One Plan Section 35 Evaluation

Freshwater Provisions

March 2023

horizons
REGIONAL COUNCIL

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EXECUTIVE SUMMARY

Section 35 of the Resource Management Act 1991 (RMA) requires regional councils to monitor the state of the environment of the region and the efficiency and effectiveness of policy statements and regional plans. Essentially a section 35 evaluation provides a check on whether the objectives and the stated methods and targets have been implemented and achieved. It also provides an opportunity to examine the reasons why objectives and methods may not have been able to be implemented or achieved. This report focuses on an evaluation of the One Plan's freshwater provisions. In some cases there will be overlap with other section 35 evaluations being undertaken (e.g. Natural Hazards, Te Ao Maori, Coast). The Council published 'State of the Environment' reports in 2013 and 2019 and catchment summary updates in July 2021 which have informed the evaluation.

The evaluation that follows does two things:

1. It evaluates the effectiveness and efficiency of the One Plan freshwater provisions; and
2. Considers and compares against the requirements of the National Policy Statement for Freshwater Management, 2020 (NPS-FM) and identifies potential gaps within the existing One Plan provisions in complying with the NPS-FM.

The evaluation is organised by chapter theme. To navigate between sections, it is recommended the navigation pane be used. The One Plan chapters covered in this evaluation include:

- **Land**, Chapters 4 and 13. Discussed in Section 6 of this report.
- **Water Quality** (surface water, groundwater and lakes), Chapters 5 and 14 and Schedules A, B and E. Discussed in Section 7 of this report.
- **Water Quantity** (surface and ground water), chapters 5 and 16 and Schedules C and D. Discussed in Section 8 of this report.
- **Beds of Rivers and Lakes**, Chapters 5 and 17. Discussed in Section 9 of this report.
- **Indigenous biodiversity (aquatic habitats)**, Chapters 6 and 13 and Schedule F. Discussed in Section 10 of this report.
- **Coastal water quality**, Chapters 8 and 18 and Schedule I. Discussed in Section 11 of this report.

Overall the One Plan is performing reasonably well and Horizons is well positioned to implement the new requirements of the NPS-FM into the current planning framework.

From an effectiveness point of view, the Plan is partially effective. There are areas where water quality and outcomes do not meet the anticipated environmental results or have not been able to be implemented as intended or in the timeframe specified. In some cases, this is because analysis against the Anticipated Environmental Results (AER) has not been possible, either because monitoring information is not available or the AER itself is not measurable. There are a number of areas where changes are required to improve Horizons' ability to implement the Plan. Other than the nutrient management provisions, none of these changes are considered significant but will require some careful consideration from experts. From an efficiency point of view, the efficiency assessment of this evaluation has been limited. Data availability and integrity was constrained which made it difficult to draw a robust conclusion. However, at a high level, it is considered that the freshwater provisions of the Plan are generally efficient.

From a NPS-FM point of view, the One Plan goes some way to meeting the requirements of the NPS-FM but there are a number of areas where the Plan will require updating through a Plan Change as required by the NPS-FM.

EVALUATION CONTEXT SETTING

1 Introduction

As required by the Resource Management Act, 1991 (RMA), Horizons Regional Council administers a Regional Policy Statement (RPS) and a Regional Plan (Plan) which outlines how natural and physical resources should be managed and regulated within the region. The RPS and Plan for the Horizons Region are comprised as the One Plan. The One Plan was notified in 2007 and became operative in 2014 following a lengthy hearings and appeal process. Since the One Plan came into effect there has been one Plan change and two amendments as follows:

- Plan Change 1 (2016): minor amendments were made to the Plan to insert a new policy and consequential amendments required by the National Policy Statement for Freshwater Management (2014). Through this, the opportunity was taken to correct minor errors that had been identified since the One Plan became operative.
- Plan Amendment 1 (2018): Amendments were made to the Plan to comply with the National Environmental Standard for plantation forestry. The chapters amended through this process include Chapter 13 (Rule 13-3) and the Glossary (definition of forestry).
- Plan Amendment 2 (December 2022): This amendment incorporates changes to the One Plan to comply with minor changes required by the NPS-FM (2020).

Proposed Plan Change 2 (Existing Intensive Farming Land Uses) addresses issues identified through experience in implementing the One Plan provisions that manage diffuse nutrient loss from existing intensive farming land use activities in specified water management zones. The Council's decision on proposed Plan Change 2 was publicly notified in April 2021 and four appeals were received and these remain unresolved at the time of preparing this report.

This report focuses on an evaluation of the One Plan's freshwater provisions. Freshwater spans across many chapters of the One Plan and is a fundamental aspect of the Plan. Consequently, this evaluation is detailed and lengthy. In some cases there will be overlap with other section 35 evaluations being undertaken (e.g. Natural Hazards, Te Ao Maori, Coast).

2 Purpose of this report

Section 35 of the RMA requires regional councils to monitor the state of the environment of the region and the efficiency and effectiveness of policy statements and regional plans. The Council published 'State of the Environment' reports in 2013 and 2019. Internal catchment summary updates were created in July 2021. The Council commissioned an assessment of the efficiency and effectiveness of the One Plan provisions for managing intensive farming in 2018.

This report focuses on the freshwater resources of the region. The report summarises the current state of freshwater in the region (based on available state of the environment data) and assesses the efficiency and effectiveness of the One Plan's freshwater management provisions. Freshwater resources are addressed or affected by many chapters of the One Plan. Integrated management of land and freshwater is a fundamental aim of the One Plan. Accordingly, this report considers the provisions in the 'freshwater' chapters as well as the provisions in other chapters that influence freshwater outcomes. In some cases there will be overlap with other section 35 evaluations being undertaken (e.g. of natural hazards, Te Ao Māori, and coastal management provisions).

This evaluation report is intended, in part, to inform the preparation of a plan change to give effect to the requirements of the NPS-FM and to meet reporting and evaluation requirements of s35 of

the Resource Management Act 1991. A separate document titled "*Section 35 Desktop Evaluation of One Plan Freshwater Provisions Project Scope"* outlines the purpose and scope of this evaluation in detail.

In general, evaluation provides an essential check on the practicality of objectives and the capacity for stated methods and targets to be achieved, given resourcing levels, budget constraints and other circumstances. This evaluation of One Plan freshwater management provisions also considers the extent to which the One Plan provisions align with the NPS-FM 2020 requirements.

3 Statutory Context

3.1 Resource Management Act 1991

The Resource Management Act 1991 (RMA) provides a well-established framework for evaluation, monitoring and review of Regional Policy Statements and Regional Plans. Section 80A requires regional councils to review their freshwater management provisions, engage with the communities and tangata whenua of the region and publicly notify changes to policy statements and plans to give effect to the NPS-FM no later than 31 December 2024. This evaluation report is guided by sections[1] 35 and 80A of the RMA. Further detail on the statutory context is outlined in Appendix 1[2] to this report.

3.2 NPS-FM 2020

Given the direction provided by section 80A of the RMA, completion of a section 35 evaluation of the One Plan freshwater management provisions is an important input into the wider review required by section 80A. In order to meet the timeframe prescribed by section 80A (4)[3], this evaluation of freshwater provisions has been prioritised ahead of evaluation of other One Plan provisions.

In accordance with Part 1.6 of the NPS-FM, this evaluation report draws on best available data, research and the Council's experience of implementing the One Plan provisions.

3.3 One Plan

One Plan RPS Chapter 10 (Administration) states that the Regional Council will regularly check the effectiveness of the policies and methods in this Plan in achieving anticipated environmental results. Chapter 10 outlines that this will be done every three years.

Chapter 10 of the One Plan specifies that monitoring and reporting on the effectiveness of the One Plan will be based on the following process:

a) *Evaluation of the Regional Council's Annual Reports and the policies and methods in this Plan to assess which policies and methods have been implemented,*

b) *Evaluation of the LTCCP and Annual Reports to assess actual work done to implement this Plan compared to the intended level of work each year, including consent, compliance and environmental incident response activity,*

c) *Evaluation of the results of environmental monitoring carried out under the Regional Monitoring Strategy to assess the condition and trends of the Region's environment,*

[1] Any further references to sections in legislation in this document are abbreviated to 's'
[2] Section 35 Desktop Evaluation of One Plan Freshwater Provisions Project Scope
[3] Which requires public notification of policy statement and plan changes to give effect to the NPS-FM no later than 31 December 2021.

with an emphasis on those parts of the environment where specific work has been done to make improvements, and

d) Assessment of whether changes need to be made to policies and methods where there is slow or no progress toward achieving anticipated environmental results.

Chapter 10 then continues that changes to the One Plan will be sought when:

a) Plan effectiveness monitoring identifies the need to enhance progress toward achieving anticipated environmental results, or

b) Major resource management developments arise such as significant amendments to the RMA or the adoption of national policy statements or national environmental standards by Government that have major implications for the contents of this Plan, or

c) *The results of new scientific work enhance this Plan and make plan provisions more certain for resource users.*

Changes to the Regional Plan may be requested by any person, including by a Minister of the Crown, the Regional Council or any District Council within, or partly within, the region. The process used to review and change a RPS of Regional Plan is set out in Schedule 1 to the RMA.

As referenced above, Chapter 10 relied partly on Long Term Council Community Plans, which were a requirement under Section 279 of the Local Government Act to monitor the One Plan. However Section 279 was repealed in 2010 and LTCCP's are no longer a requirement of local government. Instead, Councils are required to prepare Long Term Plans, with monitoring and reporting now included in Annual Reports prepared by Council.

Given updates to the LGA and changes over time, consideration of the effectiveness and efficiency of changes to Chapter 10 will need to be considered through a separate s35 evaluation of this topic.

4 Evaluation Scope

This evaluation report addresses the chapters of the One Plan that relate to or affect freshwater outcomes. The provisions subject to evaluation are outlined in Table 2 below:

One Plan Chapter to be evaluated	Specific provisions subject to evaluation	Comment
Chapter 4: Land	• Full chapter. • Objectives 4-1 & 4-2 • Policies 4-1, 4-2 & 4-3 • Methods 4-1, 4-2, 4-3 and 4-4	This chapter deals with management of hill country land use by encouraging and supporting sustainable land management to reduce erosion and sediment loss. While not directly related to freshwater, it holds significant importance to overall water quality in that it seeks to reduce sediment losses to water (a known issue for the region) and is therefore subject to this evaluation.
Chapter 5: Water	• Full chapter • Objectives 5-1, 5-2, 5-3, 5-4 • Policies 5-1, 5-2, 5-3, 5-4, 5-5, 5-6, 5-7, 5-8, 5-9, 5-10, 5-11, 5-12, 5-13, 5-14, 5-15, 5-16, 5-17, 5-18, 5-19, 5-20, 5-21, 5-22, 5-23, -24, 5-25, 5-26, 5-27	Policy 5-8 (Regulation of Intensive Farming land use activities affecting groundwater and surface water quality) has been included on the basis that PC2 was acknowledged as an interim initiative, pending the wider freshwater futures review

One Plan Chapter to be evaluated	Specific provisions subject to evaluation	Comment
	• Methods 5-1, 5-2, 5-3, 5-4, 5-5, 5-6, 5-7, 5-8, 5-9, 5-10, 5-11 • Anticipated Environmental results	
Chapter 6: Indigenous biological diversity, landscape and heritage	• Objective 6-2 • Policies 6-2, 6-8, 6-9, 6-10 • Method 6-1, 6-3, 6-4, 6-5	Chapter 6 includes specific provisions relating to natural wetlands, and sites of aquatic and riparian significance (i.e. freshwater resources and are addressed by the NPS-FM). For this reason, specific provisions relating to natural wetlands and freshwater biodiversity have been included within the scope of this project. Terrestrial biodiversity provisions will be evaluated in a separate report.
Chapter 8: Coast	• Objectives 8-1, and 8-3 • Policies 8-1, 8-2, 8-6 • Methods 8-2, 8-4 • Anticipated environmental results	The NPS-FM relates to freshwater management. The Coastal Environment is regulated by the NZ Coastal Policy Statement, with the Coastal Marine Area of a river or stream generally falling outside the definition of 'freshwater'. However, a recent decision of the Environment Court (2021 NZEnvC006) provides greater clarity as to the intent and scope of freshwater as it relates to the coastal area. Based on the findings of the Environment Court, waters within the Coastal Marine Area (CMA) upstream of the river mouth are subject to the NPS-FM 2020. Applying the findings of this decision, Chapters 8 and 18 are relevant insofar as they pertain to coastal resources that are connected to freshwater resources.
Chapter 13: Land use activities and indigenous biological diversity	• Objectives 13-1, 13-2 • Policies 13-1, 13-2, 13-3, 13-4, 13-5 • Rules 13-1, 13-2, 13-4, 13-5, 13-6, 13-7, 13-8	Rule 13-3 (Forestry) has been excluded from the scope of this review due to it being updated by Plan Amendment 1 (August 2018) and will be further updated by Plan Amendment 2 soon, to give effect to the NES-Freshwater.
Chapter 14: Discharges to Land and water	• Objective 14-1 • Policies: 14-1, 14-2, 14-3, 14-4, 14-5, 14-6, 14-7, 14-8, 14-9 and tables 14.1 and 14.2 • Land discharge rules: 14-1, 14-2, 14-3, 14-4, 14-5, 14-6, 14-7, 14-8, 14-9, 14-10, 14-	• **Nutrient management provisions:** Policies 14-5 and 14-6, Tables 14.1 and 14.2 and Rules 14-1, 14-2, 14-3 and 14-4 have been included on the basis that PC2 was acknowledged as an interim initiative, pending the wider freshwater futures review. • **Rules** 14-7, 14-8, 14-9, 14-10, 14-13, 14-14, 14-15, 14-16 14-21, 14-22

One Plan Chapter to be evaluated	Specific provisions subject to evaluation	Comment
	11, 14-13, 14-14, 14-15, 14-16, 14-21, 14-22 • Water discharge Rules: 14-12, 14-17, 14-18, 14-19, 14-20, 14-23, 14-24, 14-25, 14-26, 14-28, 14-29, 14-30	relate to the discharge of contaminants to land. They do not specifically relate to dairy farm activities and their inclusion within the scope of this review is questionable given they do not allow for discharges to water from the activity and are not expressly covered by the NESFW or NPS-FM provisions. However, they have been tentatively included because they do include buffer distances to water and if mismanaged have the potential to impact ground and surface water quality. Rule 14-27 has been excluded on the basis that it refers explicitly to contaminants not entering water.
Chapter 16: Takes, uses and diversions of water, and bores	• Full Chapter • Objectives 16-1 • Policies 16-1, 16-2, 16-3, 16-4, 16-5, 16-6, 16-7, 16-8, 16-9 • Rules 16-1, 16-2, 16-3, 16-4, 16-5, 16-6, 16-7, 16-8, 16-9, 16-10, 16-11, 16-12, 16-13, 16-14, 16-15	
Chapter 17: Activities in artificial watercourse, beds of rivers and lakes, and damming	• Objective 17-1 • Policies 17-1, 17-2, 17-3, Table 17.2 (general conditions) • Rules 17-1, 17-2, 17-3, 17-4, 17-5, 17-6, 17-7, 17-8, 17-9, 17-10, 17-11, 17-12, 17-13, 17-14, 17-15, 17-16, 17-17, 17-18, 17-19, 17-20, 17-21	
Chapter 18: Activities in the Coastal Marine Area	• Objective 18-2 • Policy 18-1, 18-2, 18-3, 18-4, 18-10, 18-11, 18-12, 18-13 • Rules 18-1, 18-2, 18-3, 18-4, 18-5, 18-29, 18-30, 18-31, 18-33, 18-34, 18-35, 18-36, 18-37, 18-38, 18-39, 18-41	See above comments under Chapter 8. The link in some of these policies/rules to freshwater is tenuous in places. However, based on current case law there are potentially aspects of the CMA within river and stream sections that are addressed by the NPS-FM and these are included in this evaluation (noting that the wider coastal provisions within the chapter are being addressed in a separate evaluation).
Schedules A – G, and I		
Chapters not included in this evaluation		

One Plan Chapter to be evaluated	Specific provisions subject to evaluation	Comment
• Chapter 2 (Te Ao Māori)		Chapter 2 is being evaluated separately. Potential points of overlap between this review of freshwater provisions and Chapter 2 are highlighted in the following evaluation.
• Chapter 7: (Air) • Chapter 15 (Air discharges) • Schedule H (airsheds)		
Chapter 9: Natural Hazards	Policy 9-5	This policy relates to climate changes which is addressed under Policy 4 of the NPS-FM 2020. It is therefore technically within scope for this freshwater s35 evaluation. However, concurrent to this evaluation is a separate evaluation being undertaken for Chapter 9. For that reason, this report will not evaluate Policy 9-5 in detail as this will be covered in a separate evaluation.
• Chapter 9 (natural hazards)		While these provisions relate to freshwater bodies, they are intended to manage natural hazard risks and therefore don't fall within the gambit of the NPS-FM or NESFW. As per the above, they have been excluded from this review and are addressed by a separate evaluation.
• Schedule J (Floodways and areas prone to flooding)		
• Admin chapters (1, 10, 11 and 12		Some provisions of Chapter 12 are relevant to freshwater outcomes (e.g. consent duration) however will be addressed in a separate s35 evaluation focusing specifically on Chapter 12 of the One Plan.

Table 1: Specific One Plan chapters to be evaluated in this report under section 35 of the RMA.

5 Evaluation guiding questions

To assist this s35 evaluation, a set of guiding questions was developed to structure the evaluation. These questions focus on effectiveness (have the provisions achieved what was intended and do they work?) and efficiency (are they able to be implemented at reasonable cost?). The guiding questions, which have been considered for each provision within scope of this evaluation, are outlined below.

Plan effectiveness	Plan efficiency

• Are the anticipated environmental results and objectives being achieved?
  ○ Are the Plan's policies, rules and methods effective in achieving the objectives of the RPS and the Plan?
  ○ Are the Plan's policies, rules and methods consistent with the relevant objectives (do they give effect to the objectives)?
 	
• Do the provisions give effect to the NPS-FM and, in particular:
  ○ Do they give effect to Te Mana o Te Wai?
  ○ Do they give effect to the hierarchy of obligations?
 	
• Are the plan provisions accepted or supported by resource users:
 	
  ○ Are the provisions workable and enforceable?
  ○ Can the provisions be reasonably implemented?
 	
• Other than those related to the NPS-FM requirements, are there other emerging issues relating to freshwater that are not being addressed?
 	
• Are there any provisions in the NPS-FM that the One Plan does not currently address?
	• Are the regulatory, consenting and administrative transaction costs in line with what was anticipated?
	
	• What additional costs, risks and opportunity benefits or costs (resource use implications) are created for resource users?

Table 2: Section 35 evaluation – guiding questions.

EVALUATION

This section of the report commences the evaluation and efficiency of the relevant One Plan provisions identified above to be within scope. This section has been organised by theme and chapter i.e. Land (chapters 4 and 13), Water Quality (chapters 5, 13, 14), Water Quantity (chapters 5, 16), Beds of Rivers and Lakes (chapters 5 and 17) and so on.

6 Land Provisions

This section outlines the One Plan provisions as they relate to land management. The two chapters that are relevant are Chapter 4 *Land* of the Regional Policy Statement and Chapter 13 *Land Use Activities and Indigenous Biological Diversity* of the Regional Plan. Indigenous biological diversity is not evaluated in this section. The aquatic biodiversity provisions in Chapter 13 are addressed under section 10 of this report, indigenous terrestrial biodiversity is not within the scope of this freshwater evaluation and therefore has not been addressed.

Land use and management has a direct relationship to water quality through erosion and release of sediment. How hill country areas and activities such as earthworks, cultivation, vegetation clearance and forestry are managed impacts the amount of sediment likely to enter freshwater. Over 60 per cent of the region's total 2.2 million hectares is hill country, much of which is underlain by erosion-prone mud, silt or sandstone. The region has approximately 22 per cent of New Zealand's highly erodible land, despite only covering 8 per cent of New Zealand. Over 260,000 hectares of land in the region is identified as highly erodible land in pasture and 200,000 hectares identified as highly erodible but protected from erosion through vegetated cover. The highly erodible land in pasture is a high priority for erosion control.

The One Plan contains a range of provisions designed to protect land from erosion and sediment release as a result of various activities. It also includes a range of non-regulatory mechanisms (such as the Sustainable Land Use Initiative) to manage land use, particularly in highly erodible areas.

The specific One Plan 'land' provisions addressed under this evaluation are listed in table 3 below.

One Plan Chapter to be evaluated	Specific provisions subject to review
Chapter 4: Land	• Objectives 4-1 & 4-2 • Policies 4-1, 4-2 & 4-3 • Methods 4-1, 4-2, 4-3 and 4-4
Chapter 13: Land use activities and indigenous biological diversity	• Objectives 13-1 • Policy 13-1 • Rules 13-1, 13-2, 13-4, 13-5, 13-6, 13-7

Table 3: Land Chapters subject to evaluation

6.1 How this section works

This section of the report evaluates the 'land' provisions, specifically those that relate to management of freshwater quality. To assess the effectiveness of the provisions, water quality data has been considered, with a specific focus on visual clarity and sediment loads. For a detailed breakdown of water quality data, refer to section 7.3 of this report. The water quality findings and evidence from Horizons' land information team have been used to measure against the methods, indicators and anticipated environmental effects included in the One Plan Regional Policy Statement. A separate s35 evaluation of these provisions was drafted in 2019. The 2019 draft

evaluation has informed much of the content included in this section, with updates provided as necessary, along with additional analysis against the NPS-FM 2020.

Consideration has been given to whether the provisions of the NPS-FM are met by the current One Plan through Chapters 4 and 13. The efficiency of the Plan provisions for water quality are also considered based on anecdotal evidence from the Regulatory[4] team, Land Management team and use of Council's information database Integrated Regional Information System (IRIS), which houses consent information (but not compliance information).

There has been significant monitoring and assessment of water quality, which is largely addressed in section 7.3 of this report. Analyses relevant to this evaluation are:

- The findings from the 2019 State of the Environment reporting;
- The draft catchment summary reports prepared by Horizons Science and Policy & Strategy teams;
- Environment Committee Reporting over the period 2019-2020; and
- Catchment Operations Committee reporting on Sustainable Land Use Initiative (SLUI) up to 2020.

6.2 One Plan Land Policy Linkages

The following table presents a 'wiring diagram' that outlines the One Plan linkages between the RPS and Regional Plan for the land provisions subject to this evaluation.

[4] Comprised of the Consents and Consents Monitoring teams

ONE PLAN: LAND FRAMEWORK LINKAGES				
Objectives (RPS)	**Supporting Policy Framework**	**Methods**	**Indicators**	**Anticipated environmental results**
Objective 4-1 By 2017, 50% of farms within hill country land subject to an elevated risk of accelerated erosion will have (or be putting) farm-wide sustainable land management practices in place to minimise erosion and reduce sediment loads entering water bodies.	**Policy** 4-1	**Method 4-1** Sustainable Land Use Initiative (SLUI) **Method 4-2** Whanganui Catchment Strategy (WCS) **Method 4-5** Land Research, Monitoring and Reporting Programme	% of farms within the SLUI priority catchments that have voluntary management plans and are being implemented. % of Region's land being used in accordance with sustainable use guidelines.	By 2017, there will be a net reduction in the adverse effects on water quality, people, buildings and infrastructure caused by *accelerated erosion**, and hill country and *coastal foredune** wind erosion in the Region.
Objective 4-2 *Land*^ is used in a manner that ensures: a) *accelerated erosion** and increased sedimentation in *water bodies*^ (with resultant adverse *effects*^ on people, buildings and *infrastructure*^) caused by *vegetation clearance**, *land disturbance**, *forestry**, or *cultivation** are avoided as far as reasonably practicable, or otherwise remedied or mitigated, and b) sediment loads entering *water bodies*^ as a result of accelerated erosion are reduced to the extent required to be consistent with the *water*^ management objectives and policies for *water*^ quality set out in Chapter 5 of this Plan.	**RPS: Policies** 4-2 and 4-3; **Regional Plan** Objective 13-1 and Policies 13-1 and 13-2	**Method 4-1** Sustainable Land Use Initiative (SLUI) **Method 4-2** Whanganui Catchment Strategy (WCS) **Method 4-3** Soil Health (Education on best management practices) **Method 4-4** Adoption of Sustainable Land Use Codes of Practice and Best Management Practices **Method 4-5** Land Research, Monitoring and Reporting Programme **Method 4-6** Infrastructure Protection **Method 4-7** Education in Schools – Land **Rule 13-1** Small-scale land disturbance **Rule 13-2** Large-scale land disturbance, including earthworks. **Rule 13-3** Forestry. **Rule 13-4** Cultivation. **Rule 13-5** Vegetation clearance. **Rule 13-6** Specified vegetation clearance, land disturbance or cultivation in a Hill Country Erosion Management Area. **Rule 13-7** Vegetation clearance, land disturbance, cultivation or forestry that does not comply with Rules 13-1 to 13-6.	Water quality monitoring results, especially for "muddy" waterways: in the Whanganui and Rangitīkei Rivers. Rate of deposition of sediment in coastal river reaches, focusing on the Whanganui, Rangitīkei and Manawatū Rivers. Costs of storm damage. Level of achievement of deposited sediment, visual clarity and phosphorus *water quality targets** specified in Schedule E. Changes to long-term mean sediment discharges of rivers to sea.	

Table 4: One Plan Land Framework linkages

Objective 4-1 refers to farm plans which are developed and implemented as part of the Sustainable Land Use Initiative and Whanganui Catchment Strategy programmes. This target is clearly measurable; it is underpinned by a policy platform that is largely non-regulatory and funded from a range of sources. Activity and progress is therefore well-documented in Council reporting systems.

Policy 4-1 gives effect to Objective 4-1, directing the Regional Council to encourage and support sustainable land management, including by working with landowners to prepare voluntary land management plans, monitor implementation, and review the effectiveness of practices. The policy provides for a non-regulatory approach to the adoption of sustainable land management practices focusing on encouragement and support of land owners, rather than using regulation to achieve sustainable land management. It focuses primarily on farms in hill country where there is an elevated risk of accelerated erosion, and also provides a pathway for Horizons' involvement in supporting the preparation of voluntary management plans for less vulnerable land.

Objective 4-2 and **Policy 4-2** underpin the regional plan framework for regulating effects associated with erosion and sedimentation generated in association with vegetation clearance, land disturbance, forestry and cultivation. **Objective 4-2** is explicitly linked to the water quality objectives in Chapter 5 *Water* of the One Plan.

Policy 4-2 recognises vegetation clearance, land disturbance, forestry and cultivation as main contributors to accelerated erosion, particularly when those activities are undertaken in close proximity to water bodies.

Policy 4-3 states that the Regional Council will support development and use of codes of practice, standards, guidelines and environmental management plans which all assist to reduce accelerated erosion.

Regional Plan **Objective 13-1** and **Policies 13-1** and **13-2** give effect to Objective 4-2 and Policy 4-2 above, underpinning the regulatory framework for vegetation clearance, land disturbance, cultivation and forestry activities provided by Rules 13-1 to 13-7.

The table below outlines the linkages between the objectives, policies and methods, and the anticipated environmental outcomes and performance indicators.

6.3 Water quality monitoring key findings

Detailed information on regional water quality is addressed in section 7 of this report. The findings below have been extracted based on their relationship to erosion and sediment control from land activities.

Information included in the 2019 State of the Environment Report (SoE) from a case study identified that approximately one quarter of the total sediment contribution comes from natural processes, while hill country erosion accounts for around 40 per cent and erosion of the river channel around 20 per cent. These findings were specific to the Oroua River where the case study was undertaken and there will be variations in these contributions in other rivers systems in the region depending on river type and the land use activities in and around the river. Irrespective, these findings provide some useful context of the contribution of sediment within river systems.

Water quality monitoring from the SoE shows that:

- Ten year trends in river quality are predominantly **degrading** for: clarity, macroinvertebrate community index and spot measurements of dissolved oxygen.
- Comparison with the One Plan targets show nearly all river quality monitoring **fail** the criteria for water clarity.

- 7 out of 40 estuaries in the region have been identified as vulnerable to nutrient and sediment and 33 have low to moderate vulnerability.

The catchment stocktakes undertaken in 2020 provide a useful snapshot of trends within each Freshwater Management Unit (FMU) and represent the most up-to-date information for surface water quality in the region's surface water bodies. Overall the results are mixed. However, most of the seven FMUs are characterised by poor visual clarity and *E.coli* levels that fall short of the One Plan or National targets. Further, contact recreation standards and Macroinvertebrate Community Index (MCI) scores also generally perform poorly across a number of the FMUs.

6.4 Plan Effectiveness Assessment

This section considers the effectiveness of the Chapter 4 and 13 provisions in achieving the anticipated environmental result. The questions guiding Plan effectiveness are outlined in Section 5, Evaluation Guiding Questions, and for brevity are not repeated here.

6.4.1 Are the Anticipated Environmental Results and Objectives being achieved

The below table summarises the key objectives, indicators and anticipated environmental results associated with the land provisions subject to this evaluation.

Objectives (RPS)	Indicators	Anticipated environmental results
Objective 4-1 By 2017, 50% of farms within hill country land subject to an elevated risk of accelerated erosion will have (or be putting) farm-wide sustainable land management practices in place to minimise erosion and reduce sediment loads entering water bodies.	% of farms within the SLUI priority catchments that have voluntary management plans and are being implemented. % of Region's land being used in accordance with sustainable use guidelines.	By 2017, there will be a net reduction in the adverse effects on water quality, people, buildings and infrastructure caused by *accelerated erosion**, and hill country and *coastal foredune** wind erosion in the Region.
Objective 4-2 *Land*^ is used in a manner that ensures: a) *accelerated erosion** and increased sedimentation in *water bodies*^ (with resultant adverse *effects*^ on people, buildings and *infrastructure*^) caused by *vegetation clearance**, *land disturbance**, *forestry**, or *cultivation** are avoided as far as reasonably practicable, or otherwise remedied or mitigated, and b) sediment loads entering *water bodies*^ as a result of accelerated erosion are reduced to the extent required to be consistent with the *water*^ management objectives and policies for *water*^ quality set out in Chapter 5 of this Plan.	• Water quality monitoring results, especially for "muddy" waterways: in the Whanganui and Rangitīkei Rivers. • Rate of deposition of sediment in coastal river reaches, focusing on the Whanganui, Rangitīkei and Manawatū Rivers. • Costs of storm damage. • Level of achievement of deposited sediment, visual clarity and phosphorus *water quality targets** specified in Schedule E. • Changes to long-term mean sediment discharges of rivers to sea.	

Table 5: One Plan Chapter 4 Objectives, Indicators and Anticipated Environmental Result links

Managing Accelerated Erosion – Sustainable Land Use Initiative, Whanganui Catchment Strategy and Whole Farm Planning

Methods 4-1 (SLUI), 4-2 (WCS) and 4-5 (Land Research, Monitoring and Reporting Programme) – give effect to Objective 4-1 and Policy 4-1 of the RPS)

The Sustainable Land Use Initiative and Whanganui Catchment Strategy non-regulatory programmes are directed towards active engagement with landowners to implement sustainable land management practices. Interventions include mapping of hill country farmland and the creation of whole farm plans (WFP) to manage land at risk of accelerated erosion. These plans set out a range of actions including afforestation, poplar and willow planting, fencing of riparian margins, stock exclusion, managed retirement from pastoral farming to more sustainable land uses such as forestry for mānuka honey production or carbon sequestration, and successional planting of forestry land.

Whole farm planning began in 2006; however, the One Plan provides an explicit policy framework around the administration of the significant funding that is channelled into hill country sediment and erosion management. The framework includes a reporting structure, as well as methods to promote the creation of new WFPs and encourage implementation of older existing plans.

Horizons Regional Council continues to invest considerable resourcing to SLUI and the WCS as well as to land and fluvial research and monitoring programmes. This funding is allocated through the Land Management Activity in the Long Term Plan. These programmes have also received external funding via central government through central government's Hill Country Erosion Fund which is currently in its fourth contract. The WCS is supported through funding from the Whanganui River Enhancement Trust. Landowners also make a significant financial contribution to the programme by carrying out the works set out in their WFP.

Continued implementation of SLUI at this level is projected to result in an average reduction of 27 per cent of sediment entering water courses overall, and over 50 per cent in some priority catchments, by 2043 (LTP 2018-28).

The SLUI programme has a range of targets associated with each of the four funding sources (including those set out in Horizons' Annual Plan 2020-21). This includes targets for areas mapped (in total and for land in priority areas), numbers of poles or trees for forestry planted, sediment monitoring reporting, areas of land 'retired' (i.e., no longer used for pastoral farming but instead allowed to regenerate or planted for forestry or mānuka honey production, for example). The target set in the funding contract with Ministry for Primary Industries (MPI) for the number of hectares of works to be completed has been exceeded consistently since 2010. Reporting on the SLUI programme is provided regularly to Council's Catchment Operations Committee. The following graph is from the report dated 9 December 2020. It shows the target number of hectares to be completed, and the actual area where works have been done by type since 2007. The second graph shows the number of plans completed by year from 2006, by financial year[5].

[5] That is, for the period 1 July of the previous year to 30 June of each year shown on the graph in figure 1.

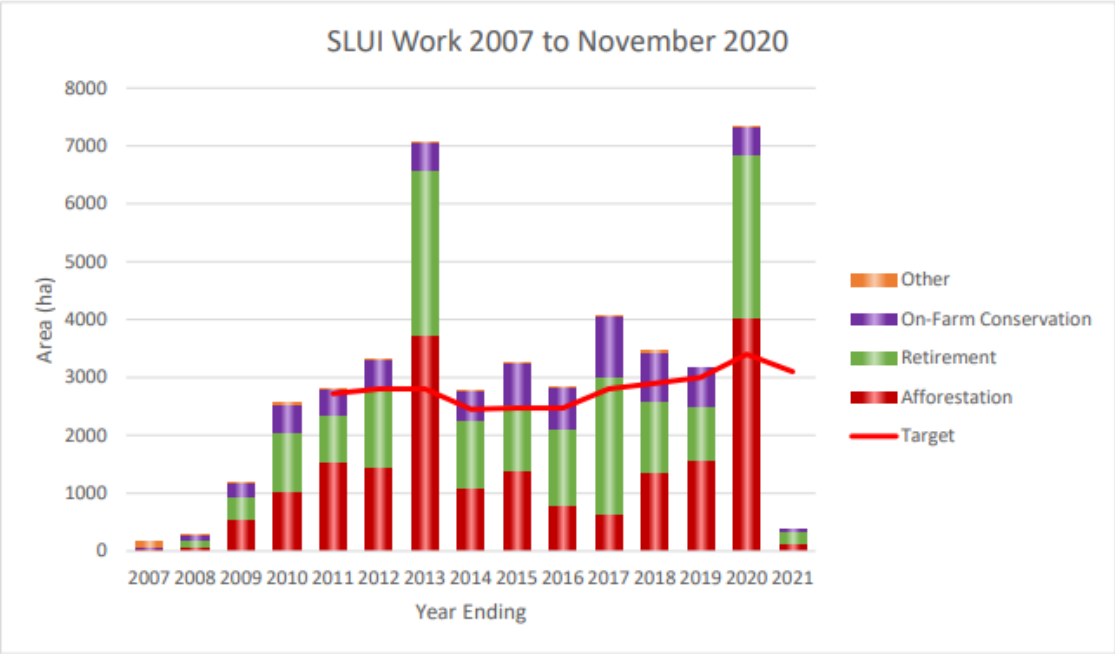
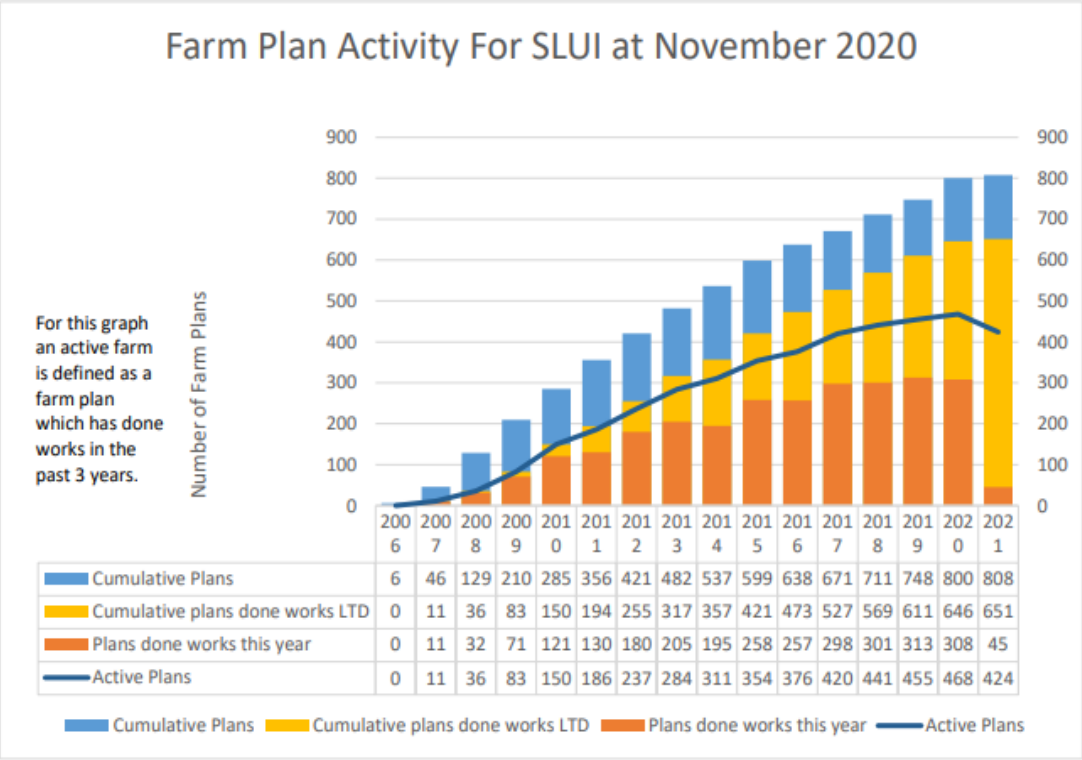


Figure 1 SLUI targets and actual work undertaken by year[6]



Graph 1: Farm Plan Activity at November 2020. Note the results for 2021 (2020-21) reflect the timing of this report at an early point in the year.

Figure 2 Farm Plans completed 2006 - 2021 and Active as at November 2020[7]

[6] Source: Report to the Catchment Operations Committee, 9 December 2020
[7] Source: Report to the Catchment Operations Committee, 9 December 2020. Note that the figure for 2021

Environmental Outcomes: There has been significant monitoring and assessment of water quality in relation to the SLUI programme. Analysis relevant to this evaluation are:

- The findings from the 2019 State of the Environment reporting; and
- The regional case study *Assessment of recent reductions in E. coli and sediment in rivers of the Manawatu-Whanganui Region: including associations between water quality trends and interventions* (Snelder, 2018).

Findings from SoE monitoring: SLUI works to date are estimated to have reduced sediment load in rivers by 835,000 tonnes (six per cent). The greatest reductions have been seen in Kai Iwi, East Coast and Lower Rangitīkei, with up to 19 per cent reduction in sediment loads in some of these areas. It is estimated that if SLUI continues to be implemented at a similar pace, the annual average sediment load could be decreased by 27 per cent and visual clarity improved by 29 per cent by 2043.

Despite the relative success of SLUI, changes to rainfall patterns from climate change are likely to impact (increase) rates of hill slope erosion and river sedimentation, which could decrease the predicted reduction in sediment load, particularly in the northern and western areas of the region. Modelling suggests the predicted decrease in sediment load of 27 per cent by 2043 could be reduced to just 19, 12 or five per cent under the minor, moderate and major climate change scenarios.

Modelling also shows that the current SLUI programme may not be enough to offset the increases in sediment load from climate change in the longer term, with increases between 40 and 180 per cent of sediment loads predicted in rivers by 2090. This suggests the long-term effectiveness of the work already undertaken through SLUI is likely to reduce under climate change, as heavier rainfall events increase sediment loading in the region's rivers.

In addition, reporting indicates that many catchments have issues with water clarity and phosphorus. Acknowledging that it takes time for trees to grow and meaningful environmental trends to be detected, the fact that clarity (and phosphorus, at a few sites) has not yet 'turned the corner' may simply be due to time lags, or it may indicate that environmental works are not yet occurring at sufficient scale and pace.

Findings from the Case Study: This study investigated state and trends in river water quality measures that indicated human health risk and sediment contamination of the region's rivers, including three measures of sediment contamination: visual clarity, suspended solids concentration and turbidity[8]. The water quality data was derived from Horizons' monitoring of 231 river sites over the past decade. The study also investigated the associations between the water quality trends and Horizons' interventions aimed at improving water quality, including land management initiatives.

The study's trend analyses provide strong statistical evidence of a regional improvement in water quality measures over the past decade. It also found a significant association between improving trends in all variables and the proportion of the upstream catchment involved in SLUI farm plans:

> *The spatial models for all water quality variables… were consistent in associating the highest probability of improving trends with hill-country catchments of moderate size (~500 km^2) and dominated by soft sedimentary geology and pastoral land cover. This is evidence for positive benefits associated with HRC's interventions because farms in the types of catchments that the association describes have been targeted for interventions aimed primarily at reducing erosion by the sustainable land use initiative (SLUI)* (Snelder, 2018, p. xii).

While this association is based on correlations and cannot prove that the interventions caused the changes in water quality, several independent analyses carried out during the

[8] The measure for human health was *E. coli* concentration.

study found associations between trends and improvements, and that water quality changes are consistent with expectations:

> *It is… not possible to conclude with certainty that the water quality interventions have caused the observed water quality improvements in the Region, but it seems likely they have at least contributed* (Snelder, p. 106).

The study cannot be used to quantify the effectiveness of individual mitigations; it considered the mixture of interventions deployed by Horizons, including not only WFP but also point source discharge upgrades, and individual stream fencing and planting. However, intensification of land uses and climate change effects may negate the positive impacts of the interventions (Snelder, 2018).

The results of the 2019 SoE and 2018 Case Study reports provide strong evidence of progress towards Objective 4-1 and the overall anticipated environmental result of a net reduction in adverse effects from accelerated erosion from hill country in particular, as a consequence of the One Plan's policy direction and methods. Both reports also highlight the potential adverse impact of projected climate change on the effectiveness of current programmes.

Sustainable Land use – Regulation, good practice, education, research and monitoring

Methods 4-3 (Soil Health), 4-4 (Sustainable Land Use Codes of Practice and Best Management Practices), 4-5 (Land Research, Monitoring and Reporting Programme), 4-6 (Infrastructure Protection) and 4-7 (Education in Schools - Land) give effect to Objective 4-2 and Policies 4-2 and 4-3; Rules 13-1 (Small-scale land disturbance), 13-2 (Large-scale land disturbance, including earthworks), 13-3 (Forestry), 13-4 (Cultivation), 13-5 (Vegetation clearance), 13-6 (Specified vegetation clearance, land disturbance or cultivation in a Hill Country Erosion Management Area), and 13-7 (Vegetation clearance, land disturbance, cultivation or forestry that does not comply with Rules 13-1 to 13-6).

Horizons uses a range of methods, including regulation, to promote sustainable approaches to land use activities. Non-regulatory methods involve working with sectors, industries and the community to promote and improve understanding and practice through development, support, sponsorship, partnering and education. Regulation is focused on managing the effects of land disturbance (including earthworks), vegetation clearance, cultivation and forestry. Staff resourcing is contributed by the Land Management, Freshwater, River Management, Rural Advice, Consents, and Consents Monitoring Teams, and the Environmental Educator.

In contrast to SLUI and WCS, in practice Methods 4-3 Soil, 4-4 Sustainable Land Use Codes of Practice and Best Management Practices, 4-6 Infrastructure Protection, and 4-7 Education in Schools - Land involve a less formal, wider-focused approach based on recognising and maximising opportunities, many of which originate outside Horizons' own work programmes. The outputs of these activities may be closely linked or overlap with activities associated with other regulatory and non-regulatory methods for Land; for example, open days may have the dual outcome of encouraging uptake and implementation of WFP as well as more generally promoting good practice, and the development of industry codes such as the *Code of Practice for Commercial Vegetable Growing in the Horizons Region* may be incorporated into the rule framework.

Reporting on individual initiatives varies and is generally focused on outputs rather than outcomes. However, a soil health monitoring programme has commenced and regional baseline data is being established. This programme aims to monitor up to 100 sites across

the region and will, in time, provide soil health trends linked to land use practice, which will support evaluation and review of this group of methods.

The regulation of land-based activities is described and comprehensively evaluated in Knight's 2017 evaluation (p. 5-6). In summary, she concluded that the new or strengthened rules and their implementation were generally working largely as intended, while noting the following specific issues[9] in relation to the rules in Chapter 13:

- While some land disturbance activities have potential to create significant unanticipated impacts such as sedimentation of waterways and there may be an opportunity to consider alternative approaches such as a risk assessment matrix, it should be possible to address these issues through the existing rule cascade and the requirement for Erosion and Sediment Control Plans, and other tools available through the RMA.
- The definition of 'track' within the exclusions for land disturbance has unintentionally allowed major upgrades of roads and should be reviewed.
- More outreach and engagement is required with smaller forestry operators, who tend to operate in isolation and are therefore less aware of best management practices.
- There is anecdotal evidence of areas planted in forestry for erosion control purposes being returned to pasture after harvesting. This warrants further monitoring.
- Grazing practices (such as break feeding, mob stocking and unsealed feed pads), including following 'spray and pray' oversowing of crops on hill country, are likely to be a major determinant of sediment run off. Options to encourage best practice or regulation should be explored.
- There are a number of contributing factors to sediment run-off from land used for horticulture in Horowhenua, including horticultural practices, high rainfall events and, in some locations, increased volumes of water running off roads following upgrades. This could be investigated further.
- The lack of systematic monitoring, raising questions about the level of compliance with permitted activity standards and some resource consents, was identified across all the land activities (although informal follow-up on consents by Land Management Officers was acknowledged). If cost recovery for monitoring permitted activities is not possible, alternative options such as farmers / operators sending in photographs of completed works or remote-sensing were suggested.
- Grazing practices are likely to be a major determinant of sediment levels coming off land into waterways and can lead to pugging and compaction, reducing soil capacity for drainage
- Sediment 'creep' from horticultural production areas on flat land may occur as a result of farming practices combined with factors such as drain blockages, flooding from roading, and flooding / ponding after inclement weather, for instance sudden surges of water from the Arawhata drainage network can cut gullies through cropping fields, causing top soil to wash through the drainage network into Lake Horowhenua
- Hill country pasture renovation, also known as 'Spray and Pray', has emerged as an issue where existing vegetation is killed off to establish pasture / fodder crops. Currently no consent is required given that this is a no-till method; however, adverse effects tend to arise when grazing is not carefully managed leading to damage of soil surface and subsequent sediment run-off.

[9] Based on interviews with officers

Grazing practices: Feedlots and intensive winter grazing is an emerging issue which has been considered by the Rural Advice and Policy Teams. Following an investigation in early 2018 which confirmed that the current One Plan provisions do not specifically control this activity, it was recommended that regulation be considered in catchments where there was strong evidence to support such an intervention, preferably through the freshwater review required by the NPS-FM, 2020. These matters are now regulated through the National Environmental Standard for Freshwater 2020 and the One Plan provisions have been amended accordingly through Plan Amendment 2 (14 December 2022). The One Plan updates via Plan Amendment 2 for intensive winter grazing and feedlots were made via a series of advice notes requiring users to adhere to the most stringent rule, whether that be the Regional Plan or NES-Freshwater. Consideration of whether these provisions would be better incorporated into the rule structure should occur as part of the Oranga Wai plan change process.

6.4.1.1 Progress towards the anticipated environmental result

Section 4.2 of the One Plan sets out a number of indicators that apply more generally to the anticipated environmental result rather than directly informing assessment of progress towards a specific plan objective. It is noted that all the monitoring and data to support these indicators has not eventuated as initially expected when the Plan was first notified in 2007. The constraints of the plan making process means that, in the absence of submissions on these points, there has been no opportunity to update this part of the Plan without a formal plan change process. It is considered that this could be addressed as part of the review undertaken in response to the NPS-FM requirements.

Based on the information available, the following conclusions have been made in relation to the indicators for progress towards the anticipated environmental result.

Storm damage and resilience (indicator)

The severe effects of the 2004 storm event in the Horizons Region are the point of comparison for assessing the impact of subsequent events. This event affected large areas of hill country with a 3-day rainfall between 140 and 200 mm, a 100-150 year return period. Landsliding occurred across 16,000 km^2 (Carey, Ries, Della-Pasqua, Low & Dellow, 2017) with 62,000 individual landslides covering ca. 10,000 ha of hill country farm land (Dymond, Ausseil, Shepherd & Buettner, 2006).

The June 2015 storm event was the subject of a reconnaissance report by GNS Science (Page, Rosser, Townsend, Carey & Reis, 2015) on behalf of Horizons and Taranaki Regional Councils. In comparison, the rainfall event was between 100 and 200 mm over 48 hours, with the highest totals in the Whanganui catchment. Return periods were highly variable but were generally between 40 and 100 years in the mid-reaches of the Whanganui, Whangaehu, Turakina and Rangitīkei Rivers. Government estimates of the total economic impact across both regions was $275 million (Page et al., 2015); Horizons estimated that the cost of flood damage to the Whanganui urban area would be in between $7 million and $15 million (Horizons, 2016 A). GNS observed that:

> *Inevitably there have been reports in the media comparing the June 2015 storm with the February 2004 storm which is regarded as the most severe to have affected the Wanganui-Manawatu area in the last 100-150 year [sic]. Given that such storms characteristically contain cells of very high intensity rainfall, some farmers have reported that landsliding in 2015 was worse than in 2004 on their properties. However, overall landslide damage in 2015 is not considered as severe across the region as it was in 2004* (Page et al., 2015, p. 30).

