Regulatory Impact Statement

Amendments to the National Policy Statement for Freshwater Management 2011

Agency Disclosure Statement

This Regulatory Impact Statement (RIS) has been prepared by the Ministry for the Environment and the Ministry for Primary Industries. It accompanies the RMA section 32 evaluation report, the RMA section 52 report with recommendations on submissions, and proposed amendments to the National Policy Statement for Freshwater Management (NPS-FM).

This RIS summarises an analysis of the options to assist regional councils with setting freshwater objectives and limits required under the NPS-FM.

The proposals include requiring regional councils to set objectives relating to two compulsory national values (ecosystem health and human health for recreation). Estimating fiscal costs and benefits of the proposed national bottom lines for the compulsory values is particularly difficult because there is no way of predicting:

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

The impacts of the options were assessed through case studies in the three regions likely to be most affected by the compulsory national bottom lines. Because of the challenges in estimating the overall costs of applying the bottom lines, we have instead modelled the costs of compliance in areas where bottom lines would not be met. The information from these studies cannot be extrapolated to other regions because land uses and hydrological conditions are unique to particular catchments. However, the results show that there are likely to be material economic impacts in the small number of areas where levels are below the proposed national bottom lines. The magnitude of these impacts will depend on what policies councils choose to adopt and which water bodies they prioritise for action.

A limited exceptions framework to allow objectives to be set below the bottom lines would deal with effects caused by naturally occurring process and existing significant infrastructure. The impacts of meeting bottom lines in the affected water bodies were not assessed for this RIS because the discussion document indicated that the infrastructure would be identified in a separate amendment to the NPS-FM. This was signalled to occur in 2016, but officials are investigating whether to progress this sooner to provide increased certainty to the owners of affected infrastructure.

Councils will also be required to set up water accounting systems to ensure that objectives and limits are set based on good data, and to monitor the achievement of those objectives. The cost to councils of setting up these accounting systems is largely unknown as councils vary in the amount of accounting work already completed and the scope and level of sophistication of the methods councils may use.

C. Neill 20 May 2014

Catherine Neill, Director, Water Directorate Date

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1 Executive Summary

1. This Regulatory Impact Statement (RIS) describes the options assessed to address two main problems councils are having in implementing the National Policy Statement for Freshwater Management (NPS-FM). These are in setting freshwater objectives, and managing over-allocation of resource use. Environmentally conservative objectives may lead to unnecessary constraints on resource use, while objectives that are set at the wrong level to safeguard the life-supporting capacity of water impose clean-up costs on future generations.

2. These problems arise partly from lack of technical resources and partly because the issues councils are trying to resolve (degraded quality of freshwater bodies and increased pressure to use what is available) are highly complex and contentious. These problems cause regional plan development to be time-consuming and expensive.

3. The options presented here constitute some of the additional reforms Cabinet agreed would need to be developed to achieve effective implementation of the NPS-FM. The recommendations have been informed by specialist reference groups, freshwater iwi leaders group and their advisors and freshwater science panels.

4. Continuing with the status quo risks inconsistent and potentially ineffective approaches to setting objectives for freshwater bodies as required under the NPS-FM. The RIS assesses the regulatory and non-regulatory tools that could be used to support councils' implementation of the NPS-FM, and the policy options within the preferred tool (the NPS-FM) that could be used to address the problems.

5. The preferred option to address the identified problems is to amend the NPS-FM by

    a. More clearly articulating the national significance of fresh water and tāngata whenua values at the beginning of the NPS-FM
    b. Requiring councils to follow a specified process to set objectives, based on managing water bodies to meet community and tāngata whenua values, and providing a set of water quality measures (attributes) that must be used to set objectives (the national objectives framework)
    c. Making ecosystem health and human health for recreation compulsory national values
    d. Establishing national bottom lines for the compulsory values, and provide for two situations where councils can set objectives below those national bottom lines
    e. Requiring councils to establish a system to account for all resource use that affects fresh water (specifically water takes and sources of contaminants)
    f. Requiring councils to take a more integrated approach between fresh water and coastal water, to monitor progress towards achieving the objectives, and to fully implement the National Policy Statement by 2025 rather than 2030.

6. The proposals have been informed and refined through public consultation in March 2013 on the *Freshwater Reform 2013 and Beyond* discussion document, and between November 2013 and February 2014 on the *Proposed amendments to the National Policy Statement for Freshwater Management 2011* discussion document.

7. Government agencies were consulted on the detail of the proposed amendments. The public provided feedback on all the proposals consulted on in the discussion document and a report of recommendations on those submissions has been prepared for the Minister.

8. If the amendments are adopted, the Government will provide a comprehensive package of guidance, workshops and technical support to councils to assist them with the new requirements.

9. The two components of the proposed policy package likely to impose costs on resource users and communities are
    a. Meeting national bottom lines in those areas where they are currently breached, and
    b. Setting up council systems to account for all resource use that affects fresh water

10. Analysis of water quality data nationally shows that few rivers and lakes are below a national bottom line. A detailed "Total Economic Value" study in three areas facing challenges with water quality showed that the means chosen to improve water quality to a bottom line will have significant impacts on the costs and benefits of a limits-based approach to freshwater management. In over-allocated catchments, the proposed national bottom lines will drive choices in the way the primary sector uses water.

11. One of the main benefits of the amendments will be to settle the science required to support freshwater objectives for ecosystem health and human health. Specifying attributes that must be managed to achieve national bottom lines in the NPS-FM reduces the scope of matters that can be challenged through the plan development process. This will be more efficient than every council having to do so when they develop and review their regional plans and set objectives for freshwater, or when they assess a resource consent application.

12. While there will be costs to councils in setting up accounting systems and building expertise in setting limits based on the specified attributes for the compulsory values, these will be balanced by lower costs in producing their regional plans, and by the public benefit in having better freshwater management over the longer term.

13. The preferred option of the Ministry for the Environment and Ministry for Primary Industries is that, with some small changes described in section 8 of this report, these proposed amendments should be made to the NPS-FM.

2 Background & Context

2.1 Existing legislation/regulations

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

15. The National Policy Statement for Freshwater Management (NPS-FM) came into effect on 1 July 2011. The NPS-FM sets out the following policy directives:

    a. Regional councils must set freshwater objectives and limits.
    b. Limits must describe the maximum amount of resource use available which allows a freshwater objective to be met (for example a total catchment contaminant load or a total water abstraction rate of take).
    c. The life supporting capacity, ecosystem processes and indigenous species of fresh water, including their associated ecosystems are to be safeguarded.
    d. The overall quality of fresh water within a region is to be maintained or improved.
    e. Over-allocation is to be avoided, and existing over-allocation is to be phased out.
    f. In over-allocated water bodies, regional councils are required to set targets, with defined timeframes within which those targets are to be achieved.

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

2.2 Relevant decisions that have already been made

17. When Cabinet agreed to the NPS-FM in 2011, it agreed to develop the following measures to achieve effective implementation of the NPS:[1]

    i. general guidance on decision making and processes for implementing the provisions in the NPS (including the setting of water quality and quantity limits, the fair and efficient allocation of water beyond the limits set, improving integrated management, and involving iwi and hapū in freshwater management);

    ii. detailed work on the nature of limits, technical methods for describing limits and ways to implement limits to reduce the potential costs of the NPS;

[1] CAB Min (11) 18/8. See Cabinet paper: National Policy Statement for Freshwater Management 2011 on the MfE website

iii. work on supporting measures such as development of databases, catchment modelling and other scientific tools, to ensure that the decision making processes at a regional level are supported;

iv. additional RMA regulatory measures as required, for example National Environmental Standards.

18. As a first step in this, the Government invited the Land and Water Forum[2] (LAWF) to provide recommendations on a framework for setting and managing objectives and limits for freshwater quantity and quality. LAWF provided a report with 38 recommendations among which were several options around greater national guidance and the concept of a national objectives framework. [3]

19. In November 2012, having considered the recommendations from the LAWF about setting objectives and limits, Cabinet agreed in principle that Government consult, through a discussion document in early 2013, on proposals to implement a water reform strategy. The water reform package was to include reforms to governance, setting objectives and limits, and managing limits for both quality and quantity.[4]

20. In December 2012 Cabinet considered four papers about water reform. Cabinet noted that the proposals had built on the platform provided by the LAWF recommendations, and **agreed**:

i. that a discussion document, to be released in early 2013, include the following proposals in relation to more effective and efficient objective and limit setting: [5]

- a regulated national objectives framework to support regional objective setting, and
- setting a limited number of national bottom line objectives to apply to all water bodies.

ii. that the desired results of a water reform strategy in relation to managing within quality limits are to ensure the regime maximises the value to society of the assimilative capacity (i.e. the agreed limit) both now and in the future, while ensuring iwi/Maori rights and interests are considered.[6]

iii. that the policy goal of a water reform strategy in relation to managing with water quantity limits is to ensure the regime for managing within limits maximises the value to society of the water available for use, both now and in the future, while ensuring iwi/Maori rights and interests are considered.[7] Cabinet also agreed that the discussion document include proposals to improve water accounting systems.

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[2] The Land and Water Forum is an independent forum whose first phase of work lasted from August 2009 to August 2010. Their report *A Fresh Start for Freshwater* (2010) identified a set of outcomes and goals for freshwater management and recommended a number of policy changes to achieve those. Public meetings to discuss the Forum's Report were held around the country at the end of 2010 and the beginning of 2011.

[3] Land and Water Forum (2012). *Second report of the Land and Water forum: setting limits for water quality and quantity Freshwater policy - and plan-making through collaboration*. The Second Report also recommended that councils follow a collaborative process in developing their regional plans for water management. This recommendation is being progressed through the wider proposals considered for resource management reform.

[4] EGI Min(12)26/2. See Cabinet paper Water Reform overview, November 2012 on the MfE website

[5] EGI Min(12)28/7. See Cabinet paper Water Reform Paper Two: Objectives and Limit Setting under the National Policy Statement for Freshwater Management 2011, November 2012, on the MfE website. A regulatory impact statement was prepared for that decision. Ministry for the Environment. Regulatory Impact Statement: Fresh Start for Fresh Water – objective and limit setting, on the MfE website

[6] EGI Min (12)28/8. See Cabinet paper Water Reform Paper Three: Managing within water quality limits under the National Policy Statement for Freshwater Management, November 2012, on the MfE website

[7] EGI Min (12)28/9. See Cabinet paper Water Reform: Managing within Water Quantity Limits (Paper Four), on the MfE website

21. Cabinet also noted that that the aim for the water reform strategy is:[8]

> To create a more effective water management system that protects water quality, supports economic growth, and enables the efficient use of fresh water within limits that reflect national and community objectives.

2.3 Status quo and problem definition

22. Policy E1 of the NPS-FM requires regional councils to implement the policies as promptly as is reasonable so the NPS-FM is fully implemented by 31 December 2030, but if a council cannot implement the policies by 31 December 2014 it must set out in a publicly notified programme how it will implement the policies. No council has yet fully implemented the NPS-FM, but most councils have notified a progressive implementation programme showing when they expect to complete implementation. All but four (Horizons, Taranaki, Otago, and Nelson) expect to take more than ten years to have objectives and limits set in regional plans.

23. Two main problems councils have identified in implementing the NPS-FM are setting freshwater objectives and managing over-allocation of resource use.

2.3.1 Problem 1 - Difficulties setting freshwater objectives in regional plans

24. Objective 1A of the NPS-FM is: "To safeguard the life-supporting capacity, ecosystem processes and indigenous species including their associated ecosystems of fresh water in sustainably managing the use and development of land, and of discharges of contaminants." Objective B1 has the same requirements in relation to managing the taking, use, damming and diverting of fresh water. The NPS-FM requires regional councils to give effect to these objectives by establishing freshwater objectives and setting freshwater limits for all bodies of freshwater in their regional plans.

25. Good decision making about freshwater management requires community-based judgments supported by scientifically robust technical information, informed by an assessment of economic impacts. In response to a survey conducted in December 2012, half of all councils cited issues with capability and capacity to undertake the technical investigations and science required to inform objective and limit setting. Some councils acknowledged difficulties with defining life supporting capacity and so could not set objectives for safeguarding life-supporting capacity as is required to give effect to the NPS-FM. Confusion around understanding NPS-FM requirements was a common theme.

26. Alongside difficulties in setting objectives to safeguard the life-supporting capacity of water, not all councils were managing the effects of contaminants in water on human health. Contact with fresh water during recreation is internationally recognised as a risk factor for microbiological health risks. The data from the Ministry of Health's notifiable disease programme show that contact with recreational water is adversely affecting some people's health. Campylobacteriosis is the most commonly notified disease in New Zealand and had the largest number of notified cases where recreational water contact was a risk factor in 2012 – more than 15% of 7,031 cases. Giardiasis and Cryptosporidiosis had fewer notified cases in 2012, but recreational water contact was a more common risk factor – 36% of 1,719

[8] EGI Min (12)29/7. See Cabinet paper Water Reform overview, Implementing the Water Reform Strategy, November 2012 on the MfE website

Giardiasis cases and 32% of 877 Cryptosporidiosis cases nationally.[9] There is no requirement in the NPS-FM to have any regard to effects on human health when setting freshwater objectives.

27. An indication of the extent of the costs and delays that confront councils and communities in setting objectives and limits can be gained from the experience of two councils which set objectives and limits prior to the NPS-FM coming into effect. *Variation 5 - Lake Taupō Catchment* to the Waikato Regional Plan cost the council $11.3 million over 12 years for policy development and scientific studies. For the "One Plan" for the Manawatu-Whanganui region, Horizons Regional Council spent over $10 million and around eight years on plan preparation, council hearings, and appeals to the Environment and High Courts. While the One Plan covered all resource management in the region, the appeals related largely to the objectives and limits set for water management.

