs to be more clearly stated. A statement could be made that "E. coli levels were above guidelines because rainfall has caused faecal matter to run off

23 Environment Southland (2010), "Our Health: Is our water safe to play in, drink and gather kai from?" Part 1, *Southland Water 2010: Report on the State of Southland's Freshwater Environment*, page 5.

from land. There are health risks associated with high E. coli levels and the water is not suitable for swimming.”

- 3.53 Most of the four regional councils provided information on what they were doing in response to any water quality issues, but this information was not always easy for the reader to access. This information was generally in a separate section of the report and not structured in a way that allowed the reader to easily identify what aspects of freshwater quality the various management actions were targeting and whether they were working. This means that the reader could not judge whether the council was responding appropriately to freshwater quality issues.
- 3.54 State of the Environment reports are often published as high-quality documents. With the availability of the Internet, councils might wish to consider whether it is necessary to provide a State of the Environment report in hard copy. Targeted report cards and online databases are a timely and cost-effective alternative to producing more time-consuming and expensive State of the Environment reports. One risk of using report cards and online databases is that it can be more difficult to get an overall picture of the state of the whole region. This risk could be reduced by providing clear links between report cards and by ensuring that all online information is easily accessible in one place.
- 3.55 All regional councils’ freshwater quality monitoring results are available on a new website (www.landandwater.co.nz). Regional councils and unitary authorities set up the website, which aims to report data in a common format. Creating the website has helped identify opportunities for regional councils to improve practices and be more consistent in monitoring, data storage, analysis, and reporting.

Reporting freshwater quality information to councillors

- 3.56 We looked at reporting of freshwater quality information to councillors. We expected information about freshwater quality to be regularly reported in a format that allowed councillors to understand the issues and make informed management decisions.
- 3.57 We found that all four regional councils operated a reporting framework that allowed information about freshwater quality and issues to be brought to the council promptly for advice or decisions. Information was regularly reported on freshwater quality to the council and council committees. The information included summaries on work programmes, specific projects, water quality trends, consent and compliance updates, and monitoring approaches. We considered that the information provided to the councils and their committees was clear, appropriate, and understandable.

- 3.58 All four regional councils published council and committee agendas, minutes, and most reports about freshwater quality reporting on their websites.

Conclusion

- 3.59 All four regional councils report freshwater quality information to their councillors and to communities. A number of innovative methods were in use. Overall, regional councils could improve how they report on freshwater quality to make it easier for the public to understand what freshwater quality results mean to them, where freshwater quality is not good, the factors contributing to this, and what the council and communities could do to improve it.

Recommendation 1

We recommend that all regional councils and unitary authorities review methods for reporting results of their freshwater quality monitoring to ensure that the methods:

- compare the freshwater quality monitoring results with (ideally specific, measurable, achievable, relevant and time-bound) plan objectives, limits, and standards where possible and with guidelines where necessary;
 - say whether freshwater quality is getting better or worse;
 - outline probable reasons why freshwater quality is in the condition that it is; and
 - discuss what the council and the community are doing, or can do, to remedy any problems.
-

Monitoring and reporting on the effectiveness and efficiency of policies and methods

- 3.60 Taranaki and Waikato Regional Councils met the RMA requirements to monitor and report on the effectiveness and efficiency of the policies and methods in their planning documents. Horizons Regional Council and Environment Southland were not formally monitoring the effectiveness and efficiency of their policies and methods, and therefore not making the results of the monitoring available to the public.
- 3.61 Horizons Regional Council and Environment Southland were not alone in this. In 2007/08, the Ministry for the Environment asked regional councils and unitary authorities whether they were doing the monitoring and reporting required under the RMA.²⁴ The results of the survey showed that, although all regional councils monitored the effectiveness and efficiency of policies and methods, only

²⁴ Ministry for the Environment (2009), *Resource Management Act: Two-yearly Survey of Local Authorities 2007/2008, Ministry for the Environment*, Wellington, page 43.

75% reported this information. Only 60% of unitary authorities monitored the effectiveness and efficiency of their plans and only 20% did the required reporting.

- 3.62 Taranaki Regional Council has robust methods for reviewing the effectiveness and efficiency of its policies and methods. In 2008, it carried out a comprehensive review of its *Regional Freshwater Plan*. The review was made available to the public. In our view, it clearly shows that Taranaki Regional Council understands the importance of monitoring whether its plans and policies are having the desired effect. Its monitoring incorporates State of the Environment monitoring, and monitoring of complaints and compliance with resource consents.
- 3.63 Waikato Regional Council monitors the effectiveness of its policy and methods and reports the results of this monitoring to the public. In 2007, the council evaluated its 2002 regional policy statement. It has also carried out a series of reviews looking at the extent to which the objectives of the regional policy statement were being achieved. Each review looks at a selection of objectives, so that every five years all objectives will have been reviewed.
- 3.64 The regional policy statement evaluation and the reviews look at whether objectives (outcomes) are achieved. They are done on the assumption that the policies and methods would need to be re-examined if the outcomes were not achieved. If objectives are not achieved, the methods and how they are implemented are analysed in more detail. More detailed analysis seeks to understand what is going wrong (that is, whether the methods are the right ones, whether they are implemented successfully, or whether there are external pressures that are not being managed). Suggestions for improvements to meet the objectives are identified.
- 3.65 Waikato Regional Council's regional plan became operative in 2007 and has not yet been monitored under section 35(2)(b) of the RMA.
- 3.66 Waikato Regional Council's 2007 regional policy statement evaluation found that, for the most part, its objectives had not been met. There had been either no monitoring to assess whether they were achieved or the objectives were too imprecise to measure. In late 2010, Waikato Regional Council released a proposed new regional policy statement, which, like its predecessor, does not provide a strong basis for measuring the effectiveness and efficiency of its policies and methods. The Environmental Results Anticipated²⁵ (ERAs) in the proposed regional policy statement are not a statement of what can be achieved by implementing the proposed regional policy statement, are not easily measurable, and, sometimes, do not specify an environmental result.

²⁵ Environmental Results Anticipated must be included in regional policy statements, and are a statement of what might be achieved from the combined effect of the objectives, policies, and methods. For more information on the contents of planning documents, see Appendix 3.

- 3.67 Waikato Regional Council is planning to review its regional plan, which presents an opportunity to improve its ability to monitor whether its policies and methods are having the desired effect. To support the quality of its performance information, Waikato Regional Council needs to write specific, measurable, achievable, relevant, and time-bound objectives and clearly set out how its policies and methods will ensure that these objectives are achieved. This approach has largely been taken for the objectives set in the Waikato Regional Council's *Variation 5 – Lake Taupo Catchment*. Also, Waikato Regional Council's regional policy statement includes a method to set standards associated with the values of water bodies. These standards should help to set a measurable framework for assessing whether the policies and methods are being achieved.
- 3.68 Horizons Regional Council has clear methods to evaluate the effectiveness and efficiency of its policies and methods in its new combined regional policy statement and regional plan, called the *One Plan*. It has thought about how it will use water quality monitoring results to show that its policies are working. Horizons Regional Council has aligned the ERAs in the *One Plan* with the outcomes in its long-term plan. Therefore, the information needed to assess progress towards ERAs and community outcomes is the same.
- 3.69 Horizons Regional Council intends to monitor how effective the policies and methods in the *One Plan* are in achieving ERAs every three years. It will do this at the same time as it reports progress made in achieving community outcomes for the region. Although the *One Plan* is still under appeal and it is too early to have assessed this plan under section 35(2)(b), Horizons Regional Council has not met these requirements for its previous regional policy statement or regional plans.
- 3.70 Environment Southland's regional policy statement has been in use since 1997, but there was no review of the effectiveness and efficiency of its policies and methods until a statutory review of the document began in 2009.²⁶ The *Regional Water Plan* for Southland became operative in March 2010, so has not yet been reviewed. The *Regional Water Plan* includes a method to assess the plan's effectiveness. As with Waikato Regional Council, the method measures whether environmental outcomes are achieved as a proxy for measuring the effectiveness of the policies and methods. As well as the method outlined in the *Regional Water Plan*, Environment Southland has written a monitoring strategy. The strategy is high-level, and does not specifically set out how the policies and methods in the regional plan will be monitored. Environment Southland's approach to effectiveness and efficiency monitoring includes State of the Environment and compliance monitoring.

26 Under section 79 of the RMA, there is a legal requirement to review planning documents every 10 years.

- 3.71 Environment Southland intends to use annual report cards to report to the community on how effective its plan is. Environment Southland considers that trend data indicates whether its policy approaches and rules are effective. There need to be stronger links in the monitoring strategy to how this data will be used to assess policy effectiveness. Again, as with Waikato Regional Council, the water quality standards in the *Regional Water Plan* provide a basis for this.

Conclusion

- 3.72 Taranaki Regional Council and Waikato Regional Council were meeting the requirements of the RMA to measure and report on whether their policies and methods are having the desired effect. Horizons Regional Council and Environment Southland were not.
- 3.73 The purpose of sections 35(2)(b) and 35(2A) of the RMA are to ensure that councils are pursuing environmental management in the most effective way available. These legislative requirements ensure that policies are developed, monitored, and reviewed on an ongoing basis.
- 3.74 Including specific, measurable, achievable, relevant, and time-bound objectives in planning documents provides a strong basis for measuring and reporting on whether policy outcomes are being achieved.
- 3.75 We consider that writing regional plans with specific, measurable, achievable, relevant, and time-bound objectives, including numeric targets for water quality, and including indicators and systems to monitor efficiency and effectiveness, is not too onerous. The ultimate measure of whether policies and methods for freshwater quality are working is whether freshwater quality objectives are being achieved and, where not yet achieved, whether freshwater quality is improving or declining.

Recommendation 2

We recommend that all regional councils and unitary authorities set up stronger links between freshwater quality monitoring results and how they measure the effectiveness of their policies for maintaining and enhancing freshwater quality.

Recommendation 3

We recommend that all regional councils and unitary authorities meet the requirements of sections 35(2)(b) and 35(2A) of the Resource Management Act 1991 to monitor the effectiveness and efficiency of the policies, rules, or methods in their policy statements and plans, and to compile and make the results of this monitoring available to the public at least every five years.

Recommendation 4

We recommend that the Ministry for the Environment provide guidance on what is expected from regional councils to meet the requirements of sections 35(2)(b) and 35(2A) of the Resource Management Act 1991.

Recommendation 5

We recommend that all regional councils and unitary authorities include specific, measurable, achievable, relevant, and time-bound objectives in their regional plans and in their long-term plans under the Local Government Act 2002.

Part 4

Responding to issues and setting policies

- 4.1 In this Part, we discuss how regional councils:
- respond to water quality issues as they arise; and
 - set freshwater policies.

Our overall findings

- 4.2 All four regional councils have areas of declining freshwater quality. The regional councils were responding to these areas of decline and to complaints and pollution incidents reported by community members. The timeliness of responses was variable, with Waikato Regional Council and Environment Southland needing to improve.
- 4.3 Some regional councils are moving away from permitted activity rules towards stronger regulatory approaches to managing non-point source discharges. The activities and land uses that regional councils are seeking to regulate are often the same activities that the dairy sector is working with farmers to manage better. There is already significant collaboration between the dairy sector and some regional councils, and we encourage regional councils to continue to work closely with the dairy sector to improve freshwater quality.
- 4.4 All regional councils are currently considering how they will respond to the National Policy Statement. Regional councils may need support from central government and the Land and Water Forum on how to set limits under this framework, and how to manage the effects of intensified land use within those limits.