Notably, "landsliding was generally confined to areas in pasture…, or recently planted or logged forest… Landsliding was less common in scrub…, and infrequent in areas of indigenous forest

and closed-canopy exotic plantation forest…" (Page et al., 2015, p. 16). Although there appeared to be extensive streambank erosion along most rivers, it appeared to be less along reaches planted with willows (Page et al., 2015). Overall, 8,900 km^2 was affected by landsliding[10]. Areas of severe landsliding generally corresponded with areas where 48 hour rainfall totals were between 150 and 200 mm, occurring in the lower and mid reaches of the Whanganui, Whangaehu and Turakina catchments on steep pasture land on soils with high landslide susceptibility (Carey et al, 2017).

Following the 2015 event, the Whanganui Flood Management Review Group (WFMRG) compared channel sedimentation in the Whanganui River with cross-sections surveyed in 1995. They found that below the Cobham Bridge the bed level was higher, but not to a degree that would have a significant effect on flood carrying capacity or flood levels. Above the bridge, the bed level was lower; this change was more pronounced than the increase below the bridge. The perception that there had been significant deposit of sediment throughout the City and below the Dublin St Bridge was found to be incorrect; this appeared to be localised redistribution. WFMRG concluded that "there is no significant channel sedimentation problem and that in fact channel capacity has generally increased through the critical 'City' reach" (Horizons, 2016 B, [p. 4]).

GNS was also engaged to prepare a report on the storm event in April 2017 (Carey et. al., 2017). Although nationally significant, it was considered only a 30 year return event in this region. Landsliding effects were slight to none except in a small area where there had previously been a short high-intensity rainfall event. The authors concluded that this indicates significant landsliding and is triggered in susceptible areas when total rainfall exceeds 150 mm over 48 hours.

Trends in costs and impacts of storm damage are difficult to determine, primarily because of the variations between different storm events. Put simply, while costs and impacts can be estimated or measured for specific events, comparisons between events are not like for like, with differences such as scale, extent, location and demography (Strong, pers. comm., 12 March 2019).

Surveys of the extent of landsliding across catchments following storm events, such as those carried out by GNS for Horizons in 2015 and 2017, do provide evidence of vulnerable areas where further works can be targeted. Ministry for Primary Industry and Horizons both allocated funding to improve resilience generally in the region through poplar pole planting in the Whanganui catchment following the 2015 flood event (Horizons, 2016 C), using the findings of the 2015 report.

Land use within sustainable use guidelines (indicator)

Reporting on this indicator is focused on land prioritised through SLUI as this programme identifies areas (as well as farms) most at risk of accelerated erosion. It is therefore closely linked to reporting using farms as the basis. Horizons endeavours to incorporate information about land use changes enabled by other funding sources, particularly where the application process has been supported by staff (Todd, pers. comm., 27 March 2019). Measurement is not being carried out in areas outside the SLUI programme.

Deposition of sediment in coastal water reaches, and sediment discharges to sea (indicator)

The monitoring that was expected to support these indicators at the time the One Plan was drafted in 2007 has not progressed exactly as anticipated. Notably, changes of long-term means sediment discharges from rivers to the sea cannot be assessed from current monitoring because of the sampling method; it is not possible to identify whether the sediment originates from the river or has been released from the bed by surf. Likewise, the proportion of sediment

[10] Across both the Horizons and Taranaki Regions.

loads in estuarine sampling that will settle in the estuary rather than being discharged into the sea cannot be determined. Expansion of the estuarine monitoring programme is currently focused on broadening its extent rather than the approach or methods; no changes are planned for the coastal programme (Kamke, pers. comm., 13 March 2019).

Progress towards deposited sediment, visual clarity and phosphorous water quality targets (Schedule E)

The 2018 report *State and trends of river water quality in the Manawatū-Whanganui Region* (Fraser and Snelder) considered the results of water quality monitoring carried out across the region's sites over 10 years, and 20 years for a smaller group of older monitoring sites. The state and trends of a range of indicators, including visual clarity and dissolved reactive phosphorous (DRP), were assessed against One Plan water quality targets in Schedule E. This report informed the State of the Environment, 2019.

The results show that, across the region, sites generally did not meet the Schedule E targets for these two indicators, and that the majority of sites were showing **degrading** trends. However, for DRP there is a cluster of sites in the Manawatū catchment that are improving over the 10 year timeframe, and most of the sites improving over the 20 year timeframe are also in that catchment. Otherwise, there is currently no strong geographical pattern associated with the distribution of increasing or decreasing trends for these variables. Future work is planned that is likely to be able to relate trend patterns to catchment characteristics. The magnitude of the trend and its impact on individual sites will also be considered, to assist with decision-making around where resources and interventions should be prioritised.

Coastal foredune

The anticipated environmental result refers to the coastal foredune and effects of wind erosion as well as hill country. The coastal foredune is defined as "the strip of land between the coastal marine area [i.e., the mean high water spring tide line] and a line roughly parallel with the beach, extending 200 metres inland of the first line of vegetation" (One Plan Glossary). This area is also covered by the policy framework and non-regulatory methods in Chapter 8 Coast. There is strong regulation of land activities within a foredune; all are discretionary activities. The effectiveness of management of the coastal foredune will be assessed through the coastal s35 evaluation being completed separately to this evaluation.

6.4.1.2 Do the provisions have support of users

Officers have identified a number of land provisions and associated definitions where amendments could be considered, generally to improve clarity. The table below outlines amendments to One Plan provisions identified through implementation and the suggested improvements. It is considered that these matters are relatively minor; however, they should be addressed as part of the plan review undertaken in response to the NPS-FM.

While the list in the table below contains relatively minor issues, there is one that requires some additional context. Currently the rule and policy framework in the Beds of Rivers and Lakes (BRL) chapters (chapter 17) enables installation of culverts, bridges and other structures as a permitted activity, subject to conditions being met. This also extends to other disturbance works in the bed of a river or lake. See rules 17-1 to 17-11, 17-13 and 17-19 of the One Plan. These rules do not provide for any ancillary disturbance of land adjacent to the bed associated with the primary activity or installation of the structure. The land chapter enables land disturbance and vegetation clearance as a permitted activity (Rules 13-1, 13-4 and 13-5), however not if the works occur within five metres of a river bed or lake. This buffer distance increases to 10 metres for wetlands, sites of significance aquatic and trout spawning sites.

The consequence of this is that currently, land disturbance and vegetation clearance adjacent to a waterbody requires consent, even if it's ancillary to a work in the bed such as installing a culvert or bridge, or constructing a drain or diversion. This creates a perverse outcome where the same activity, with the same effects (potential discharge of sediment to water) is permitted if it occurs in the higher risk area within the bed, but requires a consent for the activity located outside the bed. This is inconsistent with the intention of the One Plan that these activities be permitted where environmental effects will be minor. It also does not align with the NES-Freshwater regulation 70 which seeks to enable culverts to be installed as permitted activities (subject to conditions). This issue likely arose as unintended consequence of more restrictive land disturbance rule regime arrived at through the appeal process; previously the land disturbance regime was quite permissive up to 2,500m^2, in the Decisions Proposed One Plan (POP). The issue needs to be addressed through the freshwater review of the BRL and Land chapters as part of the NPS-FM 2020 programme.

From a compliance perspective, the regulatory framework provided by Rules 13-1 to 13-7 is generally considered to provide a sound basis for monitoring and enforcing activities subject to the plan's permitted activity rules or resource consents (Kinaston, pers. comm., 21 March 2019).

Provision	Issue/Suggested change	Reason
Definitions of 'vegetation clearance' and 'land disturbance'	Amend exclusion (e) "the maintenance or upgrade of existing tracks, structures (including fences) or infrastructure". This is also implicated in the definition of land disturbance which is bundled into the definition of vegetation clearance. The Land	The current definition is test-based and therefore not clear, particularly when applied to a permitted activity.
Definition of 'Hill Country Erosion Management Area'	Refer only to land with a pre-existing slope of 20 degrees, or insert a comma following "cultivation".	The current definition is confusing.
Definitions of 'maintenance' and 'upgrade'	Consider amending to make more certain when an activity is maintenance or an upgrade.	Test based – have to do an assessment of effects to decide whether consent is required. Links to exclusions in other definitions, i.e. land disturbance.
Definition of 'Erosion and Sediment Control Plan'	Update reference to the *Erosion and Sediment Control Guidelines for the Wellington Region* (Sept 2002).	These have been superseded and are no longer considered best practice.
Land disturbance and cleanfill	Clarify (possibly through the rule guides) when land disturbance and cleanfill rules will apply, and consider inserting a standard in relation to soil contamination in the cleanfill rule.	If the cut and fill occur on one land parcel then the activity would be consented by a land disturbance consent. If the cut occurred on a separate land parcel then the filling would be consented by a cleanfill consent and the cut consented by a land disturbance consent. The reason for this is that the cleanfill rule has control over the importation of contaminated soil to the fill site.
Earthworks rule 13-2 and 'land disturbance' definition	Consider amendments to prevent sequential exposure of a large area (such as a hillside) over a period of years. Consideration of the 2,500m^2 permitted activity threshold and	Rule refers to disturbance of an area greater than 2500m^2 / yr. There is no explicit restriction on the amount that can be exposed at any time; the area can be accumulated each year so that

Provision	Issue/Suggested change	Reason
	whether it is still appropriate is also required.	considerably more than 2500m^2 is exposed at one time. Land disturbance definition focuses on physical means of disturbance, rather than simply: exposed.
Riparian planting and vegetation clearance	Consider a permitted activity for this activity.	Planting in riparian margins and removing plants such as willows requires consent in some circumstances. The approach is not consistent across the plan; for example, it may be unregulated in 'riparian margin' at risk habitat (adjacent to a Site of Significance – Aquatic) for enhancement, but require a consent if carried out for the same purpose within 5 m of a waterbody with no Schedule B Values.
Land and BRL provisions – disturbance works in the riparian margin	**Land disturbance and vegetation clearance adjacent to waterbodies associated with works in the bed:** Currently, land disturbance and vegetation clearance adjacent to a waterbody requires consent, even if it's ancillary to a work in the bed such as installing a culvert or bridge, or constructing a drain or diversion. Consider incorporating into the BRL rules. Consideration is also required regarding the impact of associated land disturbance from bed activities on the ECOP River Works and ability to operate under Rule 17-13 as a permitted activity. **Review the rules in the land and BRL chapters. Determine the best way to address disturbance in these areas.** Permitted or otherwise, the ECOP may require updating to be consistent.	Inconsistent that essentially the same activity, with the same effects (potential discharge of sediment to water) is permitted if it occurs in the higher risk area within the bed, but requires a consent outside the bed. Also inconsistent with the intention that these activities be permitted where environmental effects will be minor. Rule 17-5 also enables minor bed disturbance and removal of plants in the bed as a permitted activity, however does not extend to land immediately adjacent to the bed – meaning these works require resource consent. This issue likely arose as an unintended consequence of more restrictive land disturbance rule regime arrived at through the appeal process. Previously the land disturbance regime was quite permissive up to 2,500 m^2, in the Decisions POP.
Rule 13-1 & 13-2 (Land disturbance rules)	Consider whether it would be sensible to have a restricted discretionary activity rule for larger areas (eg over 1 ha), and/or whether 2,500 m^2 is appropriate for the PA rule.	There is a high risk of potential environmental effects from larger-scale land disturbance which may make a more onerous activity status desirable.
Rule 13-2 Large-scale land disturbance	Require the preparation of the Erosion and Sediment Control Plan as a rule condition or standard.	The Plan should be submitted as part of the application; therefore should be a condition. At present the timing of its preparation [and submission] is a matter of control [along with additional content and standard to which it must be prepared, and its implementation].
Rule 13-4 Cultivation	Update document incorporated by reference *Code of practice for commercial vegetable growing in the Horizons Region* (Horticulture NZ).	This document has been superseded by a national code of practice.

Provision	Issue/Suggested change	Reason
Rule 13-3 Forestry	Consider making the activities controlled by conditions (i)(ii), (m) and (n) prohibited activities.	These conditions set out periods when activities must not happen within the bed of a river in reaches with particular Schedule B Values. If they cannot be avoided or the effects mitigated, then consider whether the activity need to be prohibited at those times.
Stopbank development and upgrade	When developing or upgrading stopbanks, Council often require resource consent to undertake large scale land disturbance under Chapter 13, specifically new stopbanks. Maintenance or upgrade of infrastructure meets the exclusion criteria under the land disturbance definition (in some cases). This will also need considering.. The Environmental Code of Practice for River Management is limited to works in the beds of rivers and lakes and does not address stopbank development which is another core role of the River Management Team.	If the Environmental Code of Practice for River Management (COP) provided for stopbank development and upgrade by Horizons, these activities may be addressed as permitted activities subject to specific controls. A cross reference to the COP would be required in Chapter 13. Consider whether the COP should be updated to include stopbank development and upgrade.

Table 6: Implementation issues – Chapters 4 and 13

6.4.1.3 NPS-FM context

- Does the provision give effect to the NPS-FM?
  - Does it give effect to Te Mana o Te Wai?
  - Does it give effect to the hierarchy of obligations?

It can be concluded that the Chapter 4 and 13 provisions of the One Plan give effect to the NPS-FM, **in part**. The provisions recognise the interconnectedness between land use and freshwater and the modelling shows the SLUI programme has resulted in less sediment entering waterways, indicating these provisions are effective to a certain extent. However, water quality data indicates visual clarity and deposited sediment is not improving in some catchments. Additionally, gaps in monitoring and likely implications from climate change mean that these provisions may not continue to give effect to the NPS-FM in the longer term. For that reason, they should be considered and reviewed alongside the provisions of Chapters 5, 14, 16, 17, and Schedule E to ensure the objectives align with these chapters.

The provisions give effect to Te Mana o Te Wai in part in that they seek to protect the mauri of the wai by reducing sediment and contaminant release from land into water. However, there is a question whether the current provisions go far enough to fully give effect to this concept, noting that the way in which Te Mana o Te Wai is to be implemented in the region has yet to be finalised through the NPS-FM plan change.

The current provisions were developed under a different national planning framework that did not place the same hierarchy of obligation that the NPS-FM does. It is therefore considered that the current provisions **do not give effect to the hierarchy of obligations** in that the provisions do not prioritise the health and wellbeing of water bodies and freshwater ecosystems over the ability of people and communities to provide for their social, economic and cultural wellbeing in the manner intended by the NPS-FM Objective 2.1. An example of this is the fact that joining the SLUI programme and development and implementation of WFPs is voluntary for land owners. These provisions will need to be tested against Te Mana o Te Wai and the hierarchy of obligations to determine if they meet this criteria.

On a specific note, clause 3.33 (specified vegetable growing areas) of the NPS-FM states:

"When implementing any part of this National Policy Statement as it applies to an FMU or part of an FMU that is in, or includes, all or part of a specified vegetable growing area, a regional council must have regard to the importance of the contribution of the specified growing area to:

(a) the domestic supply of fresh vegetables; and

(b) maintaining food security for New Zealanders."

This clause enables councils to set an attribute state below the national bottom line (where the baseline state is already below the bottom line), provided the attribute state is an improvement on the existing baseline state. Requirements to comply with action plans, limits and conditions of consent to meet the attribute state will still be required. Lake Horowhenua and the Hokio stream catchment downstream of Lake Horowhenua outlet are identified as a specified vegetable growing areas in the NPS-FM. Vegetable growing is addressed in two places in the One Plan, permitted activity Rule 13-4 (cultivation) and rules 14-1-14-4 (intensive farming land use - commercial vegetable growing). NPS-FM clause 3.33 is relevant to both of these chapters and will need consideration when undertaking the freshwater review of the One Plan in response to the NPS-FM.

6.4.1.4 Overall findings – Plan effectiveness

The Chapter 4 AER relevant to freshwater reads: *By 2017, there will be a net reduction in the adverse effects on water quality, people, buildings and infrastructure caused by accelerated erosion*, and hill country and coastal foredune*[11] wind erosion in the Region.*

Overall, there has been solid progress made towards achieving the above anticipated environmental result in some catchments. Monitoring shows water quality improvements in some catchments for some parameters and degrading trends in others. The parameters linked to sediment release (visual clarity, deposited sediment and phosphorus) are relevant to land use provisions. Overall the surface water in the region is seeing a degrading trend in visual clarity. Modelling shows that continued implementation of SLUI at current levels is projected to result in an average reduction of 27 per cent of sediment entering water courses overall, and over 50 per cent in some priority catchments, by 2043 (LTP 2018-28). Currently the SLUI programme has an estimated six per cent reduction in sediment entering watercourses. Modelling indicates climate change will have an impact on the ability of SLUI to reduce sediment release into watercourse. Further investigation and possible expansion of the SLUI programme or other methods for managing sediment release should be considered.

The non-regulatory and regulatory provisions of the One Plan appear to be **largely effective** in reducing the effects on water quality from accelerated erosion and hill country wind erosion. Although, given visual clarity and phosphorus levels in many catchments are still an issue, the level of impact these provisions have had on water quality may not be what was anticipated by the Plan. In addition, there are a number of changes identified through analysis and regulatory processes to improve the ability to implement the provisions, although these changes are not considered to be at a level that would detrimentally affect the overall outcomes sought by the above AER. On that basis, **it is considered that the AER is being achieved.** However, looking forward it is recommended the provisions be considered under the lens of climate change to ensure the objectives, policies, methods and rules continue to be effective into the future.

[11] Noting the coastal foredune aspect of this AER is outside the scope of this freshwater evaluation and will be addressed in a separate s35 evaluation for coast.

The provisions do not strictly align with the NPS-FM and as such will require updating as part of the freshwater Plan review to be notified in 2024.

6.5 Efficiency assessment

Costs and resourcing

There are a number of activities undertaken by Horizons' staff in relation to the provisions of Chapters 4 and 13. The primary activities involve administering the SLUI programme and development of Whole Farm Plans, of which Horizons funds part of and land owners fund the remainder. In addition to this, other activities undertaken to reduce sediment release into water include installation of sediment traps, planting erosion-prone land and education.

Further to this are regulatory costs associated with processing and monitoring compliance of resource consents for activities that require resource consent. The table below outlines the range of costs associated with implementing the land provisions of the One Plan.

Activity	Indicative cost	Explanatory notes	Current annual target / capacity
Fencing[12] (riparian – Freshwater team)	$4 – 30 per metre. *Horizons contributes advice and 50% of fencing cost.*	Depends on type of fencing, location, soils, terrain, access to site, machinery required, number of angles.	110-140 km per year (Freshwater team);
Fencing (retiring land – Land Management team)	Approximately $3,500 per ha for riparian retirement; ca $900 per ha for bush retirement *Horizons contributes advice and 30-50% of fencing cost.*		120 km per year (Land Management)
Riparian planting	$6 – 6.50 per plant, in the ground. *Horizons contributes 30-50% of the cost, including the plant, pre-planting spot spray, planting and one release spray.*	Depends on size and species of plant; plants are also significantly lower in cost in Tararua. Additional costs for the landowner can include pest management.	90,000-150,000 plants per year (equates to approx. area 36-60 ha/per year[13], across approx. 40 sites per FMO - Freshwater team);
Fish pass	$7,000-15,000 for a rock and concrete fish pass. *Broader range of options would cost between $10 and $100,000.* *Horizons contributes up to 100%*	Depends on design and construction. There is a regulatory requirement for owners of structure to make them fish passable; however, Horizons currently offers advice (and also design and oversight of works). Currently there are approximately 240 identified sites needing a remedy.	7 per year (4 in the Manawatu catchment).
Sediment trap[14]	$15,000-20,000 when consent not required; $20,000-30,000 if consent needed. *Horizons contributes 30-50% of the cost.*	Includes construction of dam, residual flow pipe, fencing at $18/m and planting (flax, Manuka). Larger (consented) design may include a fish pass.[15]	Could supervise / provide advice for 40-50 farm-scale projects per year (4-5 per LMO), if there

[12] Ferguson, pers. com. 23 January 2020. Fencing costs are split roughly half and half between the cost of labour and cost of materials; Land Management team uses estimated cost of $18 per m (Cooper, pers. com. 4 Feb 2020).
[13] Based on 2x2 m spacing – Ferguson.
[14] A very basic sediment trap can be constructed for ca$500 – consists of an earth dam, no planting or fencing. These are vulnerable to damage by stock and can then collapse, releasing the accumulated sediment. This option would not be supported by Horizons. (Grant McLaren, pers. com. 3 Feb. 2020; Grant Cooper, Malcolm Todd, pers. com. 4 Feb 2020).
[15] The eventual outcome is essentially a constructed wetland, although the landowner may have intended it as a 'duck pond'.

Activity	Indicative cost	Explanatory notes	Current annual target / capacity
	$500,000 for Arawhata catchment (4[8?] ha)	approximately $350,000 for design and construction (including consents / legal costs[16]); ca $150,000 to purchase land	was sufficient funding and demand.
Constructed wetland	Similar to sediment trap, with additional planting costs. *Horizons contributes 30-50% of the cost.*	Same basic method as sediment traps, with more plants and less water. Costs could increase significantly for projects at a bigger scale[17]; for example, if land had to be purchased.	
Regulation (consenting and consents monitoring)	$885-1725 deposit for non-notified consent application for discharge, land use, land disturbance, bridges or culverts; $7,500 or $20,000 additional deposit for limited or fully notified application. Plus any additional actual and reasonable costs. Approximately $112,000 per year for a Consents Planner & $132,000 for a Senior; $125,000 for a Consents Monitoring Officer and $140,000 for a Senior. *Applicant is liable for full cost of consents.*	Includes consents for intensive farming land uses; land disturbance (to create a wetland or bioreactor, for example; depending on area and/or proximity to waterway); discharges to land and water; stock crossings. A proportion of staff costs is offset by charging for consent applications and monitoring (approx. 50% for consents planners; more variable for monitoring officers); this is not reflected in these estimates. Planning consultants are routinely contracted to provide additional capacity, or expertise for complex applications and processes.	Consent numbers are demand driven and processing aims to occur within statutory timeframes. Annually, approx. 1500 consents granted (including 5-10 publicly notified, multi-consent applications) Consents monitoring uses a risk-based approach, and responds if there are complaints about unmonitored consented and permitted activities.

Table 7: Regulatory and non-regulatory costs associated with implementing chapters 4 and 13 provisions relating to freshwater (2019-20)

The cost of delivering the SLUI and WFP programmes is significant. However, this is supplemented by environmental grants and central government funding, which provide the opportunity to expand the programme and potentially act faster than if the entire programme was funded through rates. Land owner contributions also limit the amount that must be recouped via rates. It is not possible to draw a robust conclusion regarding the efficiency of the provisions based on the data available, however indications are that the provisions are efficient.

6.6 Overall findings for plan efficiency and effectiveness

From the above analysis, it can be concluded that the land provisions in Chapters 4 and 13 of the One Plan are both largely effective and efficient in that the objectives and the capacity for stated methods and targets to be achieved subject to resourcing levels, budget constraints and other circumstances are practical. However, the emerging impacts of climate change on the effectiveness of the SLUI programme and land provisions mean that consideration of this chapter should occur as part of any future review to ensure the provisions give effect to the NPS-FM now and into the future. Key recommendations include:

[16] These were relatively high due to the location of the project and a number of long-standing issues in that catchment.
[17] Construction costs for a 0.75 ha constructed wetland in the Wairarapa in 2013 were at least $55,000, not including design, consenting and potential lost capital value (Praat et. al., 2015, p. 175).

- Consider impacts of climate change on effectiveness of SLUI programme and potential interventions or work required to address this.
- Incorporate reference to the "Code of Practice for Commercial Vegetable Growing in the Horizons Region" and any future amendments into the One Plan framework.
- Consider the merit of incorporating the intensive winter grazing and feedlot practice advice notes (added through Plan Amendment 2 in response to the NES-Freshwater 2020) into the One Plan rule framework.
- SLUI – land provisions – climate change impacts on this programme. e.g. consideration of Climate change and ability for SLUI programme to 'keep up' under current funding and resourcing levels.
- A number of definitions relating to hill country erosion, vegetation clearance, earthworks, erosion and sediment control plans require updating.
- Potential new permitted activity rule for vegetation clearance and disturbance within riparian margins to address the disconnect between chapters 17 and 13 regarding activities in the bed of a river/lake that also require land disturbance within 5-10 metres of the bed.
- Review and redraft relevant provisions to give effect to Te Mana o te Wai and the NPS-FM hierarchy of obligations (acknowledging that this is being done through the national objectives framework process (Oranga Wai) currently underway).
- Consider the requirements of clause 3.33 of the NPS-FM in relation to rule 13-3 cultivation for the Lake Horowhenua/Hokio Stream specified vegetable growing area.

7 Water Quality Provisions

This chapter evaluates the surface and groundwater quality provisions of the One Plan. It includes lakes but not wetlands as these are addressed under the Indigenous biodiversity: Wetlands chapter of this report (Section 10). Water quantity and provisions relating to the beds of rivers and lakes are addressed under Sections 8 and 9 of this report respectively.

The relevant One Plan chapters for surface and groundwater quality are chapters 5, 14, 16 (in part) and 17 (in part).

7.1 How this section works

The water quality data and information is detailed and complex. This report provides an evaluation by catchment, focusing on the key themes. A regional summary is also provided. The analysis focuses on key trends and outcomes for each catchment to determine if the relevant anticipated environmental outcomes and objectives have been broadly achieved or not. This section of the report will encompass the discharge to land and water provisions of the One Plan.

Following the data analysis, consideration has been given to whether the provisions of the NPS-FM are achieved. The efficiency of the Plan provisions for water quality are also considered based on anecdotal evidence from the Regulatory[18] team and use of Council's information database IRIS, which houses consent information (but not compliance information).

There has been significant monitoring and assessment of water quality. Analyses relevant to this evaluation are:

- The findings from the 2019 State of the Environment reporting;
- The draft catchment summary reports prepared by Horizons Science and Policy & Strategy teams; and
- Environment Committee Reporting over the period 2019-2020.

[18] Comprised of the Consents and Consents Monitoring

7.2 One Plan water quality linkages

The following table presents a 'wiring diagram' that outlines the One Plan linkages between the RPS and Regional Plan for water quality. Water quantity, activities in beds of rivers and lakes and the nutrient management provisions (subject to Plan Change 2) are addressed in separate tables.

ONE PLAN WATER QUALITY FRAMEWORK LINKAGES				
Objectives (RPS)	**Supporting Policy Framework**	**Methods**	**Indicators**	**Anticipated environmental results**
Objective 5-1 Surface *water bodies*^ and their *beds*^ are managed in a manner which safe guards their life supporting capacity and recognises and provides for the Values in Schedule B[19].	**Policies** 5-1 and 5-2 **Objective** 14-1 and Policies 14-1	**Methods** 5-2 – 5-11 **Rule 16-10** lawfully established diversions, including existing drainage **Rule 16-11** new drainage **Rule 16-12** new diversions **Rule 16-13** Diversions that do not comply with permitted activity and controlled activity rules **Note:** the rules identified below under Objective 5-2 also apply to objective 5-1.	• Measured water quality compared to *water quality* targets*, especially measures for "muddy waterways", "safe swimming", "safe food gathering", and "aquatic ecosystem health" in priority catchments. • Incidents where surface water quality is confirmed as unfit for use. • Measured flows of surface water compared to the allocation and minimum flow regime outlined in this Plan.	During the life of this Plan, water quality and quantity maintain the Values set in this Plan. In *Water Management Sub-zones**: • where *water quality targets** are met prior to this Plan becoming operative, they continue to be met. • where *water quality targets** are not met prior to this Plan becoming operative, they are either met or improved from the current state where targeted for action or, where not targeted for action, they are no worse than prior to this Plan becoming operative.
Objective 5-2 *Water Quality*: *a) Surface water^ quality is managed to ensure that:* *i. water^ quality is maintained in those rivers^ and lakes^ where the existing water^ quality is at a level sufficient to support the Values in Schedule B.* *ii. water^ quality is enhanced in those rivers^ and lakes^ where the existing water^ quality is not at a level sufficient to support the Values in Schedule B.*	**Policies** 5-3, 5-4, 5-5, 5-6, 5-9. 5-10, 5-11 Policies 5-7 and 5-8 (intensive farming) **Objective** 14-1 **Policies** 14-1, 14-2, 14-3, 14-4, 14-7, 14-8 and 14-9	**Method 5-2** Sewage treatment plant upgrades **Method 5-3** Onsite wastewater forum **Method 5-4** Human sewage discharges to water **Method 5-5** Stormwater system discharge upgrades **Method 5-6** Lake Horowhenua and other Coastal Lakes **Method 5-7** Lake Quality research, monitoring and reporting		

[19] Schedule B is not a component of Part I - the Regional Policy Statement. It is a component of Part II - the Regional Plan.

ONE PLAN WATER QUALITY FRAMEWORK LINKAGES				
Objectives (RPS)	**Supporting Policy Framework**	**Methods**	**Indicators**	**Anticipated environmental results**
iii. accelerated eutrophication and sedimentation of lakes^ in the Region is prevented or minimised. *iv. the special values of rivers^ protected by water conservation orders^ are maintained.* **b)** *Groundwater quality is managed to ensure that existing groundwater quality is maintained or where it is degraded/over allocated as a result of human activity, groundwater quality is enhanced.*	Policies 14-5, and 14-6 (intensive land use)	**Method 5-8** Trout and native fish spawning habitat **Method 5-9:** Water quality improvement **Method 5-10** Education in schools - water **Method 5-11** Water (fluvial resources, quality and quantity) research, monitoring and reporting **Method 5-12** Innovative Land Use Research[20] **Method 5-13** Provision of information Land Discharge Rules **Rule 14-1 (**Existing intensive farming land use activities) **Rule 14-2** Existing intensive farming land use activities not complying with Rule 14-1 **Rule 14-2A** Existing intensive farming land use activities not complying with conditions, standards or terms (a) to (d) of Rule 14-1 or Condition (a) of Rule 14-2. **Rule 14-3** New intensive farming land use activities		

[20] Red text indicates the updated and new methods and rules associated with Plan Change 2. At the time of writing the Plan Change 2 decision was under appeal.

ONE PLAN WATER QUALITY FRAMEWORK LINKAGES				
Objectives (RPS)	**Supporting Policy Framework**	**Methods**	**Indicators**	**Anticipated environmental results**
		Rule 14-4 New intensive farming land use activities not complying with rule 14-3 **Rule 14-5** Fertiliser **Rule 14-6** Stock feed including feedpads **Rule 14-7** Discharges of grade Aa biosolids and compost to production land **Rule 14-8** Grade Ab, Ba or Bb biosolids **Rule 14-9** Discharges of poultry farm litter or pig farm litter and associated temporary stockpiling **Rule 14-10** Offal holes and farm dumps **Rule 14-11** Farm animal effluent including effluent from dairy sheds, poultry farms and piggeries. **Rule 14-13** Existing discharges of domestic wastewater **Rule 14-14** New and upgraded discharges of domestic wastewater **Rule 14-15** Discharges of domestic wastewater not complying with rules 14-13 and 14-14 **Rule 14-16** Human effluent and storage facilities **Rule 14-21** Discharges of cleanfill material		

ONE PLAN WATER QUALITY FRAMEWORK LINKAGES				
Objectives (RPS)	**Supporting Policy Framework**	**Methods**	**Indicators**	**Anticipated environmental results**
		Rule 14-22 Composting activities **Rule 14-23** Closed landfills **14-28** Discharges of contaminants into or onto land that may enter water **<u>Discharges to water</u>** **Rule 14-12** Discharges of water to water **Rule 14-17** Discharges of untreated human effluent directly into surface water **Rule 14-18** Discharges of stormwater to surface water and land **Rule 14-19** Discharges of stormwater to surface water and land not complying with Rule 14-18 **Rule 14-20** Discharges of due and salt tracers **Rule 14-24** Discharges of persistent and harmful contaminants **Rule 14-25** Discharges of contaminants to a reach of a river with Schedule B values of natural state and sites of significance – aquatic **Rule 14-26** Discharges of contaminants to surface water		

ONE PLAN WATER QUALITY FRAMEWORK LINKAGES				
Objectives (RPS)	**Supporting Policy Framework**	**Methods**	**Indicators**	**Anticipated environmental results**
		Rule 14-29 Replacement consents for discharges of water and contaminants to water and land from existing hydroelectricity schemes **Rule 14-30** Discharges of water or contaminants to land or water not covered by other rules in this Plan or chapter. **Rule 16-14** The drilling, construction or alternation of any bore and any ancillary discharge of water or contaminants **16-18** unsealed bores		

Table 8 One Plan water quality framework linkages

7.3 Water Quality Monitoring

State of the Environment, 2019 (SoE) monitoring and the more recent Catchment Stocktake reports are the two primary documents that have been relied upon for drawing conclusions on water quality in the region. The SoE report considers trends at a regional level, utilising all available data collected by Horizons to 1 July 2017. The Catchment Stocktake reports are internal reports created by Horizons' Science and Policy & Strategy teams. The stocktakes look at each catchment in more detail, considering any additional data since the 2019 SoE was prepared (essentially the five year period to 31 December 2019). Between the two documents, a reasonable representation of trends and outcomes for regional water quality can be drawn. As always, there are limitations and in some cases limited data or trends available.

SoE monitoring

The SoE monitoring programme for rivers consists of monitoring of up to 16 different physical, chemical and biological parameters at 174 sites every month. The network consists of 90 state of the environment monitoring sites, as well as 26 sites upstream, 26 downstream and 32 effluent sites from discharges of treated urban or industrial wastewater across the region.

Summary of key findings from the 2019 SoE monitoring report:

Surface water

- 10 year trends in river quality are predominantly **degrading** for: periphyton (chlorophyll *a*), macroinvertebrate community index, dissolved reactive phosphorus, clarity, and spot measurements of dissolved oxygen.
- 10 year trends are predominantly **improving** for: soluble inorganic nitrogen, ammoniacal nitrogen, and the number of exceedances of the *E.coli* criteria for swimmability.
- National modelling shows 45 per cent of the region's large river lengths and 55 per cent of the region's lakes are considered suitable for swimming year round. This has increased (for rivers) from 35 per cent in 2006 to 40 per cent in 2016.
- Comparison with the One Plan targets show nearly all river quality sites **meet** ammoniacal nitrogen criteria; however, nearly all river monitoring sites **fail** the criteria for dissolved reactive phosphorus, bacteria and water clarity.
- All 15 monitored lakes pass the ammoniacal nitrogen and bacteria targets in the One Plan.
- Nearly all 15 monitored lakes **fail** the One Plan targets for chlorophyll *a* (algae), total nitrogen and total phosphorus.
- The ecological condition of 31 lakes was assessed using the LakeSPI[21] method. This monitoring shows 19 per cent of the 31 lakes are at **high or excellent**, 45 per cent at moderate, 23 per cent at **poor** and 13 per cent are non-vegetated.
- 7 out of 40 estuaries in the region have been identified as vulnerable to nutrient and sediment and 33 have low to moderate vulnerability.

Groundwater

- 3 of 31 state of the environment monitoring bores **exceed** the drinking water standard for nitrate. Elevated nitrate concentrations were generally observed in the Horowhenua and Tararua areas.
- 19 of the 31 bores (61 per cent) **exceeded** *E.coli* concentrations for drinking water.

[21] LakeSPI (Submerged Plant Indicators) is a bio-assessment tool that uses carefully selected features of submerged plant vegetation to monitor change and assess the ecological condition of New Zealand lakes.

- Median concentrations of iron and manganese **exceed** their respective drinking water criteria in a number of bores throughout the Manawatū and Rangitīkei catchments. There appears to be a link between areas of reducing groundwater and the concentration of iron and manganese levels. This is likely to be a natural feature of the groundwater in those areas.

The sections that follow outline the findings for surface and groundwater quality in greater detail, providing an analysis against the One Plan targets and national criteria (as at the time the 2019 SoE monitoring report was produced). Since the SoE monitoring report was published, Horizons' monitoring programmes have continued and updated catchment summaries are being produced. At the time of writing this report, the summaries were still in draft format. However, given the relevance of up to date information, this information has also been considered and any change trends has been highlighted in the analysis.

Interventions for freshwater quality under the One Plan planning framework include:

- Regulatory: regulation of direct and indirect discharges to land and water, intensive land use, forestry, earthworks
- Non-regulatory: SLUI, riparian management, rural advice, environmental education
- River & drainage schemes
- Stakeholders and partnerships: MRLA, Fresh water clean-up, Tu te Manawa, IMPs, Environment Network Manawatū.

Horizons 2020 Catchment Stocktakes

Subsequent to the release of the 2019 SoE monitoring report and NPS-FM 2020, Horizons Policy & Strategy and Science teams were undertaking further monitoring and analysis of water catchments and drafted 'catchment stocktakes'. The purpose of these stocktakes was to provide a snapshot of the current state of knowledge of the region's freshwater management units[22] (FMU). The stocktakes also drill down into the water quality trends by catchment rather than the region as a whole to determine if issues associated with water quality or One Plan provisions apply regionally or in specific areas. At the time of preparing this evaluation, the stocktakes represented the most recent available information on the state of each catchment. For that reason, the catchment stocktakes have been used as an additional information source for this evaluation.

It is noted that at the time this evaluation was nearing completion, Council had launched the Oranga Wai website which includes recent information on water quality state within the region. This information draws from the Catchment Stocktakes and presents information for public use.

7.3.1 Surface water

7.3.1.1 State of Environment monitoring

The SoE report assesses 10-year and 20-year water quality trends for surface water across the region and compares a five year state of water quality against the One Plan targets and National Objectives Framework (NOF). The analysis is also broken down into impact sites which represent the sites located immediately downstream of point source discharges and land discharge sites for treated urban or industrial wastewater and SoE sites (sites representative of broader catchment water quality). For brevity, the information provided below shows only the 10-year trends, and the One Plan and NOF assessment for SoE sites only.

[22] A FMU is all or any part of a water body or water bodies, and their related catchments that a regional council in partnership with Iwi and Hapū determines is an appropriate unit for freshwater management purposes. The FMU's were still proposed at the time of writing this evaluation.

The three graphs[23] that follow have been sourced from the 2019 State of the Environment monitoring report and provide a useful overview of the region's water quality state compared to the One Plan targets and NOF over the five year period (1 July 2012 – 30 June 2017), and the proportion of sites showing improvement over the 10 year period 2007-2017.

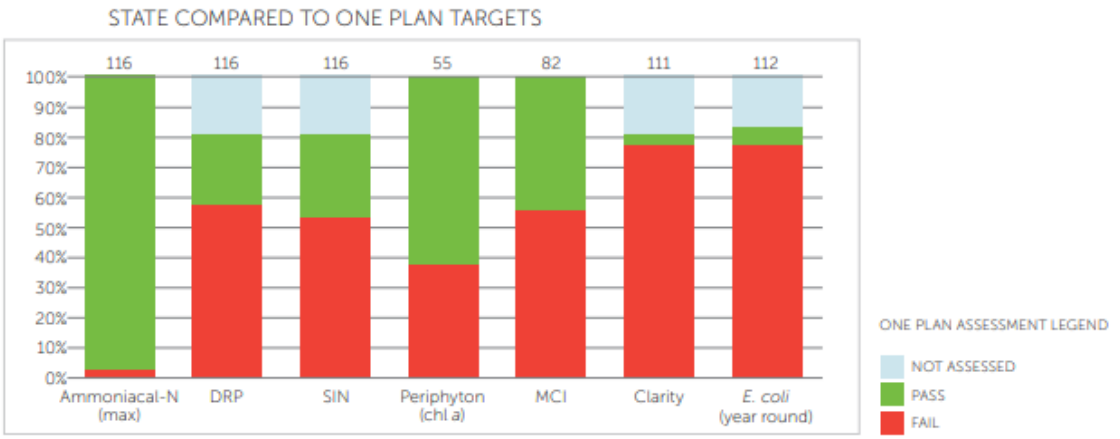


Figure 3: SoE, 2019 regional water quality state compared to One Plan targets

Comparison of the water quality monitoring results with the One Plan targets, shows nearly all sites meet the ammoniacal nitrogen criteria, however nearly all sites fail the criteria for dissolved reactive phosphorus, *E. coli* and water clarity.

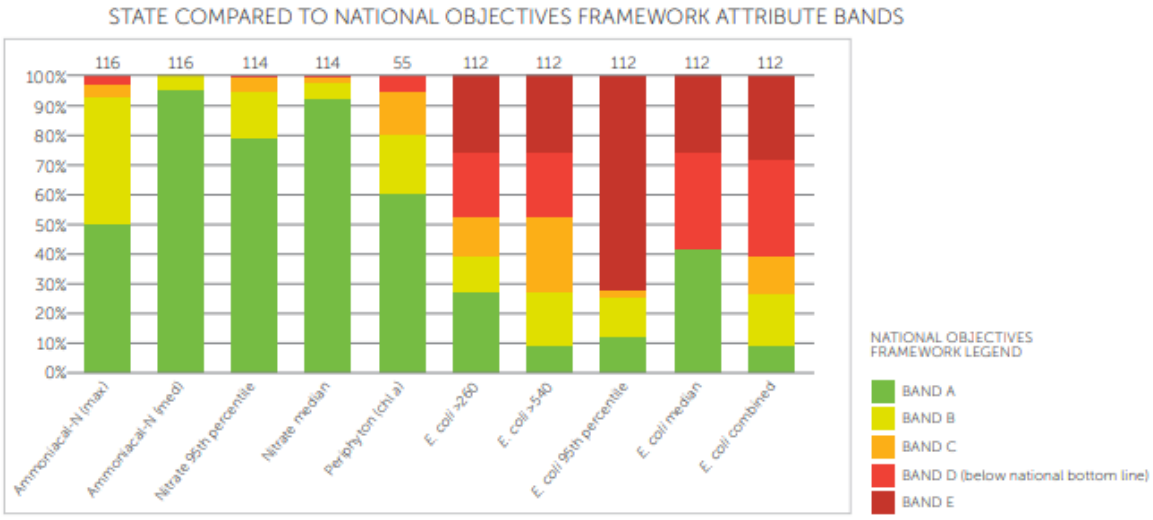


Figure 4 Regional water quality state compared to national objectives framework attribute bands

Comparison with the National Objectives Framework[24], shows most sites were in Band A for nitrate and ammonia toxicity. Of the 55 sites analysed for periphyton, a number were in Band A; however, five fell below the national bottom line (band D).

[23] DRP = Dissolved Reactive Phosphorus, SIN = Soluble Inorganic Nitrogen, chl *a* = Chlorophyll *a* (periphyton) and MCI = macroinvertebrate community index.

[24] From the National Policy Statement for Freshwater Management, 2017.

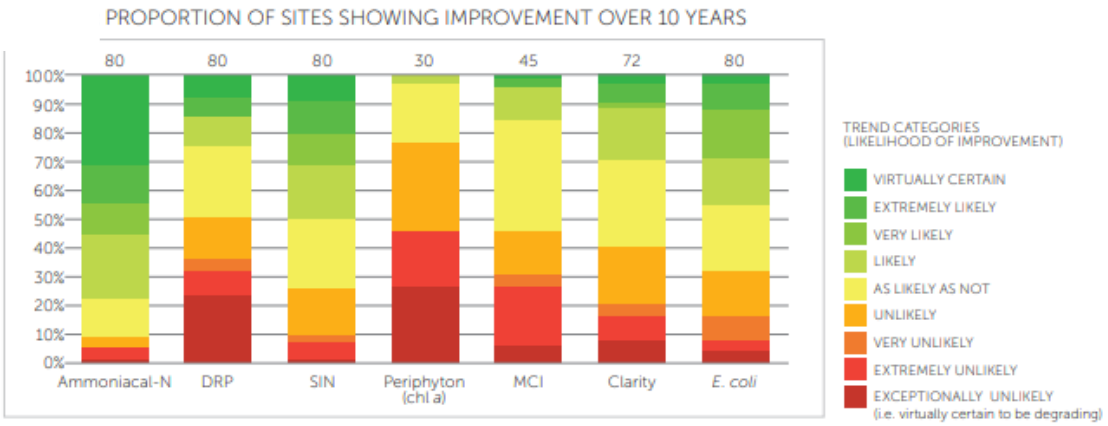


Figure 5 SoE, 2019 10 year trend for One Plan sites

The 10 year trends show predominantly degrading trends for periphyton (Chlorophyll *a*), MCI, DRP, clarity and spot measurements of dissolved oxygen. Parameters which showed a higher proportion of improvement included *E.coli*, ammoniacal nitrogen, soluble inorganic nitrogen and particulate organic matter. The number of exceedances of *E.coli* criteria for swimmability also showed an improving trend. It should be noted this is confidence in the direction of trends but not an indication of the size of the trend.

When comparing the state of water quality with the size of change observed in the trend, Fraser and Snelder concluded that, overall while trend magnitude varied widely between sites, the largest degrading trends were generally associated with sites that have the poorest water quality. However, in spite of this the largest magnitudes of improvement in *E.coli* were at the sites that were in the worst state (NOF band E). The 10-year trend shows significant relationships between decreasing *E.coli* trends at discharge sites (effluent monitoring) and decreasing *E.coli* trends at associated downstream impact sites. Put simply, this indicates regional improvement in *E.coli* associated with improvements to point source discharge quality over the past 10 years.

The two graphs that follow are also sourced from the 2019 SoE report and provide more detailed information on sampling results for a wider range of parameters.

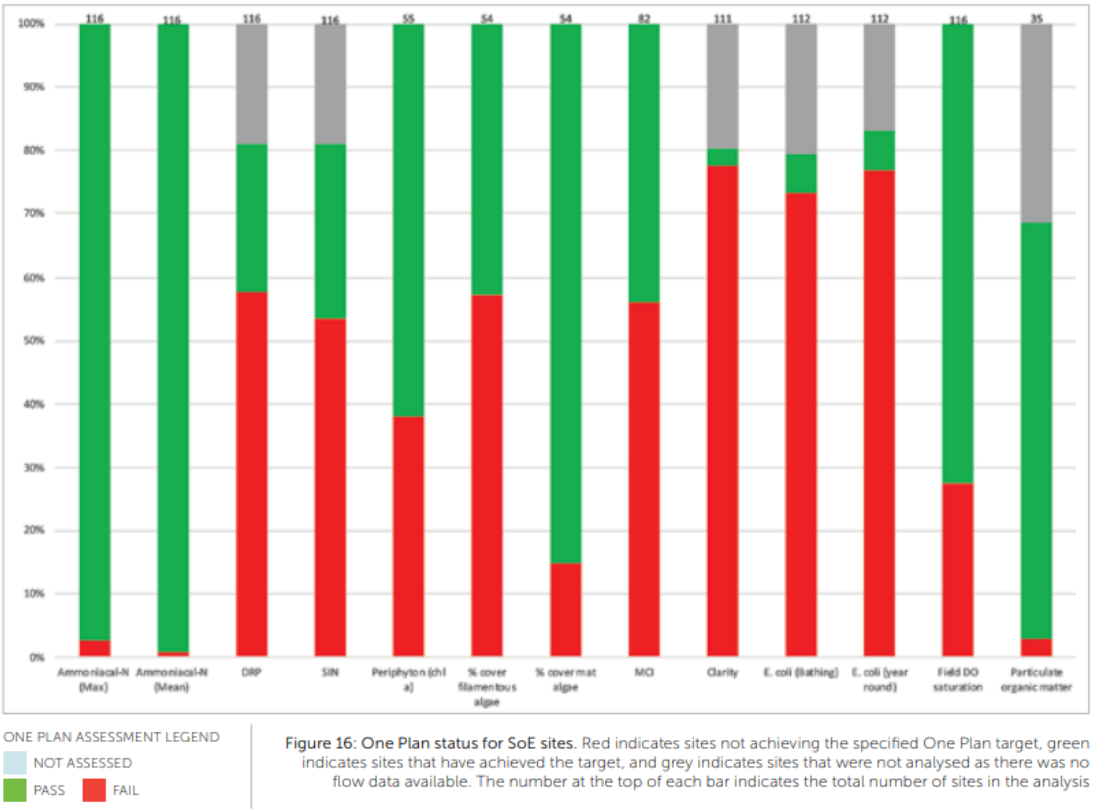


Figure 16: One Plan status for SoE sites. Red indicates sites not achieving the specified One Plan target, green indicates sites that have achieved the target, and grey indicates sites that were not analysed as there was no flow data available. The number at the top of each bar indicates the total number of sites in the analysis

Figure 6 One Plan status for SoE sites

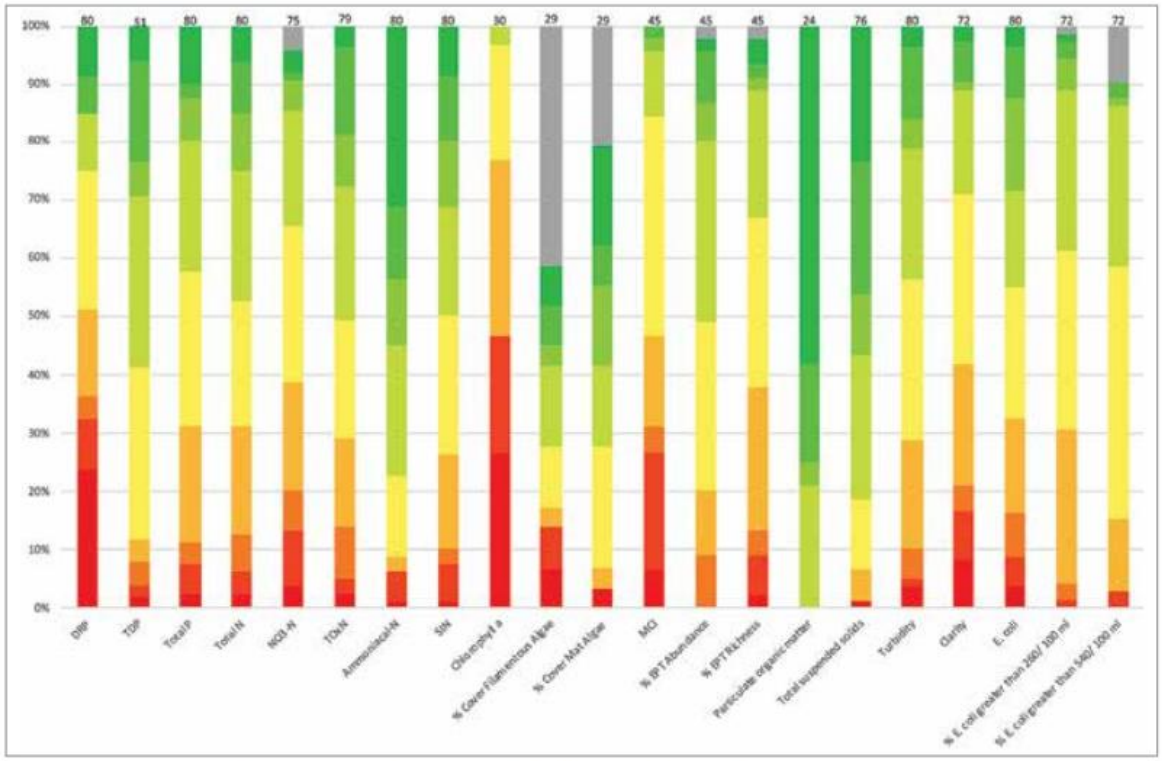


Figure 24: Proportion of SoE sites showing improving trends for the 10-year period ending July 2017. The number at the top of each bar indicates the total number of sites in the analysis

Figure 7 10 year trend – proportion of SoE sites showing improving trends

Rare and Threatened fish species: The Horizons Region is home to a variety of both indigenous and exotic fish species. Pest fish species have also been recorded in a number of areas and are becoming increasingly common in the region's waterways. These pest fish (such as catfish and koi carp) damage ecosystems and compete with indigenous fish. A number of the region's indigenous species are diadromous, meaning they spend part of their life-cycle in freshwater as well as in estuaries or at sea. In-stream factors such as barriers to fish passage (such as weirs and dams) and removal of riparian habitat can significantly affect regional fish communities.