28. The costs to appellants in those two cases are not known, and neither are the costs incurred by private parties in relation to plan appeals nationally. One industry group involved, Horticulture NZ, has spent $21.4 million on 57 distinct actions with councils in the past five years (not all of this would have been associated with fresh water policy).[10]

29. The problems with setting freshwater objectives in regional plans are:

    i. **Inefficient use of council resources**: Councils with sufficient resources are undertaking or commissioning scientific assessments to develop objectives specific to water bodies and values in their regions, or obtaining assistance from scientific research institutes. This duplicates effort from scientists around the country, especially when stakeholders who disagree with any consequent limits must then engage other scientists to debate the detail of the numbers through the planning process, the resource consent application process, and the Environment Court. Decisions made after a long adversarial planning process are costly and slow, and sometimes do not recognise earlier decisions agreed within the affected community.

    ii. **Ineffective objectives**: councils with limited resources are using various existing guidelines – usually 2000 ANZECC Guidelines and Ministry for the Environment water quality guidelines. The use of various guidelines (some more than 20 years old) means that objectives can be set at the wrong level to safeguard freshwater's life-supporting capacity, ecosystem processes and indigenous species. Environmentally conservative objectives may lead to unnecessary constraints on resource use and impede opportunities for economic growth, while objectives that are set too low to safeguard the life-supporting capacity of water impose clean-up costs on future generations, or compromise the functioning of the water body. Already the Government has spent $450 million dollars contributing to programmes to clean up just a few of New Zealand's rivers and lakes (with additional funding from regional councils) because water bodies are over-allocated in terms of contaminant loads. A lack of defined objectives can result in investment uncertainty and management of water bodies through costly and litigious consent processes rather than clear plans.

    iii. **Lack of recognition of iwi values**: Feedback from iwi during consultation for the freshwater reform in March 2013 was that iwi values should be visible and provided for in the resource management process to better recognise the inherent mana of the water in water bodies in regional plans.

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[9] The Institute of Environmental Science and Research Ltd. (2013). *Notifiable and Other Diseases in New Zealand: Annual Report 2012* Porirua, New Zealand

[10] Horticulture New Zealand, *Horticulture member benefits* Hort NZ website

iv. **Lack of recognition of effects on human health**: The data from the notifiable disease programme show that contact with recreational water is adversely affecting some people's health. These effects are not always recognised and managed in regional plans.

2.3.2 Problem 2 – Not managing over-allocation of water resources

30. The NPS-FM requires regional plans to specify targets and implement methods to avoid over-allocation of water quantity (water takes) and water quality (contaminants).[11] The targets and methods must be included in regional plans by 2030. A stocktake of regional plans in April 2013 showed that 58% have quantity limits (minimum flow and allocable limit). Only 4% of rivers and streams, 18% of wetlands, and 23% of lakes throughout New Zealand have water quality limits.[12]

31. The main reason many councils are not setting limits to manage over-allocation is that they do not have sufficient or adequate data on the total abstractions or the total contaminant loads. And the main reason they do not have sufficient or adequate data is because accounting for these pressures requires time, money and skills (especially for contaminants) that are sometimes unavailable to the council.

32. The problems managing over-allocation of water resources in regional plans are:

i. **Inconsistent approaches and lack of transparency**: The systems councils have developed to date to account for total abstractions or the total contaminant loads are inconsistent between regions, and in some cases, between catchments (especially for accounting for quality).[13] They cannot be compared and consolidated to inform decision-making e.g. investor decisions on catchments where there is "headroom" for resource use that would allow for economic growth, or government decisions on whether further policy interventions are needed.

ii. **Unclear expectations**: It is not clear to all councils, nor to the wider public, that to set and manage within limits successfully and fairly, councils need to account for all abstractions and sources of contaminants. There is no legal imperative for councils to undertake accounting beyond the general direction in the NPS-FM to avoid over allocation, and the duties imposed on local authorities by sections 35(1) of the RMA to gather such information as is necessary to carry out their functions under the Act. As a result of weak incentives, councils may not prioritise freshwater accounting over existing activities and services. This is particularly a problem for resource and capability constrained councils.[14]

iii. **Unknown costs to councils and communities**: Accounting requires time, data, money and skills (especially for sources of contaminants), and these short term costs fall to the council. When resources are not recognised as being over-allocated, or at risk of over-allocation, the costs of inadequate accounting are longer term, and fall on resource users, communities and future

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[11] See policies A1 and A2, and B1 and B5. In most cases, available assimilative capacity is not formally allocated in New Zealand. The NPS-FM uses the term "over-allocation" for water quality (e.g. Objective A2(c)), defining it as a situation where the resource is "being used to a point where a freshwater objective is no longer being met"

[12] There is no data available for quality limits for groundwater because the multi-layer nature of groundwater systems and lack of a national dataset means mapping and analysis has not been possible

[13] NIWA (2013). *Regional Council Freshwater Management Methodologies: accounting and limit setting*. Report prepared for the Water Directorate, Ministry for the Environment. The report outlines the range of accounting systems and reports across five councils. All are different.

[14] NIWA (2013). *Regional Council Freshwater Management Methodologies: accounting and limit setting*. Report prepared for the Water Directorate, Ministry for the Environment. All the councils reviewed in the report noted that councils face challenges in: financing system upgrades to collect and manage data, resource constraints e.g. staff to carry out data entry; and collecting scientific information on existing water use and discharges, as well as attenuation factors and lags (p. 101)

councils who have to change their regional plans to reduce the amounts of water allowed to be taken or contaminants allowed to be discharged.

3 Policy objectives

33. Inconsistent approaches to regional and local decision making was one of the problems that the NPS-FM was intended to address.[15] With high pressures on water use around New Zealand, continuing with the status quo risks continuing with inconsistent and ineffective approaches to setting objectives and limits.

34. To assist councils and address the specific problems arising with the implementation of the NPS-FM, and to achieve effective implementation of the NPS-FM as requested by Cabinet in 2011, the objectives are:

> *1. To ensure effective objectives and limits are set, at reasonable cost, that meet a national minimum for water quality, whilst involving iwi and hapū and recognising local views about values and the economic needs of communities.*
>
> *2. Catchment-based freshwater accounts are developed that are fit-for-purpose to enable effective and efficient decisions to be made on objectives, limits and management within them.*

3.1 Assessment criteria for analysis of options

35. The following criteria have been used to analyse the options considered to address the problems with NPS-FM implementation.

i. **Effectiveness**: whether the option can achieve the objectives of the proposed reform.

ii. **Efficiency**: whether the option will

- reduce inconsistencies between approaches taken by regional councils, and
- minimise effort (cost and time) across all parties (government, regional councils, resource users and others) in implementing the NPS-FM.

iii. **Treaty of Waitangi**: the extent to which the option takes into account the principles of the Treaty of Waitangi (as required by section of 8 of the RMA)

iv. **Transparency**: whether the option affords resource users a means to understand the impacts of proposed objectives and limits in regional plans.

v. **Practicality**: whether the option will cause the least disruption to the current approach to objective and limit setting in plans, and whether it is realistically achievable given the costs, skills and capacity that will be required to implement it.

vi. **Flexibility**: whether the option is flexible enough to recognise local views, and allow for variance in viewpoints and values between iwi and hapū.

4 Options to support councils implement the NPS-FM

[15] Ministry for the Environment (April 2011). Regulatory Impact Statement – National Policy Statement for Freshwater Management

36. This section identifies and analyses the mechanisms available to support councils' implementation of the NPS-FM. A presentation and analysis of specific policies is provided in section 5 of this report.

4.1 Initial analysis of options

37. Five options for improving implementation of the NPS-FM were considered.

- A National Environmental Standard (NES)
- A new regulation - section 360 of the RMA or other
- Amend Schedule 3 and section 69 of the RMA
- Guidance
- Amend the National Policy Statement for Freshwater Management

38. The scope of an NES is limited to standards, methods for classifying a natural resource, methods to implement standards, exemptions from standards, and transitional provisions. An NES regulates activities (as permitted, controlled, prohibited etc) according to those standards or classifications in the same way that a rule in a regional or district plan would.

39. If an NES were used, it would apply the same rules for water quality objectives across the country, and would set the same limits to achieve those objectives across the country. An NES cannot include policies or objectives and so cannot direct the planning process. NES are not, therefore, suited to directing processes for formulating objectives in regional plans where water bodies are in various states of quality, are subject to various kinds of pressures, have various intrinsic values, and where communities value various uses of the water. An NES could not solve the problem of difficulties with objective setting identified with the status quo and was discarded as a feasible option for further analysis.

40. Developing a new kind of regulation not currently provided for in the RMA was considered when an NES approach was rejected. Such an instrument could be tailor-made to suit the objective setting requirements, and provide something different to what existing regulatory tools can provide. A new instrument would have required repealing the NPS-FM and incorporating aspects of it relating to objective setting processes within the RMA itself. This option was rejected because it was seen to have the same disadvantages as an NES or other regulation.

41. Schedule 3 of the RMA has a set of water quality classes, which are based on the in-stream and out of stream uses for which water may be managed. Schedule 3 could be amended to include national bottom lines for the water quality classes of aquatic ecosystems and contact recreation, and so address the problem of plans adopting various thresholds for these water quality classes. Section 69 of the RMA would also require amendment to require regional councils to use the water quality classes in the schedule, or the NPS-FM could be amended to require plans to use the classes. This results in a similar outcome to an NES, where a single set of numbers applies across all water bodies in New Zealand and does not allow local views about values and resource priorities to be addressed. Amending Schedule 3 was therefore discarded as a feasible option for addressing the problem.

42. Using an NES, developing a new regulatory tool under the RMA, or amending schedule 3, to support implementation of the NPS-FM were not considered feasible options and were not assessed further.

4.2 Feasible options

43. Only two options were seen as feasible ways to improve implementation of the NPS-FM from the status quo. These are:

- Option 2 – Guidance
- Option 3 – amend the National Policy Statement for Freshwater Management

4.2.1 Option 1 - Status quo

44. If a regional plan fails to properly give effect to the requirements of a national policy statement, the RMA provides these intervention options to the Minister for the Environment:

i. ministerial consultation and submissions on plan changes (schedule 1, clause 3 and 6)

ii. ministerial power to investigate the performance by a local authority of any of its duties under the RMA (section 24A)

iii. ministerial power to direct a review of a regional plan (section 25B)

iv. for matters of national significance under Part 6AA of the RMA, ministerial power to appoint project coordinators or commissioners to assist the council or a hearing panel (section 149ZA).

45. While relying on these options could ultimately reduce inconsistencies in approaches taken by regional councils, they are significant and often costly interventions and would not minimise effort across all parties. Instead, they would present significant costs and delays.

4.2.2 Option 2 - Guidance

46. This option was considered as the first part of a staged implementation strategy, with regulation resorted to only if objective and limit setting was not progressed consistently around the country. Guidance could set out a methodology for setting objectives and limits and provide values with attribute tables which could then be used by councils to set objectives in their regional plans. Guidance could also identify the minimum acceptable states for the attributes relating to each value, including for safeguarding the life-supporting capacity of a water body.

47. Guidance may minimise costs over the longer term as councils and communities recognise the cost savings of a nationally consistent approach, but this depends on how many councils use the guidance and to what extent. In the meantime, there could be a continuation of inconsistent approaches.

48. The main disadvantage of non-statutory guidance is that the use of nationally agreed science for setting objectives, and in particular, the minimum state of water quality necessary to safeguard the life-supporting capacity of water, can still be debated through the planning process, meaning the costs and delays currently experienced would continue. This means there will be less likelihood that effective objectives are set in plans, at reasonable cost, that meet a national minimum for water quality and so guidance alone would not meet the objectives to improve NPS-FM implementation.

4.2.3 Option 3 – Amend the National Policy Statement for Freshwater Management

49. The purpose of any national policy statement is to state objectives and policies for matters of national significance. Local authorities are required to ‘give effect’ to an NPS in their regional policy statements and regional plans, and to ‘have regard’ to an NPS in determining applications for resource consent.

National policy statements affect the resource user predominantly through the resulting plan provisions.

50. Option 3 is to amend the NPS-FM to incorporate more specific direction about how to set objectives and account for water abstractions and contaminant loads. Councils indicated support for national direction during early consultation in March 2013, and so are not likely to require Ministerial intervention to properly give effect to such direction.

51. Specifying both the process and the indicators to use to measure progress towards specified freshwater values in a national policy statement means the matters that could be challenged through the planning process would be limited to the value choices themselves and the thresholds at which the objective is set to achieve a particular value. There could be no debate about thresholds for any national bottom lines or what attributes to use to set objectives. This will achieve savings on the matters able to be debated (by scientists and lawyers) through the planning process, and would reduce the inconsistent approaches taken by regional councils.

52. This option is expected to reduce inconsistencies between approaches taken by councils, and increase certainty for councils and communities on how to set objectives. In particular there will be no inconsistencies in where bottom lines should be set so that they give effect to the objectives of the NPS-FM. The link between the chosen objective and the limits required to meet it would be clear, thus the implications (economic and environmental) of different value choices would be able to be clearly articulated, resulting in a more transparent process.

53. Costs and delays to resource users will be reduced because the costs of meeting objectives using limits can be more easily determined during the councils' planning processes, and once known can be more easily planned for.

54. The reduction and transfer of costs from regional councils to central government in terms of the science and technical work needed to underpin objective setting is similar whether the option of guidance or amending the NPS-FM is taken. But there are cost savings in having the process in a national policy statement rather than guidance largely because there is a reduction in matters that can be contested through the planning process. This provides efficiency gains in the next ten to fifteen years of plan development.

55. The process of preparing an amendment to a national policy statement has more certainty that the principles of the Treaty of Waitangi, in particular the principles of partnership and good faith, would be taken into account. This is because the statutory process directed in the RMA requires the Minister to "seek and consider comments from the relevant iwi authorities" (section 46). While government does consult with iwi as a principle of good faith in the preparation of national proposals, there is no statutory requirement to do so for the preparation of guidance.

4.3 Conclusion for best option to improve implementation of the NPS-FM

56. Amending the NPS-FM is considered to be the most efficient, effective and practical option. Putting Government expectations about involving iwi and recognising iwi views for water management in the NPS-FM will provide the contextual direction for councils when they are making decisions about freshwater.

57. Prescribing the process of freshwater objective setting and accounting for the contaminant inputs and water abstractions within the national policy statement means councils and communities will be

required to take a nationally consistent approach, while continuing to decide the applicable values and where to set objectives to achieve them at the local level. Councils will have comparable management frameworks for comparable water bodies in their regions, making it easier to compare water bodies both within and between regions.