Responding to freshwater quality issues

- 4.5 We expected regional councils to have systems to alert them to areas of declining freshwater quality (as shown by scientific monitoring results) and allow them to respond to declining water quality as it became apparent.
- 4.6 Responses taken by regional councils might include:
- investigating the cause of declining freshwater quality;
 - initiating programmes to improve freshwater quality; and
 - making changes to regulatory and non-regulatory programmes to address the causes of declining freshwater quality.

Initiating programmes to improve water quality

- 4.7 All four regional councils were able to cite examples where scientific monitoring data had identified declining freshwater quality and where the council had taken action in response. The councils had also changed their monitoring networks to

enable them to monitor emerging resource management issues or to ensure that policies were working. Examples included:

- identifying faecal and nutrient peaks in a Waikato stream led to identifying a stock crossing on a nearby farm that allowed effluent to be directly deposited into the water body;
- implementing an innovative plan change to protect Lake Taupo in response to declining freshwater quality trends;
- annual reporting using the Macroinvertebrate Community Index that found negative trends in two Horizons Regional Council sites. A project to assess options to improve freshwater quality began at one site, and a detailed monitoring programme is under way at the other to identify the cause of declining freshwater quality;
- identifying the monitoring results that showed a risk to a Southland river, investigating the cause of the risk, and making recommendations to address the risk;
- preparing targeted guidelines and education programmes for resource users; and
- adding additional monitoring sites to the Taranaki network to allow the council to monitor the effectiveness of its riparian planting programme.

- 4.8 The actions that councils have taken in response to emerging freshwater quality data have not always been timely. For example, we note two instances in Southland where faecal contamination of waterways was detected. In one instance, it took two years to resolve issues about contamination from septic tanks entering a waterway. In the other instance, it took four years for Environment Southland to launch a project to address the faecal contamination in the catchment.

Making changes to planning documents and council processes

- 4.9 All four regional councils used the results of their scientific monitoring programmes to update their policies, methods, or programmes for responding to emerging issues. These changes range from extensive and far-reaching plan changes to strengthening ongoing council programmes. The latter can include reorganising compliance and enforcement and education activities to better target risks from non-point source discharges or developing systems to record the number of permitted activities occurring in the region.
- 4.10 Scientific information supports Taranaki Regional Council's reviews of policies. Although Taranaki Regional Council has not made any fundamental changes to its planning documents (despite the *Regional Freshwater Plan* becoming operative

in 2001), it continues to improve on the implementation of its regional plan. Each year, Taranaki Regional Council produces annual reports on all its significant activities. There is evidence that Taranaki Regional Council uses this information to refine and adapt its programmes for managing freshwater quality.

- 4.11 Horizons Regional Council used scientific information extensively when forming the region's new *One Plan*, which resulted in a significant refocusing of policies to address the region's freshwater quality issues. It carried out a comprehensive scientific programme to ensure that policy development was based on sound technical information. Catchments at risk from non-point source discharges and sediment were identified, and regulatory and non-regulatory programmes were designed to target the risks.
- 4.12 Environment Southland has made several plan changes to respond to emerging issues in the region. The plan change for managing dairy farm effluent is not yet operative, so the council is yet to see improvements resulting from the policy change. However, we consider that the new policies significantly strengthen the council's approach to managing non-point source discharges.
- 4.13 Waikato Regional Council has also made several plan changes to respond to emerging issues in the region. The most high-profile plan change was *Variation 5*, which introduced nitrogen limits for discharges in the Lake Taupo catchment (see paragraph 4.38).
- 4.14 Waikato Regional Council has identified that its current permitted activity framework is not effectively managing significant risks to freshwater quality in the region. However, it is yet to change how it manages non-point source discharges. We consider that such change is imperative given deteriorating freshwater quality and high levels of non-compliance in the region. Waikato Regional Council publicly notified its updated regional policy statement in November 2010, and a new regional plan process will soon be under way. It is intended that the new regional plan will provide a stronger framework for managing non-point source discharges.
- 4.15 In addition, Waikato Regional Council, through *Variation 6* to its regional plan, is proposing that water takes for cooling milk and washing dairy sheds require a controlled activity resource consent. To meet the conditions of the proposed controlled activity, applicants must, among other steps, exclude all stock from water bodies (for example, by fencing) and provide a riparian vegetation management plan for the property. It is intended that this will have significant water quality benefits throughout the region. This proposal is currently before the Environment Court and a decision is expected in late 2011.

Responding to complaints and pollution incidents

- 4.16 We also expected regional councils to have systems for communities to report pollution incidents or make complaints about freshwater quality issues. We expected regional councils to respond to complaints and pollution incidents when they occurred.
- 4.17 All four regional councils operated systems to receive complaints and reports of pollution incidents and most had set targets for responding to these complaints and incidents.
- 4.18 Taranaki Regional Council reports that it responds to all pollution incidents and other complaints within four hours of receiving the complaint. The council's response includes instigating control, clean-up, and enforcement procedures where appropriate. Taranaki Regional Council registered and investigated 546 pollution incidents and other complaints in 2009/10, and 57% of these related to freshwater. The Council places great emphasis on responding to, and acting on, pollution complaints to ensure that consent and plan requirements are complied with once approved.
- 4.19 Horizons Regional Council staff use a scoring sheet to assess the appropriate response time to complaints and pollution incidents. The Council aims to respond to 80% of urgent incidents within four hours and to 70% of non-urgent environmental issues within two days. In 2009/10, Horizons Regional Council responded to 85% of urgent incidents and 67% of non-urgent incidents within the time frames set. Horizons Regional Council reports that its response is restricted by staff availability – generally because of prior work commitments to ongoing investigations or the requirements of the monitoring programme.
- 4.20 Environment Southland attempts to respond within one hour to all land-related incidents and complaints about incidents that have a negative effect on water. In 2009/10, Environment Southland met this target only 45% of the time. Staff resources are limiting Environment Southland's ability to respond within the stated time frames. The database that Environment Southland staff use to record complaints and pollution incidents does not flag follow-up actions where required. This is recognised as a problem that contributes to a lack of timeliness in responding.
- 4.21 Waikato Regional Council has set targets for responding to significant pollution incidents and complaints about freshwater quality, but not for other complaints and pollution incidents related to freshwater. Waikato Regional Council receives between 1200 and 1400 complaints each year, about 25% of which relate to

discharges to water. Waikato Regional Council has a system for recording and responding to complaints, but we were not confident that the system rigorously:

- records the follow-up action that is taken to resolve complaints and pollution incidents and identify risks to freshwater quality – especially for complaints and incidents that occur outside of office hours; or
- monitors progress in responding to complaints and pollution incidents to ensure timely resolution and recording where enforcement action has been taken.

4.22 Waikato Regional Council also notes that staff resourcing can limit its ability to respond to complaints.

Conclusion

4.23 All four regional councils had systems that allowed them to identify areas of declining freshwater quality and to respond to complaints and pollution incidents.

4.24 Regional councils used the results of their scientific monitoring programmes to:

- investigate or implement programmes to improve freshwater quality; and
- update their policies, methods, or programmes to respond to emerging issues.

4.25 Some responses to declining freshwater quality and pollution complaints and incidents were more timely than others. Staff availability is the main factor for some councils responding to complaints and incidents in a timely manner.

4.26 Waikato Regional Council needs to improve its systems for ensuring and recording responses to complaints and pollution incidents. Environment Southland and Waikato Regional Council need to improve timeliness in responding to declining water quality issues when they become apparent.

Setting freshwater policies

Implementing science-based limits, standards, or targets

4.27 When discussing water quality, the “capacity for use” of a water body means the ability of the water body to dilute and assimilate contaminants while sustaining water quality at a level acceptable to communities. A “limit” can be referred to as the maximum contaminant load that a water body can assimilate while maintaining the level of water quality that is desired by communities. Different water bodies will have different limits set according to how they are used – for example, less contamination might be acceptable for a mountain stream than for an urban stream.

- 4.28 Deciding what the numerical limit should be for a particular water quality variable and a particular water body is complex. It requires input from multiple disciplines, including various scientific fields, economics, law, policy, and planning. Setting a limit for water quality involves discussing the desired environmental state with communities and agreeing a numerical value that meaningfully represents this environmental state.
- 4.29 The Land and Water Forum found that a lack of limits for managing freshwater was a major problem. The Land and Water Forum's report stated:
- Without limits it is hard to manage [non-point source] discharges – nutrients, microbes, sediment and other contaminants that wash into water from the land – and impossible to deal with the cumulative effects on water bodies of water takes on the one hand and [non-point source] and direct discharges to water on the other.*
- ... There are a number of reasons why limits have been difficult to set. Central government has not used national instruments to provide direction though two are now in preparation. Few regional councils have had the consistent and coherent policy and planning frameworks to put the necessary management regimes in place ... It is difficult to get agreements about what limits should be, how quickly they should be achieved and who should bear the cost.²⁷*
- 4.30 In partial response to the Land and Water Forum's report, the Minister for the Environment approved the National Policy Statement, which came into effect from 1 July 2011 (see paragraphs 2.20-2.21). The National Policy Statement requires all regional councils to make or change regional plans to set freshwater objectives and freshwater quality limits for all bodies of freshwater in their regions.
- 4.31 In 2010, the Ministry for the Environment commissioned a report that identified barriers in regional councils to setting and meeting freshwater quality limits.²⁸ These included a lack of:
- political will to set limits for non-point source pollution;
 - stakeholder/community buy-in to the issues associated with non-point source pollution;
 - guidelines or robust science to translate ecological, cultural, amenity, and recreational values to limits;
 - understanding of how to trade and balance social and economic outcomes; and
 - time and resources to develop specific limits for catchments.

²⁷ Land and Water Forum (2010), *Report of the Land and Water Forum: A Fresh Start for Fresh Water*, page viii.

²⁸ Sinclair, Knight, Mertz (2010), *Regional Council Practice for Setting and Meeting RMA-based Limits for Freshwater Flows and Quality*, Ministry for the Environment.

- 4.32 Limits can be set at any level of the planning framework – including in national environmental standards, in regional policy statements and regional plans, or as conditions in resource consents. The Ministry for the Environment commissioned a report²⁹ published in June 2010 that describes the benefits of setting limits higher in the planning framework, at least at the regional plan level, as well as the consent condition level that has often been used in the past. The report suggests that objectives in regional plans must be measurable enough (preferably numeric) to allow limits to be justifiably set using science. Plans that contain measurable objectives and linked limits can:
- make environmental outcomes clearer and more certain;
 - be used to manage cumulative effects;
 - improve clarity about future resource availability and conditions likely to be included in resource consents;
 - manage multiple types of activities that affect freshwater quality (that is, point source and non-point source); and
 - measure whether objectives have been attained and monitor the effectiveness of plan provisions over time.
- 4.33 In September 2011, the Government outlined a further role for the Land and Water Forum in New Zealand’s freshwater reforms. In March 2012, the Land and Water Forum is to make recommendations on:
- what is needed to put in place the limit-settings aspects of the National Policy Statement, including what central government and local government need to do, the roles and responsibilities of water users, and the nature and scope of limit-setting tools; and
 - better processes for making decisions about limits, especially for involving iwi and other interest groups.
- 4.34 In September 2012, the Land and Water Forum is to prepare recommendations on how to manage freshwater within limits.