Monitoring carried out by Horizons includes annual fish surveys, as well as work to identify and remediate fish barriers. To develop a national index for biotic integrity (IBI), available data on indigenous fish has been used. The IBI provides a comparison between indigenous fish (and trout) species observed in the region's rivers and what would be expected based on key measures such as distance to the sea and elevation. Sites graded as excellent or good indicate the presence of many indigenous fish species expected to be found. Poor or very poor grades mean very few (or none) of the expected indigenous species were present. The IBI for the Horizons Region as at August 2017 (based on SoE information) is shown in the figure below.

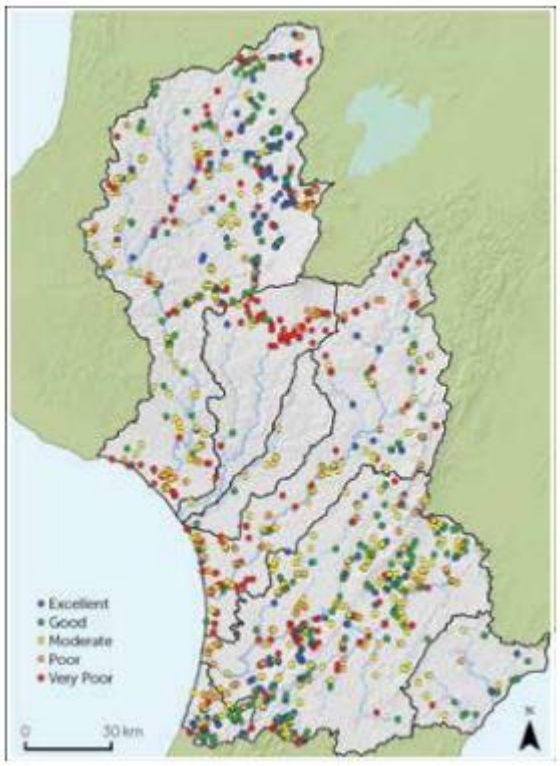


Figure 8 Index of Biotic Integrity for all sites in the Horizons region. Source: Horizons SoE, 2019

Within the Horizons Region, a reduced number of fish species have been observed in many lowland habitats. Loss of suitable habitat, barriers to migration, degraded water quality and the presence of introduced fish species are all contributing factors to reduced freshwater biodiversity of lowland reaches. Many of the rare and threatened fish species that remain are highly vulnerable to regional decline or extinction due to limited range or small, sparsely distributed populations.

In-stream structures can create barriers affecting the ability of fish to access the range of habitats required to maintain healthy populations. Poor water quality, in particular increased nutrient levels resulting in greater algae growth and lower levels of dissolved oxygen, also affect the presence of fish species.

The One Plan includes a regulatory framework designed to manage activities that may affect indigenous fish species identified as rare or threatened. These sites are identified as Sites of Significance – Aquatic in the One Plan and include a specific rule framework.

Monitoring shows, overall, that the presence of indigenous fish species in the Horizons Region is varied. Consequently a number of sites fall into all categories and others, only some.

The NPS-FM requires Councils to identify all species for which fish passage must be provided and those for which passage should be prevented. To some extent, Horizons already provides for this in the identification of threatened and rare fish species; however, the rule and policy framework will likely need to be adapted to identify those species where passage should be prevented and to align with the required clause as outlined below:

> 3.*26 Fish passage*
>
> *(1) Every regional council must include the following fish passage objective (or words to the same effect) in its regional plan(s): "The passage of fish is maintained, or is improved, by instream structures, except where it is desirable to prevent the passage of some fish species in order to protect desired fish species, their life stages, or their habitats."*

Trout are a non-indigenous species that can have impacts on indigenous fish. However, they are not identified as a pest fish and therefore are unlikely to be captured by the 'prevention' requirement of clause 3.26 of the NPS-FM. Irrespective, the One Plan provisions and values associated with trout will need consideration through development of the list of fish requiring passage and those whose passage should be prevented.

7.3.1.2 Horizons 2020 catchment stocktakes (by FMU)

The findings below summarise the findings from Horizons' 2020 catchment stocktakes for surface water based on FMU catchments. For context, the proposed Freshwater Management Units, as presented on the Oranga Wai website are shown in the following figure.

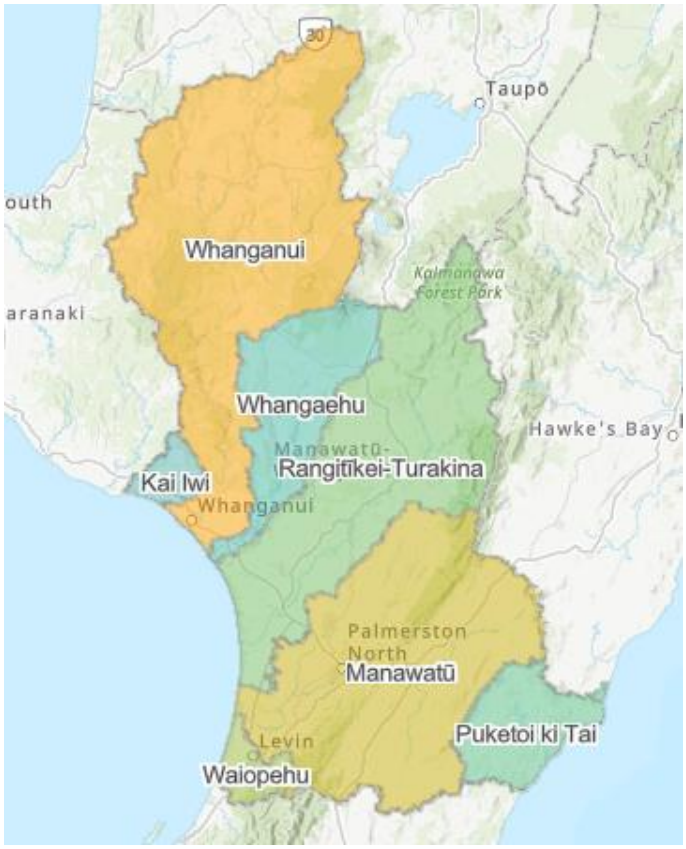


Figure 9 Proposed FMUs (Oranga wai website)

Ngā wai o Manawatū

The Manawatū catchment and its tributaries are monitored more than elsewhere in the region (or, indeed, most parts of the country), but even so, significant gaps in knowledge remain about freshwater fish, lakes, wetlands and the effects of catchment land use on downstream coastal waters. The Manawatū FMU is shown in the below image.

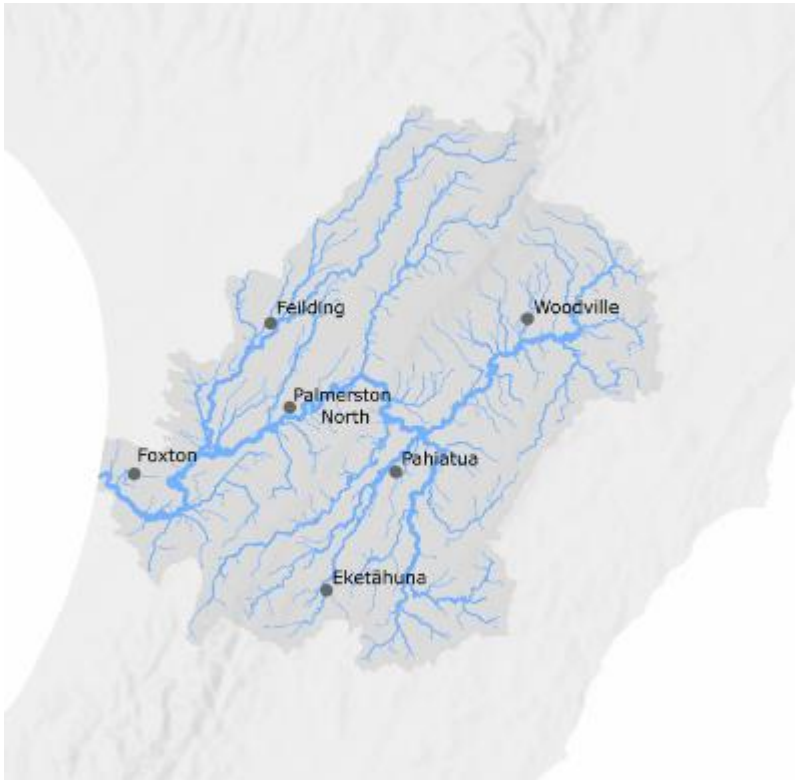


Figure 10: proposed Ngā wai o Manawatū FMU (Oranga wai website)

The Manawatū FMU stocktake report provides an update to the SoE monitoring parameters for the catchment. These are shown in the graphs below:

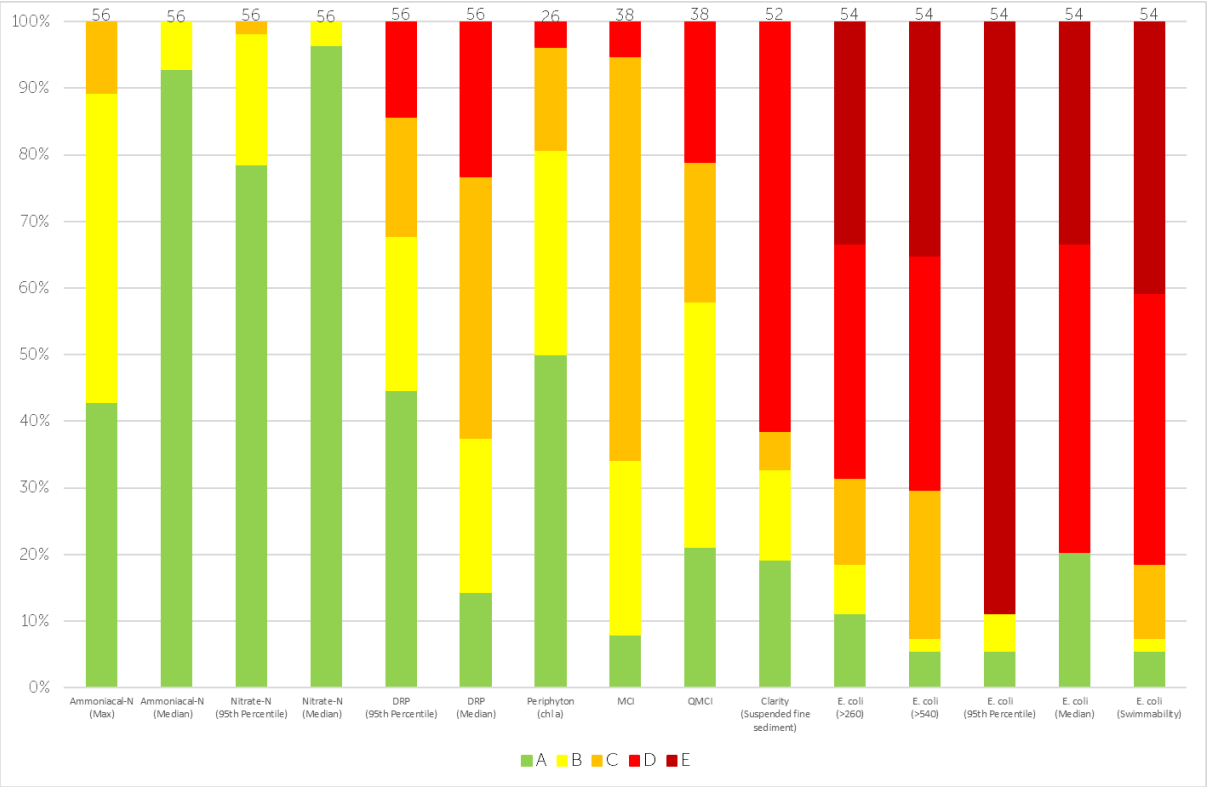


Figure 11 Overview of SoE monitoring results for the Manawatū catchment

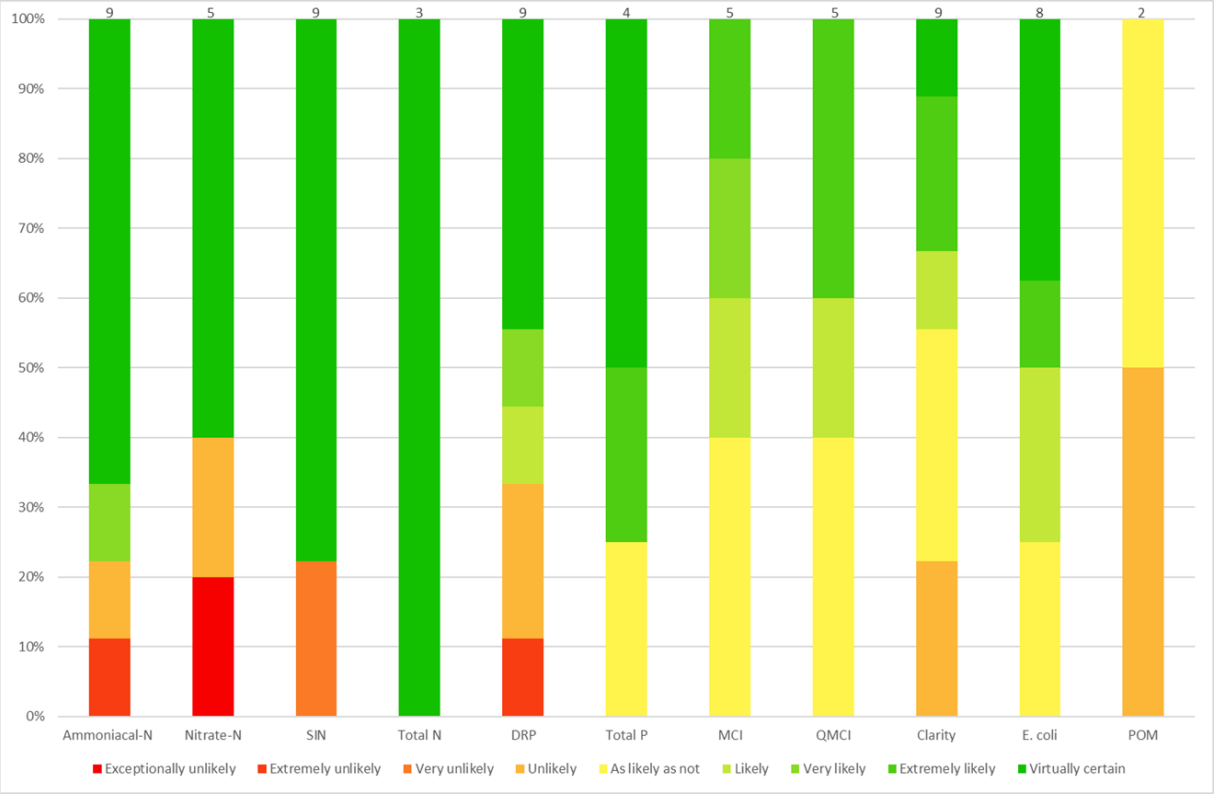


Figure 12 Proportion of sites classified for confidence over the 20-year period ending 31 December 2019 for SoE river and stream monitoring sites in the Manawatū catchment

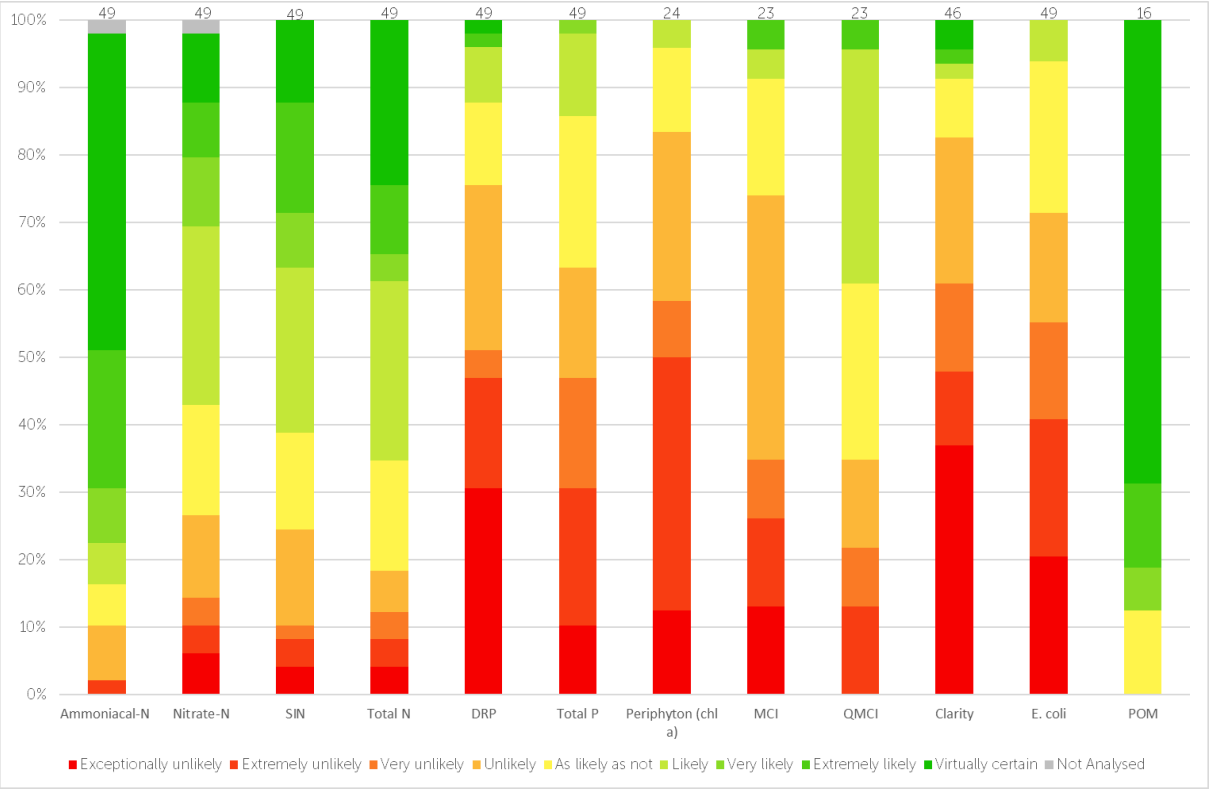


Figure 13 Proportion of sites classified for confidence of an improving trend for the 10 year period ending 31 December 2019 for river and stream monitoring sites in the Manawatū catchment

Key findings for the Manawatū catchment include:

- Many parts of the Manawatū area have good results for indicators of ecological health including MCI and fish IBI. Substantial work has been done in recent years to create fish passes and restore breeding areas.
- Modelling shows significant reductions of sediment load over the longer term as a result of the SLUI programme. Dissolved reactive phosphorus, associated with sedimentation, is also reducing at most sites across the catchment.
- Visual clarity, however, is deteriorating in most places. This poor result and trend for clarity suggests sediment is still a problem, in spite of the gains made through SLUI. SLUI, along with riparian fencing and planting programmes, represents a major investment by landowners, ratepayers and government. Reporting on this suggests that it takes time for trees to grow and meaningful environmental trends to be detected. That clarity (and phosphorus, at a few sites) has not yet 'turned the corner' may simply be due to time lags, or it may indicate that environmental works are not yet occurring at sufficient scale and pace.
- Across most of the Manawatū FMU, water quality falls short of contact recreation standards. A few individual sites meet One Plan or NPS-FM NOF targets but the catchment as a whole falls short of regional targets. While both monitoring and modelling indicate improving trends for contact recreation across other parts of the region, *E. coli* continues to get worse in the Manawatū.
- Parts of the Manawatū and Mangatainoka Rivers also suffer from blooms of potentially toxic cyanobacteria.

The catchment summary identifies the following gaps and areas for future consideration for parameters monitored in the Manawatū FMU:

- There is very limited data on the distribution and population of fish species, the location of barriers to fish migration, or how to effectively manage periphyton growth. The gaps in knowledge partly reflect the high cost of biological monitoring; the evolution of freshwater

science and new national regulations are likely to drive a greater focus in this area. Significant work remains to be done to better understand fish biodiversity and ecological requirements in the catchment.

- It is uncertain whether the visual clarity deterioration is due to time-lags between works being undertaken and environmental trends being detected or insufficient scale or pace of works. It is also acknowledged that problems associated with erosion are likely to be exacerbated as climate change leads to stormier weather and more frequent high-intensity rain events i.e. suspended sediment remains a problem.
- The findings associated with *E.coli* in the catchment suggest that measures which are effective in most conditions (stock exclusion from waterways and modest, unplanted riparian strips) are insufficient to address 'peak' contamination which largely occurs during heavy rainfall.
- There is limited information available nationally about drivers for cyanobacteria growth or what management targets to set. The catchment summary identifies this as an area for further research.

In summary, the Manawatū FMU is performing well in some areas but there is room for improvement in some parameters such as visual clarity and *E. coli*, which are still showing deteriorating trends.

Rangitīkei-Turakina FMU

The Rangitīkei-Turakina FMU covers the Rangitīkei and Turakina Rivers and their tributaries. There is good quality data on state and trends available for this catchment.

Figure 14 Proposed Rangitīkei-Turakina FMU (Oranga Wai website)

The Rangitīkei-Turakina FMU stocktake report provides an update to the SoE monitoring parameters for the catchment. Horizons' water quality monitoring programme for this FMU is relatively extensive and collects a range of physio-chemical, microbiological and biological data within the Rangitīkei-Turakina area. However, there are still sites within the FMU that do not have sufficient monitoring to be able to assess trends or the effect of actions to improve water quality.

Key findings from the stocktake report state that the headwaters in this FMU, in places like Pukeokahu, are in excellent condition. However, as the rivers flow towards the sea they pick up sediment, nutrients and microbial pathogens from the surrounding land. The lower reaches are generally poorer in their support of ecological, cultural and recreational values. Overall, monitoring shows the water quality in the Rangitīkei-Turakina FMU falls short of many of the targets set in the One Plan.

- Ecosystem health: data on freshwater fish is very limited; however, based on the information that is available it is known that IBI[25] in this FMU ranges from poor to excellent and that there are at least 30 known barriers to fish passage within the FMU. It is likely there are more.
- The MCI score is mixed (showing improving, stable & declining trends) but generally falls into the 'fair' category. All are below the One Plan targets.
- Periphyton biomass targets in the One Plan are met at around half of the measured sites, however overall trends for periphyton in this FMU are likely to be degrading.
- Modelling shows significant reductions over the longer term in sediment load as a result of the SLUI programme regionally, though this has yet to be reflected in the dissolved reactive phosphorous (DRP) measures for Rangitīkei-Turakina.
- Visual clarity targets are not met in many places, with only one site showing an improving 10 year trend and 15 below the national bottom line.
- Of the State of the Environment monitoring sites, one site consistently meets the One Plan *E.coli* targets, while the remainder do not.
- All *E.coli* trends in the Rangitīkei-Turakina FMU are either stable or improving. Some sites like the Rangitīkei River at Mangaweka are Band A or B under the National Objectives Framework for all *E.coli* measures, but many sites fall into Bands D or E. Reporting notes that the 95th percentile measure is sensitive to *E.coli* spikes and many sites in band A or B for other *E.coli* measures are band E for this. These spikes are assumed to be associated with rainfall events washing effluent into waterways (i.e. many places experience spikes of *E.coli*, while others have more constant *E.coli* issues).

In summary, the Rangitīkei-Turakina FMU is showing stable or improving trends at many sites. However, despite that the One Plan targets for visual clarity, MCI and *E.coli* are not met in many places.

Kai Iwi

The Kai iwi FMU covers the area in and around the Kai Iwi stream that leads out to the sea at Kai Iwi Beach (Taikapē and Mōwhānau). It includes the shorter Mōwhānau and Ototoka Streams. All of these streams flow out to the Tasman Sea on the west coast of New Zealand. Kai Iwi is the smallest FMU in the Horizons Region. While there is a relatively long monitoring record at the Mōwhānau at Footbridge site, overall monitoring information in this FMU is limited. There are few sites and the data available is not sufficient to draw robust conclusions. Water quality in this catchment is complex with many variables and significant natural variability.

[25] fish index of biotic integrity

Figure 15 Proposed Kai Iwi FMU (Oranga Wai website)

Key findings Overall, monitoring shows the water quality in the Kai Iwi FMU falls short of many of the targets set in the One Plan. These are outlined below:

- Both the Fish IBI and MCI act as indicators of ecological health; however, in the Kai Iwi area MCI is not measured and the limited Fish IBI scores we have are poor. Much work remains to be done to better understand aquatic life in the catchment.
- There are two SoE monitoring sites within the Kai Iwi FMU. The Mōwhānau site has high nutrient and sediment levels, and low levels of dissolved oxygen at times. It also shows signs of improvement for some indicators (ammoniacal nitrogen, total dissolved phosphorus and total suspended sediment) and signs of degradation for others (nitrate measures and total phosphorus).
- The second SoE monitoring site is more recently established and doesn't have enough information to assess trends. However, it shows generally good results for nutrients, with measures of nitrogen falling into NOF Band A or B, but also has poor visual clarity. While phosphorous measures do not perform as well as those for nitrogen, they are still above the national bottom line.
- Across almost all of the Kai Iwi area, water quality falls short of contact recreation standards, with all three stream contact recreation sites having a permanent no swim notice due to consistently high levels of E. *coli* monitored during the bathing season. The sites with data available do not meet NOF targets for *E.coli* (although some are still only showing early indications) and there is not yet a clear trend of either improvement or further degradation. Faecal source tracking of the *E.coli* results indicates that most of this *E.coli* comes from cattle, which suggests that livestock still have access to many waterways in this FMU.
- Modelling shows significant reductions over the longer term in sediment load as a result of the SLUI programme, although the dissolved reactive phosphorous trend (which is associated with sedimentation) for the Kai Iwi area is currently indeterminate and there is insufficient data to assess clarity against the One Plan targets.

In summary, the Kai iwi FMU has limited information available to make an assessment on long term trends or water quality state. However, the information that is available suggests this

catchment generally does not meet the contact recreation standards and falls short for other water quality parameters (such as nitrate and total phosphorus); however, it is showing signs of improvement for other parameters.

Whangaehu

The main waterways in the Whangaehu FMU are the Whangaehu, Mangawhero and Makotuku rivers. Monitoring information in this FMU is good, however there is limited data on the distribution and population of fish species, the location of barriers to fish migration, or how to effectively manage periphyton growth. The gaps in our knowledge partly reflect the cost of monitoring; the 2020 NPS FM directs a greater focus on these areas. In addition, the volcanic headwaters of the catchment mean that the water can be highly acidic. This catchment is complex with many variables and significant natural variability.

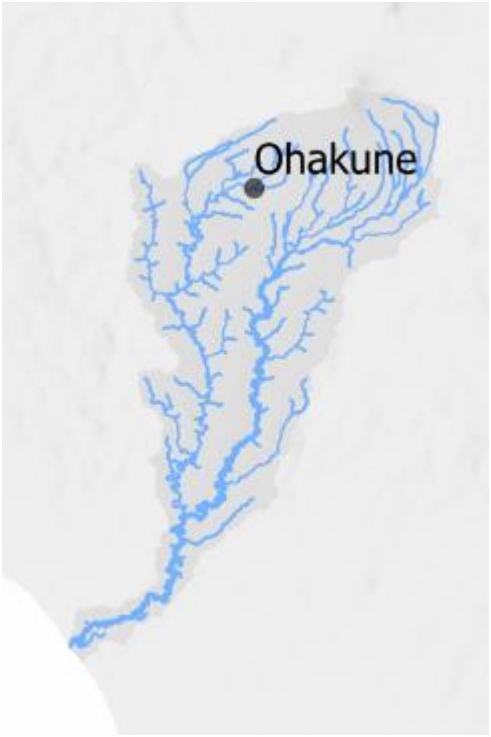


Figure 16 Proposed Whangaehu FMU (Oranga Wai website)

Key findings from the stocktake report state that the headwaters in this FMU, in places like the Central Plateau, are in excellent condition; however, as the rivers flow towards the sea they pick up sediment, nutrients and microbial pathogens from the surrounding land. The lower reaches are generally poorer in their support of ecological, cultural and recreational values. The Tongariro Hydroelectricity scheme significantly modifies the flow regime of the Tokiahuru and Wahianoa Streams and Mangawhero, Makotuku and Whangaehu Rivers. This affects the extent to which the river supports ecological, cultural, and recreational values. Overall, monitoring shows the water quality in the Whangaehu FMU falls short of many of the targets set in the One Plan, which is discussed as follows:

- Indicators of ecological health, including MCI and fish IBI, are mixed across the area, but generally fall short of targets, with monitoring trends showing that MCI is likely stable or degrading across the FMU. Much work still needs to be done to better understand aquatic life in the area.
- The Tongariro hydroelectric diversion has a significant negative impact on the health and wellbeing of the catchment. However, the importance of the scheme's contribution to New Zealand's electricity supply and greenhouse gas reduction objectives must also be recognised.

- There is limited data on the distribution and population of fish species, the location of barriers to fish migration, or how to effectively manage periphyton growth.
- Phosphorous state and trends suggest more work is required to manage phosphorus in this catchment. Results are mixed, with four sites falling below the national bottom line for at least one phosphorous measure, and One Plan targets are not met. Further, the headwaters of the catchment are naturally high in phosphorus, and this is not recognised in the targets set in the One Plan. Consideration needs to be given to how to recognise this in future revisions of the Plan.
- While visual clarity is deteriorating in many places regionally, the trends for Whangaehu are generally improving.
- Monitoring indicates that the ability for water bodies in this FMU to support recreational values is mixed, with 47 per cent of rivers and streams greater than 'order 4' are estimated to be 'swimmable' based on the NOF. Twenty and 10 year trends are mostly stable or improving, including around point source discharges.
- All sites meet the cyanobacteria target in the One Plan.
- All monitoring sites achieve band A or B for NOF measures of nitrogen (nitrate and ammonia). These parameters aim to prevent toxicity to fish and invertebrates. However, One Plan targets for Soluble Inorganic Nitrogen (SIN) – a more stringent target that aims to limit periphyton growth - are not met in the Lower Whangaehu Water Management Zone (WMZ).
- Periphyton mat targets are met at all except one site. Periphyton filament targets, however, are not met at most sites. This means that while periphyton levels are not likely to be impacting biological communities, contact recreation values are being negatively impacted.

In summary, the Whangaehu FMU has mixed results. Visual clarity is good; however, other standards for water quality are not met. Further to this, data is limited compared to some of the other catchments in the region which impacts on the ability to draw robust conclusions regarding trends.

Whanganui

At the time of writing, a catchment stocktake had not been undertaken for the Whanganui FMU; however, an updated summary outlining key water quality pressures is available and has been used to provide an update to the 2019 SoE report data. The extent of the Whanganui FMU is shown in the image below.

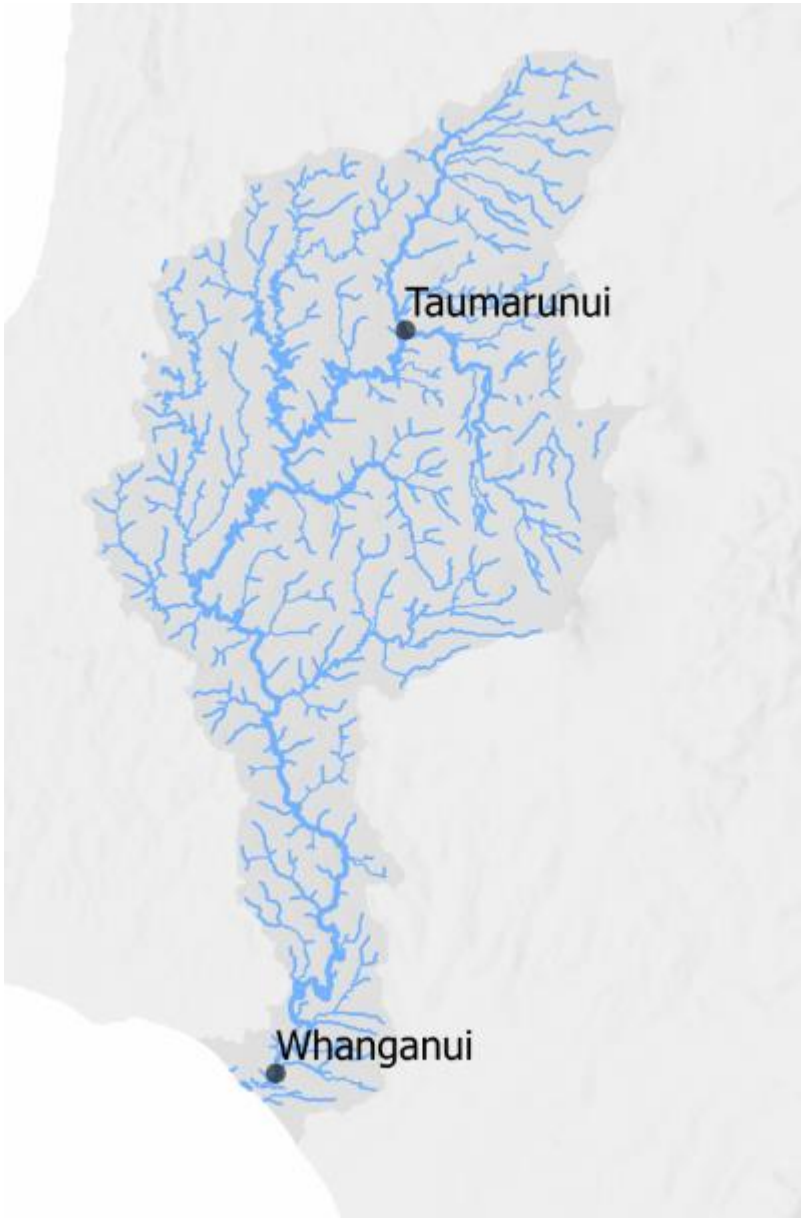


Figure 17 Proposed Whanganui FMU (Oranga Wai website)

Key findings:

The main pressures on water quality in the Whanganui FMU are:

- High nutrient concentrations (e.g. nitrogen and phosphorous);
- Poor clarity and high sediment;
- High bacteria counts;
- Impacts on life in the streams and rivers.

A large number of sites in the Whanganui FMU do not meet the targets set in the One Plan for nitrogen and phosphorus. Modelling indicates that the ten year trends for these parameters and algal growth (Chlorophyll.a) is increasing (getting worse).

The regional One Plan targets for visual clarity are not met within the catchment, with more than 80 per cent of all sites also below national bottom lines set by the NOF. The ten and 20 year trends do not indicate any improvement for visual clarity in this FMU.

The One Plan targets for *E*.coli are not met within the Whanganui FMU; and most sites also fall below the national bottom line. Ten year trend modelling indicates a degrading trend for four sites,

improving trend for two sites, with the remaining five sites being indeterminate. Data indicates that faecal contamination in the Whanganui catchment is usually associated with rainfall events (either overland or in an urban context via stormwater) rather than from piped or dairy effluent discharges to water (which have been removed).

The MCI score is mixed across the catchment with half of the sites meeting the One Plan targets and half not. The MCI score is in band C when compared to national targets. Ten year trends in MCI are getting worse (decreasing) at half of the sites and indeterminate (as likely as not to be improving) at the other half.

In summary, the Whanganui FMU falls short on a number of targets such as visual clarity, nitrogen and phosphorus. Ten and 20 year trends are not showing significant improvement or change for the catchment.

Waiopehu

The Waiopehu FMU covers Lake Horowhenua, Lake Waiwiri (also known as Lake Papaitonga), the Ōhau River, the Waikawa Stream and their catchments. This area comprises roughly half of the Horowhenua District. The main water bodies in the Waiopehu area include: Arawhata Stream, Hōkio Stream, Lake Horowhenua, Ōhau River, Waikawa River, Lake Waiwiri, Waiwiri Stream and Manakau Stream.

Figure 18 Proposed Waiopehu FMU (Oranga Wai website)

Information on the health of waterbodies in the Waiopehu FMU varies. Data is currently available in three of the five WMZ within this FMU. The headwaters at places like Waikawa at North Manakau Road and Ōhau at Gladstone Road are in excellent condition. In general, the lower reaches of rivers are often poorer in their support of ecological, cultural and recreational values; however, this is not always the case the Waiopehu area.

The main water quality issues in the wider Waiopehu are:

- High nutrient concentrations (e.g. nitrogen and phosphorous);
- Poor clarity and high sediment;
- High bacteria counts;
- Impacts on life in the streams and rivers.

Key findings:

- MCI scores are mixed across the catchment. The Ōhau and Waikawa WMZ generally meet One Plan targets; 11 of 13 sites are above the NOF bottom lines, while the Lake Horowhenua WMZ does not meet either. Periphyton meets both One Plan and NOF targets at the few sites with sufficient data. Overall, there is insufficient data to assess trends for MCI and periphyton across much of the catchment over a ten year timeframe. Ten year trends for MCI at the five sites with sufficient data are mixed, ranging from degrading to improving. The three sites with sufficient periphyton data for the same time period show likely degrading trends.
- Many sites achieve band A for NOF measures of nitrogen toxicity (nitrate and ammonia). However, most sites fail the One Plan's targets for Soluble Inorganic Nitrogen (SIN), a more stringent target related to algal growth. Over a ten year period, trends in nitrogen and phosphorous concentrations are mixed across sites. Twenty year trends show SIN is improving, while DRP is degrading.
- Clarity is poor at seven of the 11 sites.
- Only two sites meet the One Plan *E. coli* targets: the Ōhau at Gladstone Road and the Waikawa at North Manakau Road. *E coli* results tend to be worse in smaller tributaries, perhaps due to the stronger influence of the immediate environment. Where there are sufficient data for trend analysis, measures of *E. coli* are mixed. This is despite the number of point source discharges in the catchment having reduced over time as dairy effluent management has improved, and town and industry discharges have been consolidated or are discharged to land rather than to water.
- While many sites are safe to swim some of the time, long-term analysis by LAWA shows six river and stream swim spots to be in poor condition, while two ocean sites are in good condition.

Puketoi ki Tai (Coastal Tararua)

The Puketoi ki Tai FMU covers the Akitio, Owhanga, Wainui, and Waimata River and Tautāne Stream catchments that flow through to coastal Tararua.

Figure 19 Proposed Puketoi ki Tai FMU (Oranga Wai website)

Information on the health of waterbodies in the Puketoi ki Tai area is limited with only two sites monitored and both of these falling within the same water management zone. It is therefore

difficult to draw robust conclusions on trends or lack thereof. Based on the information available the below is a summary of the **key findings** for this catchment:

- MCI is showing a deteriorating trend; however, this is measured at only one site presently. While some work has been done to restore and enhance fish habitat in this area, there is limited information available on fish species and the location of barriers to fish migration (with only one known barrier).
- Periphyton is not monitored in this area.
- DRP associated with sedimentation is showing signs of improvement at one site, while visual clarity is deteriorating (noting that there is insufficient data available to draw a robust conclusion for clarity). Modelling shows significant reductions over the longer term in sediment load as a result of the SLUI programme.
- *E. coli* monitoring at both sites is insufficient to assess against the One Plan targets, however preliminary results indicate *E. coli* targets will not be met. When compared to the NOF both sites fail to achieve the national bottom line. These initial results for *E. coli* levels indicate that livestock still have access to waterways. It is noted that planned improvement to the area's only wastewater treatment plant discharge will result in some improvements; however, a collective effort from all landowners will be key.
- Contact recreation targets are not met in most of the Puektoi ki Tai FMU, with neither of the two monitoring sites meeting the One Plan or NOF targets.
- Both monitoring sites achieve band A or B for NOF measures of nitrogen. The Owhanga River site also meets the One Plan's targets for SIN, a more stringent target that aims to limit periphyton growth. There is insufficient data available for these measures in the Pongaroa River (the only other monitoring site); however, early indications suggest they are unlikely to achieve One Plan targets.
- Over a ten year period, SIN trends are improving at one site and indeterminate at the second. Other measures of nitrogen and phosphorus are mixed, with one site showing more improving trends and the other showing more declines.

Overall, the lack of data available for the Puketoi ki Tai FMU makes it difficult to draw any robust conclusions regarding water quality state or trends. However, based on the information that is available, it is reasonable to assume water quality for this area falls short of both regional and national targets.

7.3.1.3 Surface water quality (excluding lakes) – summary of findings:

The SoE monitoring provides robust and useful information on the state of surface water quality in the Horizons Region. Overall it can be inferred that there have been improvements to overall water quality, but there are a number of parameters still degrading and not meeting their target state. Ultimately, the One Plan has set a good foundation for improving regional surface water quality but in the coming years, more will need to be done to continue the improving trend and reverse those parameters that are degrading.

The catchment stocktakes provide a useful snapshot of trends within each FMU and represent the most up-to-date information for surface water quality in the region's surface water bodies. Overall the results are mixed. However, most of the seven FMUs are characterised by poor visual clarity and *E.coli* levels that fall short of the One Plan or national targets. Further, contact recreation standards and MCI scores also generally perform poorly across a number of the FMUs. Lastly, in analysing each of the catchment stocktakes, it is apparent that there are many instances where data availability is limited and trends are not able to be determined. This is a gap that will need to be filled to ensure future data capture and evaluation is able to be completed and the NPS-FM requirements, particularly the greater focus for monitoring MCI and fish IBI, are met.

7.3.1.4 One Plan framework – key linkages for surface water

ONE PLAN POLICY FRAMEWORK LINKAGES: SURFACE WATER				
Objectives (RPS)	**Supporting Policy Framework**	**Methods**	**Indicators**	**Anticipated environmental results**
Objective 5-1 Surface water bodies^ and their beds^ are managed in a manner which safe guards their life supporting capacity and recognises and provides for the Values in schedule B	**RPS Policies:** 5-1 and 5-2 **Regional Plan:** Objective 14-1 Policy 14-1	**Method 5-2** sewage treatment plant upgrades **Method 5-11** water (fluvial resources, Quality and Quantity) research, Monitoring and Reporting. **Rules:** Those included under Objective 5-2 and 16-10, 16-11, 16-12, 16-13	• Measured water quality compared to water quality targets*especially measures for "muddy waterways", "safe swimming", "safe food gathering", and "aquatic ecosystem health" in priority catchments. • Incidents where surface water quality is confirmed as unfit for use. • Measured flows of surface water compared to the allocation and minimum flow regime outlined in this Plan.	During the life of this Plan, water quality and quantity maintain the Values set in this Plan. In Water Management Sub-zones*: • where water quality targets* are met prior to this Plan becoming operative, they continue to be met • where water quality targets* are not met prior to this Plan becoming operative, they are either met or improved from the current state where targeted for action or, where not targeted for action, they are no worse than prior to this Plan becoming operative
Objective 5-2 **Water quality:** (a) Surface water^ quality is managed to ensure that: a. Water quality is maintained in those rivers^ and lakes^ where the existing water^ quality is at a level sufficient to support the Values in Schedule B. b. Water^ quality is enhanced in those rivers^ and lakes^ where the existing water^ quality is not at a level sufficient to support the Values in Schedule B. c. Accelerated eutrophication and sedimentation of lakes^ in the Region is prevented or minimised. d. The special values of rivers^ protected by water conservation orders^ are maintained.	**RPS Policies:** 5-3, 5-4, 5-5, 5-6, 5-9. 5-10, 5-11 **Regional Plan:** **Objective:** 14-1 **Policies:** 14-1, 14-2, 14-3, 14-4, 14-7, 14-8, 14-9 **Intensive Land Use[26]:** RPS Policies: 5-7 and 5-8 Regional Plan Policies: 14-5 and 14-6.	**Method 5-5** stormwater system drainage upgrades. **Method 5-6** Lake Horowhenua and other Coastal Lakes. **Method 5-7** Lake quality research, monitoring and reporting. **Method 5-9:** Water Quality improvement. **Rules:** 14-5, 14-6, 14-7, 14-814-9, 14-10, 14-11, 14-12, 14-13, 14-14, 14-15, 14-16, 14-21, 14-22, 14-23, 14-28. <u>Intensive land use[27]:</u> **Method 5-12:** Innovative Land Use Research. **Method 5-13:** provision of information. **Rules:** 14-1, 14-2, 14-2A, 14-3, 14-4.		

Table 9: One Plan surface water quality linkages

The monitoring available indicates that the objectives and anticipated environmental results are not being consistently achieved. There is evidence of degradation (not meeting the Schedule E targets) that is not being consistently improved in all catchments. It is clear that for some parameters, surface water quality is not being maintained or improved as sought by the provisions. The current framework is generally fit for purpose but the methods and anticipated environmental

[26] Policies 5-7, 5-8, 14-5 and 14-6 are subject to Plan Change 2 which is currently in the appeal process

[27] Rules 14-1, 14-2, 14-2A, 14-3 and 14-4; and Methods 5-12 and 5-13 are subject to Plan Change 2 which is currently in the appeal process

results will need updating to align with the NPS-FM requirements and the outcomes of the national objectives framework process currently under way (Oranga Wai), particularly given the rate of change in some catchments is quite slow or not improving at all for some parameters.

7.3.2 Lakes

7.3.2.1 SoE monitoring

The 2019 SoE monitoring report includes an assessment of lake monitoring. This is a relatively new programme that has been implemented since the 2013 SoE monitoring report. As such, ten year trends have not been able to be reported. To date, monitoring and research has largely focused on the region's 57 coastal dune lakes. This focus was largely driven by the need to understand the current state of the health of the lakes to inform implementation of the One Plan nutrient management rules[28] for priority catchments. The 2019 SoE report acknowledges that there are limitations with this approach, and that the water quality and ecological status of the remaining 169 lakes in the region are not well understood at present.

SoE monitoring of 15 of the 226 lakes in the region shows that nearly all monitored lakes fail the targets for Chlorophyll *a* (algae), total nitrogen and total phosphorus, but pass the ammoniacal nitrogen and bacteria targets. The table below shows the lake water quality for the 15 lakes that are monitored, and compares the results to the One Plan targets for algae, bacteria and nutrients. It is noted that these results should be viewed with caution given the quarterly sampling and short length of records provides a limited number of samples to estimate the state of water quality in a statistically robust way.