58. Amendments to the NPS-FM will provide the best net benefit overall for the following reasons:

- There is a statutory requirement to involve iwi in the amendment process.
- It can provide a non-contestable process for how to set freshwater objectives (a numeric attribute which will provide for a national value at a desired state).
- It can set the thresholds for attributes to use when setting objectives, reducing or avoiding the need for expensive scientific work in each region, which could then have been contested with each plan change (at least 10 yearly) in each of the 16 regions.
- It can set a minimum acceptable state for national values – reducing debate through the planning process.
- Objective setting would become a more transparent process for the community because the limits required to meet a numeric objective would be more readily identified (eg the amount of nitrate that can be assimilated by a particular water body) and the impacts (social and economic) of that limit will be able to be clearly articulated to the community before a particular state for any value is adopted in a plan.
- It can require accounting for the pressures on both water quality and water quantity allowing resource users to identify catchments where there is capacity for increased resource use or intensification.
- Communities can still exercise choice about what values and uses they want to assign to each water body, and where they want the freshwater objective for the water body to be set.

5 Amending the National Policy Statement for Freshwater Management

5.1 Preferred options proposed as amendments

59. The proposals have been informed and refined through public consultation in March 2013 on the *Freshwater Reform 2013 and Beyond* discussion document, and between November 2013 and February 2014 on the *Proposed amendments to the National Policy Statement for Freshwater Management 2011* discussion document.

60. Taking into account the results of early feedback in March 2013 (see section 7 of this report), a set of preferred options were proposed as amendments to the NPS-FM in November 2013. These were:

    i. Clearer articulation of tāngata whenua values for fresh water

    ii. Requiring councils to follow a specified process to set objectives, based on managing water bodies to meet community and tāngata whenua values, and providing a set of attributes and attribute states to use to set objectives for some of those values (a national objectives framework)

    iii. Making ecosystem health and human health compulsory national values

    iv. Establishing national bottom lines for the compulsory values, with a suggested framework for when those national bottom lines may be allowed to be breached

    v. Requiring councils to establish a system to account for all resource use that affects fresh water (specifically water takes and sources of contaminants)

    vi. Requiring councils to monitor progress towards achieving the objectives

    vii. Other minor changes, including increasing direction relating to the connection between fresh water and coastal water

61. These options are described here, with a description of the feedback received from the consultation and an analysis against the evaluation criteria. The summary of the consultation process and the main themes of concerns raised in submissions are given in section 7 of this report. An evaluation of the impacts of the options is provided in section 6.

5.2 Options analysis - articulation of tāngata whenua values for freshwater

5.2.1 Proposals for recognising tāngata whenua values

62. Three options were proposed to more clearly articulate tāngata whenua values for fresh water. These options relied on the expression of “Te Mana o te Wai” (the mana of the water) in the NPS-FM. Te Mana o te Wai represents the innate relationship between te hauora o te wai (the health and mauri of water),

te hauora o te taiao (the health and mauri of the environment), and their ability to support each other, whilst sustaining te hauora o te tangata (the health and mauri of people).[16]

63. The options were -

i. To expand the Preamble of the NPS-FM to articulate the importance of Te Mana o te Wai and how the NPS-FM will contribute to Te Mana o te Wai, recognising the relationship that tāngata whenua have with fresh water. The Preamble can describe and explain the policy intent of the policies.

ii. To recognise Te Mana o te Wai as a national value in Appendix 1 of the NPS-FM through te hauora o te wai (the health and mauri of water), te hauora o te taiao (the health and mauri of the environment), and te hauora o te tangata (the health and mauri of people) and the associated values of ecosystem health, human health for secondary contact recreation, and natural form and character

iii. To include Te Mana o te Wai in Objective A1 of the NPS-FM along with a definition of Te Mana o te Wai. This would require that Te Mana o te Wai is safeguarded along with the requirement to safeguard ecosystem health. This option was not formally part of the proposed amendments, but was included in the discussion document to seek feedback.

5.2.2 Consultation feedback on Te Mana o te Wai

64. A fifth of the unique submissions on the proposed amendments commented on the concept of Te Mana o te Wai and highlighted the wide range of opinions people hold about how tāngata whenua values should be expressed in the National Policy Statement. The need for regional variation in the expression of tāngata whenua values suggested that a flexible or high level approach is needed.

5.2.3 Analysis of proposals for recognising tāngata whenua values

65. **Preamble**: The RMA does not require councils to give effect to the Preamble of a national policy statement, only to the objectives and policies. While a description of the policy intent in the Preamble would be useful in helping those councils who choose to use it to give effect to Te Mana o te Wai, they could not be held to account for the way they did this.

66. **Via national values**: Identifying Te Mana o te Wai as part of the national values of ecosystem health, human health and natural form and character would compromise its holistic nature, and limit its meaning to those values. It would also compromise the ability of tāngata whenua to express different views about how they feel Te Mana o te Wai should be expressed.

67. **Via Objective A1**: If regional councils are required to safeguard Te Mana o te Wai in order to give effect to an objective in the NPS-FM, they will need it to be clearly defined. But any definition of Te Mana o te Wai in the interpretation needs to allow for different expressions of tāngata whenua values. Defining Te Mana o te Wai to include values beyond the compulsory values of ecosystem health and human health would add unquantifiable costs associated with providing for that value. If the term is left undefined there would be considerable uncertainty and litigation costs determining the meaning of Te Mana o te Wai in each region.

[16] "Mauri" means '*life force*' or '*life principle*', and as such, everything has a mauri. Mauri acknowledges connectedness and the way in which all things on earth are in some way interrelated and reliant on each other.

68. Overall, including Te Mana o te Wai in the NPS-FM means that tāngata whenua values are recognised in a statutory document (the NPS-FM) and that the profile of tāngata whenua roles and interests is raised from what currently exists in objective D1 and policy D1 of the NPS-FM. But, these options, either individually or in combination would not necessarily increase councils' recognition of iwi values in their regional plans.

69. A fourth option to include a statement at the start of the National Policy Statement that sits above the objectives and policies, and recognises the national significance of fresh water and Te Mana o te Wai was considered. The statement would be inclusive of all communities and provide an expression of collective values for both tāngata whenua and the broader community. The aggregation of community and tāngata whenua values and the ability of fresh water to provide for them over time recognises the national significance of fresh water and Te Mana o te Wai. Expressing this as a stand-alone statement at the beginning of the NPS-FM would be a more effective means to address the identified problems with NPS-FM implementation. This approach could be accompanied by a description of the policy intent in the Preamble.

5.3 Options analysis - A National Objectives Framework

5.3.1 Components of a national objectives framework

70. A policy package called the "National Objectives Framework" (NOF) was proposed to provide a process, which regional councils must use to set objectives in regional plans. The elements of the framework were drawn from LAWF's recommendations, and consulted on as a concept in March 2013.[17] The detail of the framework was developed with the help of a stakeholder group after the concept of the framework gained support through the March consultation.[18]

71. The components of the national objectives framework direct regional council planning processes for setting objectives as they transition to a limits-based regime for freshwater management (already required by the NPS-FM). The components proposed for including in the framework were:

    i. **A specified process** to set objectives, based on managing water bodies to meet community and tāngata whenua values

    ii. A set of **national values**, including two compulsory national values. The value may be an intrinsic value of the water body, or a use that relies on the water body. Each value is described according to the state of quality of water that is necessary to support the value.

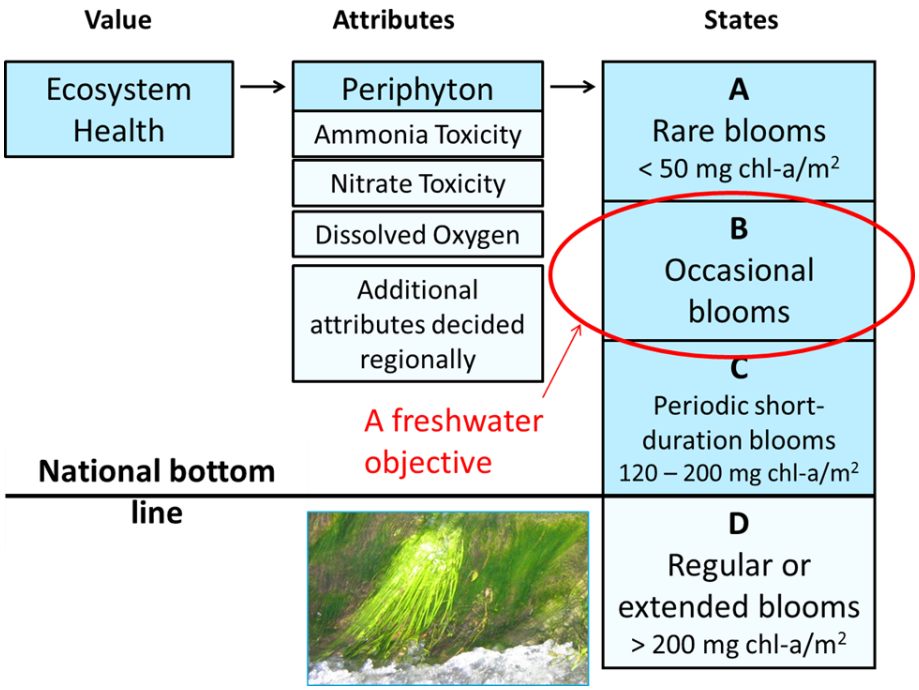
    iii. A set of **attributes** for each national value, with defined states from the "A" state where the water body would be at or near a pristine state, down to a "D" state where the water body has been changed to the extent that the value is compromised and recovery may be difficult. Freshwater objectives must be set using these attributes, but the actual number used for the objective (bottom of the C state or the middle of the B state for example) is chosen by the council through the planning process. The objective must include the timeframe for when it would be met.

[17] Ministry for the Environment. 2013. *Freshwater reform 2013 and beyond*. Wellington: Ministry for the Environment.

[18] The National Objective Framework reference group comprised fifteen stakeholders from regional councils, NGOs, Iwi Advisors Group, Horticulture NZ, Federated Farmers, Straterra, Scion, DairyNZ, Mighty River Power, and the National Institute for Water and Atmospheric Research (NIWA).

iv. **National bottom lines** apply to the compulsory values and defined as the bottom of the "C" state. Councils cannot set an objective for a water attribute lower than a national bottom line unless the water management unit to which the objective applies is eligible for an exception.

72. The relationship between the components is shown here.



5.3.2 Consultation feedback on the specified process, including allowing for exceptions

73. Around a fifth of the unique submissions commented on the NOF process with a clear majority supporting the proposal (feedback on the national values and attributes is provided in the sections below). The main concerns about the process itself centred on the provisions for allowing exceptions to the national bottom lines.

74. Ten percent of unique submissions and two major campaigns which generated 6,252 form submissions wanted exceptions be kept to a minimum and described as narrowly as possible to maintain the integrity of the system overall. Allowing objectives to be set below a bottom line where the poor quality is caused by natural processes was generally supported, but with requests for clarification on how it would be applied. The majority of submissions opposed exceptions for historical activities, with requests to limit this exception so that it would be applied narrowly.

75. Submissions were evenly divided on whether there should be exceptions for freshwater management units affected by significant existing infrastructure. Submissions from the energy sector strongly supported the exceptions framework and asked that their own infrastructure be listed as soon as possible. Other submissions expressed uncertainty about the process and wanted criteria for deciding and listing freshwater management units as eligible for an exception.

5.3.3 Analysis of having a specified process, including allowing for exceptions

76. Specifying a statutory process for setting objectives will mean that matters that can be challenged through the planning process will be limited to the value choices themselves (for the "additional

values") and the threshold at which an objective is set to achieve a particular value. There could be no debate about whether it is appropriate to set objectives for the compulsory values (ecosystem health and human health). This will help the setting of objectives "at reasonable cost" by reducing the matters able to be debated through the planning process, and will reduce unnecessary variation in approaches taken by regional councils.

77. Providing a process for situations where an objective may be set below a bottom line will mitigate the costs of compliance for resource users in some over-allocated catchments. Three situations were proposed that would allow a freshwater management unit to be eligible for an exception. These were where a national bottom line is breached because of

    i. naturally occurring processes

    ii. historical activities, or

    iii. existing significant infrastructure

78. In each of these cases, the regional council could choose to set an objective below the national bottom line for that attribute. Councils could identify eligible areas for the first two circumstances but water bodies eligible for exceptions in the third situation would be identified in the NPS-FM, following a separate amendment process.

79. The main safeguard to reduce the risk of an exception eroding the national bottom lines is that any application of the exceptions criteria in regional plans must still give effect to the objectives of the NPS-FM (including that the overall quality of fresh water within a region is maintained or improved).

80. Water bodies with existing infrastructure would only be eligible for the exception criteria to be applied if, in the absence of the infrastructure, the bottom line would not be breached. Thus, any addition of pollutants or abstractions of water could not take advantage of the presence of infrastructure to degrade the water body. More work will need to be done to identify the water bodies with existing significant infrastructure that could be added to the NPS-FM. This is required to be a separate public process, with its own assessment of impacts and benefits.

81. Including the process for setting objectives in the NPS-FM was assessed against the evaluation criteria in section 3.1 of this report as follows:

    i. Effectiveness: the proposed process includes components to address all parts of the problem and achieve the objectives of the reform. There is a risk that the exceptions framework could be used to erode the national bottom lines if the criteria for water bodies to be eligible for an exception to meeting a national bottom line are not sufficiently narrow.

    ii. Efficiency: A statutory process will reduce inconsistencies taken by councils and minimise effort across all parties.

    iii. Treaty of Waitangi: the process provides for the principle of active protection of iwi values by setting objectives for those values when they are identified through the plan development process.

    iv. Transparency: The process of limit-setting to achieve the objective will build community understanding of what affects water quality and can capture commitment across all the different sectors that need to take action. Community decision-making will operate within the proposed constraint of environmental bottom lines.

v. Practicality: Any approach that sets limits to achieve freshwater objectives will result in adjustment costs in some catchments. Meeting limits in over-allocated catchments, including where contaminant loads are over-allocated, will require changes in practice over time. These can include more efficient resource use, changes in existing land practices (including redesign of farming systems) and perhaps changes in land use in some catchments.

vi. Flexibility: the process provides for local community views to be recognised and for variance in viewpoints between iwi and hapū in the application of any national values in their rohe, except where objectives must be set for the compulsory values.

82. While the process itself is robust and was supported during consultation, the exceptions framework will need to be constrained to reduce the risk of eroding the national bottom lines. Clarifying the terms "historical activities" and "natural circumstances" to a narrow set of circumstances would help, but in practice, would not overcome the likely debate about what constitutes an "historical activity". Unlike natural circumstances, regional councils could endeavour to remedy the effects of historical activities, and have done this already in some severely degraded water bodies. Allowing exceptions for historical activities can be deleted from the NPS-FM.