Managing freshwater within limits in the four regional council regions

- 4.35 The four regional councils took different approaches to setting limits for managing freshwater quality.
- 4.36 Horizons Regional Council’s proposed *One Plan* identifies values for water bodies. Water bodies with the same values are then grouped into Water Management Zones, and water quality limits are set for each zone. The limits are designed to protect the value assigned to each zone.

²⁹ NIWA (2010), *Technical and Scientific Considerations when Setting Measurable Objectives and Limits for Water Management*, Ministry for the Environment (which is available at www.mfe.govt.nz).

- 4.37 Scientific and technical investigations identified the numeric water quality limits needed to protect the particular values, and reference was made to recognised standards and guidelines such as ANZECC. Policies set in the *One Plan* propose a course of action to manage water quality within these limits where they are currently met, and to maintain and enhance water quality where the limits are not currently met. Horizons Regional Council reports little public debate on the freshwater quality limits in the proposed *One Plan* during the process of preparing the plan. Instead, the public debate centred on the costs to landowners and city and district councils associated with the proposed policy.
- 4.38 Waikato Regional Council's operative regional plan sets region-wide water quality limits based on the water quality classes set in Schedule 3 of the RMA.³⁰ These are a mix of numeric and descriptive limits. In the Taupo catchment, *Variation 5* to the regional plan sets an overall loading limit for nitrogen for the catchment. The idea is that this limit will maintain water quality in Lake Taupo at its current level, while allowing land users to trade nitrogen allowances within the limit. Identifying and setting an appropriate catchment loading limit took a significant amount of scientific work and cost and took more than 10 years to achieve.
- 4.39 Environment Southland classified its water bodies based on source of flow and geology. It used a technical expert panel to develop water quality standards for each class of water body. The standards were designed to support the values identified for the river classes, and are predominantly numeric limits. Public debate during the plan process focused on the numeric standards rather than the values. The process resulted in an increased number of measurable standards because the public wanted standards that could be enforced. The standards are implemented by rules that require discharges to meet the water quality standards.
- 4.40 Taranaki Regional Council identified values for water bodies through community consultation. It set narrative objectives for freshwater quality management in its regional plan and has good numeric measures and targets in its long-term plan and annual plan. Taranaki Regional Council uses numeric guidelines and the water quality classes in Schedule 3 of the RMA to assess resource consent applications. The regional plan sets numeric standards for discharges of dairy effluent to land and to water (which are both controlled activities³¹).
- 4.41 In all four councils, less work has been done on setting limits for managing groundwater quality. Environment Southland was the only regional council to set region-wide limits for groundwater quality.

30 See Appendix 3 for more information on Schedule 3 of the RMA.

31 A controlled activity is one for which a council must issue a resource consent, but conditions can be imposed on the consent.

Conclusion

- 4.42 All regional councils are currently considering how they will respond to the National Policy Statement and set limits under this framework. In our view, the Ministry for the Environment's report³² (see paragraph 4.32) is a useful place to start.
- 4.43 The councils that have set a limit in their regional plans have involved the public in the process – whether on what the limit should be or to support further numeric limits to bring more certainty to managing water quality.
- 4.44 Setting limits to manage freshwater quality in all water bodies in a region will present its own set of challenges for regional councils. However, the real challenge lies in managing the activities that affect water quality in a region so that those limits can be met. Regulating the activities that lead to non-point source discharge may be required to manage freshwater quality within limits.
- 4.45 The further work by the Land and Water Forum in 2012 on setting limits and managing within them should help regional councils to implement the National Policy Statement. The Ministry for the Environment could ask regional councils whether they need further guidance.

Recommendation 6

We recommend that the Ministry for the Environment seek input from regional councils and unitary authorities on whether they need information on:

- the economic assessments required to implement the changes required in the National Policy Statement for Freshwater Management; and
 - what has been learned from limit-setting processes already carried out in New Zealand and internationally.
-

Land use controls and non-point source discharge – regulating land use

- 4.46 Regional, district, and city councils all have functions to manage land use but for different purposes. City and district councils can control the actual or potential effects of the use, development, or protection of land. Regional councils have the function of controlling the use of land for the purpose of maintaining and enhancing the quality of water and ecosystems in water bodies.
- 4.47 Under the RMA, the use of land is permitted, unless that use contravenes a national environmental standard or a rule in a district plan or regional plan. If the use contravenes a rule, it can still be allowed if a resource consent is granted or

32 NIWA (2010), *Technical and Scientific Considerations when Setting Measurable Objectives and Limits for Water Management*, Ministry for the Environment (which is available at www.mfe.govt.nz).

the use has “existing use rights”. Although the use of land is generally permitted, discharging contaminants into the environment is prohibited by the RMA unless permitted by a national environmental standard, a rule in a regional plan, or under a resource consent.

- 4.48 Non-point source discharges are widely recognised as a significant issue for regional councils in managing water quality. Until recently, most councils have not taken a strong regulatory approach to managing these discharges.
- 4.49 Many land uses are a permitted activity in regional plans. These permitted activities (including, for example, discharging dairy effluent onto land in the Waikato region and applying agrichemicals where they may enter water in Southland) are allowed, provided that all conditions of the permitted activity rule are met.
- 4.50 Permitted activity rules are not individualised for landowners, meaning there could be a low level of knowledge of what the rules are and the need to comply with them. Some councils do not monitor compliance with permitted activities. Even if they did, they would not always know where and when the activity was occurring. It is difficult to monitor some permitted activity rules (for example, that fertiliser application accords with the permitted activity rules in the Waikato regional plan). The ability to monitor compliance with a regional plan raises awareness of the required management standard and can bring about improved rates of compliance.
- 4.51 As well as using permitted activity rules for some land-use activities that contribute to non-point source pollution, most councils have previously used non-regulatory programmes to attempt to manage the effects of non-point source discharges.
- 4.52 The non-regulatory programmes to manage non-point source discharges and sediment include:
- encouraging landowners to fence and plant trees along river and stream banks (riparian management);
 - subsidising plants and fencing for riparian management;
 - council staff and farmers working together to plan sustainable options for hill country farming (for example, planting forestry on eroding hill country); and
 - promoting and providing advice to farmers about best management practices.
- 4.53 However, some regional councils have found that landowners have not taken up voluntary non-regulatory programmes as much as the councils would have liked. For example, Taranaki Regional Council’s programme to address non-point source

discharges is its riparian management programme. Taranaki Regional Council has made significant progress in writing riparian plans for about 95% of dairy farms in the region. Since the riparian management programme began, landowners have fenced an additional 1919 kilometres of stream banks and 2 million plants have been sold to landowners carrying out their riparian plans. However, Taranaki Regional Council considers that rates of fencing and planting will have to increase substantially to meet the target of implementing 90% of riparian plans by 2015. Taranaki Regional Council notes in its 2009/10 annual report that:

*It is important that Taranaki farmers now get on with the job of implementation as opposed to being led by regulation as advocated by many critics of farmers' environmental performance.*³³

- 4.54 Waikato Regional Council notes that its current non-regulatory methods are not as effective as it needs them to be to maintain and enhance freshwater quality and that voluntary methods are not enough to address the water quality issues.
- 4.55 Horizons Regional Council also notes that its primary non-regulatory programme for addressing sedimentation entering water from hill country (the Sustainable Land Use Initiative) might be less effective because the programme is voluntary.
- 4.56 Environment Southland has moved to a stronger regulatory approach to managing dairy farm effluent. It achieved this by introducing tighter planning controls to its regional plan – including the need to apply for resource consent for some discharges to land.
- 4.57 Environment Southland has also begun a statutory review of its regional policy statement. It is doing this in conjunction with Southland District Council's review of its district plan. Environment Southland staff have indicated that they are discussing transferring powers from Southland District Council to Environment Southland on matters related to land use as a possible way of integrating land use into its planning regime. Environment Southland indicated to us that strengthening regulation of land use is likely to be part of future policy.
- 4.58 Horizons Regional Council's proposed *One Plan* changes its approach to managing land uses that give rise to non-point source discharges. Although currently subject to appeal, Horizons Regional Council has developed a regulatory approach to limiting nutrient inputs from some land-use activities in specific problem catchments. This approach sets limits on some farming activities to control nutrient inputs into the wider catchment.
- 4.59 With *Variation 5* to its regional plan, Waikato Regional Council has built a regulatory framework that is able to control land use in the interests of influencing water quality outcomes. The Council's proposed regional policy

³³ Taranaki Regional Council, *2009/2010 Annual Report*, page 10, which is available at www.trc.govt.nz.

statement also seeks to set up a regulatory framework that is likely to be much stronger.

Conclusion

- 4.60 Some regional councils are moving away from permitted activity rules and non-regulatory approaches to managing non-point source discharges. This change is occurring against a backdrop of intensifying agricultural land use, worsening freshwater quality, and recognition within regional councils, communities, and the primary production sector that action needs to be taken to halt and reverse declining water quality trends.
- 4.61 The activities and land uses that regional councils are seeking to regulate are often the same activities that the primary production sector is working with landowners to manage better. Close working relationships between regional councils and the primary production sector should help to achieve improved freshwater quality.
- 4.62 Environment Southland and Southland District Council were taking a co-operative approach to reviewing their planning documents. This could be a useful model for other councils considering how to manage the effects of specific land uses on freshwater quality.

Recommendation 7

We recommend that all regional councils and unitary authorities be able to demonstrate that they are co-ordinating their efforts effectively with appropriate stakeholders to improve freshwater quality.

Getting through the planning process

- 4.63 The process regional councils must go through to make new regional policy statements or regional plans, or to make changes to existing plans, is set out in the RMA. It involves several stages of community consultation and allows for appeals on decisions (see Appendix 3).
- 4.64 Overall, the changes that the regional councils have made to their regional plans, and the creation of new planning documents, have taken many years – for example:
- Environment Southland's *Regional Water Plan* took almost 10 years from being proposed until it became operative;
 - Waikato Regional Council's *Lake Taupo Variation 5* took 10 years; and
 - Horizons Regional Council's *One Plan* process has been under way for about seven years, and at the time of writing was under appeal.

- 4.65 In contrast, in the Taranaki region, there appears to have been a high degree of agreement with the community on policy development. There were no appeals on the aspects of the *Regional Freshwater Plan* relating to agricultural discharges. Taranaki Regional Council considers that its early engagement with its community on the issues led to greater acceptance of the proposed policy.
- 4.66 Council staff throughout the regions told us that the speed of getting policy through the RMA planning process is frustrating and cannot keep up with the speed of changes to the factors affecting water quality. The rapid growth in the dairy sector is a good example, with planning documents not allowing for the increase in the cumulative effects of non-point source discharge.
- 4.67 Delays to the planning process can result from the election of new councillors who may not agree with the policy direction of the previous council.
- 4.68 The Land and Water Forum's report proposes an alternative and quicker approach to regional planning. The Ministry for the Environment is working on its response to this proposal. Whatever comes out of this work, we consider that public engagement in policy development is integral to ensuring that policy meets the needs of communities. The policy development process can be useful in helping communities to understand the issues and in identifying a way forward. A good policy development process, with community support, can provide a region with a strong policy platform for many years.
- Conclusion**
- 4.69 It can take many years to get plan changes and new planning documents through the planning process set out in the RMA. Changing councillors because of the election cycle and differences of opinion on policy between councillors, between councillors and staff, and between councils and communities can contribute to delays in setting policies.
- 4.70 A long planning process is not always a disadvantage. It can allow communities to be brought up to date with issues and to plan a joint way forward. However, it can also mean that a timely response to issues is delayed while freshwater quality continues to deteriorate.