Site name	One Plan Chlorophyll *a* (average)	One Plan chlorophyll *a* (maximum)	One Plan Total Nitrogen	One Plan Total Phosphorus	One Plan Ammoniacal Nitrogen	One Plan *E.coli* (bathing season)	One Plan *E.coli* (non-bathing season)
Lake Alice	Fail	Fail	Fail	Fail	Pass	Pass	Pass
Lake Dudding	Fail	Fail	Fail	Fail	Pass	Pass	Pass
Lake Heaton	Fail	Fail	Fail	Fail	Gail	Pass	Fail
Lake Herbert	Fail	Pass	Fail	Fail	NA	Pass	Pass
Lake Horowhenua	Fail	Fail	Fail	Fail	Pass	Pass	Pass
Lake Kohata	Fail	Fail	Fail	Fail	Pass	Pass	Pass
Lake Koitiata	Pass	Pass	Fail	Pass	NA	Pass	Pass
Lake Koputaroa	Fail	Fail	Fail	Fail	Pass	Pass	Pass
Lake Pauri	Fail	Fail	Fail	Fail	Pass	Pass	Pass
Lake Waipu	Fail	Fail	Fail	Fail	NA	Fail	Fail
Lake Westmere	Fail	Fail	Fail	Fail	Pass	Pass	Pass
Lake William	Fail	Fail	Fail	Fail	NA	Pass	Pass
Lake Wiritoa	Fail	Fail	Fail	Fail	Pass	Pass	Pass
Omanuka Lagoon	Fail	Fail	Fail	Fail	NA	Fail	Pass
Pukepuke Lagoon	Fail	Fail	Fail	Fail	Pass	Pass	Pass

Table 10 SoE 2019, Lake water quality compared to One Plan targets

Comparison with the NOF showed nearly all lakes were below the national bottom line (band D) for phytoplankton (chlorophyll *a*). While sparse, monitoring also showed that that for all monitored lakes, at least one parameter falls into band D and therefore fails the national bottom line criteria under the NPS-FM (2017). Reporting on the ecological condition of 31 lakes using the Lake SPI

[28] Rules 14-1, 14-2, 14-3 and 14-4

method [29]shows 19 per cent are in the high to excellent range, 45 per cent in the moderate range, 23 per cent in the poor range, and 13 per cent in the non-vegetated range. The table below[30] shows the NOF criteria for the region's monitored lakes:

Site name	NOF: Lake phytoplankton (maximum)	NOF phytoplankton (maximum)	NOF: Lake total nitrogen	One Plan total phosphorus
Lake Alice	B	D	D	D
Lake Dudding	C	C	D	D
Lake Heaton	D	D	D	D
Lake Herbert	C	C	D	D
Lake Horowhenua	D	D	D	D
Lake Kohata	C	D	D	C
Lake Koitiata	A	A	D	C
Lake Koputaroa	D	D	D	D
Lake Pauri	B	C	D	D
Lake Waipu	B	C	D	D
Lake Westmere	C	C	D	D
Lake William	C	D	D	D
Lake Wiritoa	D	D	D	D
Omanuka Lagoon	C	D	D	D
Pukepuke Lagoon	B	C	D	D

Table 11 SoE, 2019 Lake water quality compared to the NOF

In addition to nutrient and algae monitoring, assessment against the lake trophic level index (TLI) is a common measure of ecological health in lakes. It consists of four components that each play an important role in the ecological functioning of a lake being chlorophyll *a*, nitrogen, phosphorus, and water clarity. Of the 15 lakes currently monitored, more than half are classed as supertrophic meaning they often have poor water quality and excess algal growth as a result of high nutrient levels. The table below[31] outlines the trophic state of the 15 monitored lakes:

Trophic state	Lake condition	TLI score	Number of monitored lakes	Percentage of monitored lakes (%)
Ultra-microtrophic	Clear, with extremely low levels of nutrients and algae.	<1	0	0
Microtrophic	Clear with very low levels of nutrients and algae	1-2	0	0
Oligotrophic	Clear with low levels of nutrients and algae	2-3	0	0
Mesotrophic	Moderate levels of nutrients and algae	3-4	0	0
Eutrophic	Murky with higher amounts of nutrients and algae	4-5	1	7
Supertrophic	Fertile and saturated in phosphorus and nitrogen, often associated with poor water quality. Excessive algae growth can occur.	5-6	6	40
Hypertrophic	Highly fertile and super-saturated in phosphorus and nitrogen and with excessive algae growth can occur.	>6	8	53

Table 12 SoE, 2019, Lake water quality assessment against the Lake Trophic level index (TLI)

7.3.2.2 Horizons 2020 catchment stocktakes

There are 232 lakes in the Horizons Region that are greater than 1 ha in size. Pressures on lakes are generally associated with adjacent land use; sediment and nutrient run-off, and risk of invasive plant, animal and fish species.

[29] Lake SPI combines assessments of the amount of indigenous submerged plants and exotic, invasive weeds to indicate an overall ecological condition. The index ranges from 0 per cent (heavily impacted lakes with no aquatic vegetation) to 100 per cent (pristine, un-impacted lakes dominated by indigenous aquatic vegetation) and provides five descriptive categories of condition

[30] Source: State of the Environment Report (2019)

[31] Source: State of the Environment report (2019)

Ngā wai o Manawatū

There are 71 lakes over 1 ha in size in the Manawatū FMU. This includes 11 dune lakes, 22 riverine/oxbow lakes and 38 reservoirs. No water quality monitoring of lakes is conducted in the Manawatū, with the exception of Hokowhitu Lagoon, which is sampled monthly for water quality under the SoE programme (since December 2020) and weekly during the swimming season for *E.coli* and cyanobacteria (since November 2016).

SPI monitoring shows three lakes in the Manawatū FMU are in excellent condition, one in high ecological condition and a further three in moderate condition. The lakes in excellent ecological condition had substantial indigenous vegetation with no or very little impact from invasive weed species. The others in high or moderate condition had different degrees of impact from invasive weed and/or other impacts on indigenous plant communities. Lakes in poor condition in the catchment are heavily impacted by introduced weeds like hornwort and *Egeria*.

Rangitīkei-Turakina

There are 79 lakes larger than 1 ha in the Rangitīkei-Turakina FMU, including dune lakes and oxbow lagoons. In total 21 lakes are assessed under the Lake SPI method and nine are assessed for summer contact recreation. Some lakes are assessed using both.

Of the 21 lakes monitored using the SPI method, four are in excellent condition, two are in high condition and ten are in moderate condition. Those in excellent condition high levels of indigenous vegetation with no or very little invasive weed impact. Those in high or moderate condition had varying degrees of impact from invasive weeds. The lakes in poor condition are heavily impacted by introduced weeds. Two lakes within the FMU are assessed as unvegetated.

Kai Iwi

There are three lakes (two dune lakes and one reservoir) in the Kai Iwi area. Water quality in these lakes varies by area and pressures, however, no physical monitoring of lakes is conducted in the Kai Iwi area and so conclusions regarding the overall water quality cannot be reached.

Whangaehu

There are 26 lakes larger than 1ha in size in the Whangaehu FMU. These include five volcanic lakes, four landslide lakes, three riverine lakes, two peat lakes, two dune lakes and ten reservoirs. In total, three lakes are monitored in the FMU using the Lake SPI method.

Two of the three monitored lakes (located in the Upper Whangaehu) are in excellent condition with substantial indigenous vegetation and no invasive exotic species. The third lake (located in Coastal Whangaehu) is in high ecological condition, indicating substantial indigenous vegetation with some impact from invasive exotic Egeria (oxygen weed) and Potamogeton Crispus (curly leaf pondweed). Analysis suggests this may reflect the generally higher pressures faced by lowland catchment areas.

Whanganui

At the time of writing, a catchment stocktake had not been undertaken for the Whanganui FMU; however, an updated summary outlining key water quality pressures is available and has been used to provide an update to the 2019 SoE report data. There are 36 lakes over 1 ha in size, including nine aeolian, four landslide, eight reservoir, 13 riverine and two volcanic lakes. The below is a summary of Lake SPI in the Whanganui FMU.

Total number of lakes surveyed for ecological health using LakeSPI	Excellent Health	Moderate – high health	Non-vegetated or poor ecological health
9	2	3	4

Waiopehu

The Waiopehu area is home to 13 lakes greater than 1 ha in size. All are dune lakes which are a common feature of the area, with remaining wetlands often associated with these lakes. Only two lakes (Lake Horowhenua and Lake Waiwiri) are monitored consistently for water quality. The Waiopehu area is a unique landscape with many coastal lakes that can be more vulnerable to change than inland lakes.

Lake Waiwiri (also known as Lake Papaitonga) and Lake Kopureherehere have been monitored using the Lake SPI method. Lake Waiwiri has a score of 0 due to the complete lack of vegetation in the lake bed (in contrast to the surrounding area of undisturbed indigenous vegetation in the wider Lake Papaitonga Reserve). Lake Kopureherehere is classified as poor, mostly due to the impact of invasive species.

Water quality in Lake Horowhenua is highly degraded. A range of non-regulatory interventions to reduce nutrients and sediment entering the Lake and to remove lake weed have been proposed but not all have been able to be implemented, meaning their effectiveness cannot be assessed. The catchment stocktake report states that changes in land use practices in the Lake Horowhenua catchment and direct interventions at the Lake will be necessary to achieve significant water quality improvements.

Puketoi ki Tai[32]

The Puketoi ki Tai FMU is home to four lakes that are over 1 ha in size. These are all artificial reservoirs. No water quality monitoring of lakes is conducted or planned for the future in the Puketoi ki Tai, as they are artificial reservoirs and therefore a lower priority than natural lake ecosystems elsewhere in the region.

Despite this, NIWA has assessed the ecological condition of two Owhanga lakes using the SPI method. Results show one is in high condition and the second is in moderate condition. Reporting states this reflects the impact of Potamogeton crispus (curly leaf pondweed) which can outcompete indigenous species, block outlets and drains, and also reduce the amount of dissolved oxygen available.

7.3.2.3 Lake water quality – summary of findings

The SoE monitoring and catchment stocktake reports provide useful information on the state of lake water quality in the Horizons Region. However, it is acknowledged that the current monitoring programme is limited and has not been underway long enough to establish any meaningful trends in regional lake water quality.

Of the monitoring that has been done, it is clear that a number of the region's lakes have poor water quality and increased intervention will be required to improve the current situation.

7.3.2.4 One Plan framework - key linkages for lakes

The table that follows is an extract from the table at the beginning of section 5.2 outlining the One Plan linkages. The below outlines the key provisions that relate to lakes.

[32] The catchments in the Tararua District extending from the Puketoi Range south and east to the coast.

ONE PLAN POLICY FRAMEWORK LINKAGES: LAKES				
Objectives (RPS)	**Supporting Policy Framework**	**Methods**	**Indicators**	**Anticipated environmental results**
Objective 5-2 **Water quality:** (b) Surface water^ quality is managed to ensure that: a. Water quality is maintained in those rivers^ and lakes^ where the existing water^ quality is at a level sufficient to support the Values in Schedule B. b. Water^ quality is enhanced in those rivers^ and lakes^ where the existing water^ quality is not at a level sufficient to support the Values in Schedule B. c. Accelerated eutrophication and sedimentation of lakes^ in the Region is prevented or minimised. d. The special values of rivers^ protected by water conservation orders^ are maintained.	**RPS Policies:** 5-3, 5-4, 5-5, 5-6, 5-9. 5-10, 5-11 **Regional Plan:** **Objective:** 14-1 **Policies:** 14-1, 14-2, 14-3, 14-4, 14-7, 14-8, 14-9 **Intensive Land Use[33]:** RPS Policies: 5-7 and 5-8 Regional Plan Policies: 14-5 and 14-6.	**Method 5-5** stormwater system drainage upgrades. **Method 5-6** Lake Horowhenua and other Coastal Lakes. **Method 5-7** Lake quality research, monitoring and reporting. **Method 5-9:** Water Quality improvement. **Rules:** 14-5, 14-6, 14-7, 14-814-9, 14-10, 14-11, 14-12, 14-13, 14-14, 14-15, 14-16, 14-21, 14-22, 14-23, 14-28. <u>Intensive land use[34]:</u> **Method 5-12:** Innovative Land Use Research. **Method 5-13:** provision of information. **Rules:** 14-1, 14-2, 14-2A, 14-3, 14-4.	• Measured water quality compared to water quality targets*especially measures for "muddy waterways", "safe swimming", "safe food gathering", and "aquatic ecosystem health" in priority catchments. • Incidents where surface water quality is confirmed as unfit for use.	During the life of this Plan, water quality and quantity maintain the Values set in this Plan. In Water Management Sub-zones*: • where water quality targets* are met prior to this Plan becoming operative, they continue to be met • where water quality targets* are not met prior to this Plan becoming operative, they are either met or improved from the current state where targeted for action or, where not targeted for action, they are no worse than prior to this Plan becoming operative

Table 13 One Plan water quality linkages for lakes

In considering the outcomes sought by Objective 5-2, it is difficult to draw a fully informed conclusion as to whether the objective has been achieved for lake water quality. This is primarily due to the small number of lakes monitored in the region with limited and short duration of monitoring available, which limits the ability to analyse trends with certainty. For this reason a robust conclusion cannot be drawn as to whether the outcomes of Objective 5-2 (a) (i), (ii) and (iii) or the anticipated environmental results have been achieved.

Despite this, based on the information that is available, there is evidence that suggests aspects of Objective 5-2 are not being achieved, for the following reasons:

- A number of the monitored lakes are in poor condition with high levels of nutrients and algae;
- A number of the monitored lakes fail the One Plan targets for algae and nitrogen;
- Almost all lakes have at least one parameter within band D (below the national bottom line) of the NOF.
- Assessments of many lakes result in a poor Lake SPI score.

The supporting policy and rule framework provides a strong regulatory foundation and should, in theory, enable the outcomes of the Objective to be achieved. However, in practice this does not appear to be the case. Available information suggests that significant work still needs to be done

[33] Policies 5-7, 5-8, 14-5 and 14-6 are subject to Plan Change 2 which is currently in the appeal process

[34] Rules 14-1, 14-2, 14-2A, 14-3 and 14-4; and Methods 5-12 and 5-13 are subject to Plan Change 2 which is currently in the appeal process

to improve the water quality and health of the region's lakes. Consideration should be given to increasing the lake water quality monitoring programme and updates as well as strengthening the methods and policy framework to focus of improvements in lake quality within the region.

It is also noted that Policy 14-9 refers specifically to the NPS-FM, 2014 which is now out of date. It is understood that Policy 14-9 was inserted through Plan Change 1 in response to the requirements of the NPS-FM 2014 and only ever intended to be interim. This policy will need to be updated in response to the updated NPS-FM and Oranga Wai work currently underway. Consideration should also be given to how this framework could adapt to any future versions of the NPS-FM.

7.3.3 Groundwater

Depending on the type of groundwater, quality can be impacted by a range of factors, including land use (in shallow, unconfined groundwater) and naturally occurring processes (in both unconfined and deeper, confined groundwater). The One Plan does not set numeric targets for groundwater quality, but sets an overall objective regarding relative changes in groundwater quality. This includes broadly maintaining groundwater quality where it is good, and improving it where it is degraded, with an exception made for groundwater in areas where there are discharges of contaminants to land that would otherwise directly go to water.

Groundwater samples from bores are collected quarterly and analysed for major cations (calcium, magnesium, sodium and potassium), major anions (bicarbonate, sulphate and chloride), nutrients (nitrate, ammonia, nitrite, and phosphorus), metals (iron, manganese and arsenic), other indicator parameters (silica, fluoride, boron, bromide, dissolved organic and inorganic carbon, conductivity, alkalinity and total dissolved solids), and *E*.coli bacteria.

SoE monitoring and the more recent Catchment Stocktake reports provide an overview of the state and trends of groundwater quality in the region, the findings of which are outlined below.

7.3.3.1 SoE monitoring

SoE monitoring of groundwater is undertaken for bacteria, nitrogen, iron, manganese, arsenic, pesticides, herbicides and emerging contaminants to give a measure of groundwater quality in the region. The SoE 2019 monitoring report compares key water quality indicators to the Ministry of Health Drinking Water Standards for New Zealand (2008). The findings from groundwater quality monitoring are summarised by type below.

E.coli: to provide some understanding around the levels of *E.coli* in groundwater, the SoE 2019 monitoring compares results with the New Zealand Drinking Water Standards. Of the 31 monitoring bores, 19 (58 percent) recorded *E.coli* concentrations that exceeded the drinking water standard of 1 MPN/100 mL. Reporting states there appears to be no clear spatial pattern to the occurrence of *E.coli*; however, detections are generally more frequent in shallow groundwater that is more vulnerable to contamination.

Nitrogen: In groundwater, nitrogen is generally measured as nitrate, nitrite and ammoniacal nitrogen. SoE reporting advises that elevated nitrate is often a result of agricultural land use or wastewater disposal. Nitrate is easily transportable by groundwater to waterways and can also cause health issues in people.

The SoE 2019 finds that across the region nitrate concentrations are well below the drinking water standard[35] except for some areas in Horowhenua and Tararua where they are elevated. The same report identifies 3 of the 31 state of the environment bores, and 2 additional bores exceed the drinking water standard for nitrate. This includes some deeper bores (>50 m deep).

The SoE 2019 finds that both short term (5 year) and long-term (10-20 year) trends in nitrate concentrations are generally indeterminate or improving, with only one bore to the north-east of

[35] National Drinking Water Standard maximum nitrate-nitrite limit = 11.3 mg/L

Levin showing a slight degrading trend over 5 years, and a bore near Whanganui showing a small magnitude degrading long-term trend.

Iron, manganese and arsenic: Iron, manganese and arsenic are naturally occurring minerals that can be dissolved in groundwater, affecting its taste, smell and how it looks. The SoE 2019 report shows both iron and manganese concentrations have similar spatial patterns to nitrogen, with generally lower concentrations throughout the rest of the region. Reporting shows median concentrations of both iron and manganese exceed their respective drinking water criteria in a number of bores throughout the Manawatū and Rangitīkei catchments. It is reported that in general, these exceedances appear to be associated with areas of reducing groundwater and are likely to be a natural feature in those areas.

Pesticides, herbicides and emerging contaminants: monitoring of a range of pesticides and herbicides through the region has occurred every four years since 1990. Surveys undertaken in 2014 returned no positive detections, including at locations with previous detections in 2006 (four sites) and 2010 (seven sites). This indicates a positive improvement in groundwater quality from these contaminants.

Per- and polyfluoroalkyl substances (PFAs): At the time of writing the 2019 SoE, the emergence of contaminants such as PFAs had recently become a focus following their discovery in the soil and water on and around the NZ Defence Force Base in Ohakea. At the time, the long-term impacts of PFAs were not well understood but initial monitoring had shown levels above the Interim Guideline Limits established for New Zealand. Since publishing the SoE report, Horizons has been working with the New Zealand Defence Force (NZDF) on the ongoing monitoring of PFAs and related compounds around the Base. PFAS are a large group of manufactured compounds that have industrial and consumer applications and have been in firefighting foam used at the Base. A monitoring programme was specially designed by Pattle Delamore Partners Ltd in 2020 to monitor the movement of the PFAS plume over time. The first round of sampling was undertaken in September 2020, with preliminary results showing PFAS concentrations either similar to, or slightly below, the ranges previously recorded for existing monitoring locations. These results are in general agreement with the predictions from the groundwater modelling[36]. The second round of sampling was undertaken in February 2021, however results were not available at the time of this evaluation.

7.3.3.2 Horizons 2020 Catchment Stocktakes

This section summarises the findings of the Horizons catchment stocktakes, broken down by FMU for groundwater quality.

Ngā wai o Manawatū

In the Ngā wai o Manawatū FMU, nitrates, manganese, iron, arsenic and chloride, bacteria and conductivity are monitored in a number of bores across the catchment. A summary of the findings for each parameter are outlined below:

- The pattern of nitrate concentrations is in keeping with the general groundwater characteristics of the region; in 'oxidising' areas, nitrate concentrations are typically higher. In combination with these geological conditions, nitrate contamination of groundwater generally occurs due to agricultural land use or wastewater disposal. In the majority of bores where a trend in nitrate concentrations is apparent, the data shows an improving long-term trend which is encouraging.
- There are a number of monitoring bores with median concentrations of manganese and iron that exceed the guideline values specified in the Drinking Water Standards for New Zealand. Arsenic has also been detected in two bores in the FMU at concentrations above the drinking water standard. The catchment stocktake suggests that in areas of reducing

[36] Sourced from Horizons Regional Council Environment Committee report, Annex D Water Quality and Quantity monitoring, June 2021

groundwater, higher levels of arsenic, iron and manganese are likely to be a natural feature rather than due to human activity.

- All sites within the FMU are well below the drinking water guideline for chloride.
- Between 2012 and 2017, recorded *E.coli* concentrations exceeded the drinking water standards at least once in 11 of the 15 (73.3%) monitoring bores. Most of these *E.coli* counts occur in bores downstream of the Manawatū Gorge and in the Mangatainoka catchment. There is no clear spatial pattern for *E.coli* occurrence, but in general *E.coli* is more frequently detected in shallower bores.
- Monitoring data does not show any indications of saltwater intrusion into the aquifer in the Manawatū FMU.
- An investigation into PFAS (per- and poly-fluoroalkyl substances) at Palmerston North Airport has revealed the presence of PFAS in soil, surface water and groundwater around the airport. Surface water results exceeded interim drinking water guidelines.

Rangitīkei-Turakina

In the Rangitīkei-Turakina FMU, nitrates, manganese, iron, arsenic and chloride, bacteria and conductivity are monitored in a number of bores across the catchment. A summary of the findings for each parameter are outlined below.

- Nitrate levels are generally low in this FMU despite intensive land uses such as dairy farming in many parts, particularly towards the coast.
- In the 'reducing' conditions prevalent in the Rangitīkei GMZ, nitrate concentrations are typically much lower, while concentrations of iron, manganese and chloride are higher. There are six bores where the median concentration of manganese and seven bores where the median concentration of iron exceed the drinking water guideline value specified in the Drinking Water Standards for New Zealand.
- There have been no significant changes in groundwater quality over the length of Horizons' groundwater monitoring record (more than 15 years) and little evidence that groundwater quality is deteriorating.
- One bore in the catchment included detections of arsenic at concentrations above the drinking water standard (based on 2012-2017 data).
- All sites within the catchment are well below the drinking water guideline for chloride.
- Of the six SoE monitoring bores in the FMU, five (83.3 percent) recorded *E.coli* concentrations that exceeded the drinking water standards. As with other FMUs there is no clear spatial patterns associated with the occurrence of *E.coli* but detections are more frequent in shallower bores.

Kai Iwi

In the Kai Iwi FMU, samples are collected quarterly for calcium, magnesium, sodium and potassium (major cations), bicarbonate, sulphate and chloride (major anions), nitrate, ammonia, nitrite, and phosphorus (nutrients), iron, manganese and arsenic (metals), silica, fluoride, boron, bromide, dissolved organic and inorganic carbon, conductivity, alkalinity and total dissolved solids, and *E.coli* (bacterial indicator). Of significance is that Whanganui City water supply is sourced from four artesian bores within this FMU. A summary of the findings from this monitoring is outlined below:

- **Nitrate** concentrations are well below drinking water standards in Kai Iwi. The pattern of results is in keeping with the general groundwater characteristics of the region (higher in 'oxidising' areas). Nitrate contamination of groundwater in this areas generally occurs due to agricultural land use or wastewater disposal.
- Concentrations of **iron**, **manganese** and **chloride** are higher, due to the 'reducing' conditions in the Kai Iwi area (noting these conditions mean nitrate conditions are typically much lower).

- One bore has median concentrations of **manganese** and **iron** that exceed the drinking water guideline[37] value. Some sites exceed the health based maximum acceptable values for manganese.
- Two bores in the area included detections of **arsenic** at concentrations above the drinking water standard (based on data from 2012-2017). Exceedances of manganese, arsenic and iron are not limited to deep bores, and in areas of reducing groundwater, higher levels of these contaminants are likely to be a natural feature rather than due to human activity.
- All sites are well below the drinking water guideline for **chloride**.
- The single bore in this area monitored since 2018 for *E.coli*, has reported no occurrences.
- Data from coastal monitoring bores do not show high conductivity, therefore suggesting that salt water intrusion is not occurring in this FMU.

Overall monitoring shows that groundwater quality is generally being maintained or enhanced in the Kai Iwi FMU. However, some areas remain where groundwater fails to achieve national drinking water standards.

Whangaehu

The lack of demand for groundwater in the Whangaehu FMU means it is not regularly monitored for contaminants such as nitrate and bacteria. Sampling in the Whangaehu FMU occurs for nitrate, conductivity, and per and poly-fluoroalkyl substances. *E.coli*, iron, manganese, arsenic and chloride are not monitored in Whangaehu due to low demand for water abstraction. In the event demand for groundwater in this area increases, the current groundwater monitoring framework should be reviewed and increased.

The findings from monitoring are summarised below:

- No monitored bores in Whangaehu have detected elevated nitrate concentrations.
- Data from coastal monitoring bores do not show high conductivity, therefore suggesting that salt water intrusion is not occurring in this FMU.
- PFAs have not been detected in the Whangaehu catchment.

Water quality data is limited in the Whangaehu catchment. Of the parameters monitored, there is no indication of poor water quality. However, a complete assessment of water quality in this catchment cannot be drawn based on the gaps in monitoring.

Whanganui

At the time of writing, a catchment stocktake had not been undertaken for the Whanganui FMU. However, an updated summary outlining key water quality pressures is available and has been used to provide an update to the 2019 SoE report data. Groundwater quality is monitored at one bore in the Whanganui catchment on a quarterly basis. Nitrate is a common, naturally occurring compound. However, in high concentrations it can affect drinking water (over 11.3 mg/L). The average nitrate concentration of the bore monitored in the Whanganui catchment is 0.10 g/m^3-N, with a median of 0.05 g/m^3-N and therefore meets the drinking water standard.

Waiopehu

In the Waiopehu FMU, samples are collected quarterly for calcium, magnesium, sodium and potassium (major cations), bicarbonate, sulphate and chloride (major anions), nitrate, ammonia, nitrite, and phosphorus (nutrients), iron, manganese and arsenic (metals), silica, fluoride, boron, bromide, dissolved organic and inorganic carbon, conductivity, alkalinity and total dissolved solids, and *E.coli* (bacterial indicator). A summary of the findings from this monitoring is outlined below:

- There is evidence of elevated **nitrate** levels, above the drinking water standards, in parts of the Waiopehu area (south of Shannon), which can present a health risk particularly for infants. In some areas, old, poorly maintained or inappropriately designed domestic

[37] Drinking water standards for NZ, 2005 (revised 2018)

wastewater systems, or high densities of on-site domestic wastewater discharges (septic tanks) have contributed to high nitrate levels in groundwater. However, two of the five bores with concentrations exceeding the drinking water maximum acceptable value were found to have downward trends, suggesting effective land use and better controls of on-site wastewater discharges in those areas.

- In the majority of bores where a trend in nitrate concentrations is apparent, the data show an improving long-term trend, which is encouraging for the Waiopehu area where concentrations are high.
- A notable feature of the Waiopehu FMU is a change in both nitrate and ammonia concentrations around Lake Horowhenua (typically ammonia concentrations are the opposite of nitrate concentrations, if one is high, the other will be low). In this area, nitrate concentrations are high on the up-gradient side of the Lake but much lower on the down-gradient side. Ammonia concentrations are much lower on the up-gradient side and higher on the down-gradient side of the Lake. This pattern could be consistent with the presence of a fault, acting as a barrier to groundwater flow in the area.
- **Arsenic, iron and manganese** do not exceed drinking water guidelines in most of the catchment (affected bores are not used for municipal supply). The concentration of these elements is influenced by geology and is not likely to be due to human activity.
- **Chloride** concentrations show a similar pattern and the lowest concentrations in the region can be found in the Waiopehu FMU.
- One bore in the area was found to have arsenic concentrations above the drinking water standards 'maximum acceptable value'. In general these breaches are consistent with monitoring from previous SoE reports and are expected to represent natural occurrences of arsenic, iron and manganese.
- Monitoring for ***E.coli*** occurs in seven bores across the Waiopehu FMU. None of these bores recorded concentrations above the drinking water standards. Five bores detected *E.coli* between 2015 and 2019 but these were below the maximum acceptable volume. The bores monitored as part of the SoE programme are not municipal drinking water sources; they are used primarily for irrigation.
- Data from coastal monitoring bores do not show high conductivity, suggesting that salt water intrusion is not occurring in this FMU.

Horizons undertook an initial regional survey of emerging contaminants and glyphosate (found in Roundup) in groundwater during late 2018. This survey identified the presence of some emerging contaminants in groundwater, including in the Waiopehu FMU. While these contaminants were not detected at levels of concern to human health, the environmental impacts are not well-known and further work is necessary to understand their effects on receiving waterbodies.

There have been no significant changes in groundwater quality over the length of Horizons' monitoring record (more than 15 years) and little evidence that groundwater quality is deteriorating in the Waiopehu FMU.

Puketoi ki Tai (Coastal Tararua)

The geology of Puketoi ki Tai is generally low-yielding due to the rock types present and does not provide a significant groundwater resource for use. As a result, groundwater quality and quantity are not monitored in the Coastal Tararua Groundwater Management Zone. This also means very little is known about the interaction between groundwater and surface water.

7.3.3.3 Groundwater Quality - summary of findings

The SoE monitoring provides robust and useful information on the state of groundwater quality in the Horizons Region. Likewise, the catchment stocktakes provide a useful snapshot of trends within each FMU and represent the most up-to-date information for water quality in the region's groundwater. Overall the findings from both SoE monitoring and the catchment stocktakes align, with no significant difference in the findings of each.

On the whole, the results are mixed with some catchments recording levels above recommended national standards for *E.coli,* arsenic, manganese, iron and nitrates. However, in all cases, the trend is either being maintained or improving. It must also be acknowledged that in some cases, particularly for arsenic, manganese and iron, it is thought that the presence of these contaminants is likely to be naturally occurring rather than as a result of land use.

Ultimately, the One Plan has set a good foundation for protecting regional groundwater quality but in the coming years, more will need to be done to obtain a better understanding of groundwater quality in the region and to continue the improving trend by reversing those parameters that are degrading. Work will also need to be done to better understand the impacts of emerging contaminants in order to be proactive in identifying and addressing them and allowing a more agile response than is currently possible under the RMA plan making process.

7.3.3.4 One Plan framework – Key linkages and assessment for groundwater quality

The table that follows is an excerpt from the table at the beginning of section 5.2 outlining the One Plan linkages. The below outlines the key plan provisions that relate to groundwater quality.

ONE PLAN GROUNDWATER QUALITY FRAMEWORK LINKAGES				
Objectives (RPS)	**Supporting policy framework**	**Methods and Rules**	**Indicators**	**Anticipated Environmental Results**
Objective 5-2 **Water Quality:** (b) Groundwater Quality is managed to ensure that existing groundwater quality is maintained or where it is degraded/over allocated as a result of human activity, groundwater quality is enhanced.	**RPS Policies** 5-6, 5-9, 5-20, 5-21. **Regional Plan: Objective** 14-1 **Policies:** 14-1, 14-2, 14-3, 14-4, 14-7, 14-8 and 14-9. **Intensive Land Uses:** RPS Policies 5-7 and 5-8[38] Regional Plan Policies 14-5 and 14-6.	**Method 5-2:** sewage treatment plant upgrades. **Method 5-3:** Onsite wastewater system forum. **Method 5-10:** Education in schools – water. <u>Land Discharge rules:</u> 14-5, 14-6, 14-7, 14-8, 14-9, 14-10, 14-11, 14-13, 14-14, 14-15, 14-16, 14-21, 14-22, 14-23, 14-28. <u>Discharge to water rules:</u> 14-12, 14-18, 14-19, 14-24, 14-29, 14-30, 16-14, 16-15[39]. <u>Intensive land use[40]:</u> **Method 5-12:** Innovative Land Use Research. **Method 5-13:** provision of information. **Rules:** 14-1, 14-2, 14-2A, 14-3, 14-4.	• Groundwater levels region-wide but with a focus on Opiki and Himatangi areas. • Groundwater quality region-wide, but with a focus on nitrates in Horowhenua and Tararua districts and conductivity along the Foxton-Tangimoana coast. • Confirmed incidents where groundwater sources become unavailable (i.e. dry up) or water quality is unfit for use.	The amount of groundwater used does not exceed replenishment rates and its quality is the same as or better than that measured prior to this plan becoming operative, other than where discharges to land are a permitted activity or are allowed by resource consent.

Table 14 One Plan framework linkages for groundwater quality

The One Plan does not set numeric targets for groundwater quality, but sets an overall objective regarding relative changes in groundwater quality. This includes broadly maintaining groundwater quality where it is good, and improving it where it is degraded, with an exception made for groundwater in areas where there are discharges of contaminants to land that would otherwise directly go to water.

[38] Policies 5-7, 5-8, 14-5 and 14-6 are subject to Plan Change 2 which is currently in the appeal process.
[39] Rules 16-14 and 16-15 have been included as they relate to the construction/drilling of bores and unsealed bores.
[40] Rules 14-1, 14-2, 14-2A, 14-3 and 14-4; and Methods 5-12 and 5-13 are subject to Plan Change 2 which is currently in the appeal process

In considering the outcomes sought by Objective 5-2, initial indications are that while groundwater quality in the region is of reasonable quality, there are some parameters that continue to be below national guidelines. For that reason, it can be concluded that:

- Existing groundwater quality is being maintained at most monitoring sites, however in areas where groundwater quality is degraded, at a small proportion of sites (specifically for nitrate) it is not being enhanced.
- Overall, monitoring shows that groundwater quality is being maintained or enhanced at all but two monitoring sites (where groundwater fails to achieve national drinking water standards).

There is evidence of groundwater quality being maintained in all but two monitoring bores and for that reason the overall conclusion is that the anticipated environmental result is being achieved for groundwater quality in most monitoring sites. A conclusion cannot be drawn with regards to PFAs due to the limited monitoring available. Ongoing monitoring, particularly for PFAs, will be critical moving forward.

7.4 Plan effectiveness summary (Surface and groundwater provisions)

This section considers the effectiveness of the Chapter 5 and 14 provisions in achieving the anticipated environmental result.

The Plan effectiveness questions considered are outlined as follows:

- Are anticipated environmental results and objectives being achieved?
  - The effectiveness and the efficiency of the Plan's policies, rules and methods in achieving the objectives of both the plan and the regional policy statement.
  - The consistency of the Plan's policies, rules and methods with its objectives.

- Does the provision give effect to the NPS-FM?
  - Does it give effect to Te Mana o Te Wai?
  - Does it give effect to the hierarchy of obligations?

- Is there evidence that the policies and methods are being used/applied in an effective way?

- Do the plan provisions have the support of users – is the plan perceived to work, are the provisions enforceable?
  - Can the Plan reasonably be implemented?

- Other than those related to the NPS-FM requirements, are there other emerging issues relating to freshwater that are not being addressed?
  - Are there any provisions in the NPS-FM that the One Plan does not address currently?

7.4.1 Lake and surface water quality

7.4.1.1 Are anticipated environmental results and objectives being achieved?

The following two points have been considered in drawing a conclusion as to whether the AER and objectives have been met for lake and surface water quality;

- The effectiveness and the efficiency of the Plan's policies, rules and methods in achieving the objectives of both the plan and the RPS;
- The consistency of the Plan's policies, rules and methods with its objectives.

Overall, the AER and objectives are being achieved in part. Surface water values have seen improvement for certain parameters; however, others continue to degrade. The ten year monitoring trends indicate that some water quality parameters have not improved, with improving trends described as "exceptionally unlikely (i.e. virtually certain to be degrading)". On this basis, the AER **is not being achieved**. Limited monitoring of lakes means a definite conclusion cannot be made in relation to the achievement or lack thereof of the AER and objective, however, initial indications from monitoring suggest the anticipated outcomes are not being met.

7.4.1.2 Does the provision give effect to the NPS-FM?

- Does it give effect to Te Mana o Te Wai?
- Does it give effect to the hierarchy of obligations?

Despite being developed prior to the NPS-FM 2020, the surface water quality provisions of the One Plan provide a solid foundation in giving effect to various requirements of the latest version of the NPS-FM. Specifically, the NPS-FM requires local authorities to adopt an integrated approach that:

- Recognises the interconnectedness of the whole environment, from mountains and lakes, down the rivers to hapua (lagoons), wahapu (estuaries) and to the sea; and
- Recognises interactions between freshwater, land, waterbodies, ecosystems, and receiving environments;
- Manage freshwater, and land use and development, in catchments in an integrated and sustainable way to avoid, remedy, or mitigate adverse effects, including cumulative effects, on the health and well-being of water bodies, freshwater ecosystems, and receiving environments; and
- Encourage the co-ordination and sequencing of regional or urban growth.

The One Plan identifies its 'big four' keystone issues (surface water quality degradation, increasing water demand, unsustainable hill country land use and threated indigenous biodiversity) for the region and highlights that these are all interconnected as are other resource management issues identified in the Plan. This thinking guided development of the Plan and aligns with the first three points above from the NPS-FM 2020. Regarding co-ordination and sequencing of regional or urban growth, the One Plan does not expressly provide for this but does create the initial pathway through consideration of land use in hill country or erosion prone areas and the effect this has on water quality if not managed appropriately. The Plan will need to give further consideration to additional objectives and policies to encourage coordination and sequencing of regional and urban growth as part of the 'whole environment' approach required by the NPS-FM 2020.

Moving forward there are elements introduced by the NPS-FM 2020 which Horizons will need to consider in the planning framework. The Attributes outlined in Appendix 2A and 2B (assessing when an Action Plan is required) of the NPS-FM 2020 will need to be compared with the current values included in Schedule B and E of the One Plan to ensure alignment with the NPS-FM. It is possible that the current values will not match those in the NPS-FM, purely due to the One Plan having been developed some time ago and prior to the release of the 2020 NPS-FM. Calibration between numerical objectives and the NPS-FM values is recommended, particularly given the rapid pace at which scientific knowledge and understanding of catchment processes is developing. Further, Appendix 3 of the NPS-FM sets the national targets for primary contact in rivers and lakes. It applies to all regions but individually, it means each region will need to reduce the length of specified rivers and lakes in the red and orange categories for primary contact and increase the length of those in the yellow, green and blue categories. The NPS-FM aims to have at least 90% of specified rivers and lakes within the yellow, green and blue categories by 2040. The One Plan surface water and lakes provisions and associated values in Schedule B and E will need to be reviewed with this requirement in mind.

In considering the specific sections of the One Plan relating to rivers and the NPS-FM requirements, the One Plan does align somewhat but will need reviewing and redrafting to meet all of the requirements of the NPS-FM.

The One Plan includes many policies relating to protection of water quality and improvement in areas where current water quality is degraded. It also includes policies regarding management of beds and rivers and lakes, in particular policy 5-22(d) which addresses loss of habitat diversity and is supported by the general conditions contained in Table 17.2, Chapter 17 of the Regional Plan. Further work is underway currently to identify the values associated with habitat and threatened species and to develop objectives and provisions to address their management.

Regarding monitoring, current water quality monitoring of rivers and streams in the region is relatively robust, although there are areas where monitoring is limited and less is known about those reaches. The methods of Chapter 5 include development of a monitoring programme for lakes but is silent on rivers and streams. Clearly, Council does have a monitoring programme for rivers and streams but it is not specifically provided for in the Plan. Consideration should be given to whether the current programme is sufficient to meet the requirements of sub-clause (4) of 3.24 of the NPS-FM or whether a new method should be added outlining development and adherence to a monitoring plan for rivers and streams in the region.

Further, the NPS-FM requires Action Plans to be prepared for whole, part or multiple FMUs in certain circumstances. The One Plan in its current form does not consider or provide for catchments that may have an Action Plan in place as a result of the NPS-FM. This is a gap that will need addressing through the policy framework. Leading on from this, the One Plan does not explicitly state or link to the NPS-FM equivalent limits or targets, nor does it state timeframes for addressing over-allocation (for nutrient targets) where it is identified. This is a gap that will need to be addressed through the Oranga Wai NPS-FM plan change.

In light of the NPS-FM requirements, there needs to be further consideration of the interaction between allocation of water and a catchment's limits for water quality. The NPS-FM allocation limits appear to apply to allocation of water quantity and quality. The NPS-FM defines a ***limit on resource use*** *as meaning the maximum amount of a resource use that is permissible while still achieving a relevant target attribute state (see clauses 3.12 and 3.14 of the NPS-FM)*. This requires Council to also think about the use of a resource on a whole-of-catchment basis (including consideration of the effects of the use and development of land on catchment water quality). The One Plan policy provides a good framework for this but needs to take the next step to align more firmly with the NPS-FM.

Lastly, as with all other freshwater provisions in the One Plan, the surface water objectives, policies, rules and methods were developed under the previous planning regulations which did not place any hierarchy of obligations on water quality and is not based on Te Mana o te Wai (the fundamental concept of the NPS-FM). For this reason, the provisions relating to surface water quality do not fully give effect to the NPS-FM and Te Mana o te Wai, meaning consideration of these provisions under the different lens specified by the NPS-FM will be required.

7.4.2 Groundwater Quality

7.4.2.1 Are anticipated environmental results and objectives being achieved?

In considering the outcomes sought by Objective 5-2, initial indications are that while groundwater in the region is of reasonable quality, there are some parameters that continue to be below national guidelines. For that reason, it can be concluded that:

- Existing groundwater quality is being maintained, however in areas where groundwater quality is degraded, quality at a small proportion of sites (specifically for nitrate) are not improving, and;
- Overall, monitoring shows that groundwater quality is generally being maintained or enhanced, but some areas remain where groundwater fails to achieve national drinking water standards.

The occurrence and level of degradation is extremely minimal (two sites). Objective 5-2 and the anticipated environmental result is being achieved for groundwater quality at all but two sites. A conclusion cannot be drawn with regards to PFAs due to the limited monitoring available. Ongoing monitoring, particularly for PFAs, will be critical moving forward.

On balance it is considered that the AER and objectives associated with groundwater quality are mostly being achieved. There is some uncertainty around the impact and scale of the issue for PFAs in the region and further monitoring will reveal whether this is a significant issue for groundwater quality or not. This suggests that the Plan's policies, rules and methods have been effective in achieving the objectives of both the Regional Plan and RPS.

7.4.2.2 Does the provision give effect to the NPS-FM?

- Does it give effect to Te Mana o Te Wai?
- Does it give effect to the hierarchy of obligations?

As with all other freshwater provisions in the One Plan, the groundwater objectives, policies, rules and methods were developed under the previous planning regulations which did not place the same hierarchy of obligations on water quality as Te Mana o te Wai (the fundamental concept of the NPS-FM). For this reason, the provisions relating to groundwater are unlikely to give full effect to the NPS-FM and Te Mana o te Wai. In addition to the lack of alignment with the hierarchy of obligations, the One Plan is also lacking specific values and objectives for groundwater quality. The NPS-FM is explicit in that the compulsory values identified in Appendix 1A apply to every FMU, which captures groundwater (which is to be treated as freshwater under the NPS-FM). Consideration of the compulsory values and how these should be applied in the groundwater sense, particularly for shallow groundwater that connects to surface water, will need to occur as part of the review of the One Plan.

Further, the NPS-FM requires Action Plans to be prepared for whole, part or multiple FMUs in certain situations. The One Plan in its current form does not consider or provide for catchments that may have an Action Plan in place as a result of the NPS-FM. This is a gap that will need addressing through the policy framework.

7.4.2.3 Other than those related to the NPS-FM requirements, are there other emerging issues relating to freshwater that are not being addressed?

Per- and polyfluoroalkyl substances (PFAs): The 2019 SoE identifies, the emergence of contaminants such as PFAs which had recently become a focus following discovery in the soil and water on and around the NZ Defence Force Base in Ohakea and Palmerston North Airport. At the time, the long-term impacts of PFAs were not well understood but initial monitoring had shown levels above the Interim Guideline Limits established for New Zealand. Since publishing the SoE report, Horizons has been working with the New Zealand Defence Force (NZDF) on the ongoing monitoring of PFAs and related compounds around the Base. PFAS are a large group of manufactured compounds that have industrial and consumer applications and have been in firefighting foam used at the Base. The ongoing monitoring of these contaminants will improve knowledge of their impacts and potentially the scale of the issue within the region. This is something that may need to be addressed further in future reviews of the RPS and Regional Plan.

7.4.3 Water Quality combined assessment

For the purpose of brevity and to avoid repetition, the following 'effectiveness' questions for water quality have been combined for surface and groundwater quality.

7.4.3.1 Do the plan provisions have the support of users – is the plan perceived to work, are the provisions enforceable?

- Can the Plan reasonably be implemented?

On the whole, the majority of the water quality provisions work well. Particular strengths include the strong and directive language of the provisions which are clear in their intention to improve water quality. However, through implementation of the One Plan there are a number of provisions which have been identified as being challenging to implement or that frustrate the intended outcome. This is not a failure of the Plan, it is commonplace for provisions to work in theory but be difficult to implement in practice. Issues have generally been identified through the resource consenting process. Rather than separating by groundwater and surface water, the below outlines the key issues associated with Chapters 5 and 14 as a whole. Oftentimes, a discharge to land activity will have considerations both from a groundwater and surface water perspective.

With that said, discussions with members of the consents and compliance teams have not raised any issues relating to the implementation of the existing plan provisions relating to groundwater quality, other than some issues with implementation of the nutrient management provisions (which seek to minimise effects of intensive land uses on groundwater quality). On that basis, the

provisions (minus the nutrient management provisions) relating to groundwater quality are considered to be enforceable and can reasonably be implemented.

Water Quality: Issues with rule and policy framework			
Subject / issue	**Reason**	**Background/explanation/ notes**	**Possible action**
Use of term 'saltwater' in relation to seawater intrusion into groundwater.	'Seawater intrusion' is the generally accepted term in New Zealand.	Blanket change from 'saltwater' to 'seawater' recommended. See Chapter 2 Resource issue of significance to hapū and iwi (o); throughout Chapter 5; Policy 16-7.	Minor change. To be addressed through the review – **change salt water to seawater**
Discharges from composting toilets **Rules 14-13 and 14-14**	Technically these need a consent to discharge as the discharge is not a biosolid, domestic wastewater or compost. The wording in the rules are currently not explicit when it comes to composting toilets which is difficult to implement.	Section 7.6.2 of Auckland Regional Council's TP 58 is helpful. It says the material should be disposed of in the same way as domestic wastewater because the risk from human pathogens	Consider providing additional guidance and/or explicit wording in the rule and policy framework for domestic wastewater discharges to address discharges from composting toilets.
Discharges from composting toilets **Rules 14-13 and 14-14**	Technically these need a consent to discharge as the discharge is not a biosolid, domestic wastewater or compost?	Section 7.6.2 of Auckland Regional Council's TP 58 is helpful. It says the material should be disposed of in the same way as domestic wastewater because the risk from human pathogens.	Consider providing additional guidance in the rule and policy framework for domestic wastewater discharges to address discharges from composting toilets.
Discharges of contaminants removed from a domestic wastewater treatment system	These are not covered by the onsite wastewater rule stream; rules for discharges of contaminants to land apply. A rule guide would be useful.		Develop a rule guide or provide additional context in the rule & policy framework to address.
On-site wastewater systems / treatment – encouraging installation of secondary treatment **Rules 14-13 and 14-14**	On-site wastewater rules require systems to be secondary level treatment to be a permitted activity. If not secondary, the consent is required as a Restricted Discretionary Activity.	Currently it is a significantly less expensive option to pay for consent instead of installing a secondary treatment system. This should really only be occurring in exceptional circumstances, not 'an alternative pathway'. Current situation offers a loophole – potential for effects / cumulative effects (difficult to assess the latter) and is causing considerable workload.	Consider rule and policy wording to avoid this perverse outcome.
Onsite wastewater systems, minimum lot sizes	Consenting of systems below the minimum lot size – debate about cumulative effects & appropriate minimum lot sizes for	The minimum lot sizes in the One Plan are being challenged and consents issued for	Consider a broader approach to determination of minimum lot size. This would

Water Quality: Issues with rule and policy framework			
Subject / issue	**Reason**	**Background/explanation/ notes**	**Possible action**
Rule 14-13 & 14-14	different areas and soil types.	subdivisions in concentrated areas, potentially resulting in cumulative effects. In addition, there is debate around the most appropriate minimum lot sizes specified in the Rule framework – comments that a one-size-fits-all approach isn't necessarily the most appropriate.	need to be based on science and information and put the onus on the applicant to provide an assessment for their site to show what the most appropriate size is. Re-vamp or update of the Onsite wastewater manual.
Onsite wastewater manual	Some sections don't link up with the rule requirements.		Need to ensure alignment in the Manual and rule framework to avoid inconsistency and confusion.
Fertiliser discharges (Rule 14-5(d))	Condition (d) requires a nutrient budget to be provided if the average annual limits are exceeded. Given the way fertiliser is applied, it cannot be planned in advance, therefore making compliance with this condition difficult.	Condition (d) states that, if the average annual limits will be exceeded, a nutrient budget must be undertaken to plan and carry out the discharge. If the discharge is incorporated into an intensive land use application, then the nutrient budget must be consistent with the nutrient management plan, and the discharge carried out in accordance with it. However, in practice fertiliser application will be dependent on factors such as weather conditions, so cannot be planned in advance to the extent required by this condition. It is therefore difficult to implement as written.	Consider reviewing fertiliser application practices and the efficacy of this condition within the rule.
Discharge of persistent and harmful contaminants (Rule 14-24)	Radioactive waste is not included in the rule.	Radioactive material is not covered by Hazardous Substances and New Organisms (HSNO) Act; covered instead by the Radiation Protection Act 1965 and 1982 Regulations, which is administered by the Ministry of Health (Office of Radiation Safety). Clause 14 of the regulations covers disposal of	Review Rule 14-24 and relevant legislation to determine if radioactive waste needs to be included in the rule framework.

Water Quality: Issues with rule and policy framework			
Subject / issue	**Reason**	**Background/explanation/ notes**	**Possible action**
		radioactive waste. RMA only includes provisions 15C, which prohibit the dumping of radioactive material or waste from a ship, or storage or disposal of radioactive material or waste on or in any land or water in the CMA. Refers to s257 of the Maritime Transport Act for the definition.	
Map reference for the Hautapu/Rangitīkei confluence	The map reference is recorded differently within the Plan.	Schedule A, Table A.3 and Schedule B, Table B.1 both refer to the confluence in the description for the Lower Hautapu (Rang_2g) as "approx. NZMS 260 T22:529-574". Table B.8 (trout fishery) has the location as "approx. NZMS 260 T22:528-573".	Minor correction to be addressed as part of the wider review.
Schedule B, Table B.4 Tidal Rangitīkei	Reinstate SOS-R Value for this WMZ.	Table B.1 includes SOS-R Value for both Coastal Rangitīkei and Tidal Rangitīkei WMS; however, Tidal Rangitīkei was deleted from Table B.4 in the decisions version (2010). Decisions on individual submissions show that the only submission on SOS-R, which included a request to remove the Value from the Rangitīkei River, was rejected. It appears this has been deleted from Table B.4 in error.	Minor correction to be included as part of the wider review.
Schedule B, Table B.8 Upper Whangaehu	Incorrect WMZ and WMS labels for Upper Whangaehu to Whau_1, Waitangi to Whau_1b and Tokiahuru to Whau_1c.	Schedule A Table A:5 labels Waitangi and Tokiahuru as being in the Upper Whangaehu (Whau_1), Whau_1b and Whau_1c respectively.	Correct the labels as part of the wider review.
Schedule B value "Whitebait migration"	The whitebait migration value should extend further upstream.	The whitebait migration Value was originally "whitebait fishery"; however, Regional Councils don't have jurisdiction over fishing. Therefore it was changed to whitebait migration, but still really only applies to reaches to protect the fishing. Science view is that this value should apply further upstream (or even region-wide).	Consider the whitebait migration value and how far it should extend as part of the wider Plan review.