83. Clarifying the circumstances that would comprise "natural circumstances" would help avoid the potential application of the term to situations that can be controlled, such as effluent runoff from farms. Natural circumstances could be limited to situations caused by effects from native flora and fauna, and natural geological or geothermal processes.

5.3.4 Consultation feedback on national values, including the compulsory values

84. About one quarter of the 725 unique (non-form) submissions commented on the ecosystem health value, with all in support. Three quarters of the unique submissions commented on the human health value, with 15% in support of the value defined in terms of secondary contact recreation. In addition there were 7,151 form submissions arising from four campaigns, all of which opposed setting the human health value at that level. Two of these campaigns (with nearly 7,000 submissions between them) also requested additional attributes for the ecosystem health.

85. While there were many reasons people gave for opposing the secondary contact human health value, in general, the outcome they sought was water quality of a sufficient and reliable quality to use where and when they wanted. The uses and values mentioned were swimming, mahinga kai, ceremonies, fishing, and tourism. The reasons mentioned were safeguarding human health, providing for Part 2 matters under the RMA with respect to Maori culture and traditions, enabling healthy lifestyles, obliging dischargers to avoid, remedy or mitigate the effects of their activities on the environment, and trade reputation.

86. Apart from some concerns with the descriptions of some values, "food security" was the only national value whose inclusion was questioned in submissions. The food security value, which included a description about access to sufficient and suitable water to enable the production of food and fibre, overlaps with the more specific irrigation and animal drinking water values.

87. There were requests for more values to be added: aquaculture, commercial fishing, tourism, historic heritage, dilution and disposal of waste or storm water, threatened species, and variations on natural character and ecosystem health.

5.3.5 Analysis of having national values, including compulsory national values

88. The sixteen national values proposed for inclusion in the NPS-FM were drawn from the list of values and uses given in the existing Preamble to the NPS-FM. (The 16 values and the criteria for including any value in the national objectives framework are listed in Appendix 1 of this report.) Referring to a list of specified national values in a policy of the NPS-FM means that councils will be required to use those values when they set their freshwater objectives, with the proviso that councils can also choose other values appropriate to local or regional circumstances.

89. Of the sixteen values, two – ecosystem health and human health (secondary contact recreation) – were proposed as compulsory values. This will mean that in every freshwater management unit councils would be required to use the prescribed attributes for those two values to set their freshwater objectives. None of the other 14 national values were proposed as compulsory values because while they are nationally significant, they are not valued in every water body nationally.

90. Making "ecosystem health" a compulsory value helps give effect to Objective A1and B1 of the NPS-FM: *to safeguard the life-supporting capacity, ecosystem processes and indigenous species including their associated ecosystems of freshwater*. Describing ecosystem health in the NPS-FM will also address the problem of councils taking inconsistent approaches to defining the life-supporting capacity of water.

91. Making "human health for secondary contact" a compulsory value recognises that contact with recreational water is adversely affecting some people's health (as shown in the data from the notifiable disease programme), and that there was public support for applying such a value to all freshwater nationally in the March 2013 consultation. Limiting the compulsory value to activities where there is unlikely to be full body and head immersion in the water – such as boating and wading – recognised that not every water body is used or valued for activities with higher level of contact – such as swimming and kayaking. Also, analysis showed that water quality in around 40% of surface water bodies would present a risk of greater than 5% of infection to people involved in the higher contact activities, suggesting that aiming for swimming as a compulsory value everywhere would be unrealistic.

92. The costs of improving water bodies to a level that would be suitable for swimming were not calculated because the range of mitigation measures resource users might choose to put in place (sewage or stormwater systems upgrade, stock exclusion and so on), and over what timeframe, was too vast. Further, in some areas, the improvements required to make rivers suitable for swimming could mean retiring large areas of land or removing development from the catchment.

93. Including a set of national values in the NPS-FM was assessed against the evaluation criteria in section 3.1 of this report as follows:

    i. Effectiveness: the mandated set of values provides for local views to be recognised in choices about objective setting, while the two compulsory values will ensure that a national minimum for water quality will give effect to the existing requirements in the NPS-FM and achieve the purpose of the RMA

    ii. Efficiency: currently there are nearly 100 different water management purposes specified in regional plans. Some plans use the water quality classes in Schedule 3 of the RMA (such as "water supply" and "contact recreation"), with others managing for more specific local circumstances ("gravel extraction"). Having a set of values which meet a national set of criteria will help focus community discussions for plan preparation and reduce inconsistencies between councils.

iii. Treaty of Waitangi: A common view expressed by tāngata whenua during consultation was that setting the compulsory value for human health at "secondary contact" was inconsistent with providing for the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu and other taonga and that swimmable freshwater should be set as an aspirational national outcome, or at least that an agreed process is put in place to make this possible over time.

iv. Transparency: having a mandated set of values would help parties in the planning process understand any choices they may have to make between values

v. Practicality: the set of values encompass currently used existing water quality classes and the values and uses listed in the Preamble of the current NPS-FM, and would not cause disruption to the current approach.

vi. Flexibility: the values specific to tāngata whenua such as mahinga kai and wai tapu are not compulsory and can be applied wherever appropriate according to the views of local iwi and hapū.

94. The analysis shows that community and tāngata whenua views on the appropriate quality of water are not adequately recognised. If the additional national value of contact recreation was merged with the proposed compulsory value of human health it would require councils to have the discussion about where people swim or kayak within the decision-making framework of setting the objective for human health. The resulting compulsory value - human health (for recreation), could then cover the full range of activities from wading (in the C state) through to kayaking and swimming (in the B and A states). The bottom lines for the compulsory value would remain the same. The additional national value of contact recreation would become unnecessary.

95. The consultation feedback that descriptions of any national value should not imply rights to water needs to be addressed. All values should be re-written to consistently describe both the quality and quantity component of the value so as not to imply that some values or uses of water have greater allocation rights. In addition, the value of food security should be reworded or merged with the irrigation and animal drinking water values to reduce overlap.

96. No suggested values met the criteria for a value to be added to the NPS-FM.

5.3.6 Consultation feedback on attributes for the national values

97. Some technical issues with attributes for both ecosystem health and human health were raised in submissions. All were reviewed by Science Review Panel, who advised where changes were appropriate.

98. There were also requests for more attributes to be added: nutrients (rather than only nutrient toxicity), macroinvertebrates (as measured by the MCI)[19], deposited sediment, dissolved oxygen (but not downstream of point source discharges) and fish. These requests and the reasons for the requests were also reviewed by Science Review Panel, who advised what changes they thought were appropriate.

[19] MCI is the macroinvertebrate community index, which is a measure of the abundance and diversity of insects and other small animals without backbones that live in the beds of rivers and lakes. The greater the abundance and diversity of macroinvertebrates, the healthier the water body is deemed to be.

5.3.7 Analysis of having a set of attributes for the national values

99. For the compulsory values, the amendments proposed seven attributes for "ecosystem health" – three of which would apply to lakes only, two to lakes and rivers, and two to rivers only – and two attributes for human health (secondary contact recreation). One attribute was proposed for the non-compulsory value of "contact recreation" (all ten attributes are listed in Appendix 1 of this report).

100. Earlier consultation in March 2013 indicated there was support for having water attributes that would be managed for each value, but there was concern that the categorisation of the attribute thresholds needed to be based on robust science (see section 6 of this report). This concern was addressed by using panels of scientists with expertise in lakes, rivers, wetlands, and groundwater to develop and define attributes and minimum acceptable states for the attributes. Some panel members were independent, some iwi-based and others from leading research institutes and regional councils[20]. All science panel recommendations were overseen by a Science Review Panel on which each science panel was represented. The Science Review Panel agreed on the suitability of attributes according to a set of criteria (given in Appendix 1 of this report).

101. Including a set of attributes for the national values was assessed against the evaluation criteria in section 3.1 of this report as follows:

i. Effectiveness: All proposed attributes meet the attribute criteria (see Appendix 1 of this report). They are based on the most up-to-date science and are supported by the Science Review Panel. The consultation provided further opportunity for scientists not included in the panels to scrutinise the suitability of the attributes themselves. Specifying scientifically robust attributes that must be used to set freshwater objectives will address the problem of councils taking inconsistent approaches to defining life-supporting capacity, or needing to commission their own research, and so will address the main problems identified with implementing the NPS-FM.

ii. Efficiency: using a mandated list of attributes for the compulsory national values, and eventually for the additional national values, will reduce costs for councils and communities by reducing debate and potentially appeals about applicable attributes to use to set objectives in regional plans.

iii. Treaty of Waitangi: the attributes proposed so far are based on the bio-physical needs of water bodies, but attributes can also be developed in future for national values like mahinga kai or wai tapu that are important to tāngata whenua.

iv. Transparency: Once limits are set to achieve objectives using the proposed attributes, resource users will know what resource use opportunities are available to them and where and how to respond to changes. Where limits are yet to be set, no one knows what the constraints or opportunities will be, so investment is risky.

v. Practicality: Setting freshwater objectives, particularly for safeguarding the life-supporting capacity of water, was the main area of difficulty councils were having in implementing the NPS-FM. Directing which attributes to use to set objectives will mean that all councils will be measuring the same thing to assess achievement of a value. Few councils would not already be

[20] Cawthron Institute, Landcare Research, NIWA, GNS Science, Opus, Aqualinc, ESR, AgResearch, Universities of Canterbury, Otago, Waikato and Lincoln, Iwi Advisors Group, Department of Conservation, Ministry of Health, Te Ao Marama, Ministry for Primary Industries, regional councils (Wellington, Auckland, Canterbury, Waikato, Southland, Horizons, Hawke's Bay), Fish & Game, Wriggle consulting, Gail Tipa and Associates, Golder Associates, Ian Kusab's and Associates.

measuring the proposed attributes because the selection criteria required that there are established protocols in place for measuring the attribute.

vi. Flexibility: There would be no flexibility in the choice of attributes to use to set objectives, except where the existing attributes are not sufficient to support the value.

102. The analysis shows that prescribing the attributes in the NPS-FM will address many of the problems councils have had in setting objectives. Technical issues about the appropriate statistical measures to use for the attributes are best resolved through advice from the Science Review Panel and further guidance.

103. No more attributes met the criteria for an attribute to be added to the NPS-FM. To address the widespread concerns about the need to recognise the health of a water body as indicated by the MCI (Macroinvertebrate Community Index), the ecosystem health value description can be changed so that macroinvertebrates are specifically mentioned. The main difficulty with adding MCI as an attribute in its own right is that there are a wide range of factors that affect the numbers and diversity of macro-invertebrates present in fresh water, making it too difficult to quantify the impact of an MCI national bottom line. The same problem makes it difficult to use MCI as a basis for limit setting.

5.3.8 Consultation feedback on national bottom lines

104. Early consultation (see section 7.1 of this report) on having national bottom lines in an objectives framework indicated there was concern that:

- the framework could lead to all water-bodies being managed down to the bottom line or the bottom of the C band, especially if the numbers being considered were weaker than those in some existing plans, and
- the bands or bottom lines might unreasonably restrict people's use of water, with many calls for good analysis of the implications of any bottom lines.

105. The first concern re-emerged during consultation on the proposed amendments. This concern revealed a misunderstanding of the operation of the NPS-FM. Allowing all water bodies to be managed down to a bottom line would not give effect to Objective A2 of the NPS-FM. This objective is:[21]

The overall quality of fresh water within a region is maintained or improved while:

a. protecting the ~~quality~~ significant values of outstanding freshwater bodies

b. protecting the significant values of wetlands; and

c. improving the quality of fresh water in water bodies that have been degraded by human activities to the point of being over-allocated.

106. The second concern was addressed by assessing the impact of the bottom lines in exercises which modelled responses to changes in various contaminant inputs and the economic impact of bringing about those changes. The risk of unreasonably restricting people's use of water could also be addressed by setting timeframes to allow people to make the necessary adjustments for meeting any bottom line. Three options were considered for setting these timeframes. These were:

[21] A minor change (underlined) was proposed in the amendments.

- a nationally directed phased in approach,
- setting a time frame for meeting bottom lines in the NPS-FM, and
- leaving the decision to regional councils and communities to decide during their regional planning process.

107. The last option was preferred because it allows councils to determine how best to phase in meeting bottom lines in the most achievable and cost effective way for their region. For example, the least cost improvement for that region could be done first and the others approached over time. A risk with this approach is that councils could be subject to lobbying for long timeframes by some users. But making this decision nationally, attribute by attribute could not take local views and priorities into account and may incur unreasonable costs on communities, so this approach was rejected.

108. The most common feedback in submissions about the national bottom lines in the proposed amendments was that the thresholds were too low, both for human health and ecosystem health. Some submissions also raised technical issues with the statistical measures of some attributes.

5.3.9 Analysis of having national bottom lines for the compulsory values

109. Where a range of local interests is at stake in a regional decision-making process, there is potential for broadly held national values to be overlooked or to be given less than their due weight. Bottom lines for freshwater objectives will mean that values held to apply everywhere (compulsory national values) will have statutory weight.

110. The bottom of the "C" state for each attribute of a compulsory value is defined as a national bottom line. Except where specified exceptions apply, a freshwater objective cannot be set below a national bottom line, though a long timeframe can be set to achieve an objective whose state is currently below a bottom line, or is trending towards a bottom line.

111. The thresholds for the bottom of the C state were chosen to be the point where:

a. For ecosystem health, to protect most species against chronic effects, and to be well above lethal thresholds. For the most sensitive species the impacts will be some reduction in growth.

b. For human health, to provide for a no more than moderate risk (five per cent risk) of infection from exposure to water through "secondary contact", taking into account people's likely exposure to micro-organisms from inhaling or swallowing water in the water body.[22] Objectives set at a level higher than the national bottom line will provide a lower level of risk for the same range of activities, but could also be used to provide the same level of risk to a wider range of activities.

112. With no specific timeframe within which a freshwater objective must be met, a management regime can be put in place – determined through the regional planning process by the council and community – to move any water body currently in a D state toward the bottom line or better over time. This means that the costs incurred to meet an objective can be spread over time and between resource users, and the effectiveness of limits and costs of implementing them can be assessed and if necessary revised during this time.

[22] McBride, Graham (2012). Issues in setting secondary contact recreation guidelines for New Zealand freshwaters.