Part 5

Carrying out compliance monitoring and taking enforcement action

- 5.1 In this Part, we:
- provide background information on taking enforcement action under the RMA;
 - look at how the four regional councils were monitoring compliance with resource consents and plan rules; and
 - discuss decision-making for taking enforcement action at the four regional councils.
- 5.2 We looked at how the four regional councils were monitoring compliance with resource consents and plan rules. Compliance monitoring is an important part of managing freshwater quality. Compliance monitoring:
- raises awareness with consent holders and land users about the level of environmental management that is required;
 - allows regional councils to detect where activities might be adversely affecting the environment and to take action to remedy and mitigate those effects;
 - gives assurance to communities that the management framework they were consulted on is being upheld; and
 - if applied equitably, ensures that the rules and conditions are upheld for all resource users.

Our overall findings

- 5.3 Taranaki Regional Council has taken a strong approach to using formal enforcement tools for many years and reports low non-compliance rates. Horizons Regional Council and Environment Southland have improved their approach to monitoring dairy effluent compliance in recent years but are yet to see a significant drop in rates of non-compliance.
- 5.4 Waikato Regional Council has previously reported very high rates of non-compliance with its dairy effluent rules and resource consents to discharge dairy effluent to water. Recent reductions in non-compliance may indicate success with working more closely with the sector to promote compliance. Waikato Regional Council needs to improve its processes for resolving non-compliance and to reduce non-compliance related to resource consents to discharge treated dairy effluent to water.
- 5.5 Since 2009/10, Environment Southland has been operating a more targeted dairy effluent compliance monitoring programme that inspects all dairy farms with more than 50 cows at least once each year. Environment Southland does not have robust systems for monitoring compliance with permitted activity rules and can be slow to take enforcement action in instances where non-compliance is ongoing.

- 5.6 We were concerned to note that councillors in all the regional councils we audited had some involvement either in deciding whether the council should prosecute or investigating cases after the decision to prosecute had been made.
- 5.7 In central government, enforcement decisions are made by staff rather than elected representatives, so that decisions are independent of political influence. We see no reason for different principles to apply when the enforcement agency is a local authority. The Crown Law Office's *Prosecution Guidelines* have general application for all public prosecution activity.
- 5.8 In our view, councillors should not be involved in investigating breaches, or deciding whether to prosecute. To ensure fairness in matters of non-compliance, councillors should endorse an enforcement policy and should expect staff to rigorously apply that policy.

Taking enforcement action under the Resource Management Act 1991

- 5.9 A regional council can choose to respond to non-compliance by informal means, such as issuing a warning or working with the consent holder or other alleged offender to educate them and bring about compliance. The RMA also provides formal enforcement tools for regional councils to use if the RMA, its regulations, or regional plan rules are breached, or if the conditions in a resource consent have not been complied with. These enforcement tools include:
- **Abatement notice** – this is served by a council and directs a person to cease an activity that is adversely affecting the environment. Failure to comply with an abatement notice can result in fines or imprisonment.
 - **Infringement notice** – this is issued by a council enforcement officer if they observe, or have reason to believe, that a person is committing an infringement offence. Infringement fees range between \$300 and \$1,000.
 - **Enforcement order** – this is issued by the Environment Court. Any council or member of the public can apply directly to the Environment Court for an enforcement order. It also allows the council to recover clean-up costs from the polluter.
 - **Prosecution** – a council can prosecute an alleged offender, which can result in the District Court imposing a penalty. Penalties can include restorative justice, a fine of up to \$300,000 or a term of imprisonment for up to two years for a person, or a fine of up to \$600,000 for a company.

Trends in taking enforcement action

- 5.10 In recent years, local authorities have moved away from informal responses to non-compliance with resource consents towards using stronger and formal enforcement tools.
- 5.11 Nationally, the number of infringement notices issued more than doubled between 2001 and 2008. There were about 600 infringement notices issued in 2001/02, and more than 1500 issued in 2007/08. The numbers of prosecutions taken by local authorities has also more than doubled in recent years – up from an average of 39 each year during the first 10 years of the RMA's implementation to an average of 82 prosecutions each year from 2005 until 2008. Since mid-2001, the largest proportion of prosecutions under the RMA involved discharges to water (or onto land where the discharge could enter water) by the agriculture sector. The size of the fines imposed by the Environment Court has also increased.

Achieving national consistency in compliance monitoring

- 5.12 The Compliance and Enforcement Special Interest Group is a group of staff from a number of regional councils who work on compliance and enforcement. This group has been working to bring more consistency to how regional councils classify non-compliance and significant non-compliance, so that non-compliance rates can be compared.
- 5.13 A nationally consistent set of criteria for measuring and reporting dairy effluent non-compliance has been prepared. Regional councils are using this to monitor compliance. Regional council staff also meet regularly to audit each other's compliance files and check that they are using the nationally agreed criteria consistently. This audit has been held for two years and has shown that there is a high level of consistency between regional councils when reporting dairy effluent compliance statistics.

Compliance frameworks of the four regional councils

- 5.14 Our consideration of the four regional councils' compliance activities has largely focused on their efforts in ensuring compliance with rules or resource consents related to managing dairy effluent. The regional councils also operated systems for monitoring activities at commercial and industrial sites.

Waikato Regional Council

- 5.15 There are about 4200 dairy farms in Waikato Regional Council's region, and the Council expects to monitor the management of dairy effluent on about 1000 farms each year. This represents nearly 25% of the farms in the region. In contrast,

the other three regional councils we audited were carrying out annual inspections of every dairy farm in their regions. We note that the Waikato region contains many more dairy farms than the other three regions.

- 5.16 Most of the Waikato dairy farms (some 3600) discharge effluent onto land as a permitted activity under the regional plan. This means that they do not need a resource consent but there are still rules that they need to comply with. Waikato Regional Council carries out aerial surveys of dairy farms that operate under the permitted activity rule. Waikato Regional Council finds this method:
- efficiently covers a large number of farms in a short period;
 - allows the whole farm to be viewed in a short period of time; and
 - effectively identifies significant non-compliance with the dairy effluent rules.
- 5.17 If an aerial survey detects suspected non-compliance, a compliance officer visits the farm to investigate. In 2009/10, only 58% of farms operating under the permitted activity rules fully complied – the remaining 42% were either partially non-compliant (17%) or significantly non-compliant (25%).
- 5.18 Dairy farms that operate under a resource consent to discharge treated dairy effluent into freshwater are inspected by council staff. Of these, 57% were found to be partially or significantly non-compliant in 2009/10. This figure rose to 62% in 2010/11.
- 5.19 The overall rate of significant non-compliance for farms operating under the permitted activity rule and resource consents to discharge treated dairy effluent to water in 2009/10 was 27%. We note that Waikato Regional Council reported a substantial reduction in significant non-compliance for all dairy farms – from 27% to 12% in 2010/11. The Council also reported that the seriousness of breaches has decreased in recent years.
- 5.20 Waikato Regional Council is committed to monitoring compliance with effluent management rules and resource consents, and to seeing a reduction in the rate of non-compliance. However, the Council notes that non-compliance with dairy effluent rules contributes only a small percentage of the overall contamination of freshwater from non-point discharge related to intensified land use. The Council notes that cow dung and urine washed off paddocks into streams and groundwater is a more significant source of nitrogen and bacterial contaminants.
- 5.21 Waikato Regional Council reports annually on its performance in taking action to resolve significant non-compliance. In 2009/10, it took action to resolve 99% of all significant non-compliance. Most of the actions taken were in the form of an advisory letter, written directive, formal warning, or an abatement notice. We

note that Waikato Regional Council has higher rates of prosecution than all other councils in the country, and also makes greater use of formal warnings instead of issuing abatement or infringement notices than the other councils we audited.

5.22 Although Waikato Regional Council is taking action in response to significant non-compliance, it does not have good systems for recording how it resolves issues. The Council is falling short of its target for resolving significant non-compliance. In 2009/10, it aimed to resolve 80% of significant non-compliance within six months but managed to resolve just 27%.³⁴ We note that Waikato Regional Council:

- does not have an adequate system for recording performance against its target;
- does not currently have consistent practices or a system that flags when action is needed to ensure that significant non-compliance (and the associated risk to freshwater quality) has been addressed;
- does not have an enforcement strategy for dealing with repeat non-compliance and for monitoring progress with this; and
- has a degree of inconsistency in how staff categorise the findings of investigations (for example, what is compliant or non-compliant) and in the types of responses to known non-compliance.

Conclusion

5.23 Although Waikato Regional Council has previously reported very high rates of non-compliance with its permitted activity rules and with resource consents to discharge treated dairy effluent to water, there has been a considerable drop in overall rates of significant non-compliance in 2010/11. The rates of significant non-compliance with dairy farms resource consents to discharge treated dairy effluent to water remains high at 28%.

5.24 Waikato Regional Council has worked closely with Fonterra, DairyNZ, and Federated Farmers³⁵ to address issues of non-compliance during the last five years. The reduced rates of significant non-compliance might show what can be achieved by the dairy sector working alongside regional councils. It might also indicate a change in farmers' behaviour because of a strong history of Waikato Regional Council taking prosecutions for serious non-compliance.

Horizons Regional Council

5.25 The last few years have seen a new determination in Horizons Regional Council to ensure that consent holders comply with the conditions in their resource consents and with regional plan rules. Beginning with the 2008/09 dairy season, Horizons

³⁴ This figure is for all compliance activities, not just those related to freshwater quality.

³⁵ Federated Farmers is an independent rural organisation that advocates for farmers and the role of farming in the New Zealand economy.

Regional Council ran an “amnesty period” where dairy farm consent holders had time to get their consents in order. About 200 consent holders contacted Horizons Regional Council and asked for the Council’s assistance to rectify non-compliance. We see this as an effective approach to improving on-farm practice and what can be achieved by regional councils working alongside farmers.

- 5.26 After this, the region’s 900 dairy farms were inspected during a two-year period to assess compliance with discharge consents and the regional plan rules associated with that farming activity. Staff issued abatement notices and infringement notices if they found evidence of significant non-compliance with consent conditions. This non-compliance usually featured effluent discharge onto land and then into water. This was either a direct discharge to surface water or had potential to enter groundwater. Re-inspections of these properties showed that most consent holders had taken action to rectify problems. During 2010/11, Horizons Regional Council’s compliance team inspected all dairy farms in the region.
- 5.27 In 2008/09, the fees for consent monitoring were also restructured. A standard annual fee was set for discharge consents, and higher fees were set for non-compliance.³⁶ This funding regime is based on a polluter-pays principle and is focused on recovering the actual and reasonable costs associated with monitoring compliance.
- 5.28 We were impressed with the robust inspection manual Horizons Regional Council has compiled for its compliance staff, especially with its focus on collecting all the information required to take enforcement action during an inspection visit. Horizons Regional Council completed six prosecutions in 2009/10, and the Council considers that it has been able to successfully prosecute when it considered prosecutions necessary. These prosecutions have resulted in convictions for breaches of the RMA. Offenders have typically received large fines and been ordered to pay substantial costs to Horizons Regional Council.
- 5.29 Despite the increase in effort in monitoring compliance and the stronger stance taken with non-compliance, Horizons Regional Council has still reported an overall non-compliance rate of 17% during the years 2007/08, 2008/09, and 2009/10.