Water Quality: Issues with rule and policy framework			
Subject / issue	**Reason**	**Background/explanation/ notes**	**Possible action**
NPS- glossary of terms	The One Plan does not include the NPS-FM glossary terms for: effects management hierarchy; functional need; natural inland wetland & natural wetland.	These defined terms appear in the NPS-FM mandatory policies to be inserted into the One Plan.	Insert these terms as part of the One Plan review.
Winter feeding regulations / intensive winter grazing	One Plan should address winter feeding as part of the nutrient management/catchment approach.		Possibly already dealt with by Plan Amendment 2.
Stock exclusion	Currently only stock associated with intensive farming land use activities in target catchment are required to be excluded from surface water.	This is a gap. Recent evidence from Science shows the impact of stock on the Ototoka Stream, north of Whanganui (faecal source tracking – dry stock farm).	Stock Exclusion has been addressed by Plan Amendment 2, however consideration of the rule framework and whether this ought to be reviewed should occur.
Policy 5-11 (Human sewage discharges)	It is likely that this policy is not given effect to because there are no explicit provisions.	Policy 5-11(b) states that by 2020 or upon renewal – whichever is earlier – existing plants must have changed to a treatment system that meets the requirements under (a) (or be applied to land, or flow overland). Policy 5-11 carries weight, because it is directive (Feilding WWTP decision), but Horizons' view is that it is still unenforceable against an unwilling applicant / respondent "There is no set mechanism within the plan to make existing consents not due for renewal carry out any needed upgrades."	Consider whether this policy is fit for purpose or needs to be reworded to achieve the desired intent – alternatively does the rule framework support it? In any case, the 2020 date needs to be revised.
Pond lining (Rule 14-16 (a))	The pond lining specification only applies to permitted activities.	The Plan does not specify any minimum standards for pond lining of wastewater treatment plants. The only specific regulations in relation to wastewater are: the suite of rules around discharges of onsite wastewater; Rule 14-16 Human effluent storage and treatment facilities (permitted); and Rule 14-17 Discharge of untreated human	Consider whether pond lining should be applied to all ponds regardless of whether consent is required or they are a Permitted Activity.

Water Quality: Issues with rule and policy framework			
Subject / issue	**Reason**	**Background/explanation/ notes**	**Possible action**
		effluent directly to surface water (prohibited). The permitted activity regulates discharges "onto or into land of human effluent … for the purpose of storing or treating the effluent in ponds and any ancillary discharge to air". Therefore, most applications for discharges (etc) of municipal wastewater will be processed as discretionary activities under Rule 14-30.	

Table 15 Chapter 5 and 14 implementation issues

Regarding surface water quality, there is some tension between Policy 5-11 and the ability of territorial authorities and regional council to complete the consenting process by the date specified. The application process for municipal wastewater treatment plants is complex and requires significant work both prior to and during the consent process. This is due to a number of factors. Policy 5-11 of the One Plan sets a target of 2020 for treated human sewage discharges to water to be applied to land, pass overland, or other alternative systems adequate to mitigate adverse effects on the receiving waterbody's mauri. This is supported by methods to work with territorial authorities to reduce water volume, explore land application options and assist with funding opportunities. The intent of Policy 5-11 is to ensure all wastewater is discharged to land or receives land-based treatment to mitigate cultural effects. The policy requires this to be done by 2020. The timeframe has proven to be unrealistic for the following reasons:

- The capacity and resourcing constraints for territorial authorities to design, fund and implement the necessary improvements, particularly given tensions arising from community and ratepayer expectations and their implications within a three year political cycle; and
- Limited capacity of the regional council to process these significant and complex consent applications being received from the seven territorial authorities in the region. Often there will be multiple applications being processed for various territorial authorities for municipal wastewater discharges.

There are 45 municipal plants discharging wastewater (including treated sewage). Thirty-three of these hold consents to discharge to freshwater. Eight of these consents were granted after the Plan was notified in 2007. Thirteen (or 39 per cent) are at various stages of progress towards re-consenting. A further eight (24 per cent) expired before 2020 and continue to operate under RMA s124 existing use rights. Although Tararua, Manawatū and Horowhenua Districts have secured central government support for upgrades to some of their wastewater treatment plants through the Fresh Start for Fresh Water and Manawatū River Accord funds, realistically, the timeframe of 2020 in Policy 5-11 has not been met in many instances. Like the wider question of targets and timeframes, this is a challenge in terms of community expectations of how much progress can be made within a relatively short period of time and the financial consequences of doing so. The policy intent remains appropriate, but the scale of the task is large for territorial authorities who are required to upgrade their plants, and for the regional council's capacity to process what in some cases are resource-intense consent applications. Whilst the numbers may not be large, the complexity and contestability is high and the fact a number of these applications will proceed to appeal means quick resolution of these applications does not happen. The challenge is how to keep these applications moving forward, while protected by s124 RMA which allows a consent holder to continue operating under an expired consent while applying for a new one. The

Environment Court has already recorded that it considers use of s124 to allow wastewater treatment plants to continue to operate for too long under outdated management schemes is not the intent of the RMA and should not be enabled. It is therefore clear that Policy 5-11 has not been effective in meeting the specified timeframe, however the general intent of the policy is still appropriate. Consideration of the policy framework and non-regulatory methods is warranted and should be looked at as part of the Oranga Wai NPS-FM plan change work, particularly in light of the more stringent NPS-FM requirements and hierarchy of obligations.

7.4.3.2 Other than those related to the NPS-FM requirements, are there other emerging issues relating to freshwater that are not being addressed?

Other than the provisions highlighted in the foregoing sections, none have been identified at this stage.

7.5 Nutrient Management Provisions

At the time of writing this report, the Hearing Panel's decision on Plan Change 2 (PC 2) was released. Through this decision a number of interim changes were imposed to enable regulatory processes to commence for new and existing intensive farming practices. The new provisions include:

- re-calibration of Table 14.2 cumulative nitrogen leaching maximums to reflect recent changes in Overseer FM;
- changes to the policy framework to remove an unintended obstacle that prevented the granting of any discretionary activity applications;
- changes to the policy framework to insert greater clarity and rigour in the considerations for discretionary activity applications;
- clarification of the controlled activity consent pathways for commercial vegetable growing, dairy and other farming activities;
- clarification that good management and best management practices are required to be implemented by all existing intensive farming land uses that require consent under the PC2 rules;
- provision of a consent pathway for existing intensive farming land uses to transition to other land uses that have lesser diffuse nutrient discharge.

Throughout the hearings for PC2 and in the decision, it was made clear that these provisions were interim measures to enable activities to be regulated but that they would need to be reviewed in light of the NPS-FM requirements. For that reason, and the fact that the regulatory process surrounding these provisions has been variable, this report provides very little analysis on the effectiveness or efficiency of these provisions. It is also noted that a s35 analysis was undertaken prior to the PC2 review of the provisions and it is not considered necessary to repeat that process here.

At the time of writing this report, four appeals to the Environment Court decision had been received and Horizons is working through that process with the Court.

The One Plan PC2 nutrient management provisions will be subject to a wider review under the Oranga Wai NPS-FM plan change process.

7.6 Efficiency Assessment – Water Quality

This section evaluates the efficiency of the Chapter 5 and 14 provisions. It considers the cost of monitoring, non-regulatory interventions, enforceability of the provisions and regulatory costs to test the practicability of the provisions.

Costs and resourcing

The cost of delivering the water quality monitoring and improvement programmes is significant. However, this is supplemented by environmental grants and central government funding which reduces the amount required to be recouped by rates and in some cases enables more to be done.

There are a number of activities undertaken by Horizons Regional Council staff in relation to the provisions of Chapters 5 and 14. The primary activities involve the water quality monitoring programme which is substantive and other programmes such as:

- Regional stream fencing and riparian planting;
- Enhancing indigenous fish populations through fish passage remediation;
- Lake Horowhenua Accord & Lake Horowhenua water quality interventions project;
- Manawatū River Accord and freshwater improvement fund;
- Lake Waipū freshwater improvement fund.

The graph below has been sourced from the Horizons Long Term Plan 2021-31 and shows the planned operating and capital expenditure for land and water activities over the next ten years. The water quality and quantity totals approximately $8 million in the 2021, with this increasing to $12-14 million in 2022-24 in the Long Term Plan.

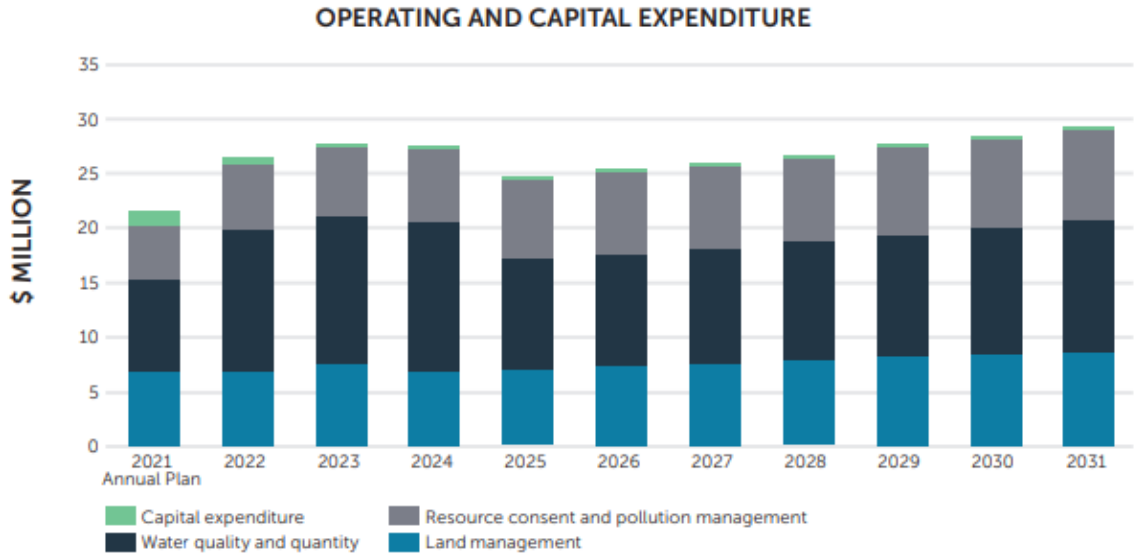


Figure 20 water quality expenditure. Source Horizons Long Term Plan 2021-31

Further to this are regulatory costs associated with processing and monitoring compliance of resource consents for activities that require resource consent. The section that follows outlines the high level costs associated with these activities.

Surface water quality – consent processing costs

To assess consenting costs, a report has been extracted from Council's consent database, IRIS. The data extracted is from the last two years (2019-2022) only. The reason for limiting the time period is due to the level of detail in the extract, which is significant, covering multiple chapters and provisions within the One Plan, thereby making it complex and time consuming to analyse. As with any dataset, there are limitations. The IRIS system has relied on users to input data such as policies and rules, and describe the activity. Differences in how the data is described can mean that not all activities are captured when searching by type. For example, domestic wastewater can be described as onsite wastewater, domestic wastewater or by the street it is located on e.g. 'Horopito domestic wastewater'. This makes filtering and sorting the dataset complex. Consequently, there will be a margin of error in the costs and number of consents reported in this

evaluation. In addition consents that have gone through the Environment Court may not have been entered with links to the One Plan policies and rules in all cases, which will affect data reliability.

Consent processing costs vary depending on the scale and type of activity consent is sought for, as well as the consenting pathway (notified vs non-notified). Some are processed for a minimal fee (i.e. $700 - $1500) and some are far more expensive (i.e. greater than $5,000). Those that cost the most are generally applications involving wastewater treatment plants, largely due to the complexity and number of consents required to operate, and discharge from, a wastewater treatment plant. On top of this, applications for such activities are often dealing with historical issues and challenges for the applicant to fund necessary upgrades to the infrastructure to meet the requirements of the One Plan. Applications of this nature are generally publicly notified due to potential adverse effects and will more often than not be heard at a public hearing or directly referred to the Environment Court. The processing cost of these consents is not efficient, but as discussed previously, the policy intent of Policy 5-11 remains appropriate. With the NPS-FM likely placing even more stringent controls on water quality, the complexity of applications for wastewater discharges to water (and in some cases land) is likely to increase. Accordingly, consent processing costs, as well as the costs of improving treatment processes and facilities to meet more stringent water quality regulation will no doubt increase. The answer may lie in non-regulatory processes but may also be addressed through the current RMA reforms and the proposed restructuring of 'three waters' by central government. The outcomes of central government policy and regulatory reforms are not fully apparent at this time, but may address the weaknesses and costs in the current systems, including being more directive and/or managing these processes through different entities. These reforms will need continued close attention as Council embarks on any review of the One Plan to ensure alignment with new regulatory requirements that may emerge.

Over the two year duration of the dataset, there were just two applications associated with wastewater treatment plant discharges lodged and granted. Both related to the Feilding (now Manawatū) Wastewater Treatment Plant. The applications were both processed on a non-notified basis and are outlined as follows:

- Variation to existing consent conditions to recognise the inclusion of satellite town wastewater (Sanson, Rongotea, Halcombe and Cheltenham) into the Feilding (Manawatū) wastewater treatment plant. The variation application also sought to remove the buffer conditions for adjacent land as they had since purchased that land for future use as part of the soon to be centralised Manawatu Wastewater Treatment Plant. This variation application was processed on a non-notified basis and processing costs totalled $12,392.20, following a $4,841.31 discount due to processing timeframes not being met.
- New suite of applications associated with the expansion of the Feilding (Manawatū) Wastewater Treatment Plant and involved the discharge of municipal wastewater to an additional 43 hectares of land. The suite of applications for this expansion were new consents, in addition to existing consents held to discharge wastewater to water and land. This suite of applications was processed on a non-notified basis and processing costs totalling approximately $23,000 after a discount was applied due to consent processing timeframes not being met.

Other than these applications, no other applications associated with the discharge of municipal wastewater were lodged, notified or granted over the 2019-21 period. However, looking further back records show the most recently granted municipal wastewater discharge was for the Whanganui Wastewater treatment plant in 2016. This consent was publicly notified and cost $60,211.97 to process. This is on top of the costs the applicant would have incurred engaging their own technical experts to prepare the application and follow it through the consenting process.

Excluding the Feilding ((Manawatū) Wastewater Treatment Plant applications, there were 47 Discharge Permits to water processed over the 2019-2021 period. Of these 26 were granted, two

were withdrawn, and 17 remain lodged and on hold. For those that have been granted, the average resource consent fee cost was $7,260. This average cost excludes one large application, which was just one of a larger suite of applications. The details of this larger and more costly consent is outlined as follows:

- Te Ahu a Tūranga (Manawatū-Tararua Highway): Stormwater Treatment Wetlands Discharge to water. Part of a suite of applications associated with building the Te Ahu a Tūranga Highway. The applications were publicly notified and totalled $1,224,602.60 in processing costs.

The largest number of consents processed is for domestic wastewater discharges to land, with 162 processed over the 2019-2021 period. This is not unexpected due to the level of lifestyle and rural/residential development occurring across the region at present but could also be symptomatic of another issue. It is understood the permitted activity framework for domestic wastewater discharges is designed to be enabling, provided wastewater is discharged via a secondary level treatment system. There is concern amongst policy, district advice and science staff that landowners are choosing to get resource consent (as a restricted discretionary activity), and installing a less superior system, rather than installing secondary treatment because it is cheaper to get consent than install a better quality system. If this is true, it is a perverse outcome and the policy and rule framework will require consideration.

The next largest number of consents processed is for dairy farm animal effluent (discharges to land). These applications relate to existing farms not captured under the 'nutrient management' and target catchment provisions of the Plan. Over the 2019-21 period, 80 dairy farm animal effluent consents were processed. Of these four are still being processed and one was returned as deficient. Seventy three consents were granted. The average cost of processing these consents was $2,560.63.

Cleanfill discharge consents represent a smaller proportion of the consents processed over this time, however attract a higher average cost. It is likely because these applications also require land use consent for ancillary activities such as large scale land disturbance. For that reason, the consent processing costs for cleanfill discharges are considered reasonable, despite being higher than consents for other types of discharge.

Of the 279 consents processed to either discharge to land or water and processed on a non-notified basis, the average cost of processing was $3,168.91. This excludes the Feilding (Manawatū) Wastewater Discharge consents discussed above and the suite of consents associated with the abstraction of water for the Tokomaru municipal supply.

Two hundred and eighty four consents were processed to either discharge into land or water. Of these; one was limited notified and cost $33,070.28 to process; and four were publicly notified. Of those publicly notified, one was for the suite of consents associated with the Te Ahu a Turanga highway and one was associated with the municipal water abstraction consent for the Tokomaru water supply.

Activity type	Number processed	Number declined	Number withdrawn	Average cost
Domestic wastewater discharge to land	162	Nil	4	$2,232.69
Discharges to water	47	Nil	2	$7,260.00
Wastewater Treatment Plant Discharge to water	1 (variation to existing consent)	Nil	Nil	$12,392.20

Activity type	Number processed	Number declined	Number withdrawn	Average cost
Wastewater Treatment Plant Discharge to land	2 (one includes a variation to existing consent)	Nil	Nil	$23,000
Dairy farm animal effluent discharge	73	Nil	Nil	$2,560.63
Discharge to land: Cleanfill	32	Nil	1	$4,873.09

Table 16 example of average consenting costs for activities under chapters 5 and 14.

While there are certainly other types of applications for various types of activities processed, the table and discussion above focuses on the activities that represent the majority of consents processed under the Chapter 5 and 14 discharge provisions.

To provide a high level comparison, the costs associated with processing discharge permits at other similar councils has been sourced from the Ministry for the Environment national consents database.

Council	Discharge consents granted	Median working days[41]	Processed on time (%)	Median application cost[42]
Bay of Plenty Regional	176	49	93.75	3652
Hawke's Bay Regional	137	27	99.27	1908
Horizons Regional	112	28.5	90.18	1521
Taranaki Regional	151	52	100	1112
Waikato Regional	117	71	98.29	3893

Table 17: Council comparison of discharge permit consent processing timeframes and costs.

On the whole, consent processing costs are considered reasonable, however limitations with the data available mean there is a margin of error in the above figures.

Groundwater quality – consent processing costs

Discharges to groundwater are generally diffuse and associated with discharges to land. For example, consents to discharge dairy farm animal effluent to land also consider potential effects on groundwater through application rates and soil type. It is therefore difficult to separate discharges into groundwater from discharges to land, and the consenting costs associated with these activities are wrapped up into the overarching discharge to land consent. In analysing the data set pulled from the consent database for the year 2019-2021, there did not appear to be any consents processed to directly discharge contaminants into groundwater.

[41] non-notified, no hearing
[42] non-notified, no hearing

7.7 Overall assessment of Plan effectiveness and efficiency – Water Quality

In assessing the effectiveness and efficiency of the One Plan throughout this report, there have been two primary lenses applied. The first is whether the One Plan provisions have shown to be effective or efficient for the purposes of s35. The second is whether the One Plan aligns with the requirements of the NPS-FM 2020. In simple terms, the evaluation is assessing whether the One Plan is fit for purpose, with current information and updated legislation in mind.

Effectiveness

Overall, many aspects of Chapters 5 and 14 of the Plan are working as expected when it comes to management of surface and groundwater quality, and have been applied appropriately. The improvement in a range of water quality parameters signals that the Plan has been successful in addressing water quality degradation within the region, particularly in target catchments. However, there are areas where monitoring is showing objectives and the anticipated environmental result are not being achieved, primarily for surface water quality (including lakes). This is largely due to water quality for some parameter continuing to degrade – the NPS-FM 2020 does not provide a pathway for this to continue. In addition there are also areas where the provisions have not been able to be applied as intended, such as the application of fertiliser to land, discharges of onsite wastewater (in certain circumstances) and discharges of human effluent to land. In some cases the rules require greater detail, updating to current standards or a rule guide to assist with implementation.

The evaluation contained within Chapter 7 of this report has identified a range of areas where the Plan will require review to either expedite improvements in freshwater quality, re-set or re-evaluate the anticipated environmental results and supporting provisions; and/or align with the requirements of the NPS-FM 2020.

The exception to the above is the nutrient management provisions which have been through a robust review and appeal process with the Environment Court. Given the process these provisions have been through in recent times, this evaluation has not touched on their effectiveness, however it is noted that the outcomes from the PC2 decision and appeals process will need to be addressed in any future review of the Plan to ensure they give effect to the NPS-FM 2020.

One Plan Provisions	NPS-FM requirements
Surface water (including lakes)	
The AER and objectives are being achieved <u>in part.</u> • The ten year monitoring trends indicate that some water quality parameters have not improved with improving trends are described as "exceptionally unlikely (i.e. virtually certain to be degrading)". • Limited monitoring of lakes means a definite conclusion cannot be made in relation to the achievement or lack thereof of the AER and objective; however, initial indications from monitoring suggest the anticipated outcomes are not being met. Consideration of the appropriateness of the current AER should occur in light of the NPS-FM requirements.	NPS-FM Attributes and limits: • It is likely that the current values will not match those in the NPS-FM in all respects, purely due to the One Plan having been developed some time ago and prior to the release of the 2020 NPS-FM. • Calibration between numerical objectives and the values that seek to protect against the NPS-FM is recommended, particularly given the rapid pace at which scientific knowledge and understanding of catchment processes is developing. • The NPS-FM aims to have at least 90% of specified rivers and lakes within the yellow, green and blue categories by 2040. The One Plan surface water and lakes provisions and associated values in Schedule B and E

One Plan Provisions	NPS-FM requirements
	will need to be reviewed with this requirement in mind. NPS-FM 2020 policy: • Consideration should be given to whether the current programme is sufficient to meet the requirements of sub-clause (4) of 3.24 of the NPS-FM or whether a new method should be added outlining development and adherence to a monitoring plan for rivers and streams in the region. Action Plans: • The NPS-FM requires Action Plans to be prepared for whole, part or multiple FMUs in certain circumstances. The One Plan in its current form does not consider or provide for catchments that may have an Action Plan in place as a result of the NPS-FM. This is a gap that will need addressing through the policy framework. • Leading on from this, the One Plan does not explicitly state or link to the NPS-FM equivalent limits or targets, nor does it state timeframes for addressing over-allocation (for nutrient targets) where it is identified. This is a gap that will need to be addressed through the next review of the One Plan and if nothing else will need to be outlined in the Action Plans required by the NPS-FM. Integrated management and holistic consideration of water quality: • The NPS-FM defines a *limit on resource use as meaning the maximum amount of a resource use that is permissible while still achieving a relevant target attribute state (see clauses 3.12 and 3.14 of the NPS-FM)*. This requires Council to also think about the use of a resource on a whole-of-catchment basis (including consideration of the effects of the use and development of land on the catchment's water quality) rather than in the individual characterisation of water allocation and discharges into water. The One Plan policy provides a good framework for this but needs to take the next step to consider this on a more integrated basis.
Groundwater	
• The occurrence and level of degradation in the region's groundwater is minimal (only 2 sites), and for that reason the overall conclusion is that Objective 5-2 and the anticipated environmental result is mostly being achieved for groundwater quality. • A conclusion cannot be drawn with regard to PFAs due to the limited monitoring	Values: • Appendix 1A of the NPS-FM applies to every FMU, which by design captures groundwater (which is to be treated as freshwater under the NPS-FM). Consideration of the compulsory values and how these should be applied in the groundwater sense, particularly for shallow groundwater that

One Plan Provisions	NPS-FM requirements
available. Ongoing monitoring, particularly for PFAs, will be critical moving forward	connects to surface water, will need to occur as part of the Oranga Wai NPS-FM plan change process. Action Plans: • Action plans are required to be prepared for whole, part or multiple FMUs in certain situations. The One Plan in its current form does not consider or provide for catchments that may have an Action Plan in place as a result of the NPS-FM. • This is a gap that will need addressing through the Oranga Wai policy review.

Table 18 summary of findings, Plan effectiveness and alignment with the NPS-FM 2020.

The above list is not exhaustive. There may well be other areas where the One Plan is not effective and does not align with updated legislative requirements. Therefore, while some parts of Chapter 5 and 14 have been effective, a wholesale review of the provisions is required and is being undertaken as part of the Oranga Wai process.

Lastly, it is apparent that the workload and tools required to give effect to and monitor the effectiveness of the water quality provisions of the plan is large, both the regulatory and non-regulatory methods. This issue will be compounded by the additional requirements of the NPS-FM and should be considered in detail through the Oranga Wai programme.

Efficiency

Evaluating the efficiency of the Chapter 5 and 14 provisions has been difficult. The water quality monitoring programme is vast and complex. The consent database is also complex and given the scale of this evaluation, the level of data extracted was extremely detailed. For this reason, there are limitations to the accuracy of the efficiency assessment in this evaluation. To get a complete picture of costs, analysis by a trained economist would be required to assess both the non-regulatory and regulatory costs associated with giving effect to the Plan. These costs should then be assessed against the benefits to give a true idea of efficiency. In the absence of such an assessment, consideration of the average consenting cost for various activities in recent times and the Long Term Plan funding have been considered.

Overall, it is considered that the regulatory and non-regulatory costs are efficient. However there are likely some consents (specifically wastewater treatment plant discharges) which attract significant cost. Whether this is efficient is a matter of debate. These activities often have more significant impacts on the environment, and the consent process is complex – usually due to historical issues, lack of previous investment in the system, and a consenting framework that does not provide a clear pathway. Review and consideration of the provisions (specifically Policy 5-11) may resolve some of these issues and mean these consenting processes are more efficient in time.

8 Water Quantity

This section addresses the One Plan chapters relating to surface and groundwater quantity. The relevant sections of the Plan are chapters 5 and 16, and schedules C and D.

Water from the two main fresh water sources within the region - surface water (rivers and lakes) and groundwater - is abstracted for a variety of uses, including municipal water supply, stock water, irrigation, electricity generation and industrial use. The single largest user of water in the

region is the energy sector, using approximately 55 m^3/s, around 77 per cent of surface water allocated in the region. Hydroelectric power generation takes are concentrated around Mount Ruapehu and on the Mangahao River. The amount of water used for power generation has not changed significantly in the past decade, although there is potential for there to be an increase in demand for hydroelectricity generation in the future as the country moves away from natural gas and coal. Consented allocation for uses other than hydroelectricity has increased by over 161% since 1997. The increase in allocation annually from 2013 to 2018 is approximately half that of the period from 1997 to 2018.

Consented allocation between groundwater and surface water (excluding hydroelectricity) is, in general, evenly split. Although the proportion of water allocated as groundwater has increased in recent times.

The One Plan contains a surface water allocation framework which specifies numerical water allocation limits and minimum flows, which are intended to achieve the freshwater management objectives. The surface water rule framework supports the objectives and is stringent in its approach for takes outside the core allocation limits. There are also allocation limits for groundwater, although groundwater allocation is not bound by minimum flows due to its different characteristics.

8.1 How this section works

The water quantity data and information is detailed and complex. Water quantity and allocation levels change regularly as consents expire and more are granted.

This report provides an evaluation by catchment, focusing on the key themes. A regional summary is also provided. The analysis focuses on key trends and outcomes for each catchment to determine if the relevant anticipated environmental outcomes and objectives have been broadly achieved or not.

Following the data analysis consideration has been given to whether the provisions of the NPS-FM are achieved. The efficiency of the Plan provisions for water quality are also considered based on anecdotal evidence from the regulatory team.

8.2 One Plan Water Quantity Linkages

ONE PLAN FRAMEWORK LINKAGES: WATER QUANTITY				
Objectives (RPS)	**Supporting Policy Framework**	**Methods**	**Indicators**	**Anticipated environmental results**
Objective 5-3 **Water quantity and allocation** *Water*^ quantity is managed to enable people, industry and agriculture to take and use *water*^ to meet their reasonable needs while ensuring that: (a) For surface *water*^: (i) minimum flows and allocation regimes are set for the purpose of maintaining or enhancing (where degraded) the existing life-supporting capacity of *rivers*^ and their *beds*^ and providing for the other Values in Schedule B as appropriate (ii) takes and flow regimes for existing hydroelectricity are provided for before setting minimum flow and allocation regimes for other uses (iii) in times of *water*^ shortage, takes are restricted to those that are essential to the health or safety of people and communities, or drinking *water*^ for animals, and other takes are ceased (iv) the amount of *water*^ taken from *lakes*^ does not	Policies 5-12, 5-13, 5-14, 5-15, 5-17, 5-18, 5-19, 5-20, 5-21 And Objective 16-1, policies 16-1, 16-2, 16-3, 16-4, 16-5, 16-6, 16-7, 16-8 and 16-9	**Method 5-1:** Large Water abstractors. **Method 5-11:** Water (Fluvial resources, quality and quantity) research, monitoring and reporting. **Rules** **Rule 16-1** minor takes and uses of surface water. **Rule 16-2** Minor takes and uses of groundwater. **Rule 16-3** use of heat or energy from surface water. **Rule 16-4** Bore and groundwater testing. **Rule 16-5** takes and uses of surface water complying with core allocations. **Rule 16-6** Existing essential takes and uses of surface water complying with core allocations taken at or below the minimum flow. **Rule 16-7** Replacement consents for takes and uses of surface water by existing hydroelectricity schemes. **Rule 16-8** Takes and uses of surface water not complying with core allocations or takes and uses taken at or below minimum flow. **Rule 16-9** other takes and uses of water.	• Measured flows of surface water compared to the allocation and minimum flow regime outlined in this Plan.	During the life of this Plan, water quality and quantity maintain the Values set in this Plan. In *Water Management Sub-zones**: • where *water quality targets** are met prior to this Plan becoming operative, they continue to be met. where *water quality targets** are not met prior to this Plan becoming operative, they are either met or improved from the current state where targeted for action or, where not targeted for action, they are no worse than prior to this Plan becoming operative. The amount of groundwater used does not exceed

ONE PLAN FRAMEWORK LINKAGES: WATER QUANTITY				
Objectives (RPS)	**Supporting Policy Framework**	**Methods**	**Indicators**	**Anticipated environmental results**
compromise their existing life-supporting capacity (v) the requirements of *water conservation orders*^ are upheld (vi) the instream geomorphological components of natural character are provided for. For the avoidance of doubt this list is not hierarchical. (b) For groundwater: (i) takes do not cause a significant adverse *effect*^ on the long-term groundwater yield (ii) groundwater takes that are hydrologically connected to *rivers*^, are managed within the minimum flow and allocation regimes established for *rivers*^ (iii) groundwater takes that are hydrologically connected to *lakes*^ or *wetlands*^ are managed to protect the life-supporting capacity of the *lakes*^ or *wetlands*^ (iv) the significant adverse *effects*^ of a groundwater take on other			• Groundwater levels Region-wide, but with a focus on Opiki and Himatangi areas. • Groundwater quality Region-wide, but with a focus on nitrates in Horowhenua and Tararua districts and conductivity along the Foxton-Tangimoana coast. • Confirmed incidents where groundwater sources become unavailable (i.e. dry up) or water quality is unfit for use.	replenishment rates and its quality is the same as or better than that measured prior to this Plan becoming operative, other than where discharges to land are a permitted activity or are allowed by resource consent.

ONE PLAN FRAMEWORK LINKAGES: WATER QUANTITY				
Objectives (RPS)	**Supporting Policy Framework**	**Methods**	**Indicators**	**Anticipated environmental results**
groundwater and surface *water*^ takes are avoided (v) saltwater intrusion into coastal aquifers, induced by groundwater takes, is avoided. (c) In all cases, water^ is used efficiently.				

Table 19 One Plan Framework for surface water and groundwater quantity

8.3 Water Quantity monitoring

State of the Environment, 2019 (SoE) monitoring and the more recent Catchment Stocktake reports are the two primary documents that have been relied upon for drawing conclusions on water quantity in the region. The state of water allocation and availability changes as resource consents are granted or expire and so the data presented in this report should be treated as a moment in time.

8.3.1 SoE monitoring

Horizons' monitors river flows and groundwater levels as part of its state of the environment reporting. River flow monitoring serves many purposes, from flood management to predicting suitability for swimming at some spots. Over time, the continuous river flow monitoring programme has increased from just a few sites in the 1940s to the network of 66[43] sites that exist today. Horizons' network is supplemented by flow recording sites from hydroelectricity generators and NIWA. Data shows Whanganui River is the largest in the region in terms of flow, followed by Manawatū and Rangitīkei.

Surface water in the region is split into water management zones and sub-zones. These zones are defined by a number of features including catchment boundaries, the availability of monitoring data, hydrological peculiarities, and pressures on the water resource. Groundwater is also split into management zones. In 2020-2021, a review of the zones was undertaken with some minor alterations made so the surface and groundwater zones better align. The updated zones are referred to in this report as Freshwater Management Units (FMU) noting that the FMUs required for the purposes of the NPS-FM have not been finalised at the time of writing this report.

Surface water

Surface water is all the water that can be seen, including rivers, streams, lakes, drains, ponds, and wetlands. During summer when river flows are at their lowest, taking too much water can affect the health of freshwater ecosystems. Maintaining natural flow variability in rivers and streams is important for supporting the habitat requirements of fish species, and to support aesthetics, recreational and natural character values as well as water quality. Water must be used efficiently so the amount available for abstraction is accessible to as many users as possible, while still maintaining a healthy environment.

Dealing with the competing demands for water and balancing them with the needs of the environment is a high priority for Horizons. A detailed water allocation framework is in place, setting out core allocation limits for surface and groundwater resources, and minimum flows for surface water takes in each water management sub-zone. The framework is implemented through consenting processes.

The core allocation limits are designed to protect and maintain instream habitat, while allowing for reasonable use of the water for various human activities. The minimum flow limits also serve to protect the health of the water by restricting all non-essential abstraction during low flows. This is to reduce the extent that abstraction may influence, how often, and for how long, low flow occurs. A range of methods were used to define the core allocation and low flow limits as part of the One Plan development process. The methods applied to each water management subzone are detailed in the Section 42A report of Raelene Mercer (nee Hurndell) to the One Plan hearing.

Much of the water allocated in high demand areas was already consented before the water allocation framework of the One Plan was in place, resulting in some areas of the region becoming over allocated when the framework was introduced. It has been the goal of the Plan to bring all of the region's water management zones back within their core allocation limits. Since 2014 the number of sub-zones allocated beyond their respective core allocation limits had reduced from 15

[43] Current physical sites. If including modelled sites, this number is 73.

out of 124 subzones (12 per cent), down to six (6 per cent) in 2018. Of these over allocated sub-zones, four are presently within ten per cent of the allocation limit. At the time of developing the 2019 SoE, approximately 61 per cent of surface water within the region was allocated for use.

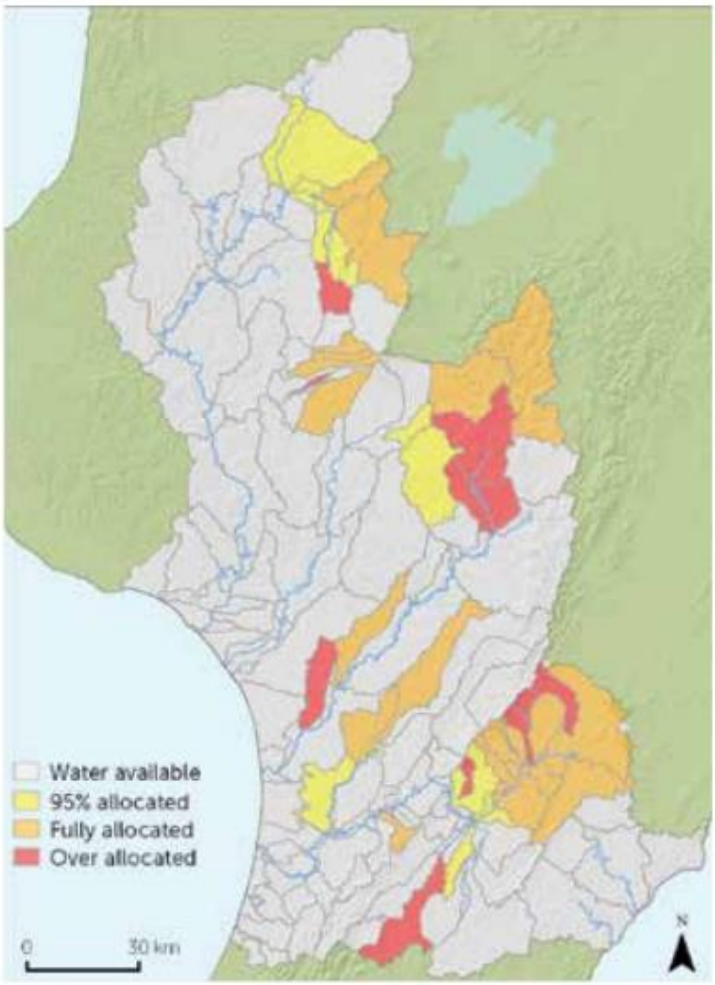
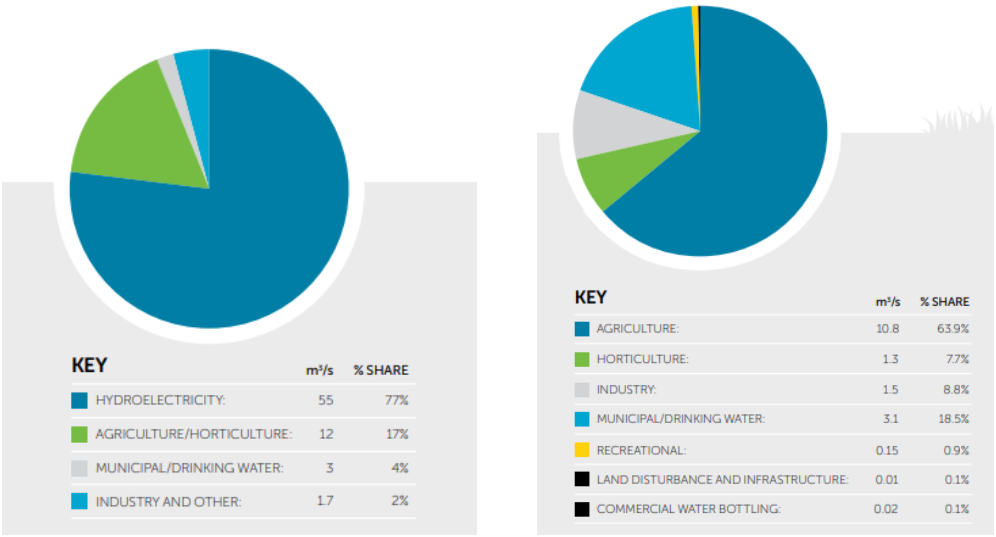


Figure 21: Allocation status (source Horizons Regional Council SoE, 2019)

In terms of surface water use, as mentioned previously, the hydroelectricity industry dominates as the largest consented abstractor of surface water. Following hydroelectricity, the agriculture industry is the next largest abstractor, followed by municipal / drinking water. When considering allocation by catchment, the Manawatū catchment has the largest amount of water allocated, followed by the Rangitīkei catchment (excluding hydroelectricity). The figures below show water allocation by use and location as outlined in the Horizons 2019 SoE report.



Figures 22 and 23: Proportion of water allocated for different uses in the region (including and excluding hydroelectricity). Sourced from Horizons SoE, 2019

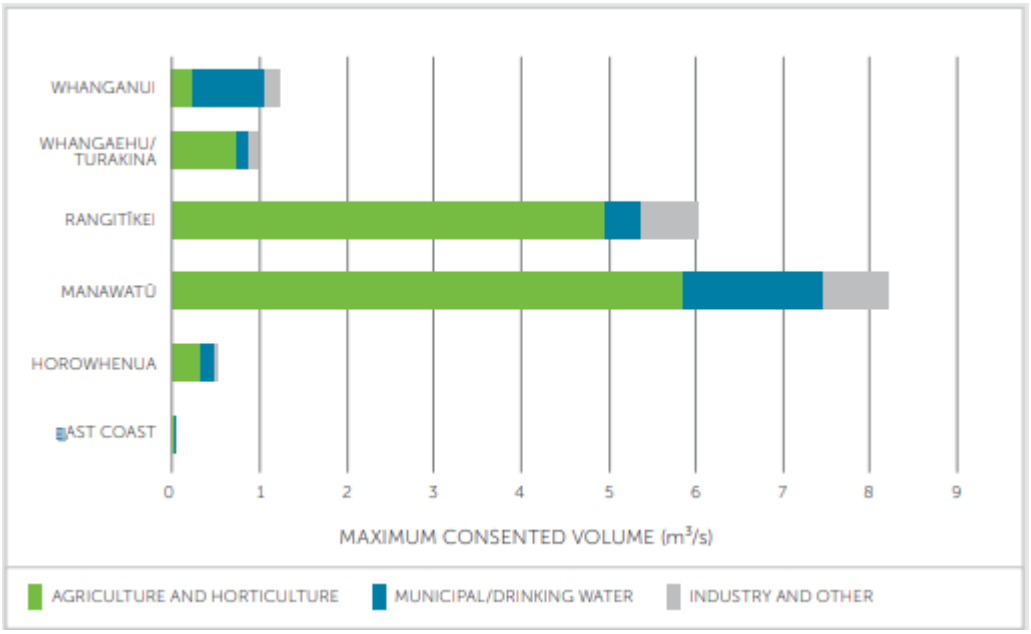


Figure 24: Current water allocation by use (excluding hydroelectricity) within major surface water catchments in the region. Source: Horizons SoE, 2019.

Work continues with consent holders to reduce the impact of water use in over allocated catchments. This is done through consenting processes, promoting and educating users on water use efficiency, and real-time monitoring of actual water use through the water metering programme.

Groundwater

Groundwater is all the water contained below the earth's surface and comes from rainfall and river water that makes its way through the ground and accumulates in underground aquifers. Generally there is more groundwater available than is currently being used in the region. However, abstracting too much groundwater can impact wetlands, rivers and lakes as well as the ability of other people to abstract water. In extreme cases, if groundwater is over-abstracted it has the potential to draw salt water from the sea into freshwater aquifers. There is no evidence this is occurring in any of the region's aquifers.

Horizons operates an extensive groundwater level monitoring network that enables council to assess the current status of the resource, measure the effects of groundwater takes, and track changes over time. Currently 130 bores are monitored every month, ranging from a depth of 2 metres to 630 metres (average depth 77 metres), with this data presented on both the Horizons and LAWA websites. A single groundwater measurement reflects conditions at a given moment in time. As more measurements are collected, trends will start to emerge which will help determine whether changes in groundwater are due to natural occurrences or induced by activities such as abstraction and irrigation.

The groundwater resource is divided into ten management zones within the region. There are approximately 8,700 bores in the region with 50 new bores drilled (on average) each year over the past ten years. Some bores are hydraulically linked to the surface water system and other, deeper bores are not. Seven of the ten groundwater management zones, where water is in demand, have annual allocation limits outlined in the One Plan. Remaining zones either have little groundwater available or have a high connection with surface water and are considered 'riparian' takes under the One Plan rule framework (meaning they are subject to the surface water allocation framework). Consented groundwater allocation volumes in all groundwater management zones are within One Plan limits for allocation. Levels are monitored at 145 bores in the region, with results showing approximately 30 per cent of sites having increasing water levels and 14 per cent declining. The declining water levels are typically being seen in the Manawatū and Rangitīkei catchments where groundwater allocation has increased.

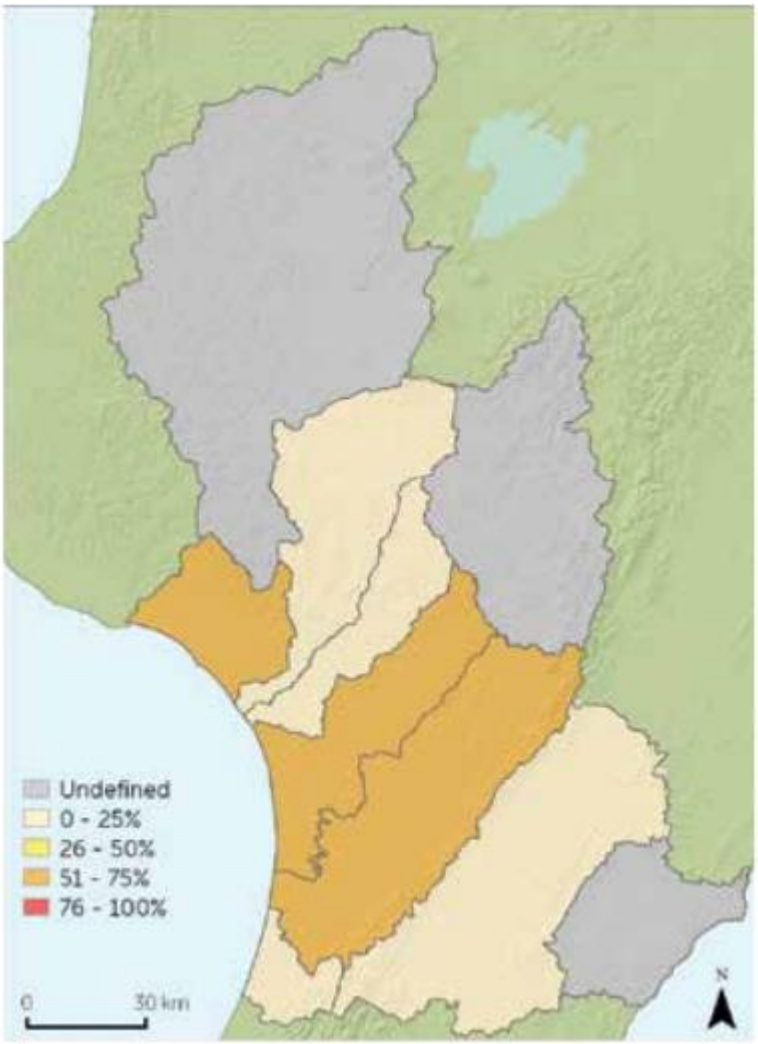


Figure 25: Water allocation levels for Horizons Region (source: SoE, 2019).

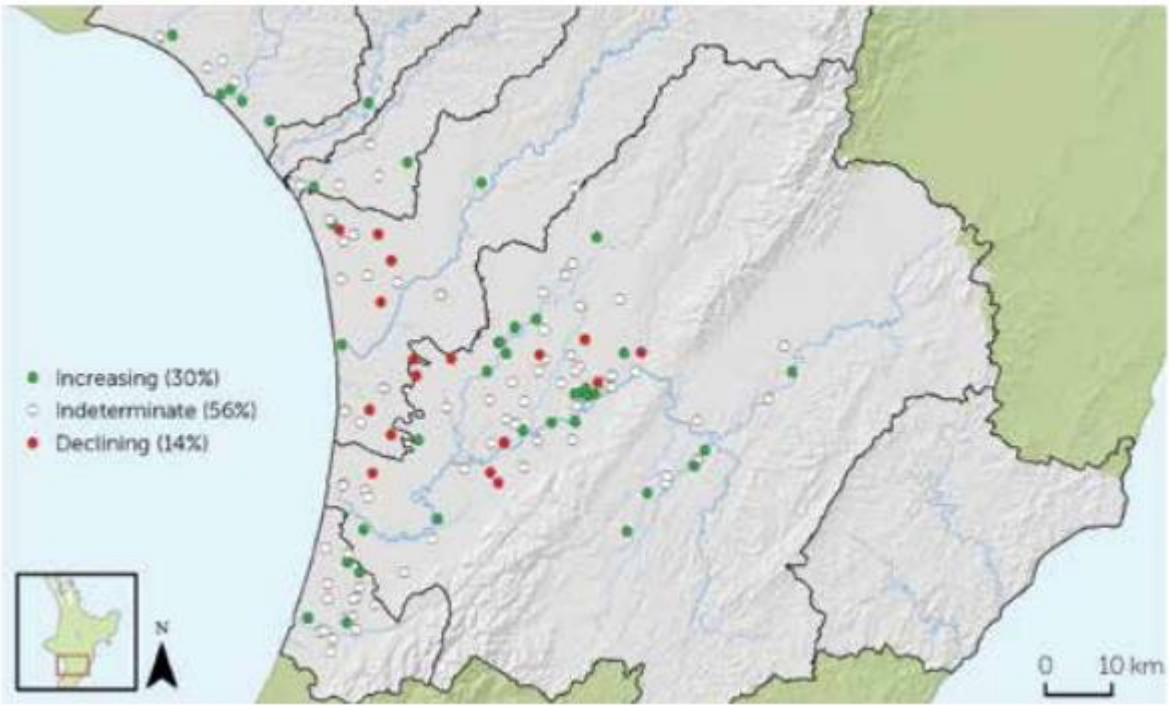


Figure 26: location of increasing and decreasing groundwater levels in the region (source SoE, 2019).

Monitoring has shown an increase in the number of areas with declining groundwater trends, with the main area of decline being in Santoft. This increase in declining groundwater trends has contributed to a decision to technically review the groundwater allocation limits. Monitoring and modelling in the Santoft area showed a continued decline in groundwater levels was possible even if no further water permits were granted. In response, Horizons developed new management methods for this area including establishing trigger levels, which were applied to all irrigation takes. The imposition of trigger levels requires groundwater abstraction to reduce (or cease) once a certain threshold has been reached in a nearby neighbouring bore. Since implementing this, groundwater levels in a number of bores have stabilised, continuing to provide a level of protection for existing water users and the water resource in this area.