113. There is a risk that when making this decision, councils will be pressured by community interests to delay the time for objectives to be achieved so that it doesn't restrict current uses of the water body. This risk is largely mitigated by having an approach where all members of the community will have access to the information about the current state of the water body, the sources of all contaminants that affect the bottom lines, and the council's proposed management approach. This increased transparency will allow better public engagement from all sectors of the community.

114. The technical issues with the statistical measures for the attributes for both ecosystem health and human health were reviewed by Science Review Panel, who advised what changes they felt were appropriate. Where a change would result in a change to the impacts of a national bottom line, and no additional impact testing could be done, the bottom line as proposed in the discussion document should be retained.

115. Including a requirement for national bottom lines for the compulsory national values was assessed against the evaluation criteria in section 3.1 of this report as follows:

i. Effectiveness: having national bottom lines will meet the objective of meeting a national minimum for water quality. Local views about resource priorities that are in conflict with improving water bodies to the bottom of the C state will be constrained except insofar as agreeing on these timeframes, though may be mitigated in some places by setting objectives below the bottom lines if the water body is eligible for an exception. Improving water quality in rivers and lakes that do not meet the national bottom lines for the human health value will reduce people's potential exposure to water related health risks.

ii. Treaty of Waitangi: the water quality associated with the threshold of secondary contact recreation was generally opposed by tāngata whenua submissions. Values, such as collecting food from the water (mahinga kai) are significant for tāngata whenua but none of these were proposed as a compulsory value.

iii. Efficiency: adopting consistent national bottom lines provides certainty to councils, resource users and communities and means they can minimise effort when setting objectives. Impacts can be managed through choices about timeframes and pathways for adjustment.

iv. Transparency: communities will know and understand what the minimum requirements will be and where the current or desired water quality sits in relation to those minimum requirements.

v. Practicality: councils must set timeframes to achieve a national bottom line and when making choices about that timeframe they must consider the implications for resource users. Councils cannot set freshwater objectives in isolation of the requirements of the RMA, specifically their obligations under section 32 of the RMA to assess the extent to which the objective is the most appropriate way to achieve the purpose of the Act. These requirements can help with ensuring the approach taken is realistically achievable.

vi. Flexibility: There would be no flexibility in the level of a national bottom line. Local views about timeframes to achieve the national bottom line will be taken into account during the objective setting process.

5.4 Options analysis - an accounting system for resource use

5.4.1 Consultation feedback on requiring a resource use accounting system

116. The majority of submitters agreed with requiring councils to account for freshwater quality and quantity in their regions. From a total of 209 submissions on this matter (around 28% of all unique submissions), eight disagreed because of the costs of accounting, mistrust of regional councils, or an assumption that freshwater accounting repeats the requirements of section 35 of the RMA.

5.4.2 Analysis of requiring a resource use accounting system

117. One of the problems identified with implementing the NPS-FM was that regional councils lack good data to underpin decisions on setting and managing limits to achieve their freshwater objectives. This is particularly so in respect of contaminant loads that affect water quality. Good planning decisions require good information about how much fresh water is taken, the sources of relevant contaminants, and the extent to which those contaminants contribute to degraded water quality.

118. Accounting for the pressures on both water quality and water quantity is important for resource users to identify catchments where there is capacity for increased resource use or intensification. Accounting also supports managing within limits, which will drive efficient use of fresh water. In time this will lead to improved reliability for water takes, increased investment certainty, reduced over-allocation, reduced conflict, easier monitoring and highest value use.

119. Two options were considered for ensuring regional councils carry out adequate freshwater accounting to underpin limit setting and management decisions:

- Guidance only: Provide guidance material to regional councils setting out the benefits of accounting, and methods for doing so.
- National direction with guidance: Providing statutory requirements for councils to carry out freshwater accounting (assisted by guidance).

120. The guidance only option was expected to have a small net benefit because it would make it clear that accounts need to be prepared before councils could set and manage within limits successfully and fairly. However, given there is no legal imperative,[23] and the cost of collecting and modelling the necessary data for accounting systems is substantial, uptake of the guidance would be likely to be partial at best. In addition, it is likely that councils would prepare accounts for only some catchments (e.g. where resource pressures are high), and with guidance only the accounts prepared are less likely to be regionally and nationally consistent.

121. Providing national direction for accounting (assisted by guidance) would set out statutory requirements for councils to carry out freshwater accounting. A statutory requirement would make it clear that accounting must be carried out despite the cost to regional councils. Consistent methods of accounting would be encouraged through guidance.

122. Guidance alone was rejected because national direction plus guidance better meets the objectives for the reforms. The combination will ensure that accounts are prepared for all water management units prior to limit setting and that they are regularly updated, resulting in better informed decision making.

[23] The Environmental Reporting Bill, introduced to the House in February 2014 proposes to give the Minister for the Environment and Minister of Statistics the power to recommend regulations to be promulgated.

Regional and national consistency will improve as a result of the guidance provided on methods for accounting and reporting.

123. The proposed policy has two parts. It requires every regional council to:

- establish a freshwater quality and quantity accounting system for freshwater management units where freshwater objectives and limits are being set (or reviewed)
- include a level of detail in the system which reflects the extent or seriousness of the issues affecting the freshwater management unit.

124. Including a requirement for accounting was assessed against the evaluation criteria in section 3.1 of this report as follows:

i. Effectiveness: the proposed policy sets out a statutory requirement to prepare fit-for-purpose accounts and so addresses the problems identified in section 2. The management unit applied for the purpose of accounting will be the same management unit to which objectives are applied, meaning that resource users will have better information about the amount of resources available to them so they can make more informed investment decisions about what is needed to manage within the limits.

ii. Efficiency: the proposed policy does not specify the method(s) that councils should use to establish and operate their accounts so there may still be inconsistencies in approaches. Directing approaches through guidance will mean that councils can adopt the approach that best meets their needs.

iii. Treaty of Waitangi: the approach will mean that tāngata whenua groups engaged in freshwater planning processes have access to more information about the takes and contaminant in the freshwater management unit, this will allow for better engagement at the regional level.

iv. Transparency: Limits will be able to be set with accurate information about pressures. This will allow councils to allocate resource use within those limits transparently.

v. Practicality: The requirements will extend existing requirements on consent holders to measure and report significant takes under the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010. For contaminants, significant effort would be required in some regions to develop the scientific and modelling inputs. A two year period was proposed before this requirement would come into effect to mitigate the impact of high costs to some councils, and overcome the New Zealand-wide capability constraints for scientific data collection and catchment modelling.

vi. Flexibility: Regional councils will determine the appropriate spatial scale for freshwater accounting within their region and will have flexibility in the type and complexity of accounting system they choose.

5.5 Options analysis - other changes proposed

5.5.1 Monitoring progress towards achieving the objectives

125. The proposed amendment requires councils to monitor their progress towards achieving freshwater objectives at representative sites within each catchment. The policy signals that monitoring regimes should be practical and affordable.

126. Submissions gave clear support for the monitoring requirements. Many, however, requested guidance about how it should be done including criteria for selecting monitoring sites, detail on what and how to monitor, and clarification regarding the links between monitoring and accounting requirements.

127. Monitoring is already required of regional councils under the RMA. The Policy simply restates the importance of monitoring and sets some necessarily broad expectations. A national policy statement cannot prescribe the methods by which regional councils undertake monitoring. The details of a monitoring plan are at the discretion of regional councils, including the selection of representative sites.

5.5.2 Improve links to coastal water

128. Earlier consultation indicated concern that any fresh water reform needed to address the coastal receiving environment, not just the freshwater system itself (see section 6 of this report). Two options for doing this are to develop attributes for estuaries and to explicitly require regional plans for have regard to the connections between freshwater and coastal water.

129. Around eight percent of the unique submissions on the amendments commented on coastal water. The majority requested additional content relating to estuaries and coastal water within the NPS-FM, and expressed concern about the lack of national bottom lines for estuaries.

130. No potential attributes for estuaries could meet the criteria for attributes (see Appendix 1) agreed by the Science Review Panel. Even though the NPS-FM does not apply to coastal water, regional councils can establish objectives, set limits, and define values and attributes that consider the receiving coastal environment, including estuaries.

131. Proposed amendments to Policies A1, B1 and C2 require regional councils to have regard to the connections between freshwater and coastal water when amending or changing their regional plans. Adding explicit direction about having regard to the connections between fresh water and coastal water should improve the effectiveness of freshwater objectives in water bodies whose water is degraded to the extent that it adversely affects coastal water.

6 Impacts of the amendments to the NPS-FM

6.1 Impacts of including an objective setting process with national values

132. Including national values in the NPS-FM is expected to have positive social and cultural impacts in communities by focussing their resources into discussing options around a well-defined set of values. The nationally defined set of values is not expected to have any economic impacts on councils or communities because the values themselves do not direct the level at which to set the objectives.

6.2 Impacts of the set of attributes and the national bottom lines

133. Including a set of attributes in the NPS-FM, with defined national bottom lines for the two compulsory values, will have positive environmental and social impacts by ensuring the life-supporting capacity of fresh water is safeguarded (as directed by the purpose of the RMA), and by ensuring that there is no more than moderate risk to human health when people are engaged in activities that bring them into contact with fresh water.

134. Defined bottom lines should also reduce delays and improve certainty for investment purposes, both for in-stream uses such as tourism ventures, and out of stream uses such as water supply and primary industry. The certainty comes from knowing what the limits on resource use are at the time a regional plan becomes operative (rather than relying on the resource consent process), thus encouraging investment plans to proceed with innovative solutions to manage their business within those limits. There will also be direct cost savings to councils and industries previously engaged in debating provisions about minimum acceptable states through the council hearings and court processes.

135. Improving poor quality freshwater in rivers and lakes currently below the national bottom lines for each of the attributes for ecosystem health will help safeguard the life-supporting capacity of those water bodies. This is required by Objective A1 of the NPS-FM, and is necessary to achieve the purpose of the RMA.

136. Improving poor quality freshwater in rivers and lakes currently below the national bottom line for the attributes for human health will provide social benefits from the reduced incidence of infection. Reducing people's risk of illness through setting a national bottom line, with the options for councils to set objectives at a higher level, is necessary to enable people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety.

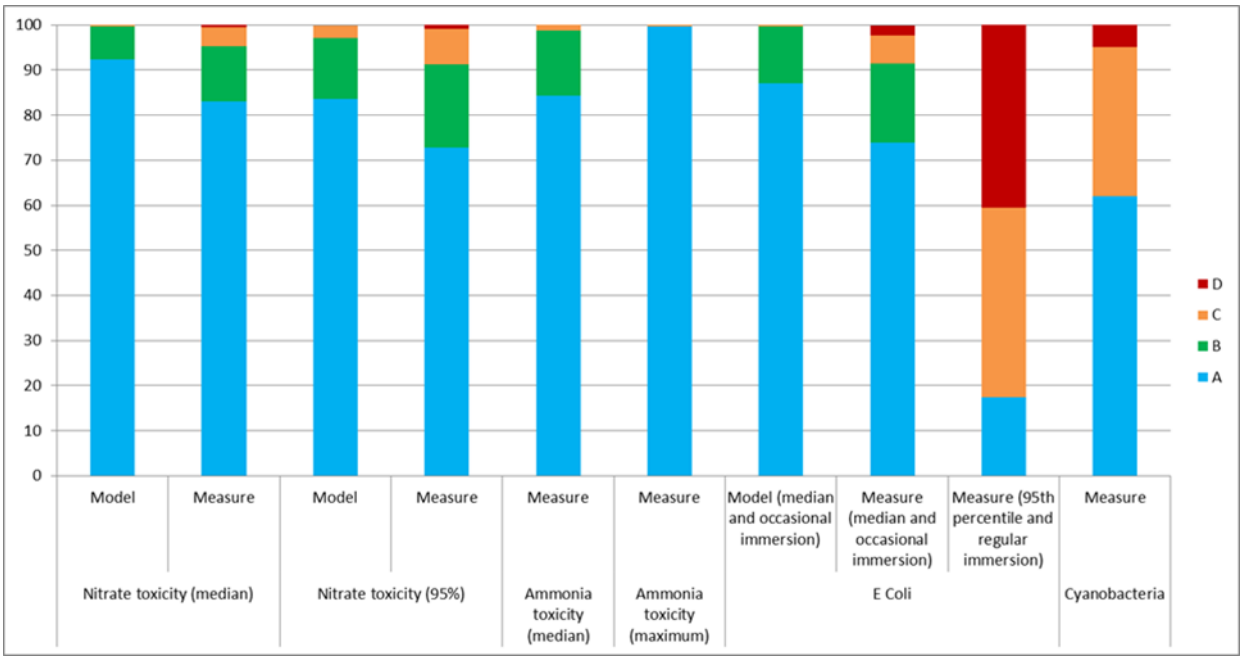
137. All freshwater management objectives set in regional plans for human health protection will be informed by the descriptions about the level of risk to human health given in the NPS-FM. The levels of risk were determined according to people's likely exposure to micro-organisms from inhaling or swallowing water in the water body.[24]

138. The bottom line for human health does not prevent councils and their communities choosing to manage particular places to a higher level where people have, or want, more contact with the water. Still more factors such as conditions in estuaries or coastal swimming beaches downstream may also drive choices about what freshwater objectives are needed upstream.

139. Under the status quo, the NPS-FM requires over-allocation of both quality and quantity to be addressed and water quality to be maintained or improved. This means that regional councils need to assess the current state of water bodies and allocate contaminant loads among resource users. Therefore, even without the constraints of statutory bottom lines, changes in practice will be required in catchments deemed to be over-allocated. The difference imposed by prescribing attributes (with national bottom lines for the compulsory values) is that the level at which a catchment, or freshwater management unit, is over-allocated in term of contaminant load is set nationally.

140. Modelling water quality data from all regional councils' state of the environment monitoring shows what percent of surface water bodies are currently below national bottom lines (see Appendix 2 for detailed tables). Shown graphically (see below), the modelling shows that very few water bodies nationally are in the D state (below a national bottom line). The attribute with the highest percentage in the D state is E. coli measured at the 95th percentile with regular immersion – ie the threshold for swimming and other activities that involve high contact with water.

[24] McBride, Graham (2012). Issues in setting secondary contact recreation guidelines for New Zealand freshwaters.