Conclusion

- 5.30 Horizons Regional Council has a strong framework for implementing compliance monitoring. This includes regular inspections of compliance with dairy farm resource consents and financial disincentives for non-compliance. The compliance monitoring programme has been strengthened since our audit in 2005.

³⁶ Standard non-compliance fees are \$600 (excluding GST) and significant non-compliance fees are \$1,200 (excluding GST), irrespective of the type of consent.

- 5.31 Horizons Regional Council has robust procedures for inspections, which has resulted in it taking more enforcement action. In our view, Horizons Regional Council's approach to compliance is fair and consistent for resource users throughout the region.

Taranaki Regional Council

- 5.32 Taranaki Regional Council has set up consistent processes for monitoring consents and enforcing compliance. Notable features of Taranaki Regional Council's compliance and enforcement programmes are:
- a monitoring programme designed for each resource consent at the time it is issued – for significant consents, this includes a consultation process with interested parties;
 - annual inspections of all dairy farm discharges are also used as an opportunity for Taranaki Regional Council to offer advice (including on how farmers can prepare for increasing expectations about environmental management) and to build relationships with farmers, which in turn supports uptake of Taranaki Regional Council's riparian management programme;
 - all dairy farms that fail to meet council policy, consents, and conditions are re-inspected, and the consent holder pays all the monitoring and inspection costs; and
 - at the time of our audit, Taranaki Regional Council did mostly visual inspections of dairy effluent ponds, rather than taking monitoring samples to confirm that the quality of the effluent discharged to waterways met resource consent conditions.
- 5.33 Compared with other regional councils, Taranaki Regional Council reports a very low non-compliance rate – 4.4% in 2009/10. We note that this low non-compliance rate is based on visual inspections of effluent management systems. Taranaki Regional Council considers that its visual inspection of effluent ponds is robust and is supported by scientific testing. As of 2011/12, the Council will also routinely sample farm effluent systems.
- 5.34 Taranaki Regional Council consistently takes enforcement action where necessary. The Council considers that it made extensive use of enforcement action in the 1980s and 1990s, which now means that less enforcement action is necessary. The Council considers strategic use of enforcement action is a tool to modify attitudes and encourage environmental outcomes.

Conclusion

- 5.35 Although we consider that Taranaki Regional Council's dairy effluent management programme is managed efficiently, its effectiveness depends on effluent systems being sized correctly and functioning properly and on the appropriateness of the limited set of conditions on the discharge consents.
- 5.36 At the time of our audit, most compliance monitoring inspections relied on a visual assessment of the effluent management system, rather than testing the quality of the discharges and the effects of the discharges on the environment. Recent changes to Taranaki Regional Council's dairy monitoring programme to add scientific testing of effluent systems will strengthen the compliance inspection framework.

Environment Southland

- 5.37 In 2009/10, Environment Southland began using a different dairy monitoring programme compared with previous years. The new programme was designed in consultation with dairy sector representatives (Federated Farmers and DairyNZ). Environment Southland reports that all dairy farms with more than 50 cows are inspected for compliance with resource consent conditions at least once each year. Farms with more than 600 cows are generally inspected twice each year, once by air and once on the ground.
- 5.38 The inspected farms are given a grading, and those classified as significantly non-compliant are re-inspected as soon as possible. Between September 2009 and June 2010, Environment Southland carried out 1293 inspections and found a significant overall non-compliance rate of 14.6%. Environment Southland states that if farms are found to be significantly non-compliant on repeat inspections, staff work with the consent holder to achieve compliance. Environment Southland states that it takes enforcement action if this approach does not work.
- 5.39 Compared with the other three councils, at the time of our audit Environment Southland made less use of formal enforcement tools. We noted an instance where four inspections on one dairy farm during 2009 and 2010 were classified as finding significant non-compliance, but no enforcement action had been taken.
- 5.40 In 2009, Environment Southland commissioned a review of its compliance work. The review identified that compliance staff were frustrated by what they felt were ineffective policies, procedures, and systems to support their work. The review recommended improvements to the incident investigation process and an increase in the transparency and accountability of the decision-making process. Environment Southland's enforcement policy has been updated as part of this

work, and Environment Southland is working to improve its documentation and information systems and to standardise its approach to enforcement.

- 5.41 Environment Southland's dairy monitoring programme does not include formal monitoring of compliance with the permitted activity rules for dairy farming and the best practice advice included in consents. The permitted activity rules and the best practice advice covers riparian management and fertiliser application. Compliance staff keep an eye on compliance with permitted activity rules during aerial and ground inspections, and also rely on complaints from the community to detect non-compliance for these activities. Environment Southland staff consider that they are not resourced enough to monitor compliance with permitted activity rules.

Conclusion

- 5.42 Since 2009/10, Environment Southland has been operating a more targeted dairy effluent compliance monitoring programme that inspects all dairy farms with more than 50 cows at least once each year. Environment Southland does not have robust systems for monitoring compliance with permitted activity rules and can be slow to take enforcement action when non-compliance is ongoing.

Decision-making for taking enforcement action

- 5.43 At all four regional councils, staff were responsible for issuing abatement and infringement notices. At the time of our audit, Environment Southland and Waikato Regional Council compliance staff needed approval from managers to issue infringement notices. At Environment Southland, this was a factor in the delays in taking enforcement action. Environment Southland's compliance staff are now encouraged to issue infringement notices without management approval when they consider this action is justified. The number of infringement notices issued between 2009/10 and 2010/11 has more than tripled.
- 5.44 At Waikato Regional Council and Taranaki Regional Council, councillors decide whether to prosecute those who breach the RMA. At Horizons Regional Council and Environment Southland, decisions to prosecute have been delegated to senior managers. However, we note that councillors at Environment Southland are part of a sub-committee that decides whether to proceed with prosecution and, at Horizons Regional Council, councillors can become involved when a decision to prosecute has been made.
- 5.45 At Horizons Regional Council, councillors have become involved to the extent that they carry out their own investigations without the knowledge of the council staff involved.

- 5.46 At Environment Southland, after a staff recommendation to prosecute, the potential defendant can appear before a prosecution sub-committee. Membership of this sub-committee includes senior council staff and two councillors. Its purpose is to give the potential defendant a chance to explain what went wrong. If the prosecution sub-committee considers that the alleged offender will remedy the problem, it may resolve not to proceed with prosecution. This approach is intended to have the dual benefit of saving Environment Southland the cost of prosecution and causing the non-compliant activity to cease.

Conclusion

- 5.47 The Crown Law Office's *Prosecution Guidelines* are clear that prosecution decisions should be free from political influence. The independence of the prosecutor is described as "the universally central tenet of a prosecution system under the rule of law in a democratic society".
- 5.48 In central government, there is a strong convention that enforcement decisions are made by officials, independent of political influence, because it is seen as "undesirable for there to be even an appearance of political decision-making in relation to public prosecutions".³⁷ This convention has been given statutory recognition in section 16 of the Policing Act 2008. We see no reason for different principles to apply when the enforcement agency is a local authority. At least one regional council has had legal advice to this effect, but has not acted on it.
- 5.49 In our view, councillors should not be involved either in decisions to prosecute or to investigate or hear grievances about cases. In our 2005 report, *Horizons and Otago Regional Councils: Management of freshwater resources*, we concluded that, to ensure fairness in matters of non-compliance, councillors should endorse an enforcement policy and expect staff to apply such a policy equally. We still endorse this approach.

Recommendation 8

We recommend that all regional councils and unitary authorities review their delegations and procedures for prosecuting, to ensure that any decision about prosecution is free from actual or perceived political bias.

³⁷ John McGrath QC (1998), "Principles for Sharing Law Officer Power: The Role of the New Zealand Solicitor-General", *NZ Universities Law Review*, Vol. 18, page 208.

Part 6

Collaboration and innovative practice

6.1 In this Part, we set out examples of good practice that we saw during our audit. In particular, we discuss:

- collaboration between entities working to maintain and enhance freshwater quality; and
- using new technology to help manage freshwater quality.

Our overall findings

6.2 We found many examples of central and local government agencies, iwi, dairy sector bodies, farmers, and communities working together to address freshwater quality issues. We consider that there is much value in taking a collaborative approach to freshwater quality issues and that this is likely to lead to positive outcomes.

6.3 Regional councils were embracing new technology to help with managing freshwater quality.

Collaboration between entities

6.4 We were encouraged to find central and local government agencies, iwi, the dairy sector, farmers, and communities recognising the value of taking a collaborative approach to maintaining and enhancing freshwater quality. Collaboration between agencies and other stakeholders is valuable for:

- creating a shared vision and goals;
- facilitating cost sharing;
- sharing a wider range of perspectives, skills, and tools; and
- working towards joint goals in an effective and efficient manner.

6.5 We noted good examples of entities working to manage freshwater quality at all levels. At the governance level, we noted:

- the Land and Water Forum – which brought organisations and stakeholders together to recommend reforms to freshwater management;
- the Land and Water Sub-Committee at Waikato Regional Council – which will help to facilitate discussions between councillors and elected officials within the dairy sector; and
- the Manawatu River Leaders' Accord signed by Horizons Regional Council, iwi, and industry, farming, and community leaders with an interest in the Manawatu River – each signatory has committed to cleaning up the river in an integrated and collaborative manner.

- 6.6 At the local authority level, we noted:
- the Compliance and Enforcement Special Interest Group – which has brought together 14 regional councils to achieve greater consistency in assessing and reporting compliance with dairy effluent management rules;
 - the Local Authority Environmental Monitoring Group – which is working to create standardised methods for regional councils to use to continuously monitor freshwater variables;
 - the joint regional council and unitary authority initiative (led by Horizons Regional Council) to build the Land and Water New Zealand website – which collates and presents national resource information in a standardised manner, allowing users access to nationwide resource information (including on freshwater quality); and
 - the joint review and community consultation on the regional policy statement for Southland and the Southland district plan by Environment Southland and Southland District Council – the two councils are collaborating with stakeholders and the community to achieve an integrated framework for resource management in Southland.
- 6.7 There were several positive examples of regional councils working with the Crown, iwi, the dairy sector, and communities to improve freshwater quality:
- the Crown, Waikato Regional Council, Taupo District Council, and Tuwharetoa’s response to community concern about declining water quality in Lake Taupo, which resulted in a plan change that introduced a cap and trade framework³⁸ to reduce the level of nutrients entering Lake Taupo;
 - the multi-agency³⁹ response led by Environment Southland to prevent further freshwater quality deterioration in the Waituna Lagoon;
 - strong levels of collaboration between Environment Southland and Te Ao Mārama Incorporated in many aspects of freshwater management, including funding, administrative support, research, and scientific monitoring; and
 - regional councils and dairy sector representatives jointly participating in long-term farm research projects, planning a nationally consistent approach to dairy effluent management, and running on-farm educational workshops.
- 6.8 Finally, there were a number of areas where regional councils are working with farmers to bring about best practice in on-farm activities that could affect freshwater quality. These include regional councils:
- employing farm advisors to provide assurance and advice to farmers on their farming methods to minimise on-farm environmental effects as much as

38 Cap and trade is a market-based environmental policy tool that sets a mandatory cap (limit) on emissions, and then allows trading of emissions permits between businesses or individuals within the capped limit.