8.3.2 Catchment Stocktakes (FMUs)

The 2020 Catchment Stocktakes undertaken by Horizons Policy & Strategy and Science teams also consider the water allocation status for each FMU in the region. These stocktakes provide a more recent snapshot of the current state of knowledge of the region's catchments and drill down into water quantity trends by catchment (FMU). At the time of preparing this evaluation, the stocktakes represented the most recent available information on the state of each catchment[44]. The following is a summary of the allocation status and water use in each of the FMUs identified in the Catchment Stocktakes. Allocation limits and status exclude permitted activity takes. Consideration of permitted takes in the allocation framework is becoming an emerging issue where current permitted takes can now require resource consent due to stream fencing and restriction of stock access to waterways. Additionally, the number of permitted water takes in the region is unknown. This is an issue for all surface and groundwater catchments in the region.

Ngā wai o Manawatū

Surface water

[44] Noting at the time of completion of this report, the Oranga Wai information had been released providing further information on catchment trends but due to timing has not been considered in this evaluation.

The Manawatū FMU has 13 WMZs, which are divided into 49 sub-zones with approximately 598,752 m^3/day of surface water available for abstraction. The largest user of water within the Manawatū FMU is the Mangahao Power Scheme which abstracts water from the Mangahao and Tokomaru Rivers, and diverts it (via the power scheme) to the Mangaore Stream. Hydroelectricity takes such as this are treated as non-consumptive. The Mangahao water abstraction (which was in place when the One Plan was developed) is therefore not part of the core allocation framework in the One Plan.

Much of the surface water allocated in the Manawatū FMU was consented before the water allocation framework of the One Plan was in place. This resulted in some areas becoming over allocated, including all WMZs upstream of the confluence of the Manawatū River with the Tīraumea River. Given the lack of data available, it is uncertain what role permitted takes play in this. Since then, there has been a focus on bringing zones back within their allocation limits. There are currently four sub-zones that remain over allocated. Efforts to bring these sub-zones back within their allocation limits are ongoing, including working with consent holders to reduce the volume of water they are consented to take based on their actual usage, encouraging offline (out of river) storage (for example, Woodville's water supply dam), and changing the location of takes to nearby sub-zones where water is still available for allocation. However, this typically only happens at the time of consent renewal which affects the ability to reduce over-allocation quickly.

Excluding hydroelectricity, the largest user of surface water in the FMU is agriculture, followed by municipal water supply.

In the Manawatū FMU, minimum flows are typically reached in the upper catchment first. This is because baseflows are lower in this area and flow is strongly influenced by rainfall in the ranges, (i.e. there is no significant groundwater resource to feed the river). Smaller tributaries like the Oruakeretaki, Raparapawai, Kūmeti and Tamaki tend to reach minimum flow earlier and stay at low flow for longer periods of time, with flows occasionally increasing for a short time in response to brief localised rainfall events. In the mid-catchment (Upper Gorge – Palmerston North) minimum flows are reached in drier years but usually sometime after the minimum flow has been reached in the upper catchment. In extremely dry years, the lower catchment may also reach minimum flow. Consents for non-essential uses are required to cease abstraction during these times.

Groundwater

The Tararua and Manawatū groundwater management zones (GMZs) fall within the Manawatū FMU. In the Tararua there are relatively few consents for groundwater takes with only one per cent of the allocable amount being allocated. Given the limited data available, it is uncertain how many permitted takes there are in the catchments. In the Manawatū GMZ, there is more demand for the resource with 47 per cent of the allowable amount allocated through resource consents.

Rangitīkei-Turakina

Surface water

The Rangitīkei-Turakina FMU is split into seven WMZs and 19 sub-zones with approximately 297,648 m^3/day of surface water available for abstraction. The largest user of water in the Rangitīkei-Turakina FMU is the Tongariro Power Scheme which abstracts water from the Moawhango and Mangaio Streams, and diverts it via the Moawhango Dam and Moawhango Tunnel to the Tongariro River, which is outside of the Horizons region. Hydroelectricity takes such as this are treated as non-consumptive. The Tongariro Power Scheme (which was in place when the One Plan was developed) is therefore not part of the core allocation framework in the One Plan. Excluding hydroelectricity, agriculture is the largest user of surface water in the catchment, followed by municipal water supply and industry.

Much of the water allocated in the Rangitīkei-Turakina area was consented before the water allocation framework of the One Plan was in place. As a result, one water management sub-zone

in the Rangitīkei catchment is over allocated[45]. Five sub-zones are fully allocated as they have zero allocation limits, with water available in the remaining WMZs and sub zones in the FMU. Permitted activity takes are not included in the allocation limits and information about the number of takes in the catchment is scarce.

Groundwater

Like surface water, groundwater is used for a number of purposes including irrigation, agriculture and horticulture, drinking water supply and industrial uses.

The Rangitīkei and Turakina GMZs fall within the Rangitīkei-Turakina FMU. In the Rangitīkei 67 per cent of the available water has been allocated. This does not include permitted activity takes which do not form part of the allocation framework. Available data on the number and scale of permitted activity abstractions is limited. In the Turakina GMZ, there less demand for the resource with five per cent of the allowable amount allocated through resource consents.

Demand for water has increased steadily over the last two decades. In the Rangitīkei catchment, declining groundwater levels at Santoft are likely due to increasing groundwater abstraction. This could be due to the Santoft area having a localised slower recharge rate than other areas of the region. While the risk of saltwater intrusion remains low, in the near-term decline of groundwater levels is likely to continue before stabilising under current abstraction rates, due to the natural time-lag in groundwater replenishing aquifers.

Kai Iwi

Surface water

The One Plan makes 3,888 m^3/day of surface water available for abstraction in the Kai Iwi WMZ. The Northern Coastal and Mōwhānau WMZs have ten per cent of their mean annual low flow available per day; there is potentially water available to be allocated, although information about flows is limited and the amount available is unknown.

At present, across the Kai Iwi FMU there is 554 m^3/day allocated. The main use of water in the Kai Iwi FMU is irrigation for both agricultural and horticultural land uses. Water allocation in all WMZs in the FMU is within the limits set in the One Plan to protect ecosystem health.

Groundwater

There is just one GMZ located within the Kai Iwi FMU; this is Whanganui (which includes Kai Iwi). The aquifer below Whanganui is confined, however it is recharged near Kai Iwi. The Whanganui (including Kai Iwi) GMZ covers 938 km^2 and has variable recharge rates.

Within the Whanganui GMZ there are three sub-zones; Kai Iwi, Mōwhānau, and Northern Coastal. Across the whole GMZ, there are a number of consents for groundwater takes. The One Plan allows for five per cent of the estimated annual recharge to be allocated for use. Of this amount (46,000,000 m^3), 65 per cent has been allocated. This does not include permitted activity takes which do not form part of the allocation framework. Available data on the number and scale of permitted activity abstractions is limited.

[45] As at October 2020

The below shows the groundwater level status for the seven bores monitored monthly in the Whanganui Catchment as at March 2021.

Status	Number of sites
Low	0
Below average	1
Average	2
Above average	2
High	2

Whangaehu

Surface water

The One Plan makes 127,008 m³/day of surface water available for abstraction across the four surface WMZs of the Whangaehu Catchment. The largest users of water within the Whangaehu Catchment are the Genesis Energy Tongariro Power Scheme (upper catchment) and New Zealand Energy hydro-electric power scheme (middle catchment). Existing electricity generation abstractions such as these, are considered as 'existing hydro-electricity takes' and are not included in the core allocation.

Hydroelectricity takes excluded, there is generally sufficient water available for human use, although one subzone is fully allocated due to having a zero allocation limit. Another, water management zone is approaching its allocation limit. The largest use of surface water in the FMU is horticulture, followed by agriculture and municipal/drinking water. The image below shows the allocation status across the Whangaehu FMU.

Overall there is generally sufficient water available in the Whangaehu FMU to meet demand and maintain the ecological baselines required to protect aquatic health. However as with other catchments, the tension between ensuring sufficient quantity for hydroelectricity generation and providing for ecosystem health should be noted. Of note is the Tongariro Power Scheme which is a significant abstractor in the catchment, with water being abstracted (diverted) from the catchment and replaced (discharged) in a separate location. However, the importance of the scheme's contribution to New Zealand's electricity supply and greenhouse gas objectives must also be recognised. The scheme's resource consent will expire in 2039.

Groundwater

Within the Whangaehu catchment, groundwater tends to be reducing and therefore older. The longer residence time for Whangaehu groundwater could mean it is less susceptible to nutrient contamination from human activities, but any contamination may take a longer time to resolve.

Around 40 per cent of groundwater levels are increasing within the catchment, while the remainder are stable. This indicates that the current abstraction limits are likely suitable.

In the Whangaehu GMZ there are relatively few consents for groundwater takes. The One Plan allows for five per cent of the estimated annual recharge to be allocated for use. Of this amount (239,000,000 m³), only one per cent has been allocated (excluding permitted activity takes).

Whanganui

Surface water

The Whanganui FMU includes eight WMZs and 29 subzones, of which:

- 24 have water available
- two are within 95-100 % of total allocation
- four are fully allocated (due to having zero allocation limits)

- one is over allocated

There are also two commercial hydroelectricity schemes operating within the catchment.

Excluding hydroelectricity, the primary water use in the catchment is municipal supply, followed by agriculture.

Groundwater

Groundwater levels and allocation in the Whanganui FMU is assessed under Kai Iwi. Due to the way the groundwater management zones had been set, the Whanganui GMZ could not be split out from Kai Iwi and as such has been assessed under that FMU. No further analysis is provided here.

Ngā wai o Waiopehu (Horowhenua)

Surface water

Surface WMZs largely represent the major catchments of the Waiopehu area. There are five WMZs in the area. The One Plan makes approximately 30,240 m^3/day of surface water available for abstraction across the five surface WMZs and eight subzones of the Waiopehu FMU. Most of the water that is still available is in the Waikawa water management zone. All WMZs within the Waiopehu catchment are within core allocation limits, although the Ōhau WMZ is approaching its allocation limit (excluding permitted activity takes).

The primary surface water use in the Waiopehu catchment is municipal supply, followed by horticulture and agriculture.

Groundwater

The Waiopehu area has only one GMZ. Covering 394 km^2, the Horowhenua GMZ is the smallest in the region. The estimated annual recharge is 52.8 million m^3/yr. Groundwater and surface water are closely connected in the Waiopehu area, meaning groundwater-surface water interaction is high. The Ōhau River, in particular, has been shown to lose flow as it enters the plains from the upper catchment in the Tararua Ranges. Some of the loss of flow discharges into Lake Horowhenua and the groundwater system to the north of the Ōhau River. Seepage loss to Lake Horowhenua also occurs from the Waikawa Stream. Springs on the eastern side of Lake Waiwiri (also known as Lake Papiatonga) indicate groundwater likely flows into that lake as well.

In the Horowhenua GMZ, there are 37 current consents for groundwater takes. The majority of groundwater bores located throughout the catchment are for private domestic / farm supply and fall within the permitted activity limits of the One Plan. The One Plan allows for five per cent of the estimated annual recharge to be allocated for use. Of this amount (8,488 m^3/day), only 13 per cent has been allocated in the Waiopehu area. In addition, the total volume being abstracted as a permitted activity under the One Plan (that is, without needing a resource consent) is unknown, as is the cumulative effect of these abstractions.

On average, approximately 53 per cent of the total annual abstraction within the overall Horowhenua GMZ occurs during summer (December to February). Abstraction during late summer (February to April) is also approximately 50 per cent of the total, reflecting the fact that a large proportion of abstraction occurs in February.

Groundwater and surface water in the Waiopehu area are closely connected. With most abstraction occurring over summer, and the high connection between groundwater and Lake Horowhenua, it has been suggested that further abstraction could adversely affect inflow to the lake (despite groundwater allocation being only 27 per cent of the total amount available). A 2019 study by PDP Ltd found that the current amount of groundwater consented for take is large compared to the volume of groundwater inflow, while the majority of users do not utilise the full amount of water they are consented to take. Therefore, there is likely a need to cap and possibly reduce the amount of groundwater that can be allocated for use in the Horowhenua GMZ and Waiopehu area.

Puketoi ki Tai (Coastal Tararua)

Surface water

The Puketoi ki Tai FMU includes the Ākitio, Wainui and Owahanga Rivers and their tributaries, as well as a number of smaller waterbodies that flow into estuaries on the east coast and ultimately into the Pacific Ocean. The three WMZs of Puketoi ki Tai largely encompass the catchments of the Ākitio, Owahanga and Wainui Rivers.

Water allocation in all WMZs in the area is within the limits set in the One Plan to protect ecosystem health. The One Plan makes around 3,024 m^3/day of water available for abstraction in the Ākitio and Owahanga WMZs. In the East Coast WMZ, ten per cent of the mean annual low flow is available per day. The Ākitio WMZ is fully allocated. There is water available in the Waihi, and East Coast and Owahanga WMZs.

The biggest user of surface water in the Puketoi ki Tai FMU is agriculture, followed by municipal supply. The amount of water utilised via permitted activity takes is unknown.

Groundwater

The Puketoi ki Tai area contains one groundwater management zone (GMZ): the East Coast GMZ. The geology of the area means the potential for groundwater use is extremely limited. This makes the groundwater situation within the Puketoi ki Tai area regionally unique. There is very little groundwater in the GMZ, and the water that is there is hard to access. Because of this, the East Coast GMZ has been classified as 'unspecified', which means that a specific allocation limit is unnecessary. There are no groundwater consents in the area.

8.3.3 Update on allocation status 2021

Allocation levels change readily with consents being granted, replaced or expiring. For this reason, a high level update has been provided on the overall allocation status of surface water in the region.

As at 20 August 2021[46]:

- Five subzones are over allocated (4%)
- Three are fully allocated
- 59 subzones are within allocation (of these seven are nearing full allocation at 95-99% allocated).

As of March 2022[47]:

- Six subzones are over allocated[48]
- 20 subzones are fully allocated
- 98 subzones are within allocation (20 of these are nearing full allocation being 95-99 per cent allocated)

This provides a useful picture of how continued efforts to reduce over allocated catchments through the One Plan framework have succeeded. Since 2014, the number of over allocated catchments has reduced from 15 to just six (60 per cent decrease). Of those that remain over allocated, four are within ten per cent of the allocation limit.

Updated groundwater allocation information was not available at the time of writing, so the 2020 catchment stocktakes remain the most up to date data available for groundwater.

[46] Data sourced from Horizons science team via LAWA website
[47] Source is storymaps https://freshwater.horizons.govt.nz/science

[48] This increase is due to a reporting error of over allocation. The actual number of over allocated catchments has not increased.

8.3.4 Summary of findings for water allocation

Surface water: SoE monitoring and catchment stocktake reports provide robust and useful information on the state of surface and groundwater levels in the region. There are differences between the surface water allocation levels presented in the SoE and stocktake reports, however this is to be expected given the dynamic nature of water allocation. What is notable is the fact that the number of over allocated water management zones and subzones has reduced from 15 to just six (a 60% decrease) since the One Plan came into effect. This shows the allocation regime and supporting policy and rule framework is largely effective in managing water allocation. However, it has not been fully effective. The Plan has been in effect for over seven years and there are still six catchments over allocated. The constraint to bringing these catchments back within allocation limits has been through existing resource consents which are still in force, meaning opportunities to limit the amount allocated through consent are reliant on consent expiry or consent holders voluntarily reducing their abstraction prior to expiry. Discussions about reduction of abstraction or moving abstraction location to reduce over allocation typically only happen at the time of consent renewal which affects the ability to reduce over allocation quickly or out of the consent cycle. This suggests the policy and rule framework has not been broad enough to illicit change quickly and is something to be considered in the context of the NPS-FM requirements.

A theme that has come through the Catchment Stocktake reports is the impact that hydroelectricity can have on water availability and quality. Water abstraction associated with hydroelectricity generation is treated as a non-consumptive take because the water is returned back to the system once used. However, in the Horizons region water is often not returned to the same tributary, river catchment or even region in some cases. In such situations water availability in that river or stream is affected by the hydroelectricity abstraction. It is also noted that some schemes (e.g. the Tongariro hydroelectric diversion) can have a significant negative impact on the health and wellbeing of the catchment. However, the importance of the hydroelectricity scheme's contribution to New Zealand's electricity supply and greenhouse gas objectives must also be recognised. This tension between ensuring sufficient quantity for hydroelectricity generation and providing for ecosystem health is clear and is something that will need to be addressed through the One Plan review. Specific consideration will need to be given to limits and values of catchments associated with the Tongariro Power Scheme, as required by Clause 3.31 of NPS-FM 2020.

Lastly, the catchment allocation limits do not take into account permitted activity abstraction. There is increasing complexity relating to accounting of stock water takes in the region and the impacts on water availability. This issue is becoming more pressing as more stock are excluded from waterways and their drinking water supply becomes reticulated. In some cases, the abstraction will still meet the permitted activity criteria, in others, consent will be required due to the abstraction rate or possibly volume exceeding the permitted amount. Consideration of the impact and recording of permitted activity abstraction will be something that needs consideration as part of the freshwater review, particularly in over allocated catchments.

Groundwater allocation hasn't changed markedly between the SoE and Catchment Stocktake reports. However, the knowledge of groundwater in certain areas of the region has increased as more consents are granted and more monitoring information becomes available. Information on the number and scale of permitted activity takes is limited. An example of this is the stabilisation of declining groundwater trends in the Santoft area of the Rangitikei GMZ. Monitoring and modelling in the Santoft area showed a continued decline in groundwater levels was possible even if no further water permits were granted. In response, Horizons developed new management methods for this area including establishing trigger levels, which were applied to all irrigation takes. The imposition of trigger levels requires groundwater abstraction to reduce (or cease) once a certain threshold has been reached in a nearby neighbouring bore. Since implementing this, groundwater levels in a number of bores have stabilised, continuing to provide a level of protection for existing water users and the water resource in this area.

Summary: Overall it can be summarised that there have been improvements in water allocation within the region. Ultimately, the One Plan has set a good foundation for setting limits and expectations around the amount of water available for abstraction. Moving forward, consideration of the allocation limits and whether they are appropriate to provide for the health of the water (specifically surface water) may need to occur to ensure these limits are appropriate. In addition consideration of the permitted activity abstraction and recording of this information may also require addressing, particularly in over allocated catchments where abstraction will not meet the obligations of the NPS-FM. Further, consideration of hydroelectricity and its impact on surface water quality will also need to be undertaken, noting that the Tongariro Power Scheme in particular is addressed through Clause 3.31 of the NPS-FM.

8.4 Plan Effectiveness Summary

This section considers the effectiveness of the Chapter 5 and 16 provisions in achieving the anticipated environmental result.

The Plan effectiveness questions considered are outlined as follows:

- Are anticipated environmental results and objectives being achieved?
  - The effectiveness and the efficiency of the Plan's policies, rules and methods in achieving the objectives of both the plan and the RPS.
  - The consistency of the Plan's policies, rules and methods with its objectives.

- Does the provision give effect to the NPS-FM?
  - Does it give effect to Te Mana o Te Wai?
  - Does it give effect to the hierarchy of obligations?

- Is there evidence that the policies and methods are being used/applied in an effective way?

- Do the plan provisions have the support of users – is the plan perceived to work, are the provisions enforceable?
  - Can the Plan reasonably be implemented?

- Other than those related to the NPS-FM requirements, are there other emerging issues relating to freshwater that are not being addressed?
  - Are there any provisions in the NPS-FM that the One Plan does not address currently?

Are the anticipated environment results and objectives being achieved

The below table summarises the key objectives, indicators and anticipated environmental results associated with surface and groundwater quantity.

Objectives (RPS)	Indicators	Anticipated environmental results
Objective 5-3 **Water quantity and allocation** *Water*^ quantity is managed to enable people, industry and agriculture to take and use *water*^ to meet their reasonable needs while ensuring that: (a) For surface *water*^: (i) minimum flows and allocation regimes are set for the purpose of maintaining or enhancing (where degraded) the existing life-supporting capacity of	• Measured flows of surface water compared to the allocation and minimum flow regime outlined in this Plan.	During the life of this Plan, water quality and quantity maintain the Values set in this Plan. In *Water Management Sub-zones**: • where *water quality targets** are met prior to this Plan becoming operative, they continue to be met.

Objectives (RPS)	Indicators	Anticipated environmental results
rivers^ and their *beds*^ and providing for the other Values in Schedule B as appropriate (ii) takes and flow regimes for existing hydroelectricity are provided for before setting minimum flow and allocation regimes for other uses (iii) in times of *water*^ shortage, takes are restricted to those that are essential to the health or safety of people and communities, or drinking *water*^ for animals, and other takes are ceased (iv) the amount of *water*^ taken from *lakes*^ does not compromise their existing life-supporting capacity (v) the requirements of *water conservation orders*^ are upheld (vi) the instream geomorphological components of natural character are provided for. For the avoidance of doubt this list is not hierarchical. (b) For groundwater: (i) takes do not cause a significant adverse *effect*^ on the long-term groundwater yield (ii) groundwater takes that are hydrologically connected to *rivers*^, are managed within the minimum flow and allocation regimes established for *rivers*^ (iii) groundwater takes that are hydrologically connected to *lakes*^ or *wetlands*^ are managed to protect the life-supporting capacity of the *lakes*^ or *wetlands*^ (iv) the significant adverse *effects*^ of a groundwater take on other groundwater and surface *water*^ takes are avoided (v) saltwater intrusion into coastal aquifers, induced by groundwater takes, is avoided.	• Groundwater levels Region-wide, but with a focus on Opiki and Himatangi areas. • Groundwater quality Region-wide, but with a focus on nitrates in Horowhenua and Tararua districts and conductivity along the Foxton-Tangimoana coast. • Confirmed incidents where groundwater sources become unavailable (i.e. dry up) or water quality is unfit for use.	• where *water quality targets** are not met prior to this Plan becoming operative, they are either met or improved from the current state where targeted for action or, where not targeted for action, they are no worse than prior to this Plan becoming operative. The amount of groundwater used does not exceed replenishment rates and its quality is the same as or better than that measured prior to this Plan becoming operative, other than where discharges to land are a permitted activity or are allowed by resource consent.

Objectives (RPS)	Indicators	Anticipated environmental results
(c) In all cases, water^ is used efficiently.		

Table 20 One Plan Chapter 5 Anticipated Environmental Result linkages for water quantity.

General

The One Plan policy intent for water abstraction focuses on enabling water to be allocated for use where it is available (and the opposite where catchments are at their limit or over allocated). This enabling framework and the reduction in consent costs and processing times was a shift from earlier practice under previous regional plans, especially for groundwater. In many respects this approach has been successful as it provides a clear boundary of what is and isn't available, however the challenge has been reducing allocation in over allocated catchments. There are also wider issues with an increase in the need for reticulated stock water as more waterways are fenced off, restricting stock access. There is a gap in knowledge in the number and scale of permitted activity abstractions in the region. This is not uncommon across regional councils but is an area that should be given consideration as part of the Oranga wai freshwater review programme.

It is unlikely the current allocation framework will be appropriate in the context of Te Mana o te Wai and the hierarchy of obligations. It will therefore need to be adapted or a new framework developed in response to the NPS-FM. This is discussed further under the heading "do the provisions give effect to the NPS-FM".

Surface water

Water takes are managed to safeguard life-supporting capacity and provide for identified community values. An allocation framework is set out in Chapter 16 of the One Plan. This seeks to ensure efficient use of the available resource, and that river levels do not fall below minimum flows required to support aquatic life. Allocation limits for each water management sub-zone are set out in Schedule C of the One Plan.

Taking a small volume of surface water each day is permitted for domestic and stock water uses. These permitted takes are not accounted for within the core allocation limits and there is increasing complexity surrounding accounting of stock water takes in the region and the impacts on water availability. This issue is becoming more pressing as more stock are excluded from waterways and their drinking water supply becomes reticulated. In some cases, the abstraction will still meet the permitted activity criteria, in others, consent will be required due to the abstraction rate or possibly volume exceeding the permitted amount. Enabling abstraction in over allocated catchments will not address the expectations of the NPS-FM and the hierarchy of obligations. In addressing these 'new' stock water abstractions in fully or over allocated catchments, consideration of the supporting framework should occur – namely policies 5-12, 5-13, 5-17 and 5-18. These policies guide abstraction through setting reasonable use criteria, requiring efficient use of water, outlining measures for supplementary takes and restrictions during minimum flows. Given the pressure and demand associated with water allocation, ensuring the resource is used wisely is critical. It is therefore recommended the criteria listed in these policies be assessed and the following considered:

- 5-12: Are the volumes for reasonable use still appropriate in light of the NPS-FM and emerging science. Particular thought should be given to the volumes assigned to essential takes given these are generally able to continue below minimum flow (as per Policy 5-18).
- 5-13: Are the guiding measures of efficiency adequate to ensure water is utilised in the most efficient manner possible. Do they help prevent poor practice such as leaking pipes and uncontrolled water loss (particularly for reticulated stock water and municipal supply). Are the mechanisms for water storage strong enough – should this be enhanced to place

more stringent requirements for water storage in catchments with limited water availability.

- 5-17: Supplementary water allocation provides a useful mechanism for water abstraction in catchments when flows are above median flow. This policy provides a useful mechanism to provide users with water (or extra water) during certain periods, which may be particularly useful for users who wish to store larger volumes of water for use during summer low flows, particularly if in a catchment will little or no water available. Four consents applying Policy 5-17 were issued over the 2018-2022 period, which indicates consideration or use of this policy is limited. The parameters of Policy 5-17, in combination with the storage considerations of Policy 5-13 may provide a useful pathway for users who either have no access to water during summer (due to minimum flows or full allocation) or require additional water security during this time. Consideration of these policies and how they link to the outcomes required by the NPS-FM 2020 through Objective 2.1 and Te Mana o Te Wai.
- 5-18: leading on from the comments under Policy 5-12, consideration should be given to the low-flow limits and allowances for essential takes during periods of minimum flow.
- With regard to restricting and suspending water takes, which is achieved through application of Policy 5-18: Apportioning, restricting and suspending takes in times of minimum flow, there does not appear to be a direct connection between this policy and any AER[49]. Consent conditions that restrict water takes during low flow periods cannot be directly linked to improved local environmental outcomes as they are generally one of numerous, inter-related interventions and factors in the management of freshwater quality.

For larger amounts, a consent is needed. The level of regulation depends on whether there is unallocated water available in a water management sub-zone. Most surface water consents have conditions reducing the volume of water that can be taken or stopping the take altogether when river flows are lower during the summer.

The findings from surface water quantity monitoring show the objectives have been effective in that the number of over allocated catchments has reduced from 15 to six since the One Plan came into effect. There is still work to be done to bring the remaining six catchments into the core allocation limits. However given the low level of over allocation for most of these catchments, this is expected to be achievable, although the timeframe is still bound by the consent renewal process. For the few catchments that are significantly over allocated (i.e. 200 per cent allocated), it may not be practical to bring these catchments into their respective allocation limits. Work will need to be undertaken to assess what can and can't be achieved in these significantly over allocated catchments, particularly in light of the NPS-FM framework and hierarchy.

The One Plan anticipated environmental results for surface water allocation link back to ensuring water quality is improved (or at a minimum is no worse) where it was degraded prior to the Plan becoming operative, and maintained where water quality met the targets prior to the Plan becoming operative. This recognises the inherent role water quantity plays in the health and life supporting capacity of surface water. In considering the water quality outcomes outlined in section 6 of this evaluation, it is clear that there are catchments within the region where water quality remains degraded. It is not possible to draw a robust conclusion as to whether these catchments with degrading water quality are due to the amount of water abstracted or activities (both natural and unnatural) occurring within the catchment or a combination of both. However, given the majority of catchments are within the allocation limits, the anticipated environmental result is being **partially achieved** in relation to surface water abstraction (with the exception of those catchments that are still over allocated). Given there are catchments within the region still experiencing degrading water quality, the section of the anticipated environmental result requiring water quality improvement has **not been achieved**. However, it is not clear what role water

[49] See also One Plan section 5.6, the anticipated environmental results for Chapter 5 Water.

allocation levels have played in these catchments and further work will need to be done to define this in the future.

Regarding the objectives, all resource consents issued for water abstraction are assessed to consider if the volume of water sought is reasonable and justifiable for its intended use, as guided by Policy 5-12. Conditions are also imposed requiring abstraction to cease at minimum flows (for non-essential takes). Policy 5-13 outlines efficiency criteria to be considered for water abstractions. While these policies contribute to ensuring an efficient use of water, there are few practical measures of efficiency in New Zealand at this time, which makes an assessment of whether water has been used efficiently (as required by Objective 5-3(c) of the One Plan) difficult. Any conclusion would be cursory, at best. On this basis, it is concluded that the One Plan **objectives relating to water quantity have been achieved in part**.

However, given there are still some catchments showing degrading water quality trends, **it would be sensible to consider the water allocation levels in these catchments to determine the role of water abstraction on nutrient levels in the catchment**. This assessment could consider the amount of water abstracted and whether the allocation framework is suitable to ensure the life supporting capacity of the catchment and to support the values that will be confirmed through the Oranga Wai NPS-FM plan change project.

Groundwater

Groundwater is split into management zones with the allocation levels for each zone set out in Schedule D of the One Plan. Taking a small volume of groundwater each day is permitted for domestic and stock water uses. For larger amounts, a consent is needed. The level of regulation depends on whether there is unallocated water available in a GMZ. Most groundwater consents that have a hydraulic link to surface water have conditions reducing the volume of water that can be taken or stopping the take altogether when river flows are lower during the summer.

Consideration of the SoE and Catchment Stocktake reports reveal that there are no over allocated GMZs in the region, despite a significant increase in demand in some areas. Monitoring has identified some issues with increases in declining water levels in the Santoft area, however this trend has stabilised through the use of the resource consent process imposing conditions to restrict abstraction at specified times. This is a good example of how the rule, objective and policy framework has been applied to minimise environmental impacts of abstraction while still enabling people and communities to take water for their needs.

Based on monitoring, it appears the amount of groundwater used does not exceed replenishment rates and its quality is the same as or better than that measured prior to this Plan becoming operative. On that basis it can be determined that **the Anticipated Environmental Result and objectives are being met** and the objective and policy framework are effective.

Overall findings

The One Plan's water allocation regime (including metering and low-flow restrictions) appears to be effective in reducing over allocation regionally, however the pace of change is not as fast as it could be. Questions likely to arise include, reducing over allocation where existing consents are in place and not due to expire, harvesting and storage (especially in the context of climate change), accommodation of takes to replace direct stock access to waterways, the impact and management of permitted abstractions into the future, and enabling economic use of Māori land. The impacts of climate change on the availability of water will also need to be considered going forward.

Where a WMZ is over allocated (usually the result of old water permits having been granted before the core allocation limits were established in the One Plan), Horizons works with individual and groups of permit holders in those sub-zones to help them use water more efficiently and voluntarily changing their consent to reduce the amount they can take, or to collectively reduce the volume when their consents expire and they apply for a replacement. This approach means it can take significant resource and/or time to reduce over allocation levels in catchments. An alternative

approach is to use the consent review under section 128 of the RMA, however this is tightly regulated and in the past has not been a viable option. The current approach and framework is unlikely to fully meet the NPS-FM directive to eliminate over-allocation.

The tension between ensuring sufficient quantity for hydroelectricity generation and providing for ecosystem health should be noted. The Tongariro Power Scheme has a significant impact on the health and wellbeing of the catchments it operates in. However, the importance of the scheme's contribution to New Zealand's electricity supply and greenhouse gas objectives must also be recognised in accordance with the NPS-FM (clause 3.31). The Tongariro Power Scheme's resource consent will expire in 2039.

Key findings include:

- Overall, the surface water **objectives have been achieved**. However evidence suggests the **Anticipated Environmental Result has only been partially achieved** due to the ongoing degradation of some catchments (which have not improved since the Plan came into effect). However the correlation between surface water allocation levels and water quality in these degraded catchments is not clear and more analysis will be required.
- The provisions have resulted in a significant decrease of over allocated catchments in the region. This is positive. However, the ability to reduce over allocated catchments is largely dependent on the expiry of existing consents, which affects how quickly over allocation can be addressed.
- The policy and rule framework should be reviewed and options considered to enable over allocated catchments to be brought within allocation outside of the consenting timeframes (if possible).
- More consideration and analysis, where possible, of stock water abstraction across the region. Consider options for including stock water allocation and levels in the allocation framework. Consideration of the policy framework for 'new' stockwater takes in over allocated or fully allocated catchments where stock drinking water has previously been via direct stock access to a waterway.
- Assessment of the allocation framework and policy and rule provisions under the NPS-FM lens, particularly for the hierarchy of obligations. It is likely the provisions and allocation framework don't align fully with the NPS-FM.
- The allocation limits should be considered, particularly in catchments with degrading water quality to assess linkage between water/flow level and quality.

Does the provision give effect to the NPS-FM?

- Does it give effect to Te Mana o Te Wai?
- Does it give effect to the hierarchy of obligations?

The One Plan does not explicitly state or link to the NPS-FM equivalent limits or targets, nor does it state timeframes for addressing over allocation where it is identified. This is a gap that will need to be addressed through the next review of the One Plan and if nothing else will need to be outlined in the Action Plans required by the NPS-FM.

In light of the NPS-FM requirements, consideration of the interaction between allocation of water and a catchment's limits for water quality needs to be considered further. The NPS-FM allocation limits appear to apply to allocation of water quantity and quality. The NPS-FM defines a ***limit on resource use*** *as meaning the maximum amount of a resource use that is permissible while still achieving a relevant target attribute state (see clauses 3.12 and 3.14 of the NPS-FM)*. This requires Council to also think about the use of a resource as a whole rather than in the individual silos of water allocation and discharges into water (i.e. allocation of nutrient loads). The One Plan policy provides a good framework for this but needs to take the next step to consider this on a more integrated basis.

The NPS-FM also includes detail and direction for setting flows, take limits and monitoring of FMUs. This is outlined in clauses 3.16, 3.17 and 3.18 of the NPS-FM. In addition, clause 3.29 provides specific direction for freshwater accounting. The current policy, rule and allocation framework goes some way to meeting these requirements, however there are elements within the NPS-FM that are not addressed through the One Plan currently, including (but not limited to):

- 3.16: Alignment with values (which may change as a result of the review of other sections of the One Plan), having regard to climate change impacts, taking into account results or information from freshwater accounting systems.
- 3.17: stating in the Plan which existing water permits will be reviewed to comply with environmental flows and levels and the ability to impose conditions on resource consents to meet environmental flows and levels.
- 3.18: Methods for monitoring must include mātauranga Māori and the health of indigenous flora and fauna.

Lastly, as with all other freshwater provisions in the One Plan, the water quantity objectives, policies, rules and methods were developed under the previous planning regulations which did not place the same hierarchy of obligations on water quality as Te Mana o te Wai (the fundamental concept of the NPS-FM). For this reason, the provisions relating to water quantity are unlikely to give full effect to the NPS-FM and Te Mana o te Wai. Consideration of these provisions under the lens specified by the NPS-FM will be required.

Is there evidence that the policies and methods are being used/applied in an effective way?

Overall, the water quantity provisions appear to be working and applied as intended. In particular surface water and riparian takes complying with the controlled activity rule are processed quicker and at a lesser cost than those which do not meet the allocation limits. The same is true for those activities assessed as a discretionary activity under Rule 16-6 (Existing essential takes and uses of surface water complying with core allocations taken at or below the minimum flow). See Section 8.5, consenting costs for more detail on the average processing costs.

As outlined previously within this section, the policy intent of Chapters 5 and 16 for water allocation is to enable water to be taken without onerous consenting requirements when there is capacity within the Schedule C allocation limits. The figures provided in section 8.5 of this report indicate that consent processing for controlled activity water abstraction (where there is water available within the allocation limits) is quicker and cheaper than those processed as a non-complying activity. In fact the number of consents processed as a non-complying activity in the last four years is significantly less than those treated as a controlled activity.

There are known issues with management of stock water abstraction and a paper to the Strategy and Policy Committee in October 2020[50] outlines these issues. It states there is likely to be an increase in the amount of resource consents received for stock drinking water and there is likely to be a number of instances where there is:

- Insufficient available allocation in the allocation framework;
- No numerical core allocation limit (requiring individual assessment);
- Insufficient flow data to allow assessment of takes in small streams.

These issues will have an impact on the ability for resource consents to be issued for takes over and above the One Plan Permitted Activity limit (where water is not available for abstraction). The impacts may range from Horizons being unable to lawfully issue a resource consent for the take, to delays in the consenting process while hydrological data is collected and assessed.

Overall, the intent of the policy appears to have been working, however, the management of stock water abstractions (in over allocated catchments) is something that will need further consideration in future reviews of the One Plan water allocation provisions.

Do the plan provisions have the support of users – is the plan perceived to work, are the provisions enforceable?

- Can the Plan reasonably be implemented?

A range of issues have been identified through implementation of the water quantity provisions. Many of these issues have been outlined in this chapter of the evaluation. The table that follows

[50] Report number 20-158, dated 11 October 2020.

provides an overview of implementation issues collated since the Plan came into effect based on information from the regulatory team.

Water Quantity: Issues with rules and policy framework			
Subject / issue	**Reason**	**Background/explanation/ notes**	**Possible action**
Rule 16-1 (surface water abstraction) Permitted Activity	Allows abstraction for animal farming up to 30 m^3. All other uses are limited to 15 m^3.	Animal farming is not defined and it is unclear whether this applies to certain types of animal farming in particular or all.	Define animal farming.
Rule 16-1 (surface water abstraction) Permitted Activity	The rate of take must not exceed 2 l/s. To assess compliance with this, the user would need to install a meter to monitor whether they are permitted.	The 2 l/s requirement is lower than current water abstraction regulations which specify a take rate of 5 l/s.	Consider whether the take rate should increase to 5 l/s in line with regulations.
Rule 16-2 (groundwater abstraction) permitted activity	Associated with riparian bores where the abstraction is connected to surface water. The provisions within Rule 16-1 relating to volume should apply.	Needs to have an allowance to take up to the PA Surface water volume where the take is within 100m of a river or doesn't meet the 400 l/ha criteria.	Allow a take of 15-30 m^3/d as a Permitted Activity regardless of bore location same as the surface water rule (16-1).
Rule 16-5: End use of water abstraction and cultural effects	Controlled Activity status of Rule 16-5 does not enable consideration of cultural effects from an activity.	Recent consent application to take surface water for water bottling met all conditions to be a Controlled Activity under Rule 16-5. Iwi expressed concerns about the abstraction for this purpose, from a cultural perspective. The conditions and control/discretion outlined in Rule 16-5 does not provide a pathway for situations where an activity has cultural effects. Consideration of cultural impacts should also be a matter of discretion for groundwater abstraction.	Review the Conditions and matters of control under Rule 16-5 and consider whether an exception is needed where iwi identify cultural effects or if provision for cultural matters is a matter of discretion regardless. This potentially results in an adjacent issue surrounding activity status and could apply to other controlled activities in the Plan
Rule 16-14 (controlled activity)	Drilling bores within setback (e.g. 20 m) is provided for under the Controlled Activity rule but taking water is not permitted. E.g. within 200 m of a wetland.		Consider including a setback in this rule too. Alternatively, include the exclusions in the consent application forms as it is something that can easily be missed.
Stock exclusion and water allocation	Exclusion of stock from the region's waterways is encouraged as it is an important tool in improving water quality. The NES for stock exclusion requires stock access to surface water to be prevented. In order to meet these provisions and still provide water for stock, owners will need to install reticulated systems and depending	A number of catchments in the region are fully or over-allocated or nearing allocation limits. Consenting pathways for takes in full or over-allocated catchments (regardless of use) are difficult and there is no clear guidance within the rule for essential takes. Work need to be undertaken to identify the areas where this is likely to be an issue for current stock water takes, not regulated at present but requiring consent	Consideration of defining 'default' core allocation limits following completion of study and identification of priority areas.

Water Quantity: Issues with rules and policy framework			
Subject / issue	**Reason**	**Background/explanation/ notes**	**Possible action**
	on stock numbers, may require resource consent.	once stock exclusion is applied. Priority areas will be identified.	
Schedule C cumulative allocable volumes	The cumulative allocable volumes (blue highlight in Schedule C) are missing for some sub-zones.	The blue highlighted cumulative limits in schedule C are there to recognise the interconnectedness between subzones. They are in addition to the whole zone (dark grey line) limits. Blue line limits are missing from (table C.1): • Upper Whakapapa (Whai_2b), Lower Whakapapa (Whai_2c), Piopiotea (Whai_2d) – There should be a blue line cumulative limit for these subzones equalling the allocation limit of Lower Whakapapa (Whai_2c). • Upper Ongarue (Whai_2f) and Lower Ongarue (Whai_2g) – There should be a blue line cumulative limit for these subzones equalling the allocation limit of Lower Ongarue (Whai_2g). • Upper Makotuku (Whau_3b), Lower Makotuku (Whau_3c), Upper Mangawhero (Whau_3d), Lower Mangawhero (Whau_3e), and Makara (Whau_3f) – There should be a blue line cumulative limit for these subzones equalling the allocation limit of Lower Mangawhero (Whau_3e).	Check schedule C limits and add 'blue line' cumulative limits for these sub-zones.

Table 21 Implementation issues for water allocation

Other than those related to the NPS-FM requirements, are there other emerging issues relating to freshwater that are not being addressed?

- Are there any provisions in the NPS-FM that the One Plan does not address currently?

Other than the issues highlighted in the above table, none have been identified.

8.5 Plan efficiency

This section evaluates the efficiency of the Chapter 5 and 16 provisions. It considers the cost of monitoring, non-regulatory interventions, enforceability of the provisions and regulatory costs to test the practicability of the provisions.

Costs and resourcing

The cost of delivering the water quality and quantity monitoring programmes is significant. However, this is supplemented by environmental grants and central government funding which limits the amount that needs to be recouped through rates. Consent processing and compliance monitoring costs are recoverable.

There are a number of activities undertaken by Horizons Regional Council staff in relation to the provisions of Chapters 5 and 16. The primary activities involve the water quality and quantity monitoring programme which is substantive. The graph below has been sourced from the Horizons

Long Term Plan 2021-31 and shows the planned operating and capital expenditure for land and water activities over the next ten years. The water quality and quantity expenditure totals approximately $8 million in the 2021, with this increasing to $12-14 million in 2022-24 in the Long Term Plan. Of this, approximately 45% is funded through grants, subsidies, fees and charges (i.e. not rate funded).

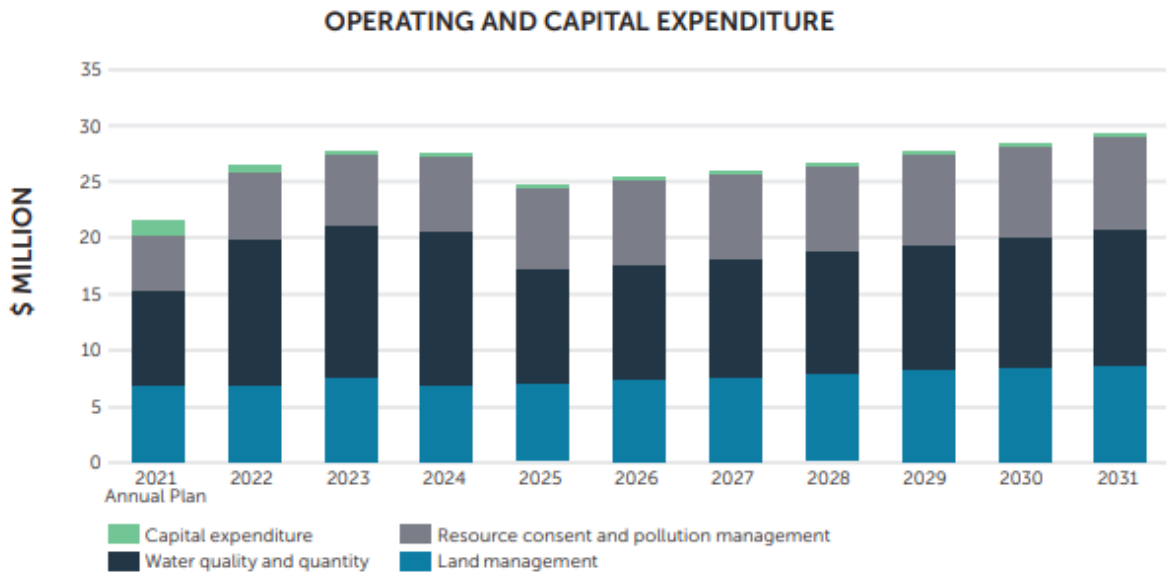


Figure 27 Horizons Long Term Plan 2021-31, operating and capital expenditure. Land and water activities.

Consenting costs – water abstraction

Water is abstracted for a variety of reasons ranging from providing stock drinking water to use in industries such as milk and meat processing. Water abstraction is either defined as groundwater (from a bore) or surface water takes (from a river, lake or spring). There are also riparian takes, which are abstraction from a shallow bore that is located within 100 m of a surface water body and hydraulically linked to that surface water system.

Surface water: A total of 57 water permits to take surface water were processed between 1 October 2018 and October 2022. Of these four were processed as non-complying activities, 15 were processed as discretionary activities (under Rule 16-6 and s127 as a variation), and 37 were processed as controlled activities. Four applications were withdrawn, one of which was deemed a permitted activity.

Of the four non-complying consents processed between 1 October 2018 and October 2022 under Rule 16-8, one was publicly notified, and three non-notified. The publicly notified application related to provision of public water supply for the Tokomaru community. Submissions were received, however the application did not proceed to hearing due to all matters being resolved. The other applications included a short-term consent of two years to undertake a nutrient trial associated with the Palmerston North City Wastewater Treatment Plant and two were for stock water provision. Other than the Tokomaru application, the non-complying consents were processed on a non-notified basis and processing costs were under $6,000. The Tokomaru application was processed over 276 working days (including days on hold) and cost $7,514.78.

There were 34 Water Permits granted to abstract surface water as a controlled activity between 1 October 2018 and October 2022 (three were withdrawn). These consents processed under Rule 16-5, on average, cost $2,269.00 and took 51 days to process. However, there are two outliers in the data, where consent processing exceeded 200 days and cost more than $5,000. These two consents required significant engagement with iwi and were also part of a larger consent

package (e.g. multiple extractions). If excluding these two outliers, the average cost and processing time for controlled activity water abstraction reduces to **$1,973** and **33 days**.

The 15 consents granted to abstract surface water as a Discretionary Activity (under Rule 16-6 or as a variation to an existing consent) cost on average **$1,815.00** to process. Processing time took an average of 36 days.

By comparison, the four non-complying water permits cost on average $4,792.45 and took an average of 92 days to process.

Combining all surface water abstraction consents processed (including granted and withdrawn applications) in the 2018-2022 period, the average processing cost was $2,421.17.

Groundwater: 159 applications processed, of which: two were publicly notified (one granted and one under appeal), four were limited notified (all still awaiting hearing), 61 non-notified and granted, seven deemed permitted activities and returned, three withdrawn, eight returned (under s88 as deficient), and 67 are still being processed. Of those consents granted on a non-notified basis, the average cost was **$3,185.56**. Non-notified groundwater abstraction consents took on average 31 days to process. The average processing time excludes four consents which took more than 100 days to process (due to further information requirements and/or iwi engagement).

The granted publicly notified consent was associated with a suite of applications for construction of the new Manawatū Tararua Highway, Te Ahu a Tūranga. Consent has been granted and the processing costs have not been included when assessing the average cost of processing groundwater takes as the total cost of this project covers multiple consent types and is not representative of the cost of obtaining a groundwater permit.

The publicly notified consent under appeal (as at October 2022) is for groundwater abstraction associated with the development and operation of a golf course in Ohau. A number of other consents and permits were also sought, including vegetation clearance and land disturbance in rare, threatened, and at risk habitats. This consent was heard at a public hearing. The water abstraction element of the proposal was granted, however other elements such as vegetation clearance within the coastal foredune were declined. Processing costs totalled **$112,093.85** (not including appeal costs) and took 253 days to process.

Combining all groundwater abstraction consents processed, the average processing cost was $2960.98 including those that were withdrawn, deemed permitted, granted, or returned as deficient. This average does not include applications still being processed by the consents team or those that were publicly notified.

Riparian takes: 25 applications processed, of which: four were returned (with one being deemed a permitted activity), one was withdrawn, 13 are still being processed (on hold) and seven were granted. Of those granted, six were processed on a non-notified basis and one was limited notified. Of those granted, on average, **cost $2,115.01 and took 25 days to process**.

Activity type	Number processed[51]	Number declined	Number withdrawn	Average cost[52]
Water Permit – surface water take (non-notified)	54	Nil	4	$2,421.17
Water Permit – groundwater (non-notified)	84	Nil	3	$2,970.80

[51] Does not include applications still being processed – i.e. lodged but no decision.
[52] Of those granted, withdrawn or returned. The average cost excludes publicly notified consents as they are less common and generally always attract higher costs.

Water Permit – riparian	25	Nil	1	$2,115.01

Table 22 Water abstraction consent processing costs

In comparison to other councils, the number of processing days and median application fee (includes processing costs) for water permits, Horizons Regional Council sits in the middle of the pack with similar processing times and costs to Hawke's Bay Regional Council and Waikato Regional Council. The table below sourced from Ministry for the Environment's national consents monitoring database, provides an overview of consent processing data for water permits in regional councils of similar size.