141. The likely amount of rivers in each of the A, B, C, and D states are as follows:

i. Ecosystem health:

- Nitrate toxicity data indicate that 0.9% of rivers would be in the D state for the 95th percentile measure.
- Ammonia toxicity data indicate that no rivers would be in the D state.
- Chlorophyll *a*: data from four regions indicate that periphyton is a problem in the Manawatu catchment (15% of the rivers would be in the D state) and the Wellington region (10% of rivers), but not in Canterbury or Southland where less than 1% of rivers would be in the D state. Proposed bottom lines for Chlorophyll *a* in lakes are breached at 24 out of 108 sites in New Zealand, including a number of Northland and Whanganui dune lakes, the Waikato peat lakes, and Lakes Rotorua, Okaro and Hayes. The effect of the bottom line on all rivers nationally could not be modelled because large variations in climate and river morphologies mean large variations in the incidence and prevalence of periphyton.

ii. Human Health: E. coli data in New Zealand rivers and lakes indicate that around two percent of surface water bodies would be in the D state (annual median E. coli presence of more than 1,000 E. coli per 100 ml).

142. These results show that few rivers nationally are in the D state as proposed in the amendments. Where councils have already set freshwater objectives in their regional plans using these attributes, they are generally as stringent or more than the proposed national bottom lines. For example, for periphyton, five out of the six regional councils[25] that have set numeric objectives for periphyton have chosen what would be the B-state. Because of this, the marginal impact on resource users of having national bottom-lines is likely to be low for most catchments.

[25] Nelson City Council has set a numeric objective which is slightly less stringent than the proposed bottom-line (allowing 60% cover rather than the recommended maximum of 55% cover).

143. Some regional councils are not currently monitoring periphyton presence, or managing it in their regional plans. This means there is limited information about the levels of periphyton in New Zealand rivers and whether the rivers meet the proposed bottom line. The Ministry will need to monitor the impacts of where councils set objectives and limits for periphyton to inform possible future reviews of the national bottom lines.

144. The proposed national bottom lines are not standards. Where they are not already met they will be used to set objectives that can be achieved over time. Where the current state is better than the proposed national bottom lines (most water bodies), regional councils can set objectives at that level or higher. This means that the bottom lines themselves will not impose costs on resource uses in those catchments.

145. The factors causing bottom lines to be breached vary according to land use, industrial and commercial activities (including water abstractions), river environments, climate, soil types, lag times for groundwater to reach surface water bodies, and land cover. Only some of these factors can be managed to bring about changes in the water body (primarily land uses and industrial and commercial activities). Also, the kinds of changes councils will impose on those activities to improve the water quality will be influenced by local community preferences and expectations, and the conditions already applying to people's existing resource consents.

146. The tools that councils can use for water bodies to meet bottom lines range from non-regulatory options (such as industry incentives to exclude stock from water bodies, or council subsidies to plant and shade streams) to regional rules that apply at a farm scale or region wide (regulating the activity according to the effect and requiring the dischargers to avoid, remedy or mitigate the effect). In pastoral farming catchments with high bacterial contamination, meeting national bottom lines may be best achieved by fencing and planting rivers and streams to exclude stock or it may require more sophisticated tools such as nutrient management through cap-and-trade arrangements. What is finally chosen will reflect the amount of improvement that is required and will likely be a mix of mitigation strategies.[26]

147. Even simple stock exclusion management options that could be applied to decrease the nutrient and E. *coli* loads will have varying effects on water quality within regions and within catchments. In practice, councils will utilise a wide range of management options tailored to each water management unit to achieve bottom lines and if needed they can apply these over a long timeframe to achieve the least cost to the resource users. The proposed amendments mean that communities and councils can work out together how to meet bottom lines, with costs and benefits of their choices explicitly recognised in their decision-making process.

148. There is a risk that setting ambitious objectives could have a significant impact on people who then have to improve their discharge quality (some farmers and owners of sewage treatment systems) and that this may affect the willingness of some communities to introduce regimes that have high implementation costs. This risk may be highest in areas where the benefits of improving the water body are poorly defined. This risk is mitigated by proposing that councils make their decisions about any required improvements to water bodies after considering the implications for resource users, including the social and economic implications, and the costs associated with meeting objectives over specified timeframes.

[26] *Assessment of Strategies to mitigate the Impact or Loss of Contaminants from Agricultural Land to Freshwaters* (June 2013). Unpublished report for MfE from NIWA, AgResearch and Waikato University.

6.3 Modelled assessment of the impact of national bottom lines on selected stakeholders

149. Estimating fiscal costs and benefits of the proposed national bottom lines is particularly difficult because there is no way of predicting:

i. How councils may choose to exercise their discretion in matters such as the timeframes for achieving objectives to meet national bottom lines.

ii. What mitigation measures resource users might choose to put in place to meet limits and over what timeframe.

150. Instead of estimating the overall costs of applying national bottom lines, we modelled the costs of compliance in the main areas where the bottom lines are not met. Modelling the full range of scenarios nationally was not attempted because most of the country will not be affected by the national bottom lines. Councils will be best placed to do these evaluations when they set the objectives in their regional plans (as they are required to do under section 32 of the RMA).

151. Modelling water quality data from all regional councils' state of the environment monitoring shows that the national bottom line likely to be breached most often is *E. coli* (for the compulsory value of human health). For this attribute, 17 of the approximately 700 sites will fail the proposed bottom lines for *E. coli*. Four of those sites are within three urban areas (Wellington, Nelson and Auckland) and the remaining sites are in Southland, Canterbury and Waikato. For nitrate toxicity, four sites will fail the bottom line for nitrate toxicity measured with the median sampling statistic. All of these are within one region (Canterbury), with two being in the study zone.

152. The Ministry for the Environment, Ministry for Primary Industries and the Department of Conservation investigated the potential impacts on stakeholders of scenarios for setting water quality objectives and limits to achieve national bottom lines through a series of interlinked economic and scientific studies. The studies were carried out in three regions – Southland (region-wide), Canterbury (two zones) and Waikato (one catchment) – in partnership with the regional councils (the approach taken in the analysis is described in Appendix 3). The three regions were selected because they:

- face challenges with water quality
- are at an appropriate stage of developing regional plan changes
- have significant dairy expansion underway
- are likely to be the most impacted by proposed national bottom lines.

153. The bottom lines tested were ecosystem health in terms of nitrate toxicity and human health in terms of E. coli. The study locations covered two of the four breaches for nitrate toxicity, and 11 of the 17 breaches for *E. coli*. (See Appendix 2 for the numbers of sites estimated to be in the D state, and a graph showing the coverage of the study sites in terms of *E. coli* breaches).

154. The nitrate toxicity bottom line is breached in four sites in New Zealand – two of these are in one of the Canterbury study locations. The study found that the cost of meeting that bottom line is around $22 million per annum or seven per cent of the zone's projected agricultural net income based on a policy of nutrient trading. On farm mitigation would be insufficient to meet the likely restrictions imposed by the proposed bottom line threshold and so these restrictions would likely drive land use change with some of the anticipated dairy conversion not proceeding.

155. The proposed national bottom lines for ecosystem health in rivers that were tested in Southland are currently met and do not impose costs. That is, water quality will be maintained above bottom lines for periphyton and nitrate toxicity under all scenarios tested, including some that allow for dairy growth. Meeting the proposed national bottom line for human health in rivers would incur some costs on sheep and beef farmers because most dairy farms already have fencing in place that would reduce *E. coli* inputs. The key conclusion from the studies is that national bottom lines for ecological health and human health can be achieved for rivers in Southland over a 25 year period to 2035 at a low or no cost to agriculture and a gain in non-market values.

156. The proposed bottom lines of ecosystem health are already being met in the Waikato River. The national bottom line for *E. Coli* (human health) is currently met in all but five monitored sites. Completing stock exclusion for larger streams and fencing smaller streams is one management option and should get four of these streams above the bottom at a present value cost of $3 million but with uncertainty around the effectiveness of this mitigation on peat soils.

157. The findings from all studies confirm that the means chosen to achieve the bottom lines will have a significant impact on the costs and benefits of a limits-based approach to freshwater management. They suggest that communities would have a wide range of economic and environmental choices in managing freshwater quality of rivers, emphasising the importance of councils testing a range of options to achieve bottom lines during the plan development stage.

158. The results from the regional studies cannot be extrapolated to other regions or to a national level because there is a substantial amount of uncertainty and potential errors associated with using assessments from one part of the country and attributing it to another (value transfer). In addition, there is limited or only partial information on other freshwater values, such as non-use values.

159. What these regional studies show is that in over-allocated catchments the proposed national bottom lines will drive changes in the way the primary sector uses or manages water. Decisions on necessary choices will be made when councils consult with the communities about setting objectives and limits in their regional plans. At that time, councils will be able to establish acceptable timeframes to work towards meeting the bottom lines, taking into account the industries and activities responsible for the contaminant loads on the water body, the likely and possible changes that may happen in those industries and activities in the short to medium term, and the aspirations of the affected communities.

6.4 Impacts of the accounting and monitoring requirements

160. The additional cost of accounting for water quality and quantity to regional councils is hard to estimate because costs vary depending on the level of sophistication of accounting methods used and the amount of work councils may have already committed to. Examples of additional one-off costs that could be incurred are the $0.15 million spent by one council to develop a basic accounting method for one large catchment, and the $0.25 million to $1.2 million per catchment other councils have estimated to develop more sophisticated accounting methods (a sophisticated method would require developing a model that is specific to a catchment and that captures the attributes of that catchment). On-going costs for maintaining freshwater accounting systems could be between $0.6 million and $0.8 million per annum (based on what some councils are currently spending).

161. Councils will only face additional costs if they otherwise would not have done these things, or did them later or not to the same level of sophistication. Most councils are already accounting for takes[27], and some will carry out contaminant source analysis as part of their limit setting process with or without the proposed amendments. The region-wide costs also vary depending on the number of freshwater management units (FMU), since accounting is to be carried out at FMU scale. Also, once a system has been set up for one catchment, the costs for setting up additional systems would reduce.

162. The costs to councils for fresh water accounting would be spread over the time they take to progressively implement the objective and limit setting requirements of the NPS-FM. The proposed changes to the NPS-FM will require councils to have an accounting system in operation for a water management unit prior to limits being set, but the requirements do not become operative for a two year period from the gazetting of the amendments. Council scheduling of the initial round of limit setting indicates a peak workload between 2016 and 2020. Introducing the accounting reforms in 2014 with a lead-in time of two years would enable councils to collect the necessary data prior to setting these limits.

7 Consultation

7.1 Summary of the results of early consultation

163. Public consultation on the first LAWF report in 2011 revealed wide support for the LAWF recommendations and direction. In March 2013 the Government consulted on their options for freshwater reform.[28] The consultation was run alongside consultation on wider resource management reform. Feedback was sought on eleven areas for water reform, including

i. effective provisions for iwi/Maori involvement in freshwater planning,

ii. a national objectives framework with a range of values – two of which (ecosystem health and human health for secondary contact) would apply to all water bodies – with minimum states for each value

iii. further national direction on setting freshwater objectives and limits, and

iv. a freshwater accounting system

164. Nearly 2,000 people attended over 50 public meetings, hui, council and stakeholder meetings around the country, with some meetings covering both freshwater and the wider resource management reform. Feedback on the freshwater reform discussion document generally reflected support across all sectors for the proposals designed to help with freshwater objective and limit setting (the national objectives framework) and freshwater accounting.

165. There were some specific concerns about how a national objectives framework would be implemented and on the detail including:

[27] NIWA (2013). *Regional Council Freshwater Management Methodologies: accounting and limit setting*. Report prepared for the Water Directorate, Ministry for the Environment.
[28] Ministry for the Environment. 2013. *Freshwater reform 2013 and beyond*. Wellington: Ministry for the Environment.

i. That the framework could lead to all water-bodies being managed down to the bottom line or the bottom of the C band, especially if the numbers being considered were weaker than those in some existing plans.

ii. That there was a need for robust science, and the ability to incorporate new science over time.

iii. That the bands or bottom lines might unreasonably restrict people's use of water, with many calls for good analysis of the implications of any bottom lines.

iv. The need to address the coastal receiving environment, not just the freshwater system itself.

v. That iwi values should be visible and provided for.

vi. Implementation issues, including the need for financial support, guidance and training for councils, and central government auditing of implementation.

166. There were calls for the framework to be progressed as soon as possible, but recognition that developing attributes for all values and all water bodies will take time. Many sought the chance to comment on the detail of the national objectives framework before it was progressed.

167. The March discussion document was reasonably high level and while it talked about a national objectives framework with bottom lines it was not specific about how this would be achieved (through guidance or a statutory instrument, with possible options being regulation, a new regulatory instrument, or changes to the NPS-FM). Nor did it set out the detail of what could be in the framework, in particular the attributes that would be used achieve the values or the level at which any bottom lines might be set.

168. The first five concerns raised in the March consultation were addressed in the proposed amendments. The sixth matter could not be addressed through the amendment and will need to be addressed through extra work programmes being progressed by the Ministry.

7.2 Process to amend a national policy statement

169. In October 2013 Cabinet agreed to consult on proposed amendments to the NPS-FM including freshwater accounting, a National Objectives Framework (NOF), and national bottom lines for two compulsory values - ecosystem health and human health (CAB Min (13) 25/12). The proposals in the amendments were based on recommendations in the second report of the Land and Water Forum, feedback received from submissions to the earlier consultation in March, and recommendations from the NOF reference group and Science Review Panel.[29]

170. The statutory requirements for amending a national policy statement are set out in the Resource Management Act 1991. For the proposed amendments to the NPS-FM, the Minister for the Environment chose to establish a process in accordance with section 46A(1)(b). The process includes:

i. Public consultation

ii. Written submissions

[29] The NOF Reference Group members were drawn from regional councils, NGOs, industries and the science community, some had also been members of LAWF. The Science Review Panel comprises members from each of the science panels who tested and reviewed the suitability of attributes to include in the NPS-FM

iii. A report and recommendations to the Minister for the Environment of the submissions and subject matter of the NPS-FM.

171. The report and recommendations for the Minister for the Environment has been prepared and a summary of this report must be made publically available. The Minister must consider the report, and may then make any changes to the NPS-FM she thinks fit, or may withdraw the proposal, but if she withdraws the proposal, she must give public notice of the withdrawal and the reasons for the withdrawal.