39 Department of Conservation, DairyNZ, Fonterra, Federated Farmers, Beef and Lamb, Southland District Council, Invercargill City Council, Fish and Game Councils, several community groups, iwi, and local farmers and residents.

- possible while maintaining a high level of productivity and cost-effectiveness;
- helping farmers with preparing farm plans to optimise sustainability and productivity (for example, by converting erosion-prone hill country to forestry); and
- providing grants or other funding arrangements to support improved riparian management.

Using new technology to help manage freshwater quality

6.9 Regional councils were embracing new technology to support their efforts in maintaining and enhancing freshwater quality.

Availability of scientific resources and data

6.10 A number of regional councils are making good use of the Internet to share scientific resources with their communities. This includes reporting freshwater quality results on regional council websites, such as:

- Horizons Regional Council *WaterMatters* and the *WaterQualityMatters* websites, which quickly report monitoring results;
- the comprehensive scientific data available on Environment Southland's and Waikato Regional Council's respective websites; and
- the Land and Water New Zealand website (see paragraph 6.6).

Pond Size Calculator

6.11 Horizons Regional Council and Massey University collaboratively developed the Pond Size Calculator. The Calculator enables farmers to test a range of scenarios to work out how much dairy effluent storage they need to safely store effluent without it overflowing into waterways during heavy rain.

6.12 The Pond Size Calculator uses information specific to each farm, such as climate, soil type, size of herd, and milking practices, to work out the amount of effluent storage needed. Having enough effluent storage reduces the risk of non-compliance with consent conditions and rules, and allows for effluent to be applied to pastures when soil can best take up nutrients. The Calculator technology has been shared with nine other regional councils.

Automated and continuous sampling

6.13 A number of councils are upgrading their freshwater quality monitoring networks and installing automated sampling equipment. The automated equipment can take water samples every five to 15 minutes. It sends the test results back to the regional council using radio or cellphone technology. The data are available for use or for uploading to a website within an hour of measurement.

- 6.14 This “continuous” measurement provides a more accurate determination of what is happening to waterways than the one reading a month that is typically associated with non-continuous sampling regimes. The automated measurement allows for timely responses to freshwater monitoring results that require action.

Land mapping

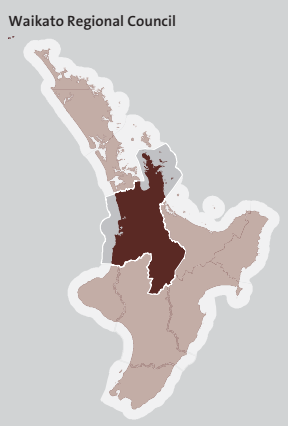
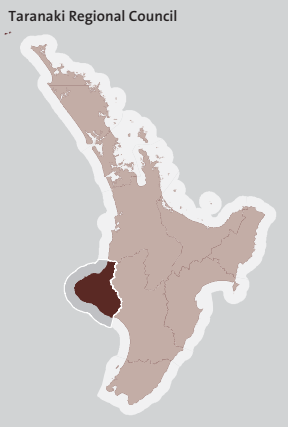
- 6.15 Horizons Regional Council is “land mapping” farms within its non-regulatory programme to prevent further erosion on hill country farms. The land mapping is part of “whole farm plan” development and involves assessing farm landscapes for rock type, soil types, slope, vegetation coverage, and areas of erosion and collecting information on water resources, biodiversity, and farm infrastructure. The mapping also collects details about fertiliser application, soil test history, stock numbers, and farm management history to use in business analysis.
- 6.16 Horizons Regional Council also uses some of the information collected during these mapping exercises in its soil and erosion databases.



Riparian management tender evaluation database

- 6.17 Taranaki Regional Council’s riparian management programme encourages farmers to fence and plant trees along stream banks. The programme is supported by a tendering system developed by the Council. The Council purchases bulk supplies of plants from various plant nurseries then supplies these plants at cost to the landowners. This system has been used by other councils. Plant sales for 2010/11 have increased by 50,000 plants from the previous year to rise to 328,000.
- 6.18 Underpinning the plant scheme is a tender-evaluation database designed and built by Taranaki Regional Council. While preparing an implementation strategy for the riparian management programme, the Council identified that time and cost was the biggest barrier to farmers fencing and planting along stream banks. However, once farmers realised that they were saving money on plants, and could use the saved funds to pay a contractor to complete the work, they were keen to allow the Council, on behalf of individual farmers, to organise professional contractors to plant the riparian margins. The Council tenders for planting contracts, and by doing this is able to ensure the quality of plantings, obtain the best prices, and pass these savings on to the farmers. This is particularly useful for first-time riparian planters, and also helps to ensure that plants are successfully established.

Appendix 1

Regional council summaries

Map of region	Regional features	Overall findings	Recommendations	Water quality state and trends	Reporting to the community	Making a timely response to freshwater quality issues	Effectiveness of regulatory and non-regulatory programmes	Compliance monitoring and enforcement action
Waikato Regional Council (WRC)								
 <p>Waikato Regional Council</p>	<p>Population: 382,716 Urban/rural: 75%/25% Land use: 58% pastoral farming/ 1% urban Regional council staff: 365 Number of dairy farms: 4200 Geographical features:</p> <ul style="list-style-type: none"> • Large river system used for hydro-electricity generation, iconic lakes. • Large areas of low-gradient land with slow-flowing rivers and streams. 	<p>Freshwater quality is not maintained or enhanced in the Waikato region. The current package of regulatory and non-regulatory methods and how they are implemented is not sufficient to manage threats to freshwater quality.</p> <p>WRC is beginning to take steps to address the notable challenges in managing non-point source pollution in its region. Its regional plan review provides an opportunity to improve its planning framework and better target programmes to manage the main risks to freshwater quality in the region.</p>	<p>We recommend that WRC:</p> <ul style="list-style-type: none"> • change the permissive framework of its regional plan to increase the level of influence its planning regime has over non-point source pollution; • review the targets and measures it uses at all levels of RMA and LGA plans and policies to identify more specific, measurable, time-bound measures, including targets for freshwater quality standards; • review its complaints, compliance monitoring, and enforcement information systems, and develop consistent, specific policies and procedures for staff to respond to repeat non-compliance and follow up on complaints and pollution incidents; and • publish an annual compliance and enforcement monitoring report. 	<p>Freshwater quality in the Waikato region mostly fails to meet WRC's standards and accepted trigger values.</p> <p>Trends also indicate that there is cause for concern over deteriorating conditions, which far outweigh results that show some signs of improvement.</p>	<p>WRC has effective systems to report freshwater quality information to the Council and community.</p> <p>There is some room to improve how information is reported to the community – for example, by providing clearer links between the results and the causes of any declining conditions.</p>	<p>WRC's monitoring systems identify risks to freshwater quality in the region and inform policy and planning analysis.</p> <p>WRC has changed its plans and policies over time to improve how it manages freshwater quality. These changes align to some of the known risks in the region.</p> <p>We cannot provide assurance that WRC's operational response systems address potential and known risks to freshwater quality in a timely or effective manner. WRC needs to improve its performance measures and targets for responding to complaints and pollution incidents.</p>	<p>WRC's regulatory and non-regulatory methods target the known risks to freshwater quality from land use, but there is no evidence that these provisions have been effective in maintaining or enhancing freshwater quality in the region.</p> <p>Given the rates of non-compliance and the state of freshwater quality, it may be time for WRC to consider more stringent regulatory methods.</p>	<p>WRC does not appear to currently have effective strategies or management systems to address risks associated with significant non-compliance and/or repeat non-compliance.</p> <p>Analysis of WRC's enforcement trends shows high rates of formal warnings versus formal enforcement action. We question whether WRC's enforcement strategies are consistent and strong enough to be effective in changing non-compliance in the region.</p>
Taranaki Regional Council (TRC)								
 <p>Taranaki Regional Council</p>	<p>Population: 104,124 Urban/rural: 77%/23% Land use: 60% pastoral farming Regional council staff: 122 Number of dairy farms: 1848 Geographical features:</p> <ul style="list-style-type: none"> • Small catchments, short and fast streams and rivers. 	<p>Freshwater quality is generally being maintained and, in places, may also be improving.</p> <p>However, there are areas where surface water quality does not meet relevant trigger values and areas where trends are deteriorating.</p> <p>In these low-elevation areas, this may indicate that current management tools are not enough to improve water quality, and the deteriorating trends may indicate potential for further decline.</p>	<p>Given that TRC is so well positioned, it could be more ambitious with taking action to enhance freshwater quality in those low-elevation areas where it does not meet relevant trigger values.</p> <p>There is a risk that non-regulatory riparian management programmes will not deliver the results anticipated because of slow implementation of riparian plans. Options to mitigate this risk could include:</p> <ul style="list-style-type: none"> • broadening the range of regulatory tools available for freshwater quality management; and • carrying out further modelling and forecasting to determine the level of freshwater quality management achieved through various levels of implementation of riparian plans. 	<p>Overall, surface water quality in Taranaki does not meet relevant trigger values for five variables in low-elevation areas. It meets the trigger values for the other three.</p> <p>Trend data mostly show no significant change, but there are deteriorating trends in ammoniacal nitrogen and water clarity. These indicate that surface water quality may be at risk of deteriorating in low-elevation areas.</p> <p>Other areas mostly have better surface water quality.</p>	<p>State of the Environment freshwater quality information was generally well communicated and is improving.</p> <p>However, there is potential for improvement: TRC could explain more clearly what the implications of water quality are for the user. It could better connect the freshwater quality indicator information to outcomes, such as algal blooms or the water being unsafe for drinking.</p>	<p>From the evidence we have seen, TRC has effective systems to identify risks to freshwater quality. It has policies, procedures, protocols, and systems to respond to known risks to freshwater quality in a timely manner.</p> <p>TRC has a strong focus on fine-tuning and improving implementation of the policies and methods it has chosen.</p>	<p>TRC has a well-developed framework for preparing plans, implementing them, and reviewing the effectiveness of the plans. The regulatory and non-regulatory frameworks are consistent and integrated.</p> <p>The overall framework uses non-regulatory methods to produce farm plans and promote riparian planting, the on-farm implementation of which has been slow. Despite this approach, we have confidence that TRC is actively managing and adapting the riparian programme to maximise its effectiveness.</p>	<p>TRC has established and consistent processes for monitoring consents. It consistently takes enforcement action where necessary and reports a very high compliance rate.</p> <p>At the time of our audit, the dairy effluent management programme was managed efficiently but its effectiveness was dependent on visual checks on dairy effluent systems. TRC has since decided to do routine testing of effluent quality as part of its compliance monitoring.</p>