Council	Consents granted	Granted (%)	Median working days (non-notified, no hearing)	Processed on time (%)	Median application fee (non-notified, no hearing)
Bay of Plenty Regional	138	99.28	58	91.37	4845
Environment Southland	133	100	22.5	96.99	2053
Greater Wellington Regional	78	100	40	100	1606
Hawke's Bay Regional	51	100	45	100	2769
Horizons Regional	45	100	49	62.22	2413
Waikato Regional	174	100	98	97.7	2628

Table 23: Summary of Regional Council water permit processing data[53]

On the whole **consent processing** costs are considered reasonable, however limitations with the data available mean there is a margin of error in the above figures. And of course these do not account for the 'whole of consent' costs (e.g. application development, undertaking the consented activity, or monitoring costs).

8.6 Overall assessment of Plan effectiveness and efficiency – Water quantity

In assessing the effectiveness and efficiency of the One Plan throughout this report, there have been two primary lenses applied. The first is whether the One Plan provisions have shown to be effective or efficient for the purposes of s35. The second is whether the One Plan aligns with the requirements of the NPS-FM 2020. In simple terms, the evaluation is assessing whether the One Plan is fit for purpose, with current information and updated legislation in mind.

Effectiveness

Overall, many aspects of Chapters 5 and 16 of the Plan are working as expected when it comes to management water abstraction in the region, however the rate of change has not been as quick as it could be – largely due to existing resource consents 'locking up' water in over allocated catchments. The improvement in a range of water quality parameters signals that the Plan has been successful in addressing water quality degradation within the region, particularly in target catchments. However, there are areas where monitoring is showing no improvement in some surface water quality parameters – the role water allocation plays in this is a valid consideration.

On the whole, there have been improvements in water allocation within the region. Of note is the number of over allocated water management zones and subzones which has reduced from 15 to

[53] Source: Ministry for the Environment National Consents Monitoring database.

just six since the One Plan came into effect. While this is positive and represents a 60 per cent reduction in over allocated catchments, there is still the fact that there are six catchments which have not be brought within allocation levels over the current life of the Plan. This suggests the Plan has not been fully effective. The constraint to bringing these catchments back within allocation limits has been existing resource consents which are still in force, meaning opportunities to limit the amount allocated through consent are reliant on consent expiry or consent holders voluntarily reducing their abstraction prior to expiry. Discussions about reduction of abstraction or moving abstraction location to reduce over allocation typically only happen at the time of consent renewal which affects the ability to reduce over allocation quickly or out of the consent cycle.

Ultimately, the One Plan has set a good foundation for setting limits and expectations around the amount of water available for abstraction. Moving forward, consideration of the allocation limits and whether they are appropriate to provide for the health[54] of the water (specifically surface water) may need to occur to ensure these limits are appropriate, as well as managing over allocation outside the consent cycle and addressing essential stock water abstraction within fully or over allocated catchments. In addressing these 'new' stock water abstractions in fully or over allocated catchments, consideration of the supporting framework should occur – namely policies 5-12, 5-13, 5-17 and 5-18. These policies guide abstraction through setting reasonable use criteria, requiring efficient use of water, outlining measures for supplementary takes and restrictions during minimum flows. Given the pressure and demand associated with water allocation, ensuring the resource is used wisely is critical. Consideration of hydroelectricity and its impact on surface water quality will also need to be undertaken. That aside, the provisions are largely considered to be effective.

In terms of groundwater, it appears the amount of groundwater used does not exceed replenishment rates and its quality is the same as or better than that measured prior to this Plan becoming operative. On that basis it can be determined that the Anticipated Environmental Result and objectives are being met and the objective and policy framework are effective.

A summary of key matters and findings associated with Plan effectiveness are outlined in the table below.

One Plan Provisions	NPS-FM requirements
Water quantity	
Surface water quantity: Given the majority of catchments are within the allocation limits, in general the anticipated environmental result is being **partially achieved** in relation to surface water abstraction (with the exception of those catchments that are still over allocated). The second clause of the AER, stating: "*where water quality targets* are not met prior to this Plan becoming operative, they are either met or improved from the current state where targeted for action or, where not targeted for action, they are no worse than prior to this Plan becoming operative"* has likely **not been achieved** due to the ongoing degradation of some catchments (which have not improved since the Plan came into effect). However the correlation between surface water allocation levels and water	The One Plan does not explicitly state or link to the NPS-FM equivalent limits or targets, nor does it state timeframes for addressing over allocation where it is identified. • This is a gap that will need to be addressed through the next review of the One Plan, and, if nothing else will need to be outlined in the Action Plans required by the NPS-FM. The NPS-FM requires Council to also think about the use of a resource on a whole catchment basis, considering all impacts on quality rather than in the individual silos of water allocation and discharges into water (i.e. allocation of nutrient loads). • The One Plan provides a good framework for enabling integrated management but doesn't go far enough to meet the NPS-FM. The impact of surface water allocation on water quality and the

[54] Includes cultural health which is a key component of Te Mana o Te Wai but is not addressed explicitly in this evaluation (see the Chapter 2, Te Ao Maori s35 evaluation for detail)

One Plan Provisions	NPS-FM requirements
quality in these degraded catchments is not clear and more analysis will be required. There are a number of refinements to the objective, policy and rule framework required, however the majority of these are minor and as such these provisions are deemed to have general support from users. **Groundwater quantity** Regarding groundwater takes the Anticipated Environmental Result and objectives are being met and the objective and policy framework **are effective.** There are a number of refinements required, however the majority of these are minor and as such these provisions are deemed to have general support from users.	overall catchment values needs more consideration. As with all other freshwater provisions in the One Plan, the water quantity objectives, policies, rules and methods were developed under the previous planning regulations which did not place the same hierarchy of obligations on water quality as **Te Mana o te Wai**. The provisions relating to water quantity are unlikely to give full effect to the NPS-FM and Te Mana o te Wai. • Consideration of these provisions under the different lens specified by the NPS-FM will be required Clauses 3.16 and 3.17: These include additional considerations for setting of flow levels and dealing with over allocated catchments, where there are existing consents to abstract surface water: • Alignment with values (which may change as a result of the review of other sections of the One Plan), having regard to climate change impacts, taking into account results or information from freshwater accounting systems. NPS-FM clause 3.16. • State which existing water permits will be reviewed to comply with environmental flows and levels and the ability to impose conditions on resource consents to meet environmental flows and levels. NPS-FM clause 3.17. These provisions will need incorporating into the One Plan.

Recommended considerations

Based on the above findings, the following considerations are recommended as part of any future freshwater review of the One Plan:

- The impacts of climate change on the availability of water will need to be considered going forward.
- Consideration of the allocation limits and whether they are appropriate to provide for the health of the water (specifically surface water) will need to occur to ensure these limits are appropriate to meet the Te Mana o Te Wai hierarchy.
- For catchments still experiencing degrading water quality, further analysis on the of role water allocation limits in these areas.
- Consideration of 'new' essential takes, particularly stock drinking water, in fully or over allocated catchments. Currently a consenting issue where historically drinking water has been via stock access to waterways but with stream fencing these takes are now reticulated and in some cases require resource consent.
- Consider the supporting policy framework for essential takes (5-12, 5-13, 5-17 and 5-18) and how this might be adapted to address essential use abstractions in fully/over allocated catchments considering options such as supplementary takes and storage.
- Consider the efficiency criteria, with a focus on essential takes and whether the current framework is good or best practice for reasonable use and efficiency – e.g. are the volumes outlined in Policy 5-12 still considered accurate and do the measures outlined in 5-13 go far enough to ensure water is being used efficiently.
- Policy 5-18: Apportioning, restricting and suspending takes in times of minimum flow, does not appear to have a direct connection to an AER. This needs to be addressed in any future plan review.
- Consider the likelihood of being able to bring all catchments within the allocation limits. Noting that for those which are significantly over allocated (one is 200% allocated), this may be very difficult. However, failure to address over allocation would conflict with the clear intention of the NPS-FM.

One Plan Provisions	NPS-FM requirements
• The One Plan needs to include timeframes for addressing over allocation as per NPS-FM requirements. • The tension between ensuring sufficient quantity for hydroelectricity generation and providing for ecosystem health is noted and will require consideration through the Plan change process. • The Tongariro power scheme is listed as a large hydro-electric generation scheme in the NPS-FM (clause 3.31) and regard must be had to it. This will require addressing through the NPS-FM plan change. • There are some regulatory issues surrounding the rules, namely controlled activity abstraction and iwi values associated with end use (i.e. water bottling). Consideration of how or whether these issues should be addressed will be needed. • Consider holistically the impacts of the available quantity and quality of the freshwater resource as an integrated whole. • Consider the place of Action Plans. • Build in requirements of NPS-FM Clauses 3.16 and 3.17 into the Plan. • Consider appropriateness of the wording of AERs (if these are to be carried through into the NPS-FM plan change) and timeframes for achieving outcomes. • Review the groundwater management zones and whether they can fit within the FMU framework.	

Table 24: Summary of findings and recommendations from effectiveness assessment

Efficiency

Evaluating the efficiency of the Chapter 5 and 16 provisions has been difficult. It has required consideration against the water quality monitoring programme which is vast and complex, as well as consideration of the water allocation framework. The consent database is also complex and given the scale of this evaluation, the level of data extracted was extremely detailed. For this reason, there is likely a margin of error in the accuracy of the efficiency assessment in this evaluation. To get a complete picture of costs, analysis by a trained economist would be required to assess both the non-regulatory and regulatory costs associated with giving effect to the Plan. These costs should then be assessed against the benefits to give a true idea of efficiency. In the absence of such an assessment, consideration of the average consenting cost for various activities in recent times, comparison against other council costs and the Long Term Plan funding have been considered.

Overall, it is considered that the regulatory and non-regulatory costs **are efficient**.

9 Beds of Rivers and Lakes

Chapters relevant for water quality are, Chapter 5 *Water* of the RPS; and the following chapters from the Regional Plan:

a. Chapter 14 *Discharges to Land and Water,*
b. Chapter 16 *Takes, uses and diversions of water*
c. Chapter 17 *Activities in artificial watercourse, beds of rivers and lakes and damming.*

This section focuses on the activities in beds of rivers and lakes and the supporting policy framework in Chapters 5 and 17 insofar as they relate to freshwater quality.

Note:

One Plan provisions relating to artificial watercourses have been included in this evaluation insofar as they relate to freshwater. While the Resource Management Act excludes artificial watercourses from the definition of River (*a continually or intermittently flowing body of fresh water; and includes a stream and modified watercourse; but does not include any artificial watercourse (including an irrigation canal, water supply race, canal for the supply of water for electricity power generation, and farm drainage canal)"*), the One Plan contains its own definition for artificial watercourses as follows:

"*Artificial watercourse* *means a continually or intermittently flowing body of fresh water^ that does not meet the definition of river^ in s2 of the RMA. For the purposes of this Plan, it includes an irrigation canal, water^ supply race, canal for the supply of water^ for hydroelectricity power generation and farm drainage canal; but excludes a non-natural lake^.*

For this reason, One Plan Policy 17-2 and Rule 17-21 (minor activities involving artificial watercourses) have been included in this evaluation and are relevant for consideration against the NPS-FM requirements on the basis that they are a waterbody.

9.1 How this section works

In previous sections of this evaluation, the findings from State of the Environment Monitoring and internal Catchment Stocktake reports have been used to determine the environmental state for comparison against the objectives and anticipated environmental outcomes outlined in the One Plan. The beds of rivers and lakes (BRL) provisions of the One Plan regulate activities such as gravel extraction, construction of bridges, culverts, laying of pipes and diversions where they disturb the beds of rivers and lakes. These activities have potential to affect water quality during their construction (and shortly after), aquatic habitat, cultural values and the flood carrying capacity of the waterbody.

Section 7.3.1 and 7.3.2 provides detail on the water quality of the region's rivers and lakes. Rather than repeat the findings from those sections, this section will refer back to the findings (particularly in relation to sediment and MCI) to guide evaluation on the effectiveness of the BRL provisions.

9.2 One Plan Framework linkages: Beds of Rivers and lakes

ONE PLAN FRAMEWORK LINKAGES: BEDS OF RIVERS AND LAKES (WATER)				
Objectives (RPS)	**Supporting Policy Framework**	**Methods and Rule framework**	**Indicators**	**Anticipated environmental results**
Objective 5-4 **Beds of rivers and lakes** *The beds*^ of *rivers*^ and *lakes*^ will be managed in a manner which: (a) sustains their life supporting capacity (b) provides for the instream morphological components of natural character (c) recognises and provides for the Schedule B Values (d) provides for *infrastructure*^ and flood mitigation purposes. The *land*^ adjacent to the *bed*^ of reaches with a Schedule B Value of Flood Control and Drainage will be managed in a manner which provides for flood mitigation purposes.	**Policies** 5-22, 5-23, 5-24, 5-25, 5-26, 5-27 And **Objective** 17-1, **Policies** 17-1, 17-2, 17-3	**Method 5-11**: Water (Fluvial resources, quality and quantity) research, monitoring and reporting. **Rules** **Rule 17-1** Damming of protected rivers. **Rule 17-2** Reclamation and drainage of regionally significant lakes. **Rule 17-3** Structures and disturbances involving a reach of river or its bed with schedule B values of natural state, SOS-A and SOS-C. **Rule 17-4** use of structures. **Rule 17-5** Maintenance and upgrade of structures and ancillary removal of bed material and plants. **Rule 17-6** Removal and demolition of structures. **Rule 17-7** New and existing small dams. **Rule 17-8** Replacement consents for existing damming of water. **Rule 17-9** Lines, cables, pipelines and ropeways. **Rule 17-10** culverts. **Rule 17-11** Other structures including bridges, fords and other access structures. **Rule 17-12** recording sites. **Rule 17-13** Bridges and culverts constructed to comply with rules 14-1 - 14-4.	• Confirmed incidents of damage to the beds of rivers. • Consents granted for activities in beds of rivers and lakes.	By 2017, the natural, physical and cultural qualities of the beds of rivers are suitable for specified *Water Management Sub-zone** Values.

ONE PLAN FRAMEWORK LINKAGES: BEDS OF RIVERS AND LAKES (WATER)				
Objectives (RPS)	**Supporting Policy Framework**	**Methods and Rule framework**	**Indicators**	**Anticipated environmental results**
		Rule 17-14 Activities undertaken by or on behalf of the Regional Council in rivers with a Schedule B value of flood control and drainage. **Rule 17-15** Activities affecting Schedule B value of flood control and drainage. **Rule 17-16** small scale gravel extraction. **Rule 17-17** Other gravel extraction. **Rule 17-18** other minor bed disturbances. **Rule 17-19** Plants. **Rule 17-20** Minor activities involving artificial watercourses. **Rule 14-21** Bed disturbance of non-natural lakes to maintain their function. **Rule 17-22** Activities that do not comply with permitted activity rule general conditions. **Rule 17-23** Activities that do not comply with permitted activity, controlled activity or restricted discretionary activity rules and all other s13(1) RMA activities not covered by this chapter.		

Table 25 One Plan Framework linkages for beds of rivers and lakes

9.3 Water Quality Monitoring

Many of the region's rivers have stony gravel beds which provide a useful and convenient source of metal for roading and construction. Gravel use in the region has remained relatively stable since 2014, with a shift to only removing gravel from beaches and banks in order to minimise sediment release, disturbance of fish communities and cultural values of waterbodies. The exception to this is where extraction in the wetted channel needs to occur to minimise flood risk or erosion and scouring. Information included in the 2019 State of the Environment Report (SoE) from a case study identified that approximately one quarter of the total sediment contribution comes from natural processes, while hill country erosion accounts for around 40 per cent and erosion of the river channel around 20 per cent. These findings were specific to the Oroua River where the case study was undertaken and there will be variations in these contributions in other rivers systems in the region depending on river type and the land use activities in and around the river. Irrespective, these findings provide some useful context of the contribution of sediment within river systems.

Water quality monitoring from the SoE shows that:

- Ten year trends in river quality are predominantly **degrading** for: clarity, macroinvertebrate community index and spot measurements of dissolved oxygen.
- Comparison with the One Plan targets show nearly all river quality monitoring **fail** the criteria for water clarity.
- Seven out of 40 estuaries in the region have been identified as vulnerable to nutrient and sediment and 33 have low to moderate vulnerability.

The catchment stocktakes undertaken in 2020 provide a useful snapshot of trends within each FMU and represent the most up-to-date information for surface water quality in the region's surface water bodies. Overall the results are mixed. However, most of the seven FMUs are characterised by poor visual clarity and *E.coli* levels that fall short of the One Plan or National targets. Further, contact recreation standards and MCI scores also generally perform poorly across a number of the FMUs.

9.4 Plan Effectiveness summary

Are the anticipated environment results and objectives being achieved

The below table summarises the key objectives, indicators and anticipated environmental results (AER) associated with beds of rivers and lakes (BRL).

One Plan Framework Linkages - Aquatic Beds of Rivers and Lakes		
Objective (RPS)	**Indicators**	**Anticipated Environmental Results**
Objective 5-4 **Beds of rivers and lakes** *The beds* of *rivers* and *lakes* will be managed in a manner which: (a) sustains their life supporting capacity (b) provides for the instream morphological components of natural character (c) recognises and provides for the Schedule B Values (d) provides for *infrastructure* and flood mitigation purposes. The *land* adjacent to the *bed* of reaches with a Schedule B Value of Flood Control and Drainage will be managed in a manner which provides for flood mitigation purposes.	• Confirmed incidents of damage to the beds of rivers. • Consents granted for activities in beds of rivers and lakes.	By 2017, the natural, physical and cultural qualities of the beds of rivers are suitable for specified *Water Management Sub-zone** Values.
Objective 17-1: Regulation of structures and activities in artificial watercourses and in the beds of river and lakes, and damming (Regional Plan) The regulation of structures and activities in artificial watercourses and in the beds of rivers and lakes, and damming, in a manner that: (a) safeguards life supporting capacity, and recognises and provides for the Values and management objectives in Schedule B, and (b) has regard to the objectives and policies of Chapter 5 that relate to structures and activities in artificial watercourses and in the beds of rivers and lakes, and damming.	As above	As above

Table 26: Beds of River and Lakes: Objectives, indicators and Anticipated Environmental result.

The AER for this provision is difficult to measure. However, based on the water quality monitoring data and information from the regulatory team, it is considered that the AER for beds of rivers and lakes is likely **not being achieved** for the following reasons:

- While there has been improvement since the One Plan came into effect, many catchments are performing poorly with regards to visual clarity and contact recreation. While this is not solely related to activities in the beds of rivers and lakes, it does play a role. The wider question is really whether the values in Schedule B are appropriate to provide for the characteristics of beds of rivers and lakes while also enabling activities in the bed.
- The cultural quality of river systems is unlikely to be meeting the values (refer to the Te Ao Māori, One Plan Chapter 2 s35 evaluation undertaken in 2021-22 for more detail).
- The current framework provides for infrastructure and flood mitigation purposes, however these may not give effect to the hierarchy of obligations set out in the NPS-FM.

Certain parts of the provisions are working well. Consents for activities in beds of rivers and lakes are common place and include a number of conditions designed to protect the natural and physical characteristics of the catchment.

The consenting framework for Horizons' flood control and drainage activities is generally functioning well. The permitted activity status gives Horizons the operational flexibility do to the works required, with the particular advantage of not having to apply to another part of Horizons for a resource consent. Consequently, activities for flood control and drainage have largely been undertaken as a permitted activity in accordance with the Environmental Code of Practice for River Works[55] (ECOP), with the odd consent required for those that do not meet the ECOP (usually due to a technicality). Since the Plan came into effect, a number of new flood control and drainage areas have been identified with flood protection provided for at risk communities in these areas. The ECOP and planning framework does not provide for situations where a new Flood Control and Drainage area is developed. This gap will need to be considered and addressed through a Plan review. In addition, the issue of land use activities within the riparian margin or associated with stopbank construction in a Flood Control and Drainage area will require addressing. This disconnect within the Plan often means an activity requires resource consent for land disturbance, despite the activities in the bed being permitted.

In terms of Objective 5-4, there is no obvious evidence that it is not being achieved. It is acknowledged that water quality in many areas of the region does not meet the One Plan or National standards, suggesting that life supporting capacity is unlikely being maintained. This is however not a flaw of Objective 5-4 or 17-1, rather a wider issue endemic to catchments in the region. Consideration of the values and targets in Schedule B and E of the One Plan is required, as is directed by the NPS-FM.

Does the provision give effect to the NPS-FM?

- Does it give effect to Te Mana o Te Wai?
- Does it give effect to the hierarchy of obligations?

Fish Passage: Clause 3.26 of the NPS-FM includes a number of provisions relating to provision of fish passage (or prevention for certain species). The focus of the provisions under 3.26 are on identifying areas where fish passage is currently a problem and developing action plans which outline such areas and identify a remediation programme. Clause 3.26 also provides direction on how regional plans should promote remediation of existing structures, and matters to consider when considering applications for consent for instream structures.

The One Plan largely addresses the requirements for fish passage outlined in the NPS-FM. Any resource consent for instream structures is assessed to ensure fish passage is enabled and conditions included to ensure this occurs. From a non-regulatory approach, Council undertakes a programme

[55] Horizons Regional Council (2010)

for identifying and remediating fish passage barriers in the region. Council also identifies and addresses pest fish through the Pest Management Plan and programme. However there are a few minor gaps where the One Plan provisions will need to be amended to align with the NPS-FM, specifically:

- Identify the undesirable fish species whose passage should be prevented and strengthen the provisions around this.
- Develop a formal 'action plan' to meet the requirements of 3.26(6).
- Creation of a register that meets the requirements of 3.26(7) in relation to identifying and recording instream structures.

In addition to the fish passage requirements, the NPS-FM sets habitat as a compulsory value in Appendix 1A (physical form, structure, extent of the waterbody, bed, banks, margins) and natural form and character as an 'other' value in Appendix 1B. These values will need to be considered and incorporated into the beds of rivers and lakes chapter.

Furthermore, the direction provided in relation to deposited sediment and attribute states for water quality will affect the One Plan provisions relating to activities in the beds of rivers and lakes. These provisions will need to be updated accordingly.

The beds of rivers and lakes provisions are unlikely to give effect to Te Mana o Te Wai and most certainly do not give effect to the hierarchy of obligations. Consideration and understanding of cultural values is also limiting in the One Plan BRL provisions.

Do the plan provisions have the support of users – is the plan perceived to work, are the provisions enforceable?

- Can the Plan reasonably be implemented?

On the whole, the provisions of the BRL chapters (5 and 17) appear to be working well. Discussions since implementation with the regulatory and river management teams have outlined some minor inconsistencies and issues with the provisions. These are outlined in the table below. The key consideration for the BRL provisions relates to the ECOP under which the River Management team operate. Discussion is required to determine whether the ECOP is fit for purpose with respect to the standards and conditions it sets for carrying out common flood control and drainage activities and the schemes it can be applied to. The provisions surrounding the ECOP (specifically Objective 17-1 and Rule 17-14) would then need to be amended accordingly.

The ECOP works well in some areas and not others. There are instances where consents have been issued to Horizons Regional Council's River Management team for works in accordance with the ECOP. These are largely for 'global gravel takes' required to manage gravel build up and flood risk in flood control and drainage schemes. Consent has been required because Horizons has not been able to meet the conditions of Rule 17-14, usually due to a technicality such as works being undertaken by an independent contractor. While Rule 17-14 provides for this, the ECOP 2010 (which is the specified version incorporated by reference into the One Plan) does not. The ECOP was updated in 2014 to provide for works, in particular, gravel extraction, to be undertaken by independent contractors on behalf of the Council. The rule still needs updating to refer to the updated version of the ECOP.

A second reason Horizons River Management team may require consent is due to the ECOP not enabling land disturbance or vegetation clearance activities associated with flood control and drainage activities but located outside the bed. The rule and ECOP do not include permitted activity conditions to address the ancillary land disturbance or vegetation clearance aspect of flood control and drainage, despite this originally being the intention. This means that many of the Horizons' global consents within flood control and drainage schemes had to seek consent for works adjacent to areas with SOS-A value (i.e. Schedule F riparian margin habitat) and all other riparian areas. This leads to a perverse outcome, where an activity initially intended to be undertaken as a permitted activity requires resource consent.

Of note in the consent data are consents held by Horizons' River Management team to construct or upgrade stopbanks. These have required land use consent for large-scale land disturbance. There is a question as to whether the ECOP should address this and a corresponding provision be included in the Chapter 13. This is something that may need to be addressed through a future Plan review.

Consideration of the ECOP needs to be undertaken in light of the new water quality requirements of the NPS-FM and to take account of cultural elements which the ECOP is largely silent on. Leading on from this, a cultural lens likely needs to be applied to the BRL provisions in light of the NPS-FM and current practices relating to iwi engagement. This is also addressed in the Te Ao Māori section 35 evaluation of Chapter 2 of the Plan (undertaken separately to this evaluation).

Lastly, the ECOP provisions in Chapters 5 and 17 are related to areas identified as Flood Control and Drainage Schemes identified in Schedule B. Since the One Plan came into effect more Flood Control and Drainage Schemes have been created. These new areas are not identified under the One Plan and therefore not subject to Rule 17-14, meaning consent is required for activities undertaken by Horizons in these areas. Schedule B needs updating to incorporate the new flood control and drainage areas; however, it would also be wise to consider future needs for flood control and drainage areas when addressing this in the Plan. Climate change and its impacts are acknowledged by Horizons and it is therefore reasonable to assume that there may be other areas of the region (particularly urban areas) that may require protection in the future. How this could be addressed and provided for in the Plan is something that should be considered.

BRL: Implementation issues with rules and policy framework			
Subject / issue	**Reason**	**Background/explanation/ notes**	**Possible action**
Dams	Inconsistencies between One Plan provisions for dams in Chapter 17 and the Building Act 2004, especially around measuring the height of a dam and the point at which it becomes a 'large dam'.	Note also that Rule 17-7 condition (c) may be unworkable as it requires the depth of the water to be "measured from the natural ground level at the upstream toe of the dam structure", i.e. within the reservoir	Review in light of current dam requirements under the Building Act.
Rule 17-8 Replacement consents for existing damming of water	Rule has controlled activity status but has a clause requiring notification of adversely affected parties.	Rule was inserted as a controlled activity by the Hearing Panel, without the notification clause. Amendments were made through the mediation process.	Consider appropriate activity status for this rule and if remains controlled remove affected parties requirement.
Flood control & drainage schemes	Incorporate 'new' schemes into Schedule B.	Not all flood control and drainage schemes are identified in Schedule B as having the Flood Control and Drainage Value, because they did not exist when the One Plan was proposed and there was not scope to include them. This applies to all of the Lower Whanganui and Kahuterawa Schemes. Other pockets have also been identified around Foxton and Foxton Beach.	Update Schedule B and consider how this rule could be made more adaptive to reflect any other new schemes that come on-line after the review
Rule 17-14 Activities undertaken by or on behalf of the Regional Council in rivers with Schedule B Value of	The rule allows Horizons (and those working on our behalf) to carry out work in accordance with the Environmental Code of Practice for River Works.	The notified POP rule covered the area in and next to rivers with the Schedule B Value. However, this was narrowed	Consider rule and policy wording to avoid this outcome.

BRL: Implementation issues with rules and policy framework			
Subject / issue	**Reason**	**Background/explanation/ notes**	**Possible action**
Flood Control and Drainage	However, the rule restricts the application of the Code to works within the bed of a river. It does not permit works on land adjacent to the bed.	down in the POP decisions version to only cover the bed. At the same time, the permissive approach to land disturbance and vegetation clearance activities would have meant most of those activities were permitted anyway, and consent would only be required in areas adjacent to SoS-A that met the criteria in Schedule F to be considered riparian habitat (at-risk). The decisions version of the Plan added considerable restrictions on the land rules for activities adjacent to waterways, introducing the need to get a consent for activities carried out by or on behalf of Horizons in these areas.	Consider whether the ECOP needs updating to be more adaptive and reflect the rule and policy framework in light of NPS-FM.
Rule 17-14 (second issue)	One Plan refers to the 2010 version of the Code of Practice. The ECOP was updated in 2014 to enable Council to engage independent contractors to undertake the work and this is now the version River Management work under. The rule provides for works to be undertaken <u>on behalf of</u> the Regional Council in its description but Condition (a) requires compliance with an ECOP version that does not allow it. This is likely something that was missed when the rule was amended through One Plan hearings.	Rule 17-14 requires compliance with the Environmental Code of Practice for River Works (Horizons Regional Council, June 2010), which some River Management Team activities are not able to meet given they generally use independent contractors to undertake the work. Further, the Code of Practice was updated in 2014 and this is the version Council now uses, which makes the 2010 version redundant and consequently means Council cannot meet the conditions/standards of Rule 17-14.	Update Rule 17-14 to refer to updated ECOP.
Stopbank development and upgrade	When developing or upgrading stopbanks, Council often require resource consent to undertake large scale land disturbance under Chapter 13. The ECOP is limited to works in the beds of rivers and lakes and does not address stopbank development which is another core role of the River Management team.	If the ECOP provided for stopbank development and upgrade by Council, these activities may be addressed as permitted activities subject to specific controls. A cross reference to the ECOP would be required in Chapter 13.	Consider whether the ECOP should be updated to include stopbank development and upgrade.

BRL: Implementation issues with rules and policy framework			
Subject / issue	**Reason**	**Background/explanation/ notes**	**Possible action**
Rule 17-17 Other gravel extraction	This is a discretionary activity, with the only condition being that it cannot occur in a rare, threatened or at-risk habitat. Reverts to Rule 17-23 catch-all (also a discretionary activity) rather than Rules 13-8 and 13-9. Rule guide is potentially confusing / contradictory.	History: rule was inserted by Hearing Panel as a RD activity with a very long list of matters for discretion (to be similar to operative BRL Rule 15). Activity status changed and other conditions removed during mediation.	Consider refreshing the rule or providing clear rule guidance to create certainty for users.
Land & BRL riparian works	**Land disturbance and vegetation clearance adjacent to waterbodies associated with works in the bed:** Currently, land disturbance and vegetation clearance adjacent to a waterbody requires consent, even if it's ancillary to a work in the bed such as installing a culvert or bridge, or constructing a drain or diversion. Consider incorporating into the BRL rules? Also impact on the ECOP River Works.	Inconsistent that essentially the same activity, with the same effects (potential discharge of sediment to water) is permitted if it occurs in the higher risk area within the bed, but requires a consent outside the bed. Also inconsistent with the intention that these activities be permitted where environmental effects will be minor. Suspected that this arose as unintended consequence of more restrictive land disturbance rule regime arrived at through the appeal process; previously the land disturbance regime was quite permissive up to 2,500 m^2, in the Decisions POP.	Review the rules in each chapter and determine the best way to address disturbance in these areas. Permitted or otherwise. COP may require updating to be consistent.
Disturbance of nesting sites & activities on surface of river (e.g. boating)	Vehicles accessing Sites of Significance – Riparian during nesting season. Information sheet tries to encourage behaviour that would protect these values through, such as limiting vehicle access and sticking to established tracks. Question whether Plan needs stricter controls in this space to protect nesting sites. The current provisions are unlikely to provide comprehensive protection from some activities by river users, particularly boating, which would be considered as an activity on the surface of a waterbody (this is a territorial authority function under s31(e) RMA). Similarly, outside the CMA.	Use of the surface of the waterbody and controlling the effects of noise would be a TA function rather than a regional function. However, accessing the waterbody and associated disturbance is a regional function. We would need to **work closely with the TA's to develop a comprehensive set of protections.**	Review permitted activity rules in BRL and Coast chapters to consider whether more controls or regulation is required to protect birds and nesting sites from vehicles and boating activities. Work closely with TAs when considering this.

Table 27: Implementation issues associated with Chapters 5 and 17 (Beds of Rivers and Lakes).

9.5 Plan Efficiency

This section evaluates the efficiency of the Chapter 5 and 17 provisions. It considers the cost of consenting, non-regulatory interventions, enforceability of the provisions and regulatory costs to test the practicability of the provisions.

As outlined in previous sections, the conclusions reached in this section should be considered with caution. They serve to give an overall 'feel' as to whether the provisions are efficient. Data limitations and not being able to consider the entire cost of obtaining resource consent (e.g. application costs and consent monitoring costs) mean we are only able to consider one part of the picture.

Costs and resourcing

The cost of delivering the BRL provisions is significant, however this is offset by scheme rates, land owner contributions and the environmental benefit gained from protecting communities from flooding as well as improving water quality through reduced river erosion.

There are a number of activities undertaken by Horizons staff in relation to the provisions of Chapters 5 and 17, most notably, the management of flood control and drainage schemes across the region, which includes erosion protection works.

The graph below has been sourced from the Horizons Long Term Plan 2021-31 and shows the planned operating and capital expenditure for river management activities over the next 10 years. The management of river and drainage schemes totals approximately $12 million in 2022, with this increasing to $15 million in 2025 in the Long Term Plan.

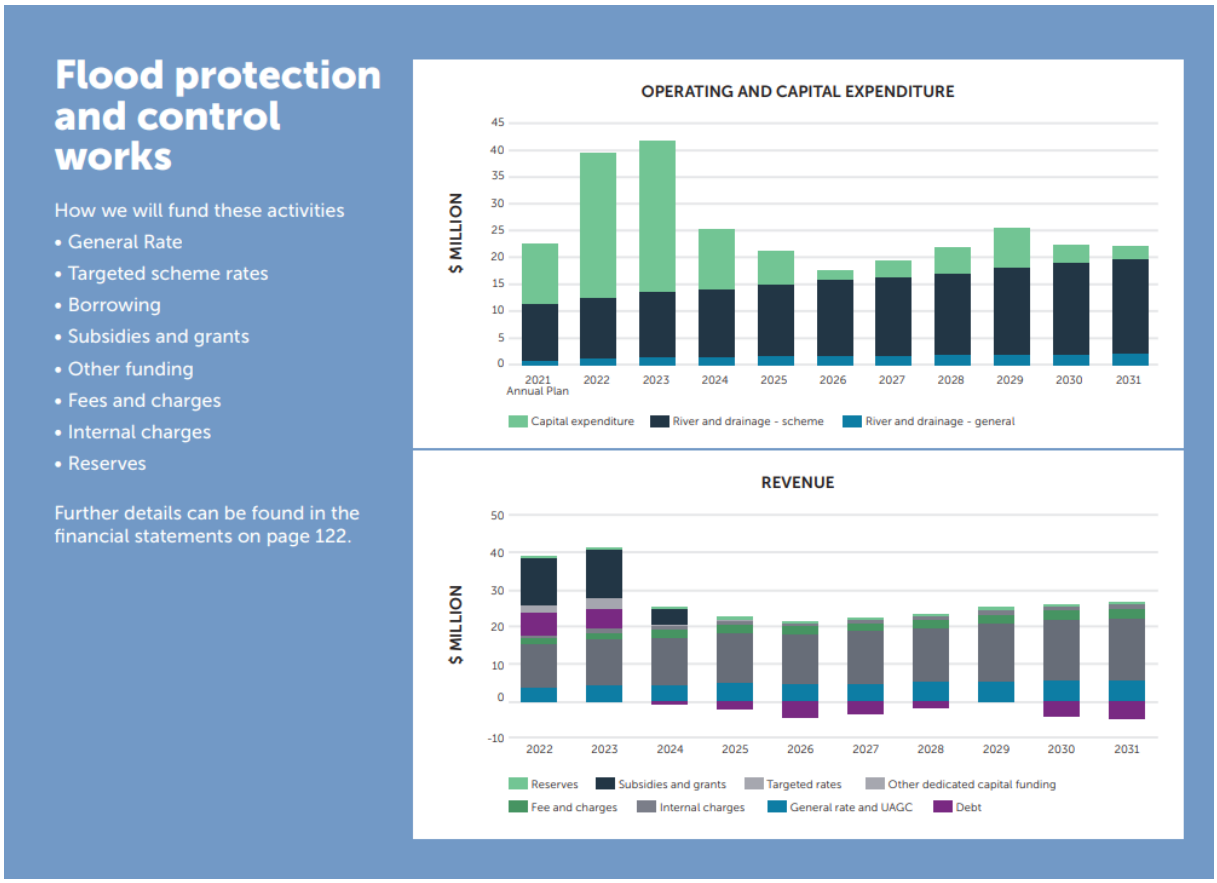


Figure 28: Horizons' Long Term Plan 2021-31, expenditure and revenue for flood protection and control works.

Further to the above, Horizons often offers environmental grants to landowners and companies to assist with undertaking erosion or flood protection works. The environmental grants for the 2020-21 year totalled $21,121.00. These grants were largely to help fund bank protection and erosion works in various streams in the region. The table[56] below outlines the details of each grant:

[56] Sourced from Horizons Catchment Operations Committee report, 5 December 2021

Name	River or Stream	Job No.	Type of work	Work status	Estimated work cost ($)	Value of grant ($)
Cvitanovech	Makirikiri	IN1514	Geo fabric	Part Completed	$14,000	$4,200
Te Rongaroa Marae	Ongarue	IN1511	Rock Lining, Layering Planting & Earth works	Approved On Hold Awaiting client funding	$35,354	$10,606
McKay & Larsen	Kiwitea	IN1516	Bank Protection	Completed	$3196.66	$958.99
Dalziel	Makirikiri Stream Upokongaro	IN1518	Channel clearance and planting	Completed	$1,380	$414
Randall	Tutaenui	IN1519	Bank Protection	Bank Protection	$11,878	$3,563
Hilton Shane	Tapuata Stream	IN1513	Rock Lining	Completed	$4600	$1380

Table 28: Environmental Grants for erosion and flood protection works 2020-21. Source: Horizons Catchment Operations Committee Report December 2021.

Consenting Costs

To assess consenting costs, a report has been extracted from Horizons' consent database, IRIS. The data extracted is from the last two years (2019-2022) only. The reason for this is that the level of detail in the extract is significant, due to it covering multiple chapters and provisions within the One Plan, making it time consuming to analyse. As with any dataset, there are limitations. The system has relied on users to input data such as policies and rules, and describe the activity. Differences in how the data is described can mean that not all activities are captured when searching by type. For example, culvert construction can be described as culvert installation, culvert construction or by the wider activity such as 'walkway access works'. This makes filtering and sorting the dataset complex. Consequently, there will be a margin of error in the costs and number of consents reported in this evaluation.

Consent processing costs vary depending on the scale and type of activity sought as well as the consenting pathway (notified vs non-notified). Some are processed for a minimal fee and some are far more expensive. For example, a simple culvert or bridge construction may cost $1,000 to process whereas a more complex erosion protection structure in a catchment with high ecological value could cost over $5,000. Below is a summary of the primary consents by type and their associated costs.

Other than the suite of consents associated with construction of the Te Ahu Tūranga, Manawatū Tararua Highway, no consents have been publicly or limited notified. Of the consents processed under the BRL provisions none have been declined. For the purpose of simplicity, these consents and any that are on hold or still being processed have not been considered when calculating the average cost of consent processing.

Note: consents to divert waterways have been included in this section. While they are classed as a Water Permit, as per the RMA, they often occur (at least partly) in beds of rivers and lakes and will also require consent under the BRL rules for bed disturbance.

Activity type	Number processed	Number declined	Number withdrawn	Average cost
Land Use Consent (gravel take)	20	Nil	2	$1947.60
Land Use Consent (culvert)	45	Nil	Nil	$2,504.19
Land Use Consent (Bridge)	19	Nil	2	$2624.03
Water Permit (diversion)	22	Nil	1 (returned)	$2,617.52
Land Use Consent erosion protection works (including riparian planting)	15	Nil	2 (returned)	$2,449.55

Table 29: Average consent processing costs for activities in the bed of the river, Chapter 17 One Plan.

While there are certainly other types of applications for various types of activities processed, they do not represent the majority. The table and discussion above focuses on the activities that represent the majority of consents processed under the Chapter 5 and 17 BRL provisions. On the whole consent processing costs are considered reasonable, however limitations with the data available mean there is a margin of error in the above figures. And of course these do not account for the 'whole of consent' costs (e.g. application development, undertaking the consented activity, or monitoring costs).

9.6 Overall assessment of effectiveness and efficiency – BRL

In assessing the effectiveness and efficiency of the One Plan throughout this report, there have been two primary lenses applied. The first is whether the One Plan provisions have shown to be effective or efficient for the purposes of s35. The second is whether the One Plan aligns with the requirements of the NPS-FM 2020. In simple terms, the evaluation is assessing whether the One Plan is fit for purpose, with current information and updated legislation in mind.

Effectiveness

Overall, many aspects of Chapters 5 and 17 of the Plan are working as expected when it comes to management of activities in the beds of rivers and lakes and have been applied appropriately. The improvement in a range of water quality parameters signals that the Plan has been successful in addressing water quality degradation within the Region, particularly in target catchments. However, there are areas where monitoring is showing no improvements in some surface water quality parameters. This includes visual clarity and MCI scores which are affected by sediment release (a primary adverse effect from bed disturbance). While it can't be determined what level of impact bed disturbance activities have had on these values (versus other activities such as land disturbance, slips, and natural state), it is known to have some impact. The evaluation contained within section 9 of this report has identified a few areas where the Plan will require review to consider the provisions against current best practice and align with changes that have been made since the One Plan became operative. Additionally, as with the surface water provisions in section 7 of this report, review may also be needed to either expedite improvements in freshwater quality, re-set or re-evaluate the anticipated environmental results and supporting provisions; and/or align with the requirements of the NPS-FM.

A summary of key matters and finding associated with Plan effectiveness are outlined in the table below.

One Plan Provisions	NPS-FM requirements
Beds of Rivers and Lakes	
The AER for the BRL provisions is difficult to measure. Many aspects of the provisions work well. However, based on the water quality monitoring data and information from regulatory teams, it is considered that the AER for Beds of Rivers and Lakes is **likely not being achieved**: • While there has been improvement since the One Plan came into effect, many catchments are performing poorly with regards to visual clarity and contact recreation. • The cultural quality of river systems are unlikely to be meeting the values (see One Plan Chapter 2 s35 evaluation on Te Ao Māori provisions for more detail). The current framework provides for infrastructure and flood mitigation purposes, however refinements to the provisions are needed. The wording of the AER should be reconsidered and potentially updated to ensure it is measureable.	One Plan provisions may need to be amended to align with the NPS-FM, specifically: • Identify the undesirable fish species whose passage should be prevented and strengthen the provisions around this. • Develop a formal 'action plan' to meet the requirements of 3.26(6) • Creation of a register that meets the requirements of 3.26(7) in relation to identifying and recording instream structures In addition to the fish passage requirements, the NPS-FM sets habitat as a compulsory value in Appendix 1A (physical form, structure, extent of the waterbody, bed, banks, margins) and natural form and character as an 'other' value in Appendix 1B. These values will need to be considered and incorporated into the beds of rivers and lakes chapter. • These provisions will need to be updated accordingly. • The direction provided in relation to deposited sediment and attribute states for water quality will affect the One Plan provisions relating to activities in the beds of rivers and lakes. These provisions will need to be updated accordingly. The NPS-FM introduces the concept of Te Mana o Te Wai and a hierarchy of obligations. Given the One Plan was adopted under a different framework, it is highly likely the BRL provisions will need to be redrafted with this in mind. In particular, the cultural effects lens needs strengthening in relation to activities in the beds of rivers and lakes.

Table 30: summary of findings from evaluation of Chapter 5 and 17 One Plan provisions and analysis against the NPS-FM requirements.

The above list is not exhaustive. There may well be other areas where the One Plan is not effective and does not align with updated legislative requirements. It is therefore likely, that while large parts of Chapter 5 and 17 have been effective, a partial review of the provisions is required as there are areas where the provisions are no longer fit for purpose and therefore **not effective**.

Efficiency

Evaluating the efficiency of the Chapter 5 and 17 provisions has been difficult. It has required consideration against the water quality monitoring programme which is vast and complex, as well as consideration of the River Management team's activities. The consent database is also complex and given scale of this evaluation, the level of data extracted was extremely detailed. For this reason, there are limitations to the accuracy of the efficiency assessment in this evaluation. To get a complete picture of costs, analysis by a trained economist would be required to assess both the non-regulatory and regulatory costs associated with giving effect to the Plan. These costs should

then be assessed against the benefits to give a true idea of efficiency. Comparison against other councils' costs would also be beneficial.

In the absence of such an assessment, the average consenting cost for various activities in recent times and the Long Term Plan funding have been considered.

Overall, it is considered that the regulatory and non-regulatory costs **are efficient**.

10 Indigenous biodiversity: Aquatic habitats

This section focuses on specific provisions relating to wetlands and aquatic and riparian biodiversity, which all relate directly to freshwater and are addressed by the NPS-FM. Terrestrial biodiversity provisions will be considered in a separate s35 evaluation.

Chapter 6 of the One Plan sets the policy framework for wetlands and Chapter 13 regulates activities around these areas through objectives, policies and rules. Schedule F identifies habitats recognised as at risk or rare and threatened, and includes wetland habitats.

At the time of publishing the One Plan, the region only had three per cent of its original wetland habitat remaining. Aquatic indigenous biodiversity has been in a state of degradation, with indigenous fish populations greatly reduced, poor habitat (loss of riparian margin and introduction of exotic species), and many barriers between coastal wetlands, streams and headwaters. Much of the remaining indigenous biodiversity is in poor condition and health with ecosystem processes more often than not interrupted. This decline in indigenous biological diversity is one of the four most critical issues addressed through the One Plan.

Preservation of the natural character of wetlands is a matter of national importance. The One Plan approach has been to at least maintain, and enhance where appropriate, the current degree of natural character of wetlands by:

- Continuing to provide a regional policy on natural character to guide decision making.
- Protecting and managing indigenous biological diversity and important wetlands.
- Restoring and rehabilitating natural character where appropriate.

The One Plan has taken the approach of providing for the natural character of wetlands by managing priority wetlands as part of the Priority Sites Programme[57]. It also includes a non-regulatory method (Method 6-1) to support protection and enhancement of wetland habitats in the region.

10.1 How this section works

This section focuses on the One Plan regulatory provisions relating to indigenous **aquatic** biodiversity and habitats. Indigenous aquatic biodiversity primarily relates to wetlands and their margins, but also lagoons, and river and stream catchments with areas identified as at risk, rare or threatened habitats (in Schedule F of the One Plan).

The findings of the 2019 Horizons State of the Environment Report (SoE) and more recent catchment stocktakes have been relied on to provide an overview of any trends or changes within these habitats over the life of the One Plan. These findings will then be used, in conjunction with feedback from the regulatory team, to complete the remaining elements of the s35 evaluation.

[57] The priority sites programme is a habitat-led programme working with landowners to maintain and enhance priority sites on private land. Previously this programme was referred to as the Top 100 wetlands, which is how it is referred to in the One Plan currently.

10.2 One Plan framework linkages

One Plan Indigenous Biodiversity Framework Linkages (aquatic biodiversity only)				
Objective (RPS)	**Supporting Policy Framework**	**Methods and rules**	**Indicators**	**Anticipated Environmental Results**
Objective 6-2: Outstanding natural features and landscapes, and natural character (a) The characteristics and values of: (i) the Region's outstanding natural features and landscapes, including those identified in Schedule G, and (ii) the natural character of the coastal environment, *wetlands*^, *rivers*^ and *lakes*^ and their margins are protected from inappropriate subdivision, use and development. (b) Adverse *effects*^, including cumulative adverse *effects*^, on the natural character of the coastal environment, *wetlands*^, *rivers*^ and *lakes*^ and their margins, are:	Policies: 6-2, 6-3, 6-8, 6-9, 6-10 And Regional Plan Objective: 13-2 Policies: 13-3, 13-4, 13-5	**Method 6-1:** Wetlands – Biodiversity. **Method 6-3:** Sites of Significance – Aquatic. **Method 6-4:** Inanga Spawning and Native Fishery sites – biodiversity. **Method 6-5:** Biodiversity (terrestrial and aquatic) research, monitoring and reporting. **Rules:** **13-8:** Some activities within at-risk habitats. **13-9:** Some activities within rare habitats and threatened habitats.	• Extent of each habitat type compared to former extent. • Number of rare habitats, threatened habitats and at-risk habitats* damaged by unauthorised activities.	Except for change because of natural processes, or change authorised by a resource consent, by 2017, the extent of rare habitat, threatened habitat or at-risk habitat* is the same as (or better than) that estimated prior to this Plan becoming operative, and the number of at-risk habitats has not increased.

One Plan Indigenous Biodiversity Framework Linkages (aquatic biodiversity only)				
Objective (RPS)	**Supporting Policy Framework**	**Methods and rules**	**Indicators**	**Anticipated Environmental Results**
(i) avoided in areas with outstanding natural character, and (ii) avoided where they would significantly diminish the attributes and qualities of areas that have high natural character, and (iii) avoided, remedied or mitigated in other areas. (c) Promote the rehabilitation or restoration of the natural character of the coastal environment, *wetlands*^, *rivers*^ and *lakes*^ and their margins.			• Number of top 100 wetlands and top 200 bush remnants under proactive management. • Habitat condition measure(s) which, where possible, will be consistent with those used by the Department of Conservation.	By 2017, the Region's top 100 wetlands and top 200 bush remnants will be in better condition than that measured prior to this Plan becoming operative.

Table 31: One Plan Biodiversity Framework linkages.


one plan

10.3 Wetland and aquatic habitat monitoring

Monitoring of the regions wetlands is undertaken through state of the environment reporting. Council's approach to management and monitoring of wetlands includes a mixture of regulatory (through consenting) and non-regulatory methods such as proactive management of priority sites, collaborative programmes and community diversity projects. The regulatory framework provided through regional rules, objectives and policies help ensure the region's indigenous habitats and species are looked after by restricting activities that will adversely affect these habitats. Non-regulatory methods include support given by Horizons, including advice, grants and work to landowners to protect habitats on their land by fencing, restoration, and pest control.