7.3 Consultation on proposed amendments

172. The proposed amendments to the NPS-FM were publicly notified on 7 November 2013. Submissions were invited during the period 7 November 2013 to 4 February 2014, and 12 public meetings and 14 hui were held around New Zealand during November and December 2013 with about 580 people attending. In total 7,151 submissions were received. Of those, 6426 were "form" submissions resulting from four campaigns, and 725 were unique.

7.3.1 Comments on the means to address the problem

173. The discussion document sought people's views on whether the problem of freshwater management was correctly identified and whether amending the NPS-FM would solve the problem. While there was agreement that there were problems with the current implementation of the NPS-FM, some submissions questioned the use of a national policy statement rather than a national environmental standard to address them. In their view, setting technical standards, methods or requirements was more suited to an NES. This option had been considered and rejected (see section 4.1 of this report) because it could not direct regional plan processes and help councils set objectives that reflect local views about values and resource priorities.[30] This approach is better suited to policies and objectives in a national policy statement which councils must then give effect to in their regional plans.

7.3.2 Major themes raised in submissions

174. Major themes raised in submissions were

i. Te Mana o te Wai: Some submitters wanted Te Mana o te Wai to be in the body of the NPS, not just the Preamble and Appendix, others felt its definition was ambiguous and that safeguarding Te Mana o te Wai would be very costly. A number of submissions, mostly from Iwi / Māori, offered an alternative approach of including Te Mana o Te Wai in a high level overarching purpose, statement, korowai, or objective of the NPS-FM.

ii. Human health (secondary contact recreation): Three-quarters of unique submissions and all form submissions opposed setting the compulsory national value for human health at the level of secondary contact recreation. The most common request in submissions was for the compulsory national value to be set at a level that would allow water to be suitable for swimming.

[30] Note that the ability to set prescriptive requirements in a national policy statement was not rejected in the April 2014 Supreme Court judicial decision "Environment Defence Society v New Zealand King Salmon and others [2014 NZSC38]"

iii. Ecosystem health: All submissions on ecosystem health agreed that it should be a compulsory national value with national bottom lines. There were differing views about how it should be described and which attributes should be included.

iv. Missing attributes from Appendix 2: There were requests to add sediment; to consider the effects of phosphorus and nitrogen as nutrients in determining ecosystem health in both lakes and rivers; and to use the Macroinvertebrate Community Index (MCI) as an indicator of ecosystem health in rivers.

v. Exceptions to national bottom lines: The majority of submissions that commented on exceptions were opposed as a whole or for anything other than exceptions where the natural conditions of a water body do not meet bottom lines. Many submissions asked that exceptions be kept to a minimum and described as narrowly as possible to maintain the integrity of the system overall.

vi. Monitoring and freshwater accounting: Submissions supported the requirement for regional councils to undertake freshwater accounting for all water takes and sources of contaminants and for this information to be available when setting freshwater objectives. There was a similar level of support for the requirement that regional councils develop monitoring plans to measure progress toward and achievement of freshwater objectives.

vii. Timeframe for regional plans to implement the NPS-FM: Submitters were concerned that the deadline for full implementation by 2030 is too long, and that further degradation of freshwater may occur in the interim. Some submissions specified dates for full implementation, for example by 2020 or 2025.

175. The concerns raised in paragraphs i to vi above are discussed in sections 5.2 to 5.5 of this report in the analysis of each proposed amendment.

176. The concerns raised in paragraph vii above relate to a matter that was not proposed in the discussion document. Setting freshwater objectives and limits under the NPS-FM is not a simple task. Despite arguments for faster implementation, it is important that the quality of freshwater plans is not compromised by the speed of progress.

177. Any change to the timeframe would present a cost to regional councils, in terms of the resources they may need to meet a shorter deadline. A shorter deadline would be unlikely to affect the community generally. The Ministry sought the views of all regional councils on the impacts to them of bringing the deadline forward. They indicated that changing from 2030 to 2025 is possible for most (but not all) councils.

8 Conclusions and recommendations

8.1 Conclusions

178. The evaluation criteria were largely met for all amendments proposed in the discussion document in November 2013.[31] The areas that would benefit from some changes from what was proposed are:

[31] Ministry for the Environment and Ministry for Primary Industries (2013). *Proposed amendments to the National Policy Statement for Freshwater Management 2011* discussion document.

i. The visibility and recognition of iwi values – by having clearer direction about the meaning and application of Te Mana o te Wai

ii. The national values – by improving their descriptions and removing duplication and redundancy

iii. The compulsory value for human health and its attributes – to merge with the additional value of contact recreation

iv. The eligibility criteria for an objective to be set in breach of a national bottom line – by narrowing the circumstances for such exceptions

v. The attributes – to reflect the advice from the Science Review Panel, unless the change would materially affect the impact of a national bottom line

vi. The timeframe for councils to implement the requirements of the NPS-FM.

179. The main area of the policy package likely to impose costs on resource users and communities is the proposed national bottom lines. These costs will accrue to resource uses in only those few areas where national bottom lines are currently breached, and councils can exercise discretion about the timeframe within which changes to their regional plans will apply to affected resource users.

180. Accounting requirements will impose some costs on councils and could be in the order of $1 million per annum for each council. The Ministry is committed to supporting the accounting requirements with guidance and will work with councils to achieve this.

181. The rest of the amendments relate to the introduction of a non-contestable process which councils must use to implement existing NPS-FM requirements about setting objectives.

182. Alongside these costs are the benefits gained from

i. addressing the problem of lengthy and expensive objective setting processes by providing scientifically robust water quality measures that can be applied nationally

ii. reducing litigation opportunities by setting statutory requirements for national bottom lines

iii. directing consistent approaches to describing and measuring freshwater values

iv. ensuring that the life-supporting capacity of rivers and lakes will be safeguarded

v. ensuring that the risk of infection caused by people's contact with fresh water will be within acceptable limits

vi. directing a process that encourages community engagement and enables the impacts of the resource management decisions to be calculated in their area

8.2 Recommended amendments

183. The amendments proposed in the November 2013 discussion document should be progressed with the following specific changes:

i. Add a statement that expresses the national significance of fresh water and Te Mana o te Wai to the start of the NPS-FM

ii. Re-write (as necessary) the national values to

- consolidate their headings to identify them more accurately and simply
- ensure that they describe the value of the fresh water itself
- ensure that the value descriptions do not imply legal rights or prioritise certain values above others
- describe the quality and quantity aspects of each value consistently
- remove redundant values (contact recreation and fire-fighting), and values that duplicate other values (food security).

iii. Merge the additional value of contact recreation (swimming) into the compulsory value of human health, and change the attribute table to show what the applicable health risks are for recreation with full immersion in the A and B states.

iv. Delete "historical activities" from the circumstances eligible for an objective to be set in breach of a national bottom line, and define "naturally occurring processes" as applying only to those not influenced by humans. Consult on which existing infrastructure could be added to the NPS-FM as part of the exceptions policy.

v. Change some aspects of some attributes as follows

- rename "chlorophyll *a*" to "phytoplankton – trophic state" for lakes (chlorophyll *a* is the unit measured);
- amend the nitrate (toxicity) attribute so that it only applies to rivers (lakes are already covered by the total nitrogen attribute);
- amend the ammonia (toxicity) attribute to use an annual maximum rather than the 95th percentile;
- amend the periphyton attribute to use an annual maximum that is exceeded no more than once per year (rather than the original two), but has an allowance for the 2% of naturally productive rivers to retain the 'no more than twice a year exceedance';
- amend the planktonic cyanobacteria attribute to apply to lakes and lake-fed rivers only

vi. Change the implementation timeframe from 2030 to 2025 but with a safety valve to ensure that there are not unreasonable costs or a loss of plan quality as a result. A council may take until 2030 in order to avoid those impacts.

9 Implementation

184. These proposed changes support and clarify what is already required by the NPS-FM. If the Minister proceeds with the amendments, they will be approved by the Governor-General. The Ministry for the Environment will send a copy of the amended NPS-FM to regional councils, which are responsible for implementing these amendments through updating regional plans. The amended NPS-FM will also be actively promoted on the Ministry for the Environment website.

185. To help local authorities implement the NPS-FM amendments and minimise compliance costs, the Government will provide a comprehensive package of guidance, workshops and technical support to councils to assist with translating objectives to limits. An updated implementation guide on the NPS-FM will be published to clarify and explain its policy intent. Technical guidance documents will also be published about technical and operational aspects of the NPS-FM. A series of workshops will be held to help regional councils become familiarised with the amended NPS-FM. For councils with water bodies

where water quality is in the D state, there will be assistance with developing regulatory and non-regulatory options to improve the water quality.

186. The implementation of the National Objectives Framework, a key component of the NPS-FM amendments, will require active engagement between regional councils and their communities (including various user groups) when they are developing their freshwater objectives. To facilitate engagement processes and minimise compliance costs, the Government will publish a range of communication materials, and host a series of public seminars across the country to disseminate information on the processes of setting freshwater objectives.

187. On 15 May 2014 the Government announced that it will spend an extra $12 million in extra funding over the next four years to help councils and communities improve the way they plan and make decisions about managing their local freshwater resources. In addition, the Government has established the Te Mana o te Wai Fund, in partnership with the Māori Party, with $5 million made available over two years. This funding will help councils and communities implement the requirements of the NPS-FM.

10 Monitoring, Evaluation and Review

188. The Preamble to the NPS-FM already states the Minister's intention to seek an independent review of the implementation and effectiveness of the national policy statement in achieving all its objectives and policies, and in achieving the purpose of the Resource Management Act 1991, no later than five years after it first came into effect (1 July 2011). The Minister will then consider the need to review, change or revoke the NPS-FM.

189. The Ministry will prepare an updated monitoring and evaluation plan for the NPS-FM when amendments have been gazetted.

190. Since 1995, the Ministry has carried out an annual survey, and more recently a biennial survey, of the implementation of council functions under the RMA, including their implementation of national policy statements. The Ministry is now working with councils and other organisations to develop a new national monitoring system, building on existing knowledge, processes and systems – including the biennial survey.

191. Some regional councils are not currently monitoring periphyton presence, or managing it in their regional plans. This means there is limited information about the levels of periphyton in New Zealand rivers and whether the rivers meet the proposed bottom line. The Ministry will need to monitor the impacts of where councils set objectives and limits for periphyton to inform possible future reviews of the national bottom lines.

192. For councils, the new framework will improve data collection efficiency, increase the amount of information collected and provide greater transparency about what councils are expected to achieve when implementing the RMA, and national instruments such as the NPS-FM. Over time, council performance will be reported to enable communities to determine the relative performance of their council.

193. As a last recourse, the Minister has the power under the RMA to investigate the performance of a local authority of any of its functions, and investigate the failure or omission of a council to exercise of perform any of its functions.

11 Appendix 1 “values” and “attributes”

11.1 Criteria for a “national value” to be included

194. The matters considered when assessing whether a value should be included in Appendix 1 of the NPS-FM, and whether the value description is appropriate included:

a. Whether the value is an intrinsic value of the water body itself, or is a use that relies on the water body, and can be used to describe qualities or characteristics of the water that support the value or use

b. Whether the value reflects and helps clarify matters in Part 2 of the RMA

c. The value should not imply a priority over other values, especially the compulsory values

d. Values should not duplicate one another, although some overlap in attributes for different values is anticipated

e. The value description is broad enough to encompasses the different ways people express the value and the different water bodies to which it might apply

f. The value can be linked to attributes so that freshwater objectives can be set in regional plans

g. The value should not be highly localised.

11.2 National values proposed in the amendments

195. The full descriptions of these values are provided in “*Proposed amendments to the NPS-FM 2011: discussion document”*.

Ecosystem health – The freshwater management unit supports a resilient ecosystem specific to that freshwater body type (river, lake, wetland, or aquifer)
Human health (secondary contact recreation) – The freshwater management unit will not present unacceptable risks to human health when used for wading or boating (except boating where there is high likelihood of immersion)
Natural form and character – where people value particular natural qualities of the freshwater management unit
Mahinga kai – kai are safe to harvest and eat
Mahinga kai – Kei te ora te mauri (the mauri of the place is intact)
Fishing – The freshwater management unit supports fisheries of species allowed to be caught and eaten
Food security – The freshwater management unit supports rural communities to grow food and fibre
Contact recreation – The freshwater management unit can be used for recreation, including swimming, kayaking, white-water rafting canoeing, waka ama and waterskiing
Wai tapu – Wai tapu represent the places where rituals and ceremonies are performed
Water supply – water in the freshwater management unit can meet people’s potable water needs
Animal drinking water – water is suitable and available for stock to drink
Commercial and industrial use – The freshwater management unit provides economic opportunities to people, businesses and industries
Irrigation – water meets irrigation needs
Hydro electric power generation – The freshwater management unit has physical qualities that are suitable for power generation

Fire-fighting – water in the freshwater management unit can meet local fire-fighting needs
Transport and tauranga waka – The freshwater management unit is navigable for identified means of transport

11.3 Criteria for an "attribute" to be included

196. The matters considered when assessing whether an attribute should be included in Appendix 2 of the NPS-FM included:

a. Link to the National Value

i. Is the attribute required to support the value?
ii. Does the attribute represent the value?

b. Measurement and band thresholds

i. Are there established protocols for measurement of the attribute?
ii. Do experts agree on the summary statistic and associated time period?
iii. Do experts agree on thresholds for the numerical bands and associated band descriptors?

c. Relationship to limits and management

i. Do we know what to do to manage this attribute?
ii. Do we understand the drivers associated with the attribute?
iii. Do quantitative relationships link the attribute state to resource use limits and/or management interventions?

d. Evaluation of current state of the attribute on a national scale

i. What do we know about the current state of the attribute at a national scale?
ii. Is there data of sufficient quality, quantity and representativeness to assess the current state of the attribute on a national scale?

e. Implications of including the attribute in the NOF

i. Do we understand/can we estimate the extent (spatial), magnitude, and location of failures to meet the proposed bottom line for the attribute on a national scale?