Map of region	Regional features	Overall findings	Recommendations	Water quality state and trends	Reporting to the community	Making a timely response to freshwater quality issues	Effectiveness of regulatory and non-regulatory programmes	Compliance monitoring and enforcement action
Horizons Regional Council (HRC)								
 <p>Horizons Regional Council</p>	<p>Population: 220,089 Urban/rural: 51%/49% Land use: 61% pastoral farming</p> <p>Regional council staff: 200 Number of dairy farms: 900</p> <p>Geographical features: • 3 large river systems, large areas of highly erodible hill country, flood prone.</p>	<p>HRC has planned a well-designed suite of regulatory and non-regulatory programmes that are appropriately targeted at reducing the known risks to freshwater quality.</p> <p>Emerging trends show water quality may be improving, and indicate that HRC interventions may be helping.</p> <p>Overall, HRC is maintaining and enhancing freshwater quality in the Whanganui and Rangitikei rivers, but not in the Manawatu River. We expect to see improvements as point source discharges and land use practices for managing contaminants are improved.</p> <p>HRC made a significant and positive response to the findings of our 2005 performance audit of its freshwater management. Its new policy framework and its implementation represent significant improvements since our earlier audit.</p>	<p>We recommend that HRC:</p> <ul style="list-style-type: none"> • compile a report on the results of its monitoring of the effectiveness and efficiency of its policies, rules, or methods in its policy statements and plans, and make this report available to the public; • provide more context to online scientific information on water quality so that it is more accessible to the community; and • look at options for improving the timeliness of its response to pollution incidents. 	<p>Water quality in the region does not meet a number of trigger values or the <i>One Plan</i> water quality targets.</p> <p>For most water quality indicators, there is no significant improvement or decline, meaning water quality is remaining steady.</p> <p>For some sites and indicators, this means that adverse water quality is persisting.</p>	<p>Freshwater quality information is appropriately provided to Council committees and the public.</p> <p>HRC last produced a State of the Environment report in 2005, and now provides up-to-date water quality information online. The information provided online could be further summarised to make the messages more accessible for the public.</p> <p>HRC is not currently meeting the RMA requirement to compile and make available to the public a review of its monitoring of the effectiveness and efficiency of policies, rules, or other methods in its policy statement or its plan at least every five years.</p>	<p>HRC is using the information arising from its monitoring programme to amend policy and investigate issues as they emerge.</p> <p>The time frames of 4 hours for responding to urgent pollution incidents and 2 days for non-urgent incidents are not always met because of staff availability.</p>	<p>Regulatory and non-regulatory programmes are appropriately targeted at reducing the known risks to freshwater quality in the region. Regulation for freshwater quality means that any proposed activity must ensure that targets are met.</p> <p>Intensive land use is regulated with specific policies to manage nutrients and dairy cows access to water bodies. Non-regulatory programmes involve HRC working closely with stakeholders to bring about improvements in water quality.</p>	<p>HRC has a strong framework for implementing compliance monitoring – this includes regular dairy farm resource consent compliance inspections, and financial incentives for compliance.</p> <p>HRC operates robust procedures for carrying out inspections, which have resulted in it taking more enforcement action.</p> <p>HRC’s approach to compliance is fair and consistent for resource users across the region.</p>
Environment Southland (ES)								
 <p>Environment Southland</p>	<p>Population: 91,000 Urban/rural: 70%/30% Land use: 30% pastoral farming</p> <p>Regional council staff: 106 Number of dairy farms: 785</p> <p>Geographical features: • Artificial drainage, long, slow-flowing rivers, significant wetlands, wet climate.</p>	<p>The package of regulatory and non-regulatory methods and how they are implemented by ES is not enough to mitigate the known threats to freshwater quality in the region.</p>	<p>We recommend that ES:</p> <ul style="list-style-type: none"> • address performance and operational issues within its consents, compliance, and enforcement operations; • use stronger enforcement actions where appropriate to tackle known significant non-compliance in a timely manner to protect freshwater quality in the region; • develop specific performance indicators for its policies and programmes (regulatory and non-regulatory) to enable ES to measure its effectiveness; • publish an effectiveness and efficiency report of its plan to meet legislative requirements in this area; • improve the Compliance Monitoring Report to show compliance trends more accurately and clearly to the public; • where freshwater quality is not meeting standards and where there are deteriorating trends, consider additional strategies to bring freshwater quality up to standards and reverse deteriorating trends; and • consult with the community on setting specific environmental outcomes (including setting limits) in sensitive environments (such as Waituna Lagoon) and/or in areas with notable ongoing risks to freshwater quality. 	<p>Many sites in Southland are not meeting ES’s published standards and some are also showing deteriorating trends.</p> <p>ES’s freshwater quality management strategies do not appear to be preventing water quality from deteriorating.</p>	<p>ES has effective systems to report freshwater quality trend information to the council and the public.</p> <p>Some improvements could be made to help the public better understand the results.</p>	<p>ES has systems to identify risks to freshwater quality. However, in many instances, responses to these known risks do not appear to be timely or effective in addressing known sources of contamination.</p> <p>The incident follow-up system needs to be improved to ensure that risks are managed by staff.</p> <p>ES has taken an adaptive management approach to managing freshwater quality, evidenced by the various changes and proposed changes to the regional policy statement and Regional Water Plan. It is too early to comment on the effectiveness of these changes.</p>	<p>ES’s planning and regulatory framework and its non-regulatory methods appear to target the areas of highest risk. However, the implementation of its regulatory framework is not currently effective in responding to known risks to freshwater quality, given the increasing rates of non-compliance and declining trends in freshwater quality.</p> <p>At the time of our audit, ES did not have any geographically focused regulatory methods to address the current risks to freshwater quality in the Waituna Lagoon. It is unlikely that the non-regulatory methods are sufficient to address a notable risk to this internationally recognised wetland.</p>	<p>Based on the increasing rates of significant non-compliance, marginal compliance and repeat non-compliance, as well as the operational issues for compliance activities, ES’s implementation of its compliance monitoring and enforcement of plans and policies is not effective in protecting freshwater quality in the region.</p>

Appendix 2

Self-assessment audit tool

The self-assessment criteria set out below consolidate the criteria we used for our audit and the emerging issues and best practice we identified during our audit.

We encourage regional councils and unitary authorities to complete this self-assessment, and welcome any questions, feedback, or self-assessment results you would like to share with us.

<p>1. Does the regional council know the current state of, and trends in, freshwater quality in its region?</p>	<p>a. Does the freshwater quality monitoring network:</p> <ul style="list-style-type: none"> • allow the regional council to collect all the information it needs to manage water resources and know whether planning objectives are being achieved? • cover all the different types of water bodies and environment classifications in the region? • measure a comprehensive set of physical, chemical, bacterial, and biological variables at a suitable frequency? • include appropriate quality control, quality assurance, and data storage procedures? <p>b. Have iwi been consulted on the monitoring network, and has inclusion of Mātauranga Māori and cultural monitoring principles been considered?</p> <p>c. Has the regional council considered standardising with other regional councils the variables it monitors and how it monitors those variables?</p>
<p>2. Does the regional council have effective systems to report freshwater state and trend information to councillors and the community?</p>	<p>a. Is the information presented so that it:</p> <ul style="list-style-type: none"> • clearly tells the reader the state of, and trends in, freshwater quality; • explains the information in a way that the community can easily understand; • is consistent with other reports and documents; • identifies whether action is needed in response to what the information shows; and • states what is being done, or needs to be done, to address any issues? <p>b. Does the regional council meet the requirements under section 35(2)(b) of the RMA to monitor the effectiveness and efficiency of policies, rules, or other methods in the regional policy statement or plans, and (under section 35(2A) to compile and make the results of this monitoring available to the public at least every five years?</p>

<p>3. Do freshwater quality monitoring systems identify risks to freshwater and trigger timely responses?</p>	<p>a. Are freshwater quality monitoring results available for analysis in a timely manner?</p> <p>b. Are significant changes in monitoring results or monitoring results outside specific parameters brought to the attention of relevant staff members?</p> <p>c. Can the regional council identify examples where freshwater quality monitoring showed declining trends and action was taken in response?*</p> <p>d. Have responses been timely – has the cause of the problem been identified, and steps taken to prevent ongoing freshwater quality degradation?</p> <p>* Responses may include investigation into the cause of declining water quality, initiating programmes to improve water quality, and making changes to regulatory and non-regulatory programmes to address the causes of declining water quality.</p>
<p>4. Are members of the public able to bring freshwater quality issues to the regional council's attention (for example, by reporting pollution incidents or making complaints)?</p>	<p>a. With regard to complaints and pollution incidents, does the regional council:</p> <ul style="list-style-type: none"> • respond within reasonable time frames? • have systems to record the response taken to complaints and pollution incidents, and to ensure that the issue is resolved? • have the ability to identify repeat complaints and pollution incidents?
<p>5. Do the range of regulatory and non-regulatory methods in place appropriately target the risks to freshwater quality in the region?</p>	<p>a. Has the regional council set performance measures for its regulatory and non-regulatory programmes?</p> <p>b. Does the regional council have a good understanding of whether the regulatory and non-regulatory programmes aimed at maintaining and enhancing freshwater quality are effective?</p> <p>c. Is the regional council making changes to methods or how they are implemented when monitoring results show this is necessary?</p> <p>d. Is the regional council working towards setting limits for freshwater quality, and understanding how to achieve management of freshwater quality within those limits?</p>

<p>6. Is compliance monitoring and enforcement action carried out consistently and to target areas of risk?</p>	<p>a. Is the regional council:</p> <ul style="list-style-type: none"> • working with dairy sector representatives to achieve greater rates of compliance? • operating compliance inspection and assessment methods that are consistent within the council and with other regional councils? • working with consent holders and landowners to resolve issues of non-compliance? • using enforcement tools strategically to bring about greater rates of non-compliance and to encourage better resource management practices? • operating systems for identifying repeat non-compliance and tracking resolution of compliance issues? • able to monitor compliance with regional rules and resource consents – that is, are rules and consents written in a way that can be monitored? • using science monitoring results to support its compliance inspections? <p>b. Are enforcement activities made independently of elected officials so that the perception of political bias is avoided?</p>
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Appendix 3

Relevant provisions of the Resource Management Act 1991

This Appendix sets out provisions of the RMA that are especially relevant for managing freshwater quality.

Purpose and principles

The RMA is the country's principal environmental legislation. The purpose of the RMA is to promote the sustainable management of natural and physical resources. Sustainable management means:⁴⁰

... managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—

- (a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
- (b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
- (c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.*

Section 6 of the RMA sets out the matters of national importance that all people exercising functions and powers under the RMA are required to recognise and provide for. These include:

- preserving and protecting the natural character of wetlands, and lakes and rivers and their margins;
- protecting areas of significant indigenous vegetation and significant habitats of indigenous fauna;
- the maintenance and enhancement of public access to lakes and rivers;
- the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, wāhi tapu, and other taonga; and
- the protection of protected customary rights.

Section 7 sets out other matters that people exercising functions and powers under the Act are required to have particular regard to. These include:

- kaitiakitanga, which is defined as “the exercise of guardianship by the tāngata whenua of an area in accordance with tikanga Māori in relation to natural and physical resources; and includes the ethic of stewardship”;
- the efficient use and development of natural and physical resources;

⁴⁰ Section 5 of the Resource Management Act 1991.

- the maintenance and enhancement of amenity values;
- intrinsic values of ecosystems;
- maintenance and enhancement of the quality of the environment;
- any finite characteristics of natural and physical resources; and
- the protection of the habitat of trout and salmon.

Everyone exercising functions and powers under the Act is required to take into account the principles of the Treaty of Waitangi.

The RMA imposes a duty on all people to avoid, remedy, or mitigate adverse effects on the environment. The Act also contains restrictions on discharging contaminants into water and on the taking, use, damming, or diversion of water, and certain uses of the beds of lakes and rivers.

RMA planning framework

The RMA sets out the planning framework for managing natural and physical resources. Regional councils must produce a regional policy statement. These are high-level documents that provide an overview of the resource management issues of the region, and policies and methods to achieve integrated management of the region's natural and physical resources – including freshwater.

District plans, which are made by city and district councils, must give effect to the regional policy statement produced by the regional council.

Regional policy statements must include:

- issues – an existing or potential problem that must be resolved to promote the purpose of the RMA;
- objectives – a statement of what will be achieved through resolving the issue;
- policies – an intended action or attitude towards an issue;
- methods – the way the policy is implemented (these can be regulatory or non-regulatory); and
- Environmental Results Anticipated (ERAs) – what might be achieved from the combined effect of the objectives, policies, and methods.

Regional policy statements must be reviewed no later than 10 years after they become operative – this means that most regional councils have reviewed these documents at least once since the RMA came into effect.

Regional councils may also produce a regional plan to assist with managing the natural and physical resources in a region. Regional plans must contain objectives and policies and may also include rules (which have the force of regulation).

Regional plans are important for managing freshwater quality as they can permit or enable resource consents to be granted for certain activities (that would otherwise be prohibited under the RMA), subject to meeting certain requirements.

A regional plan can set water quality standards. Schedule 3 of the RMA sets out a list of different water quality classes that a regional council can apply to a freshwater body through its regional plan. These water quality classes include numeric and narrative standards for the water body. The water quality classes, and the associated standards, differ depending on the intended use of the water – for example, contact recreation or fishery purposes.

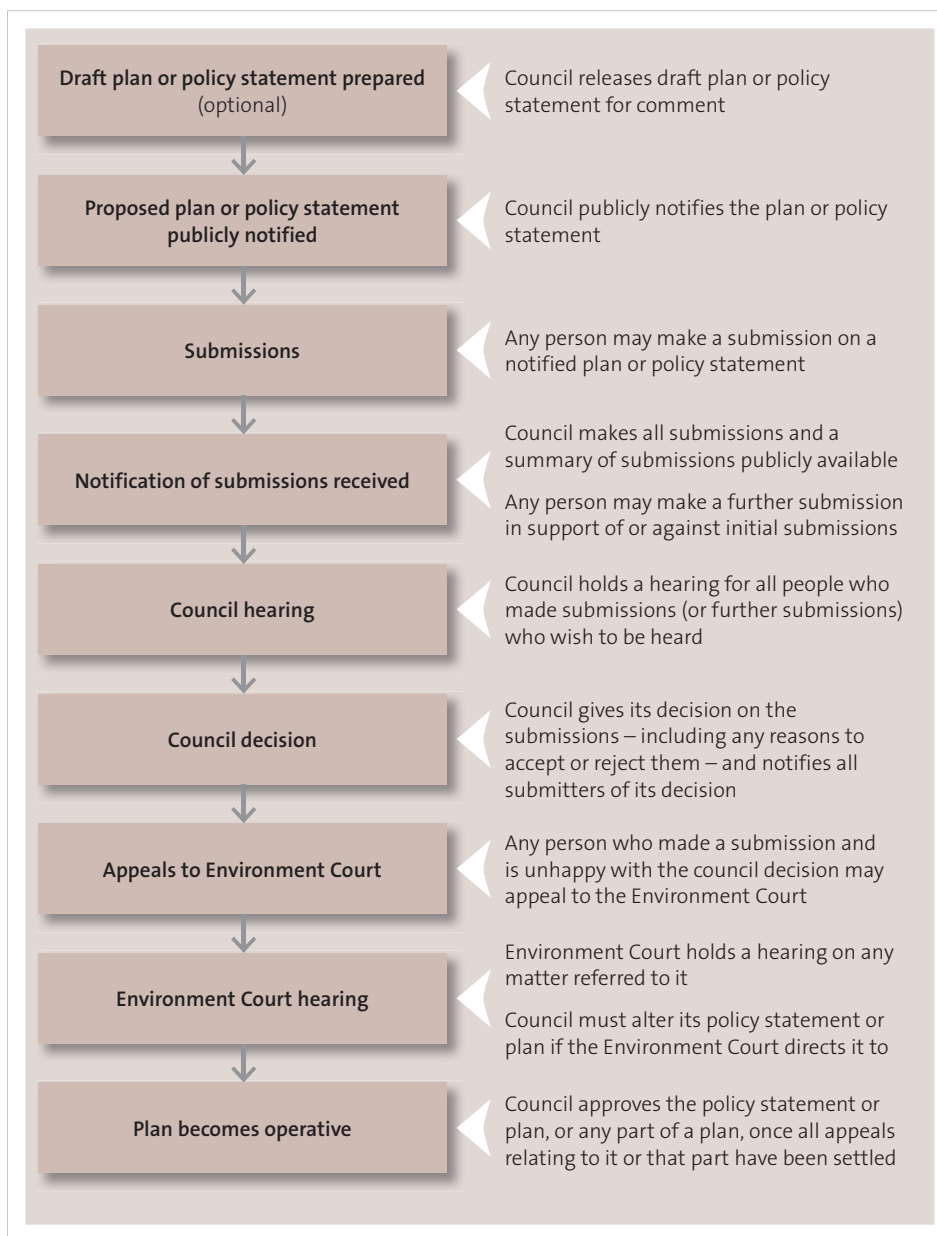
A regional council can state in its regional plan that water bodies in its region are to be managed for the purposes described in the water quality classes set out in Schedule 3 and the standards relevant to those water quality classes will then apply to those water bodies. The rules in the regional plan will then require observance of those standards. If the council does choose to use the Schedule 3 classes, it can include more stringent or specific rules. Regional councils are not required to use the water quality classes in Schedule 3.

The RMA allows for a “mixing zone” downstream of a discharged contaminant where water quality may be reduced but, past the mixing zone, a regional council cannot set standards in a plan that result, or may result, in a reduced quality of the water in any waters unless it is consistent with the purpose of the RMA to do so.

Preparation of planning documents

The process for preparing planning documents is set out in Schedule 1 of the RMA (see Figure 11). It involves public notification of planning documents, and allows for the public to make submissions to which a local authority must respond. If a person is unhappy with a local authority’s decision about his or her submission, that person may appeal to the Environment Court. The Environment Court can direct the local authority to amend a planning document if appropriate.

Figure 11
The Resource Management Act’s process for preparing regional plans and regional policy statements



Functions of regional councils under the RMA

To manage freshwater quality, the RMA allows regional councils to control:

- using land for the purpose of:
 - maintaining and enhancing the quality of water in water bodies;
 - maintaining the quantity of water in water bodies; and
 - maintaining and enhancing ecosystems in water bodies;
- discharging of contaminants into or onto land, air, or water, and discharges of water into water; and
- in relation to any bed of a water body, controlling the introduction or planting of any plant in, on, or under that land, for the purpose of:
 - maintaining and enhancing the quality of water in that water body; and
 - maintaining the quantity of the water in that water body.

The RMA also requires regional councils to monitor the:

- efficiency and effectiveness of policies, rules, or methods in regional policy statements or regional plans;
- exercise of resource consents;
- exercise of delegated or transferred functions and powers; and
- the general state of the environment.

The RMA also requires regional councils to take appropriate action (in response to monitoring carried out) where it is shown to be necessary.

Regional councils may also take enforcement action for breaches of the RMA, of regulations made under the RMA, or of regional plans or resource consents.

Appendix 4

Variables assessed for state and trends, and guidelines and trigger values used

Variable type	Variable name	Description	Units	Guidelines used	Trigger value used
Physical	CLAR	Black disc visibility	m	MfE (1994) Guideline*	1.6
	COND	Electrical conductivity	mS/cm	No guideline available	NA
	SS	Total suspended solids	mg/L	No guideline available	NA
Nutrients	NH4-N	Ammoniacal nitrogen	mg/L	ANZECC (2000)** (Lowland)	0.021
				ANZECC (2000) (Upland)	0.01
	NOx -N	Oxidised nitrogen	mg/L	ANZECC (2000) (Lowland)	0.444
				ANZECC (2000) (Upland)	0.167
	TN	Total nitrogen	mg/L	ANZECC (2000) (Lowland)	0.614
				ANZECC (2000) (Upland)	0.295
	DRP	Dissolved reactive phosphorus	mg/L	ANZECC (2000) (Lowland)	0.01
				ANZECC (2000) (Upland)	0.009
	TP	Total phosphorus	mg/L	ANZECC (2000) (Lowland)	0.033
				ANZECC (2000) (Upland)	0.026
Bacterial indicators	E. coli	Escherichia coli	n/100 mL	MfE/MoH (2003)***	550
	FC	Faecal coliforms	n/100 mL	MfE/MoH (2003)	148

* *Resource Management Water Quality Guidelines No. 2: Guidelines for the Management of Water Colour and Clarity*, Ministry for the Environment, 1994.

** ANZECC (2000), *National water quality management strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.

*** Ministry for the Environment and Ministry of Health (2003), *Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Areas*.

Glossary

Catchment – The entire area from which a stream or river receives its water. When it rains, the water flows naturally over and through the soil to the lowest point on the land, forming into springs, wetlands, and small streams that feed into larger streams and rivers as they run downhill. Eventually, all the streams and rivers in a catchment join and have the same outlet to the sea. Natural features such as ridges and hills form the boundaries of a catchment.

Dairy effluent – refers to a mixture of dung, urine, water, and milking plant wash water that is created in dairy milking sheds each day.

Discharge – deliberate or accidental deposit or release of any substance to air, water, or land.

Ecosystem – a dynamic complex of plant, animal, and micro-organism communities and their non-living environment interacting as a functional unit.

Environmental values – these reflect the community’s aspirations for the water in its region, and the level of water quality desired. They can include ecological function and biodiversity, natural character, natural features and landscape, cultural and spiritual values, scenic and amenity values, contact recreation, and mauri (life force) and mahinga kai (customary places where food is collected or produced).

Freshwater – all water except geothermal water and coastal water. Freshwater may be surface water or groundwater.

Groundwater – freshwater that occupies or moves through openings, cavities, or spaces in geological formations in the ground.

Non-point source discharge – a discharge of water or contaminant that enters a water body from a diffuse source.

Periphyton – algae that grow on the beds of rivers, streams and lakes that turn dissolved nutrients into nutritious food (periphyton biomass) for invertebrates, which are themselves food for fish and birds.

Permitted activity – an activity allowed by a regional plan without a resource consent if it complies in all respects with any conditions specified in the plan.

Point source discharge – a discharge of water or contaminant that enters a water body at a definable point.

Resource consent – a permit to carry out an activity that would otherwise contravene the Resource Management Act 1991. Requirements included as part of the resource consent are known as resource consent conditions.

Riparian – relates to the strip of land next to a water body, which contributes to maintaining and enhancing the natural functioning, quality, and character of the water body.

Significant non-compliance (with resource consents or rules in a regional plan) – a significant issue causing contaminants to enter water, such as unauthorised direct discharges of effluent to drains and streams, or excessive application of dairy effluent leading to groundwater pollution.

Surface water – water in all its physical forms that is on the ground, flowing or not, but excludes coastal water and geothermal water.

State of the Environment – a type of environmental monitoring and reporting that provides a snapshot of information about the environment and how it is changing over time.

Unitary authority – a combined regional council and territorial authority (city or district council).

Water body – a river, lake, stream, pond, wetland, or groundwater.

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