11.4 Attributes proposed in the amendment

197. Attributes were only proposed for rivers and lakes because no attributes with accompanying numeric states for groundwater and wetlands met the criteria. The ten attributes proposed were

i. For the compulsory value of ecosystem health:
   - Chlorophyll a, total nitrogen and phosphorus (for lakes)
   - Nitrate toxicity and ammonia toxicity (for lakes and rivers)
   - Periphyton (for rivers)
   - Dissolved oxygen (downstream of point source discharges in rivers)

ii. For the compulsory value of human health (secondary contact recreation):
   - *E. coli*
   - Planktonic cyanobacteria

iii. For the additional value of contact recreation:
   - Suitability for recreation grade (a combination of an indicator bacteria (*E. coli*) measurement and a qualitative assessment of contaminant sources in the catchment)

12 Appendix 2. Rivers in the "D" state

Periphyton

Modelled length of river and measured count of monitoring sites in 4 regions (Manawatu, Wellington, Canterbury, Southland)

	Periphyton Existing proposal	
	Model	Measure
A	Not assessed	153
B		
C		
D		26

As percentage

	Periphyton Existing proposal Model				Measure
	Manawatu	Wellington	Canterbury	Southland	
A	85%	90%	>99%	>99%	85.5%
B					
C					
D	15%	10%	<1%	<1%	14.5%

Nitrate toxicity

Modelled length of river and measured count of monitoring sites

	Nitrate toxicity (median) Existing proposal		Nitrate toxicity (95%) Existing proposal		Nitrate toxicity (maximum) New proposal	
	Model	Measure	Model	Measure	Model	Measure
A	391,565	565	354,392	496	344,422	295
B	30,737	83	57,304	126	60,259	74
C	1,407	29	12,013	53	19,027	20
D	0	4	0	6	0	1

As percentage

	Nitrate toxicity (median) Existing proposal		Nitrate toxicity 95%) Existing proposal		Nitrate toxicity (maximum) New proposal	
	Model	Measure	Model	Measure	Model	Measure
A	92.4	83.0	83.6	72.8	81.3	75.6
B	7.3	12.2	13.5	18.5	14.2	19.0
C	0.3	4.3	2.8	7.8	4.5	5.1
D	0.0	0.6	0.0	0.9	0.0	0.3

Ammonia toxicity

Measured count of monitoring sites

	Ammonia toxicity (median) Existing proposal Measure	Ammonia toxicity (95%) Existing proposal Measure	Ammonia toxicity (maximum) New proposal Measure
A	387	Not assessed	393
B	66		0
C	6		1
D	0		0

As percentage

	Ammonia toxicity (median) Existing proposal Measure	Ammonia toxicity (95%) Existing proposal Measure	Ammonia toxicity (maximum) New proposal Measure
A	84.3	Not assessed	99.7
B	14.4		0
C	1.3		0.3
D	0.0		0

MCI

Modelled length of river and measured count of monitoring sites

	MCI New proposal	
	Model	Measure
A	133,282	226
B	141,604	399
C	112,327	255
D	17,889	154

As percentage

	MCI New proposal	
	Model	Measure
A	32.9%	21.9%
B	35.0%	38.6%
C	27.7%	24.7%
D	4.4%	14.9%

Secondary contact E coli

Modelled length of river and measured count of monitoring sites

	Secondary contact (1/4 ingestion and median) Existing proposal		Secondary contact (1/10 ingestion and 80%tile New proposal	
	Model	Measure	Model	Measure
A	368,653	544	307,942	458
B	53,510	130	45,126	56
C	1,507	46	66,757	152
D	38	17	3,884	72

As percentage

	Secondary contact (1/4 ingestion and median) Existing proposal		Secondary contact (1/10 ingestion and 80%tile New proposal	
	Model	Measure	Model	Measure
A	87.0	73.8	72.7	62.1
B	12.6	17.6	10.7	7.6
C	0.4	6.2	15.8	20.6
D	0.0	2.3	0.9	9.8

Cyanobacteria

Measured count of monitoring sites in 2 regions

	Two year average Existing proposal Measure	80th percentile New proposal Measure
A	23	18
B/C	4	10
D	2	1

As percentage

	Two year average Existing proposal Measure	80th percentile New proposal Measure
A	79	62
B/C	14	33
D	7	5

Primary contact

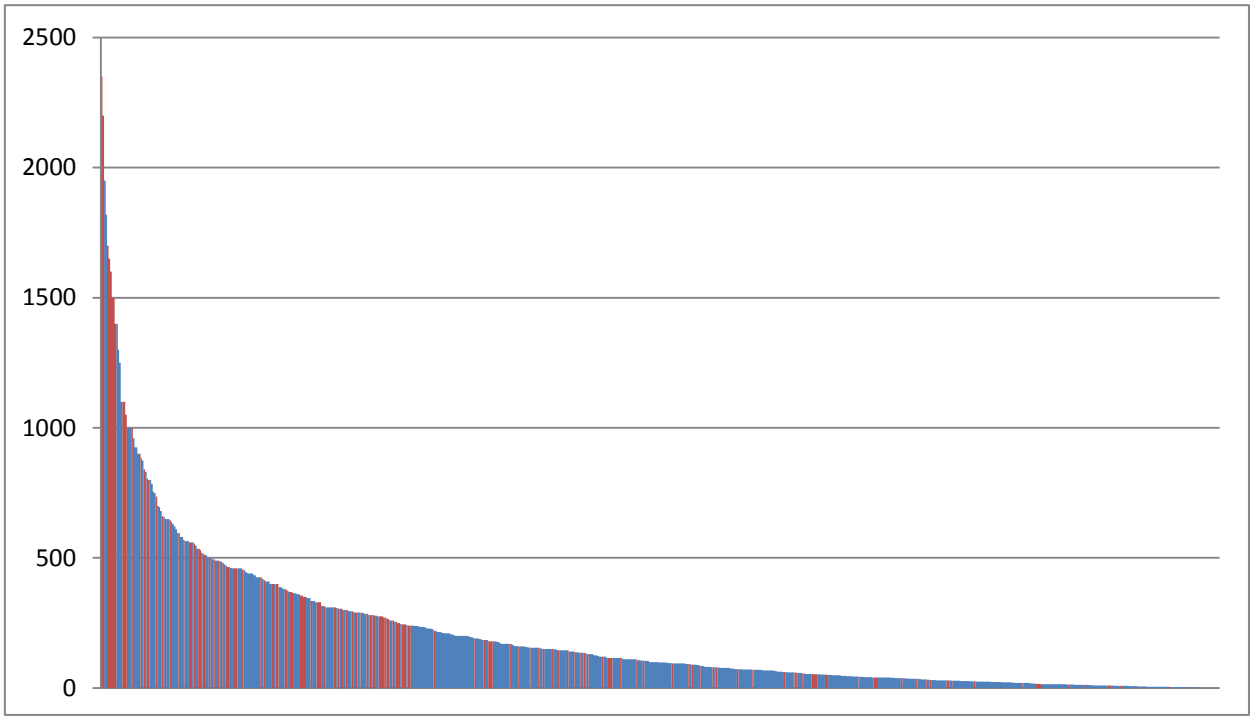
Measured count of monitoring sites

	SFRG Existing proposal Measure	E coli New proposal Measure
A	36	38
B	27	38
C	37	54
D	100	89

As percentage

	SFRG Existing proposal Measure	E coli New proposal Measure
A	18.0	17.4
B	13.5	17.4
C	18.5	24.7
D	50.0	40.6

The figure below shows water quality results for *E. coli* at approximately 700 sites nationally. All sites above 1,000 are not meeting the national bottom for human health. The results shaded red were part of the economic impact study (see section 6.3). The figure shows that the impact studies covered sites in the full range of states from A to D, and in particular those not meeting the bottom line (> 1,000 *E. coli* per 100 ml).



13 Appendix 3. Approach taken in assessing impact of bottom lines

Applied analysis in Southland: The approach taken to assess the impacts of bottom lines

Water Quality in Southland

- Environment Southland have stated that they are concerned that rivers and streams in the developed areas of Southland generally have high levels of nitrogen and phosphorus, and that they see worsening nitrogen trends in both groundwater and surface water. Sediment and faecal bacteria levels across the region are also a concern to the council. The most sensitive parts of catchments (the estuaries, lagoons and coastal lakes) are showing signs of stress with deterioration due to excess sediment and nutrients, including three of the region's main river catchments (Jacob's River Estuary, New River estuary and Waiau Lagoon).

Information inputs

- Information has been collected from a range of sources, including data on regional economic performance, water consents, actual water takes, agricultural information on the impact of mitigation actions on land run-off, the costs and effectiveness of on-farm mitigation actions, point source water quality monitoring data, landowner behavioural responses, and municipal and industrial uses of water.
- Sources include Environment Southland, the CRIs AgResearch, Landcare Research and NIWA, the Ministry of Business, Innovation and Employment, and information and datasets already compiled by scientists at Aqualinc, and economists at NZIER, Market Economics, Nimmo-Bell, Covec and Lincoln and Waikato University. Datasets provided have been rigorously checked for internal completeness and consistency by external experts in data analysis prior to use.

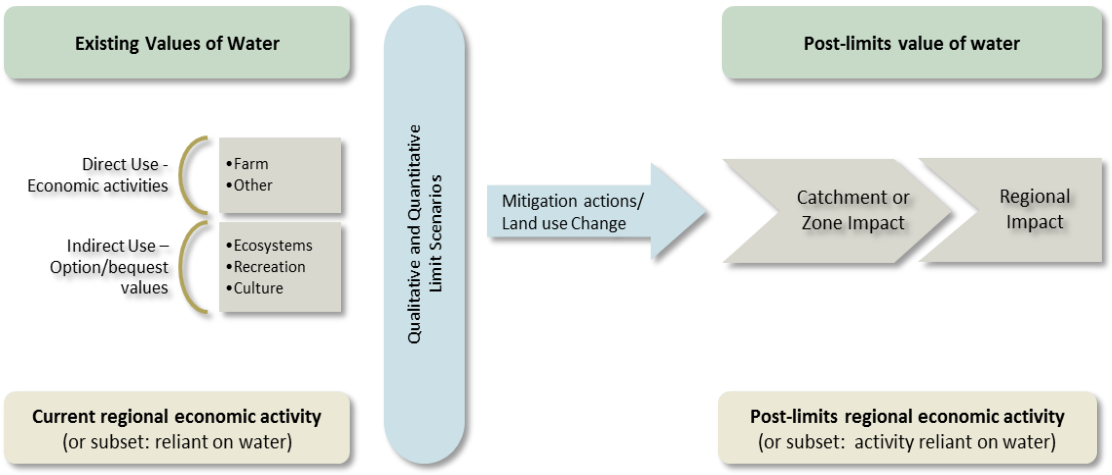
Total economic value

- The studies use a total economic value (TEV) approach which takes into account all values of water, including consumptive (volumetric) water use, and non-consumptive use, which includes volumetric use when water is immediately returned to a water flow, using water's assimilative capacity when discharging nutrients or effluent, and when water is not consumed but nonetheless a value is placed on water's existence and quality, eg,for recreation or cultural activities.
- The TEV approach was used as the overall framework for the Southland economic impact studies. TEV identifies and quantifies (where possible) the marginal impacts of setting water quality limits on economic, environmental, social and cultural values of fresh water. The TEV approach was considered broad enough to give an appropriate order of magnitude for cost and benefit estimates of scenarios for setting water quality objectives and meeting proposed national bottom lines for ecosystem and human health in the Southland region.

Assessing marginal impact of policy proposals

- The national bottom lines for water quality proposed under the National Objectives Framework (NOF) may require changes water usage – in terms of both volumetric water quantity used and nutrient and other contaminant discharges into soil and waterways. Assessing the impact of a national bottom line requires identifying the *marginal* impact of requiring water use changes across all parties that use water, discharge into water or otherwise place value on water. The analytical approach is shown in the figure below.

Figure 1: Total Economic Value Framework to assess marginal impact of a change in water policy



Component Studies:

Regional overview	An overview of the value categories of water in the region and the contribution of water to the outputs and value of each sector.
Aggregate farm-level model	Evaluates the marginal costs and benefits to agriculture of scenarios (applied via farm level mitigation tools) to limit nutrient discharges and the resultant changes in nitrate (N) and phosphorous (P) loss.
Hydrological modelling	Aggregates the estimated farm level and point source nutrient discharges to downstream water quality concentrations for 73 monitored sites in Southland, to determine whether nutrient discharge limits can feasibly achieve national bottom lines.
Non-market value study	The non-market values study is a first step in assessing the marginal impact of maintaining or improving water quality on non-market values of freshwater.
Industrial and municipal value	Identifies the value of industrial and municipal use of water and the marginal impacts of improving water quality on those values.
Electricity generation	Evaluates the potential economic impacts on electricity generation if hypothetical *minimum flow requirements* were imposed on the upper and lower Waiau river. This study is based on *quantity* limits.

It is important to understand the logic of how the studies fit together. The series of marginal impact analyses were undertaken as follows:

- Started at the on-farm level, 20 scenarios to reduce nutrient discharges at farm level (including a range of nutrient discharge caps, allowing grandfathering of existing discharge rights with equally proportionate reductions, and mandating mitigation actions) were tested, and farm-level responses and associated costs (and benefits) modelled. The 20 scenarios were divided into 7 groups (A – G) depending on the outcomes for farm contaminant loss rates.
- Hydrological modelling combined farm-level discharge, point source discharges and naturally occurring leaching to establish contaminant loads at 73 sites for 2012. Contaminant loads were also predicted forward to 2037 under the current policy regime and under each of the 20 scenarios. Nitrogen loading was also estimated for each of the nine Southland estuaries. Predicted contaminant loadings were then converted into water quality attributes identified under the proposed National Objectives Framework for each of the 73 river sites and nine estuaries for all scenarios, and compared these to the thresholds (bands) proposed for the National Objectives Framework, including the national bottom lines.
- The non-market value study took the downstream improvements in water quality achieved via one of the scenarios modelled (uniform nutrient discharge caps) tested as given, and assessed the marginal impact of improved water quality on non-market values.
- The industrial and municipal case studies assessed the costs to industry and municipalities of achieving an improvement in discharge, or stormwater runoff, quality. It is important to note that the approach of the municipal and industrial study evaluates the impact of improved water quality and does not directly assess the impact of meeting proposed national bottom lines.
- A study into the impact of changes to water quantity restrictions on electricity generation was also carried out. However the results of this study cannot be combined with the above studies in an assessment of national bottom lines. The above studies assess the impact of a change in quality standards, whilst the study on the electricity sector assesses the impact of changes in available water quantity. An assessment of the interrelationship between water quality and flow rates (quantity) was not feasible within the given timeframe.
- The timeframe under which the studies had to be completed meant we were restricted to using existing models to undertake the series of partial impact analyses described above. Thus we have been unable to assess optimal mitigation strategies across all sectors under the scenarios modelled.