Across the region some wetlands have been monitored for their ecological condition separately from lakes as part of Horizons' non-regulatory biodiversity programme. These assessments have been conducted by Horizons and evaluate the general pressures, edge conditions, ecological conditions and integrity of different wetlands. Edges are important for wetlands as they can provide a filter for nutrients and pollution, as well as habitat for wildlife and unique plant species. Integrity as a measure considers both the ecological condition, and the hydrology of the wetland – how drainage has likely impacted the site and how the water flows for a wetland have been modified. Not all wetlands assessed are managed under the programme.

In 2015-2017 Horizons re-evaluated the wetlands that were first assessed in 2002, to determine general condition of these wetlands. The outcomes of this evaluation are addressed in the Catchment Stocktakes.

The analysis that follows summarises the key findings associated with wetland quality and the presence of rare and threatened species as reported through the SoE and catchment stocktakes.

For the purpose of clarity, the One Plan Schedule F wetland habitats are provided in the table below:

***Wetland*^ Habitat Types Classified as Rare or Threatened**			
Dune slack wetland	Dune slack *wetlands*^ support low-growing *indigenous** *herbfield** and occur in topographically low *sites** where wind has eroded hollows or depressions in raw sand, or where *water*^ is permanently or seasonally ponded.	Rare	Dune slack *wetlands*^ are found close to the sea on sand country, and can comprise a mosaic of *indigenous** vegetation and bare sand. Exotic species are frequently present.
Ephemeral wetland	Ephemeral *wetlands*^ support indigenous* turf (<3 cm tall) species, indigenous* rushland* and indigenous* scrub*, are most frequently found in depressions lacking a surface outlet, and are characterised by a marked seasonal ponding and drying.	Rare	Ephemeral *wetlands*^ are of moderate fertility, neutral pH and fed by groundwater or an adjacent *water body*^. Seasonal variations in rainfall and evaporation result in seasonal variation in *water*^ level. Ephemeral *wetlands*^ may experience complete drying in summer months or dry years. Ephemeral *wetlands*^ are found on sand country (although they also occur elsewhere), and may comprise a mosaic of *indigenous** vegetation and bare sand. Fluctuations between aquatic and terrestrial plant species often occur and exotic species are frequently present.
Bog and fen wetland	Bog *wetlands*^ support *indigenous** mosses, lichens, cushion plants, sedges, grasses, restiads, ferns, *shrubs** and	*Threatened*	Bog *wetlands*^ can be found on relatively level or gently sloping ground including hill crests, basins, terraces and within other *wetland*^ classes. Bog

Wetland^ Habitat Types Classified as Rare or Threatened			
	*trees** and are formed on peat with rainwater the only source of *water*^. *Fen* wetlands^ *support* indigenous* *restiads, sedges, ferns, tall herbs, tussock grasses and* scrub* *and are on predominantly peat. Fen* wetlands^ *receive inputs from groundwater and nutrients from adjacent mineral soils.*		*wetlands*^ are nutrient poor, poorly drained and aerated, and usually acid. The *water*^ table is often close to or just above the ground surface. Fen *wetlands*^ can be found on slight slopes (eg. fans), toes of hillsides, or on level ground without much accumulation of peat. Fen *wetlands*^ can grade into swamp *wetland*^. Fen *wetlands*^ are of low to moderate acidity and fertility and the *water*^ table is usually close to or just below the surface. *Bog* wetlands^ *and fen* wetlands^ *are often found in* association* *with each other and are* dominated* *by* indigenous* *species, but exotic species can also be present.*
Pakihi wetland	*Pakihi* wetlands^ *support* indigenous* *restiads, sedges,* fernland*, shrubland* *and* heathland*. *Pakihi* wetlands^ *are rain-fed systems on mineral or peat, or mature, skeletal soils.*	*Rare*	Pakihi *wetlands*^ can be found on level to rolling or sloping *land*^ in areas of high rainfall. Pakihi *wetlands*^ are of very low fertility and low pH and are frequently saturated, but can be seasonally dry. *Pakihi* wetlands^ *are often found in* association* *with bog and fen* wetlands^. *Exotic species can also be present.*
Seepage and spring wetland	Seepage *wetlands*^ support *indigenous** *sedgeland**, *cushionfield**, *mossfield** or *scrub**, occur on slopes, and are fed by groundwater. *A spring* wetland^ *occurs at the point that an underground stream emerges at a point source.*	*Rare*	Seepage and spring *wetlands*^ can be found at the point of change of slopes and places where the *water*^ table is raised. Seepage *wetlands*^ are often also fed by surface *water*^ including where groundwater has percolated to the surface. Substrates (ranging from raw or well-developed mineral soil to peat), nutrient levels and pH vary from *site** to *site**. Seepage and spring *wetlands*^ are often small and can occur as isolated systems or in *association** with other *wetland*^ types. The volume of *water*^ within a seepage system is less than that within a spring system. Seepage and spring *wetlands*^ are *dominated** by *indigenous** species but exotic species can also be present.
Swamp and marsh wetland	Swamp and marsh *wetlands*^ support *indigenous** sedges, rushes, reeds, *flaxland**, tall herbs, *herbfield**, *shrubs**, *scrub** and *forest**. Swamp *wetlands*^ are generally of high fertility, receiving nutrients and sediment from surface run-off and groundwater. *Marsh* wetlands^ *are mineral* wetlands^ *with good to moderate drainage that are mainly groundwater or surface* water^ *fed and characterised by fluctuation of the* water^ *table.*	*Threatened*	Substrates within swamp and marsh *wetlands*^ are generally a combination of peat and mineral substrates. Standing *water*^ and surface channels are often present, with the *water*^ table either permanently, or periodically, above much of the ground surface. Swamp and marsh *wetlands*^ can usually be found on plains, valley floors and basins. Marsh *wetlands*^ can be differentiated from swamp *wetlands*^ by having better drainage, generally a lower *water*^ table and usually a more mineral substrate and higher pH. Exotic

***Wetland*^ Habitat Types Classified as Rare or Threatened**			
			species are frequently present in both *wetland*^ types.
Saltmarsh wetland	Saltmarsh *wetlands*^ support *herbfield**, *rushland** and *scrub**, form within areas of tidal intertidal zones, and are fed from groundwater and estuary *waters*^. Saltmarsh *wetlands*^ occur in *association** with mudflats.	*Threatened*	*Water*^ within a saltmarsh *wetland*^ can be saline or brackish. Substrates are typically mineral. *Saltmarsh* wetland^ *can comprise a mosaic of* indigenous* *species and bare substrate (mudflats). Exotic species can be present. In some places the mudflats can be extensive and are characteristic of estuarine* wetland^ *systems.*
Lakes and lagoons and their margins	Lakes and lagoons support *indigenous** aquatic plants (emergent, floating, submerged or rafted), and *indigenous** rushes, reeds, sedges, *sedgeland**, *flaxland**, *reedland** turf (< 3 cm tall), *herbfield**, *scrub** and *shrubs** on the margins. *Indigenous** terrestrial vegetation (such as *scrub**, *shrub** species, *shrubland**, *treeland** and *forest**) can also be found in *association** with lake and lagoon margins. Lakes are areas of standing (non-flowing) *water*^. Lagoons are shallow lakes, connected to, or independent of, a *river*^, lake or the sea.	*Threatened*	Lakes and lagoons in the Region are associated with dune, *river*^, and volcanic landforms and include dune lakes, ox-bow lakes and tarns. Lakes and lagoons can exist in isolation, be entirely within, or have elements of, other *wetland*^ habitat types. Exotic species (aquatic, *wetland*^ or terrestrial) may also be present.

Table 32: One Plan Schedule F, wetland definitions.

10.3.1 State of the Environment, 2019

Horizons monitors a number of biodiversity sites under protection and management to track changes in their ecological health. At the time of the SoE report, Horizons had identified 1,109 biodiversity remnants, covering 52,660 hectares. Of these 1,109 sites, 309 are wetlands covering 6,906 hectares. Of the 309 known wetland sites, 124 (or 40%) have been assessed by Horizons and 66 have received either a one-off or regular funding contrition from Horizons. This is summarised in the table as follows:

Biodiversity Sites	Number of known sites	Number of sites assessed	Percentage of sites assessed (%)	Number of sites with Horizons' contribution	Percentage of sites with Horizons' contribution (%)
Terrestrial	801	376	47	145	18
Wetland	309	124	40	66	21
Total	**1,109**	**500**	**45**	**211**	**19**
	Total hectares of known sites	Total hectares of sites assessed	Percentage of hectares assessed (%)	Number of hectares with Horizons' contribution	Percentage of hectares with Horizons' contribution (%)
Terrestrial	45,754	17,480	38	11,631	25
Wetland	6,906	3,277	47	2,157	31
Total	**52,660**	**20,757**	**39**	**13,787**	**26**

Table 33: Summary of terrestrial and wetland sites inventory, including sites that have received a contribution from Horizons since the bush remnant and wetland programme commenced[58].

Horizons tracks the management level status of known sites using a management level index framework. In broad terms the management levels are described as outlined below with each management level increase above management level 1, including the requirements of the management levels below that (e.g. a management level 2 site has both the requirements of Management Level 1 and Management Level 2). The management levels are:

- 0.5: site may have received management from Horizons but has not been assessed;
- 1: Rapid Ecological Assessment completed within the last ten years,
- 2: site has received Horizons contribution to management;
- 3: site receives ongoing management input from Horizons;
- 4: site receives a higher level of management inputs;
- 5: site receives significant inputs from stakeholders;
- 6: site receives management inputs for all animal pests.

Management actions in the 2021-22 year have been prioritised to fit the available budget through a process that is focused first on adding the 11 new sites to meet the Annual Plan target, then on the 77 sites at Management Level 3 and above.

Due to changes in how sites are identified and managed, comparison against the 2013 SoE findings is not possible.

[58] Table sourced from the Horizons State of the Environment report 2019

10.3.2 Horizons 2020, Catchment Stocktakes

The 2020 Catchment Stocktakes undertaken by Horizons Policy & Strategy and Science teams also consider the water allocation status for each FMU in the region. These stocktakes provide a more recent snapshot of the current state of knowledge of the region's catchments and drill down into water quality trends by catchment (FMU). At the time of preparing this evaluation, the stocktakes represented the most recent available information on the state of each catchment[59]. The following is a summary of the allocation status and water use in each of the FMUs identified in the Catchment Stocktakes.

Ngā wai o Manawatū

There are 78 known wetlands in the Ngā Wai o Manawatū FMU. Through the 2015-17 re-evaluation of wetlands, 34 sites were surveyed in the Manawatū FMU, with mixed results. Most sites were reported in 'good ecological condition'. Nine had improved and three had degraded. None of the 34 wetland sites surveyed in this FMU were in poor condition.

Pressure scores for wetlands in the Manawatū FMU have largely remained the same, while edge conditions have improved at a few sites and degraded at others. One site (Kitchener Park) faces the most severe pressures on its wetland, despite its overall condition score remaining in the 'good' category. Careful management and monitoring of this site will be important to minimise the risk of degradation of the habitat.

The overall integrity (a combination of ecological condition and hydrological state) of the assessed wetlands in the Ngā wai o Manawatū FMU shows a slight improvement since they were first assessed in 2002.

Rangitīkei-Turakina

Through the 2015-17 re-evaluation of wetlands, eight sites were surveyed in the Rangitīkei-Turakina, with none resulting in poor condition scores. An additional four sites were added to monitoring in 2015-17. Two of these are in good condition with excellent edges (vegetation buffers) while the other two in fair condition with fair edges. Pressure scores for wetlands in the Rangitīkei-Turakina FMU have largely remained the same, while edge conditions have mostly improved. The overall integrity of Rangitīkei-Turakina wetlands shows a slight improvement.

Kai Iwi

The Kai Iwi FMU only has one wetland site, monitored in 2002 and re-evaluated in 2015-17. No additional sites were added or assessed following the 2015-17 evaluation. This site, Lake Marahau, is in poor ecological condition but good general condition. This could reflect the role and impact of exotic plants at the site that are not invasive.

The pressure score for this wetland has remained the same, while edge conditions have deteriorated. With a 'fair' rating, the overall integrity of Lake Marahau wetland has remained the same.

Whangaehu

Through the 2015-17 re-evaluation of wetlands, 12 sites were surveyed in the Whangaehu FMU and none are in 'poor' condition. One site has seen improvements in edge conditions and ecological conditions, now categorised as 'excellent' for the edge and 'good' for ecological condition. Other sites within the FMU are categorised as being in 'good' and 'fair' condition.

The pressure scores for wetlands in Whangaehu have largely remained the same. Edge conditions have improved. Two sites (Motts wetlands and Parker Gully wetland) were assessed for the first time as part of the 2015-17 evaluation.

[59] Noting at the time of completion of this report, the Oranga Wai information had been released providing further information on catchment trends but due to timing has not been considered in this evaluation.

The overall integrity of Whangaehu wetlands shows a slight improvement. No sites have changed their overall condition category.

Whanganui

	Number of sites	Hectares
Wetlands	69	1,999

At the time of writing, little information was available for the Whanganui FMU.

Ngā wai o Waiopehu (Horowhenua)

Wetlands were once extensive in the coastal Waiopehu area, but changes in land use and drainage have had a significant impact on the extent, values and conditions of wetlands in this FMU. This FMU is home to 13 lakes over 1ha in size. They are all dune lakes which are a common feature of the area and often associated with wetlands.

Five wetland sites were re-evaluated in 2015-17 after being first assessed in 2002. Of these two sites have improved since 2002. Others have remained the same. Some of the remaining wetland margins in the area are in excellent ecological condition; however, in other cases aquatic wetland health is more variable. In some cases this is because the margin is in good condition but poor ecological condition and vice versa.

Wetland pressures in this FMU present threats that relate to a lake's catchment characteristics, including likely sources of pollution, weed and predator presence, and modifications to the catchment hydrology. Regardless, pressure scores in this FMU have remained the same, while edge conditions have improved.

The overall integrity of Waiopehu shows a slight improvement.

Puketoi ki Tai (Coastal Tararua)

The Puketoi ki Tai FMU only has one wetland site, monitored in 2002 and re-evaluated in 2015-17. No additional sites were added or assessed following the 2015-17 evaluation. This site, the Oropae Wetland Complex, has improved from 'fair' to 'good'.

The pressure score for this wetland has remained the same; however, edge conditions have improved from 90/100 to 100/100. The overall integrity of the Oropae Wetland Complex shows a slight improvement.

10.3.3 Additional reporting and analysis

The SoE and Catchment Stocktakes provide useful information on the quality of the region's known and monitored wetlands. However separate work has been undertaken to assess wetland extent. Information at the regional level is reasonably scarce, however some initial analysis has been undertaken by science staff at Council against the Land Cover Database (LCDB). Version 5 of the LCDB includes a wetland indicator that can be used to identify a variety of wetland types. The indicator flags do not include lakes, ponds, rivers, or estuarine open water. The wetland indicator is present for every date of LCDB mapping so far (1996, 2001, 2008, 2012, 2018) and therefore can be used to track changes to wetlands over these time periods. However, this information does need to be interpreted with caution. Horizons' information on the number of wetlands in the region does not match the LCDB; in particular, Horizons' 'Science_KnownWetlandSite' contains 433 wetland sites (9,897 ha). Only 247 of those are identified in the wetlands in the LCDB. While the Horizons' data also includes lakes, outside of the lakes there are known wetland sites that are not identified in the LCDB; the LCDB is not completely accurate. While not perfect, it is the best information available at this time and does provide an indication of what is happening to wetland extent in the region.

The LCDB indicates that both the number of wetlands and wetland extent in the Manawatū-Whanganui region **has declined over time**. There has been a 115 ha reduction in wetland area and four fewer wetlands (28 fewer wetlands units) identified in 2018 compared to 1996. The majority of the loss has been of areas that were classified as herbaceous freshwater vegetation (110 ha, 96 per cent).

Year	# Wetland	Wetland units	Area (ha)
1996	564	990	8887
2001	563	988	8866
2008	562	977	8827
2012	562	971	8794
2018	560	962	8771

Table 34: Wetland Count and area in the Manawatū-Whanganui Region between 1996-2018

10.3.4 Summary of findings (aquatic biodiversity)

This summary has been split into wetland extent and ecological condition of monitored wetlands.

Extent of wetlands

Based on the information available, wetland extent in the region appears to be **declining overall**. Analysis of data from the Land Cover Database (version 5) shows that between 1996 and 2018 there has been a 115 ha reduction in wetland area and four fewer wetlands in 2018 compared to 1996. Looking at the time period from when the One Plan came into effect, the extent of decline appears to have reduced slightly, however there is still a definite decline in wetland extent as shown in the graph below.

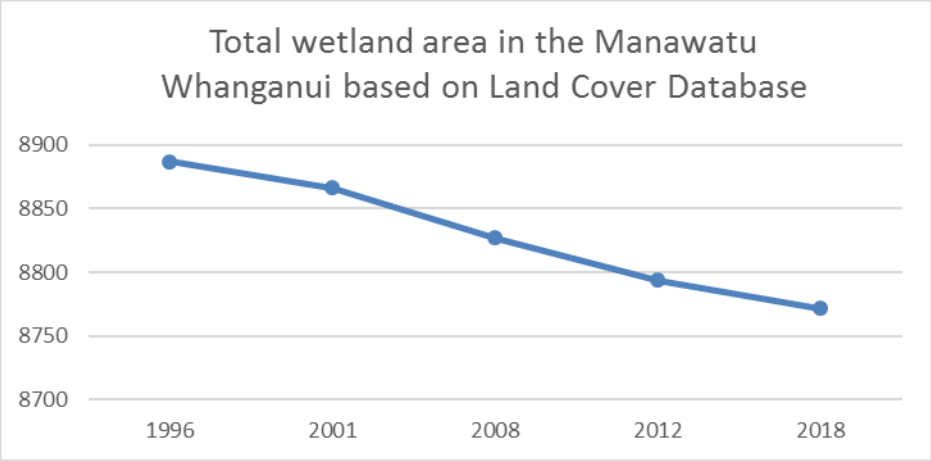


Figure 29 Total wetland area in the Manawatū-Whanganui Region based on the Land Cover Database, V5

Ecological condition of wetlands: Based on the monitoring information available, it appears overall ecological condition and hydrological state of monitored wetlands in the region has **improved** (albeit slightly) between 2002 and 2015-17. This largely seems to be due to edge conditions which have improved in all but one site. The analysis concludes that there has been a general trend of improvement across all five of the indices for sites managed under the Priority Sites Programme. This improvement is more pronounced in these sites than changes that have occurred in less formally managed sites. The results highlight that the current wetland management and co-management practices undertaken under the programme are effective at maintaining and enhancing wetland biodiversity.

The table below summarises the findings from the 2015-17 re-evaluation of monitored wetland sites that were initially monitored in 2002.

FMU	Number of sites assessed	Pressure score	Edge conditions	Overall integrity (ecological condition and hydrological state
Nga Wai o Manawatu	34	No change	improved	Slight improvement
Rangitikei-Turakina	8	No change	Improved	Slight improvement
Kai Iwi	1	No change	Deteriorated	No change
Whangaehu	12	No change	Improved	Slight improvement
Whanganui	Not available	Not available	Not available	Not available
Nga Wai o Waiopehu	13	No change	improved	Slight improvement
Puketoi ki Tai	1	No change	improved	Slight improvement

Table 35: Wetland monitoring results (overview).

The table that follows shows the number of sites (HRC has co-managed, partially managed and unmanaged).

	State	Fully Managed	Partially managed	Unmanaged
Pressure index	Improved	**0**	**1**	**0**
	Stable	**30**	**10**	**16**
	Declined	**2**	**0**	**0**
Condition index	Improved	**22**	**5**	**9**
	Stable	**7**	**4**	**4**
	Declined	**3**	**2**	**3**
Edge condition index	Improved	**20**	**3**	**8**
	Stable	**11**	**5**	**4**
	Declined	**1**	**3**	**4**
Ecological condition index	Improved	**23**	**1**	**6**
	Stable	**8**	**9**	**8**
	Declined	**1**	**1**	**2**
Wetland integrity index	Improved	**22**	**1**	**7**
	Stable	**8**	**8**	**7**
	Declined	**2**	**2**	**2**

Table 36: Wetland scores by scoring index. Table source from internal report: *the state and ecological condition of wetlands in the Manawatu-Whanganui Region 2015-2017 focus.*

Given the large and diverse nature of the region, wetland monitoring and knowledge relies on a strong partnership between Horizons, landowners and the community. Horizons commissioned modelling and mapping of the region around the time the SoE was being developed to identify the full complement of ecosystems prior to human induced land change. This was then compared with the current state and shows the extent of change for both terrestrial and aquatic biodiversity in the region. While some of the ecosystems remain relatively intact, their limited extent means that protecting these areas is crucial to ensuring their survival.

The current level of information available on monitored wetlands gives a reasonable understanding of how these wetlands are performing. However, the more monitoring that is undertaken and as the number of wetlands monitored increases, understanding of these ecosystems and the pressures on them will improve.

10.4 Plan effectiveness summary

Are the anticipated environmental results and objectives being achieved?

<table>
<tr><th colspan="3">One Plan Aquatic Biodiversity Framework Linkages</th></tr>
<tr><th>Objective (RPS)</th><th>Indicators</th><th>Anticipated Environmental Results</th></tr>
<tr><td rowspan="2">Objective 6-2: Outstanding natural features and landscapes, and natural character
(a) The characteristics and values of:
(i) the Region's outstanding natural features and landscapes, including those identified in Schedule G, and
(ii) the natural character of the coastal environment, wetlands^, rivers^ and lakes^ and their margins
are protected from inappropriate subdivision, use and development.
(b) Adverse effects^, including cumulative adverse effects^, on the natural character of the coastal environment, wetlands^, rivers^ and lakes^ and their margins, are:
(i) avoided in areas with outstanding natural character, and
(ii) avoided where they would significantly diminish the attributes and qualities of areas that have high natural character, and
(iii) avoided, remedied or mitigated in other areas.
(c) Promote the rehabilitation or restoration of the natural character of the coastal environment, wetlands^, rivers^ and lakes^ and their margins.</td><td>• Extent of each habitat type compared to former extent.
• Number of rare habitats*, threatened habitats* and at-risk habitats* damaged by unauthorised activities.</td><td>First AER:
Except for change because of natural processes, or change authorised by a resource consent, by 2017, the extent of rare habitat*, threatened habitat* or at-risk habitat* is the same as (or better than) that estimated prior to this Plan becoming operative, and the number of at-risk habitats* has not increased</td></tr>
<tr><td>• Number of top 100 wetlands and top 200 bush remnants under proactive management.
• Habitat condition measure(s) which, where possible, will be consistent with those used by the Department of Conservation.</td><td>Second AER:
By 2017, the Region's top 100 wetlands and top 200 bush remnants will be in better condition than that measured prior to this Plan becoming operative.</td></tr>
<tr><td>Objective 13-2: Regulation of activities affecting indigenous biological diversity (Regional Plan)
The regulation of resource use activities to protect areas of significant indigenous vegetation and significant habitats of indigenous fauna or to maintain indigenous</td><td>As above</td><td>As above</td></tr>
</table>

One Plan Aquatic Biodiversity Framework Linkages		
Objective (RPS)	**Indicators**	**Anticipated Environmental Results**
biological diversity^, including enhancement where appropriate.		

Table 37: One Plan policy, indicator and Anticipated Environmental Result linkages

Objective 6-2 seeks to protect areas of natural character and avoid adverse effects on areas with outstanding natural character. Wetlands by their nature are areas of high natural character. Monitoring results indicate that for the most part, monitored wetlands in the region have been protected from inappropriate subdivision and development and adverse effects on their natural character have been avoided. The foundation for this statement is that on the whole, monitored wetlands have experienced some improvement in their integrity. However, the level of information available is not substantial and more monitoring of existing sites is needed to establish robust trends in this area. Likewise the number of sites monitored and managed through Horizons' wetland programme is expected to increase which will assist with overall protection of the remaining wetland extents in the region.

Objective 13-2 seeks to guide regulation and decision making on activities in areas of significant indigenous vegetation or fauna in order to maintain and/or enhance indigenous biological diversity in the region. It is supported by a range of policies and rules guiding decision making for activities in rare, threatened and at-risk habitats. Whether this objective has been effective is determined by the activities that have been consented within these areas and their impacts overall on the extent and integrity of the habitats. Terrestrial biodiversity aside, given wetland integrity appears to be improving in the region, it would suggest that this objective and its supporting policies and rules have been effective in at least maintaining indigenous wetland biodiversity.

Anticipated Environment Results: Information shows the extent of wetland habitats in the Horizons region decreased between 1996 and 2018. It is difficult to establish exactly when the loss occurred and how much was after the One Plan came into effect, however the most recent data analysis undertaken by Horizons' science team in 2020 suggests there was 22ha lost from 2012-2018. This timeframe obviously covers the period when the One Plan came into effect and it can reasonably be assumed that the loss likely occurred during the time the Plan was in effect. It is unclear whether this loss (wetland changed from 'Herbaceous Freshwater vegetation' to 'High Producing Grassland') was undertaken lawfully or not. On this basis, it has been concluded that the **first AER has not been achieved** in relation to wetland extent. It appears that the extent of rare and threatened wetland habitats has decreased, rather than being maintained or increased as intended by the AER. It is likely that further work is needed to focus on managing wetland extent through the planning framework.

There were no wetland habitat types identified in the One Plan as being at-risk. This is because wetland habitats in the region are so rare (only three per cent of the original extent remain). Consequently, this aspect of the AER is not applicable to wetland habitats.

Regarding the second AER, the 2015-17 re-evaluation of wetlands shows that while pressure scores and edge conditions have been variable, on the whole the region has seen a slight improvement in the overall integrity of the majority of monitored wetlands result since the last evaluation in 2002. This suggests that Horizons' current wetland management programme is effective and shows slight increases across the five scoring indices for wetland condition and integrity. While partial management leads to a trend of maintaining the scores over the monitoring period, some increases in scores were seen. The One Plan objective and policies to maintain or enhance wetland ecosystems through the programme is generally fit for purpose for the region's wetland systems.

This indicates that the **second AER has been achieved**, in relation to wetlands. However work will need to continue to ensure this remains the case and to increase the number of sites monitored and managed under Horizons' wetland programme.

Is there evidence that the policies and methods are being used/applied in an effective way?

Over the course of two years between 2019 and 2021, six consents were granted to undertake activities within wetland habitats identified as rare or threated under the One Plan. None have been declined. Of these granted consents, all were processed on a non-notified basis. Processing costs for these applications ranged between $2,000 and $11,500 with the average cost being $8,014. This is not representative of the true cost of getting a resource consent as the applicant will have engaged planning and ecology experts to develop the application, which would have come at a significant cost (What these costs equate to, is unknown).

While there have only been a small number of consents granted, it is possible that this is due to advice given by Horizons' biodiversity team resulting in a proposal being changed or abandoned before it gets to the consenting stage. Estimates from the science team indicate they respond to around one every two weeks. These are desktop assessments. On top of this, the team receive around twelve enquiries per year which require a site visit to determine habitat status. Indications from the science team are that the number of enquiries and demand for information, particularly for wetlands, has increased since the NPS-FM and NES-F.

At present there is no way of assessing how often Horizons' advice has changed the course of a proposal. In the case that a proposal is changed and assessed under a different rule framework or abandoned because the effects are such that the non-complying consent framework is not a viable pathway, it can reasonably be argued that the provisions are effective. In these situations, impacts on the wetland habitat is avoided and extent maintained. Therefore, while it can't be measured with any accuracy, anecdotal accounts from the biodiversity team suggest that the free-advice given by the team (Method 6-9) increases the effectiveness and efficiency of the rule and policy framework.

Noting that while all applications were processed on a non-notified basis and granted, there is only a small number which is evidence that the objective and rule framework is effective. If multiple applications were granted for many sites, then one would question whether the rules are actually effective in ensuring rare and threatened habitat is maintained and extent is not lost.

Do the plan provisions have the support of users – is the plan perceived to work, are the provisions enforceable?

- Can the Plan reasonably be implemented?

On the whole, the plan provisions relating to indigenous aquatic biodiversity appear to work and are enforceable. Two potential issues have been raised by those using the framework for activities in this area, is outlined in the table below.

Wetlands (Biodiversity): Issues with rule and policy framework		
Subject / issue	**Reason**	**Background/explanation/ notes**
Enhancement of lakes and wetlands	Where lakes are Schedule F habitat and works are proposed to enhance them, there is an inconsistency between the rules in Chapter 17 and Rules 13-8 & 13-9. Latter do not reference section 13 of the RMA, therefore disturbance of lake beds cannot be considered	From the consent application to enhance Lake Koputara: The activity status of project activities involving removal of plants and ancillary activities is assessed as a Discretionary Activity under Rule 17-23 according to the following rationale: a. Rule 17-19 Plants Permitted Activity - Condition (e) cannot be complied with because the activity is in a *threatened habitat*. (Note: In all other respects the activity complies with the Permitted Activity conditions);

Wetlands (Biodiversity): Issues with rule and policy framework		
Subject / issue	**Reason**	**Background/explanation/ notes**
	against them; Chapter 17 has to apply.	b. Rule Guide refers activities undertaken in *threatened habitats* to regulation under Rule 13-9; c. Rule 13-9 Some activities in rare habitats and threatened habitats – This Rule excludes activities carried out for the purposes of protecting or enhancing the habitat; d. Unlike land use activities, there is a presumption in the RMA that an activity cannot be done unless allowed by a planning instrument, so the assessment returns to chapter 17; e. Activities that do not comply with other rules (in this case Rule 17-19) are dealt with as Discretionary Activities under Rule 17-23. It is therefore concluded that the removal of plants from the bed of Lake Koputara and ancillary activities requires resource consent. All other project activities (land disturbance and vegetation clearance) can be done as unregulated land use activities.
Heavily modified lakes with rare and threatened habitats	Lake Koitiata is heavily modified and is no longer classified as a lake, but still technically has rare and threatened status under Schedule F. Therefore any works in and around this area would require resource consent under rules 13-9 as a non-complying activity. There are likely other lakes or areas that will fall into this same category.	

Table 38: One Plan implementation issues

Anecdotal evidence suggests that on the whole the wetland provisions are perceived to work by users. The rules and policy framework are direct and reflective of the environmental vulnerability of wetland habitats. Speaking with members of the science team, it is clear that the number of enquiries about activities in wetland areas do not match the number of resource consents sought activities in these areas, suggesting that the rule and policy framework is effective in deterring activities that are contrary to the Plan from being undertaken.

Other than those related to the NPS-FM requirements, are there other emerging issues relating to wetlands that are not being addressed?

There are three government policy documents that may impact how wetlands are to be managed in regional plans in the future. These are, the National Policy Statement for Indigenous Biodiversity (NPS-IB), The National Environmental Standards for Freshwater (NES-F) and the Resource Management Act reforms (RM reforms).

NPS-IB: It is known that the NPS for indigenous biodiversity is due to be released in 2022. This may also affect the wetland provisions in the One Plan and how these are required to be addressed.

NES – Freshwater: The NES-Freshwater treats some activities in wetlands as discretionary activities (e.g. earthworks or land disturbance in a wetland or within 10 m associated with construction of specified infrastructure*) as a discretionary activity. This is at odds with the One Plan which treats these as a non-complying activity, although section 6(1) of the NES allows a regional rule to be more stringent than the regulations. Consideration of whether the rule framework should be more stringent than the NES is warranted as part of the freshwater review. One Plan rules 13-8 and 13-9 have been updated by Plan Amendment 2 to refer to the NES requirements.

* The NES-F refers the NPS-FM definition for specified infrastructure which is as follows:

Specified infrastructure *means any of the following:*

(a) infrastructure that delivers a service operated by a lifeline utility (as defined in the Civil Defence Emergency Management Act 2002)
(b) regionally significant infrastructure identified as such in a RPS or regional plan
(c) any public flood control, flood protection, or drainage works carried out:

(i) by or on behalf of a local authority, including works carried out for the purposes set out in section 133 of the Soil Conservation and Rivers Control Act 1941; or
(ii) for the purpose of drainage by drainage districts under the Land Drainage Act 1908.

Resource Management reforms: Through the Resource Management reforms, government is proposing a new regulatory and policy framework. The RMA will be replaced with three documents, the Spatial Planning Act, Natural and Built Environment Act and Climate Adaptation Act. Information released to date indicates the role of regional councils in regulating biodiversity is likely to change, with territorial authorities being responsible for this. While wetlands are clearly in the realm of freshwater and addressed through the NPS-FM, it is unclear whether their protection will remain the responsibility of regional councils. As more information comes to light and the reforms move forward in the enactment process, consideration will need to be given to the role of biodiversity in the One Plan.

Do the provisions give effect to the NPS-FM?

- **Does it give effect to Te Mana o Te Wai?**
- **Does it give effect to the hierarchy of obligations?**

The NPS-FM is direct in its requirements for wetland habitats, both in the way they are defined and provided for in the planning framework. To some extent the One Plan provisions give effect to the NPS-FM. However, the NPS-FM goes a step further in outlining how wetlands should be defined and addressed in the planning context.

Definitions relating to wetlands and rivers

The National Policy Statement for Freshwater Management, 2020 includes provisions for the protection and enhancement of wetlands. These provisions apply to a wide range of areas that meet the NPS-FM definition of 'natural wetland', including wetland areas in improved pasture with less than 50 per cent exotic pasture species. This means there are likely to be more require management under the NPS-FM.

Section 3.22(1) of the NPS-FM 2020 includes guidance on policy required to be included in Regional Plans, specific to natural inland wetlands, and this has been included through Plan Amendment 2.

Section 3.22 of the NPS-FM then provides consenting guidance for any activity that falls into one of the stated exceptions that would result in the loss of extent or values (indirectly or directly) of a natural inland wetland under subsection (2). Plan Amendment 2 has inserted the required policy into Chapter 17.

The current objective and policy framework in the One Plan regional plan goes some way to meeting the intent of the above policy and guidance from the NPS-FM, specifically in how it restricts activities within at-risk habitats, rare habitats and threatened habitats, by assuming consent won't be granted unless certain conditions are met. However it does not expressly contain the wording above and requires updating to include the exceptions/conditions outlined in subsections of clause 3.22 (3) and (4) of the NPS-FM 2020.

The wording and structure of Objective 13-2 and its supporting policies will require careful consideration and re-structuring to ensure the requirements of section 3.22 of the NPS-FM are addressed in the Plan. Subsequently, the structure of Rules 13-8 and 13-9 will also need updating in response, along with consideration of their activity status in light of the new requirements and definitions for wetlands contained within the NPS-FM.

As with other provisions of the One Plan, the Chapter 13 provisions do not fully give effect to Te Mana o Te Wai and the hierarchy of obligations, and will need to be critically reviewed.

10.5 Efficiency Assessment

This section evaluates the efficiency of the Chapter 6 and 13 provisions insofar as they relate to aquatic biodiversity. It considers the cost of monitoring, non-regulatory interventions, enforceability of the provisions and regulatory costs to test the practicability of the provisions

Costs of managing the biodiversity programme (non-regulatory).

Biodiversity Protection Biodiversity management occurs in three main categories:

- Actively managing high priority habitats by identifying and assessing biodiversity sites and contributing to the management of a select few of these, based on their vulnerability and rarity in the region. Management could include actions such as fencing and/or pest control.
- Supporting landowners and community groups including in icon projects (Te Āpiti Manawatū Gorge, Kia Wharite, Pūkaha Mount Bruce, Bushy Park and Manawatū Estuary), a contestable biodiversity fund and through a community engagement programme.
- Management of Tōtara Reserve Regional Park, including running the campground and biodiversity and biosecurity work in the approximately 300 ha reserve.

Protecting and enhancing the region's biodiversity is a team effort, generally requiring input and support from multiple groups. At the time of the 2019 SoE being published, Horizons supported 34 different projects for biodiversity enhancement works undertaken by community groups. These projects include smaller projects such as the Puddleducks Montessori wetland restoration through to multi-agency partnerships for large and complex sites. In the 2021-31 Long Term Plan, funding for the biodiversity programme continues with five priority sites and two additional sites being allocated dedicated funding, with the remainder of the available funding being contestable each year. This contestable fund has been increased to $260,000 from year 1 of the Long Term Plan to enable further community biodiversity work to be undertaken. A further $50,000 is allocated to community engagement projects. In addition, additional resources are being phased in over the first three years of the LTP to enable the priority site programme to expand by 11 priority sites per year and improve the management of existing sites. This will likely include a combination of wetland and terrestrial biodiversity sites. The 2021-31 Long Term Plan has allocated approximately $6.5-7 Million in 2021, with this increasing to approximately $9 Million in 2022 (noting that these costs apply to the entire biodiversity programme, not just aquatic biodiversity). From 2023, the budget is adjusted by inflation only with a target of three further sites per year.

Consenting costs

Consenting costs for activities under these provisions are considered reasonable. Costs range from $2,000 to $11,500, averaging $8,014 for each consent processed. If a consent was notified (which is a distinct possibility for activities in wetland areas), the consent processing costs would be much higher.

10.6 Overall assessment of effectiveness and efficiency

The information available suggests that wetland quality has not decreased since the Plan has been in effect, however wetland extent has. The data is limited and it would be prudent to undertake further evaluations of wetland integrity and extent to complement the evaluation undertaken in 2015-17. This will help complete the picture on what is occurring within the wetland space in the region over time.

In terms of the NPS-FM and its requirements for aquatic biodiversity, the One Plan goes some way to meeting these requirements. However, it will need to be reviewed to give full effect to the NPS-FM.

Effectiveness

On the whole, the One Plan provisions relating to wetland biodiversity are considered **partially effective**. There will be some changes required in order to meet the NPS-FM requirements, which will also present a good opportunity to address loss of wetland extent that is still being experienced across the region.

Efficiency

The One Plan provisions relating to wetland biodiversity are considered **efficient**, however there have been limited consents processed to get a good indication of processing costs. In terms of the non-regulatory programme, this is likely efficient but may require additional resourcing to meet the requirements for wetlands introduced through the NPS-FM 2020.

Key considerations arising from this evaluation include:

- The NPS-FM is directive when it comes to wording and inclusion of policy in RPS and Regional Plans. Updates to existing provisions and development of new policies is likely to be needed in response to the NPS-FM.
- Wetland extent needs further mapping, particularly in light of the updates to wetland definitions in the RPS. This will then inform the AER.
- Rule provisions seem to be working as intended but some minor refinements are required.
- The wording and structure of **Objective 13-2** and its supporting policies will require careful consideration and re-structuring to ensure the requirements of clause 3.22 (including the exceptions and conditions required by clause 3.22 (3) and (4)) of the NPS-FM are addressed in the Plan. Subsequently, the structure of **rules 13-8 and 13-9** will also need updating in response, along with consideration of their activity status in light of the new requirements and definitions for wetlands contained within the NPS-FM.
- The NES-Freshwater treats some activities in wetlands as discretionary activities (e.g. earthworks or land disturbance in a wetland or within 10 m associated with construction of specified infrastructure) as a discretionary activity. This is at odds with the One Plan which treats these as a non-complying activity and will need to be rationalised in the NPS-FM plan change.
- Provision for regular monitoring and evaluations on wetland integrity and extent to complement prior work undertaken in 2015-17. This could be achieved by updating the Plan's methods to enable further monitoring of wetland extent and integrity on a regular basis.
- Continued surveillance of the requirements of the NPS-IB and Resource Management reforms to ensure the One Plan meets its regulatory functions with regard to biodiversity.

11 Coast

The region's coast includes part of both the west and east coasts of the North Island. It includes approximately 3,000 km^2 of surface coastal water. The west coast beaches are characterised by narrow sandy beaches backed by sea cliffs in the north and by a dynamic dune system from Whanganui southwards.

There are several estuaries of varying sizes along the west coast of the region. The 200ha Manawatū estuary is the largest and is a wetland of national significance under the RAMSAR agreement. Most of the west coast estuaries have extensive tidal flats and are specifically noted as habitats for birds, including many migratory species.

The east coast covers approximately 40 km from Cape Turnagain south to the Owahanga River mouth. It is characterised by rocky platforms backed by cobbled or sandy beaches dotted with

boulders. The estuaries and tidal flats on the east coast also support a wide range of bird and fish life.

In our region's estuaries, freshwater from streams and rivers mix with seawater, influenced by tides as water flows upstream and downstream twice each day. There are 40 estuaries in the region, 25 on the west coast and 15 on the east coast. This represents almost ten per cent of the nation's estuaries. Estuaries receive and transport nutrient and sediment daily from land, and via streams, rivers and from the sea. They are highly productive, providing habitat for a range of birds, fish and other aquatic life.

11.1 How this section works

This chapter evaluates the sections of the coastal chapters of the One Plan, where they relate to freshwater. Provisions considered outside the scope of the freshwater evaluation are not addressed in this report, and will be assessed in a separate evaluation specifically related to the coastal provisions. In the event there is cross over between the two, this will be acknowledged.

11.1.1 Relevance of coastal provisions to freshwater

In the planning framework, the coast is regulated separately under the National Coastal Plan and via a Regional Coastal Plan. The One Plan was developed as an integrated RPS, Regional Plan and RCP to ensure integrated management across all areas of resource management. The One Plan therefore includes the Regional Coastal Plan in Chapters 8 and 18, Schedule I and applicable parts of various administrative chapters. With the release of the NPS-FM and this subsequent s35 evaluation, the relevance of coastal water to freshwater systems needs to be considered. In simple terms, water quality upstream affects coastal systems such as estuaries and wetlands.

Analysis of the NPS-FM and its application within the coastal marine area (CMA) has been undertaken by the Policy team[60]. The following key findings apply:

- Interim regulatory impact analysis for the Essential Freshwater package is clear that the CMA is the domain of the NZCPS, not the NPS-FM.
- The objective and policies of the NPS-FM are all clearly drafted as applying to freshwater.
- Freshwater is defined in the RMA as 'all water except coastal water and geothermal water'. Coastal water is defined as 'seawater within the outer limits of the territorial sea and includes: seawater with a substantial freshwater component; and seawater in estuaries, fiords, inlets, harbours and embayments'.
- The NPS-FM does not apply to the CMA. However, the combination of the NPS-FM, NZCPS and One Plan does provide strong direction requiring Council to consider how the methods and targets used in the various land and water chapters of the One Plan[61] will impact the CMA.
- Te Awa Tupua (Whanganui River Claims) Settlement Act, 2017 states that 'Te Awa Tupua is an indivisible and living whole from the mountains to the sea, incorporating the Whanganui River and all of its physical and metaphysical elements'. Similarly, under the Ngāti Rangi Claims Settlement Act 2019, Te Mana Tupua o Te Waiū-o-Te-Ika states that 'Te Waiū-o-Te-Ika is a living and indivisible whole from Te Wai ā-moe to the sea, comprising physical (including mineral) and metaphysical elements, giving life and healing to its surroundings and communities. Based on this, it is likely that parts (or all) of the Whanganui and Whangaehu Estuary Management sub-zones will need to be included in the freshwater plan change. However this needs to be discussed with the Whanganui River and Ngā Wai Tōtā o Te Waiū (Whangaehu River) and their iwi seeking direction on this approach. Depending

[60] Interaction between the NPS-FM and NZCPS: Options for the freshwater plan change (draft), November 2021

[61] These will be two Land and Freshwater chapters (RPS-LF and RP-LF) following the National Planning Standards Amendment. Schedule I will become RCP-SCHED9.

on any direction given by the Whanganui River and its iwi, part of the Whanganui River's CMA may need to be included in the freshwater plan change. The same applies to the Whangaehu River.

- The One Plan is an integrated Plan. This is apparent in the Schedule I (Coastal water quality values) and Schedule B (Surface water quality values) which are largely the same. Under the freshwater review (subsequent to this evaluation), it is likely that the Schedule B values will be reviewed to bring them into line with the NPS-FM. If aiming to retain the same level of integration between schedule B and I, it would be logical to also include a review of the Schedule I values as part of the freshwater review.

It is clear from the Policy team's analysis that there is a case to be made for considering elements of the coastal chapters of the One Plan in the freshwater review and plan change. However, there are a number of decisions that need to be made regarding the scope of the freshwater review that are outside the gambit of this evaluation. Based on the interaction between estuaries and upstream freshwater sources, it is considered appropriate to include the objectives and policies of Chapters 8 and 18 and values in Schedule I in this evaluation. The evaluation is limited to the provisions that relate to estuaries and coastal water. It does not evaluate any provisions within these chapters relating to use or occupation of the CMA, earthworks or any other coastal land use provisions.

11.2 One Plan Framework Linkages

One Plan Coastal Framework Linkages (water quality only)				
Objective (RPS)	**Supporting Policy Framework**	**Methods and rules**	**Indicators**	**Anticipated Environmental Results**
8-1: Integrated management of the coastal environment Achieving integrated management of the coastal environment by: (a) Providing a consistent, efficient and integrated management framework, and (b) Recognising and managing the effects of land uses and freshwater based activities (including discharges) on the CMA.	Policy: 8-1	**Method 8-1:** Coastal Management Forum **Method 8-4:** Coastal information **Rules:** 18-32, 18-33, 18-34, 18-35, 18-36, 18-37, 18-38, 18-39, 18-40, 18-41	• Measured water quality compared to water quality targets in Schedule I, especially measures for "safe swimming", "safe food gathering" and "aquatic ecosystem health" • Incidents where water quality in the CMA is confirmed as unfit for use	By 2017, water quality in the open sea is generally suitable for the specified Values at all times. Water quality in estuary areas is no worse than it was prior to this Plan becoming operative
8-3: Water Quality Water quality in the CMA is managed in a manner that has regard to the values set out in Schedule I: Part C so that: (a) Water quality is maintained in those parts of the CMA where the existing water quality is sufficient to support the water management values of the relevant area in the CMA set out in Tables I.2 and I.3 and the water quality targets in Tables I.4 to I.7 of Schedule I; and (b) Water quality is enhanced om those parts of the CMA where the existing water quality is not sufficient to support the water management values of the relevant area in the CMA set out in Tables I.2 and I.3 and the water quality targets in Tables I.4 to I.7 of Schedule I.	RPS: Policy 8-6 Regional Coastal Plan: Policy 18-12 and 18-13			

Table 39: One Plan Coastal Policy Framework linkages.

11.3 Coastal Water Quality monitoring

Monitoring of Horizons estuary and coastal environments is relatively new when compared to rivers and groundwater. The coastal monitoring programme began in 2011 and estuary monitoring in 2015. As at 2019, Horizons monitors four beaches and seven estuaries around the region for a range of water quality indicators. Work is underway with NIWA to redesign the current programme to respond to climate change impacts and build on the existing knowledge base.

Analysis of coastal water quality in this evaluation is sourced from the Horizons State of the Environment, 2019 (SoE) report and the more recently produced draft catchment stocktake reports (internal reporting).

11.3.1 State of the Environment, 2019 monitoring

Horizons' SoE reporting states that estuary vulnerability in the region is determined by a range of factors including size, depth, residence time, ecological diversity and ability to flush sediment and nutrients. In the region's low-risk estuaries, nutrient and sediment loads can be quite large; however, they are generally not subjected to long periods of eutrophication and sedimentation due to their small size, low ecological diversity and regular periods of high flushing.

Estuaries in the region that are moderately or highly vulnerable are often closed to the estuary mouth and poorly flushed, particularly during summer.

Coastal water quality comparison to One Plan targets

When comparing the last five years of coastal water quality data with One Plan values, all beach sites meet the criteria for ammoniacal nitrogen but most fail to meet the criteria for Chlorophyll *a*, total nitrogen, and E.*coli*. Only Ākitio Beach meets the Chlorophyll *a* and total nitrogen targets. All sites fail to meet the target for total Phosphorus. The table below shows a breakdown of each site and whether they pass or fail to meet the One Plan water quality targets in Schedule I of the One Plan.

	Chlorophyll *a* (average)	Ammoniacal Nitrogen (average)	Total Nitrogen (average)	Total Phosphorus (average)	Enterococci (bathing season)	Enterococci (non-bathing season)
Ākitio Beach at Surf Club	Pass	Pass	Pass	Fail	Fail*	Fail*
Himatangi Beach at Surf Beach	Fail	Pass	Fail	Fail	Fail	Pass
Kai Iwi Beach at Kai Iwi Stream Bridge	Fail	Pass	Fail	Fail	Fail	Pass*
Waitarere Beach at Waitarere Surf Beach	Fail	Pass	Fail	Fail	Pass	Fail

Table 40: SoE monitoring report, 2019 – Beach water quality monitoring sites and their One Plan compliance. *indicates there is insufficient data for statistically robust data and results should be considered as an indication only.

Estuary water quality comparison to One Plan targets

For the region's estuaries, comparison against the One Plan targets (in Schedule I) also highlights issues at some sites. This is shown in the table below. All sites meet the criteria for ammoniacal nitrogen and temperature, with the exception of the Rangitīkei Estuary. The Manawatū and Rangitīkei Estuaries both fail to meet one of the four reported targets. The Ōhau and Waikawa Estuaries fail to meet two of the reported targets. Ākitio and Whanganui Estuaries meet all four of the targets.

	Chlorophyll *a* (average)	Dissolved oxygen saturation	Ammoniacal Nitrogen (average)	Temperature
Ākitio Estuary at Coast Rd Bridge	Pass	Pass	Pass	Pass
Manawatū at Foxton	Fail	Pass	Pass	Pass
Mōwhānau	NA	Fail	Pass	Pass
Ōhau at Estuary	Fail*	Fail*	Pass	Pass
Rangitīkei Estuary at River Mouth	Pass	Pass	Pass	Fail
Waikawa Estuary at Footbridge	Fail	Fail	Pass	Pass
Whanganui Estuary at Wharf St Boat Ramp	Pass	Pass	Pass	Pass

Table 41: SoE monitoring report, 2019 – Estuary water quality monitoring sites and their One Plan compliance. *indicates there is insufficient data for statistically robust data and results should be considered as an indication only.

Estuary habitat modelling

In 2016, Horizons Regional Council commissioned a region-wide study of estuary habitat and vulnerability to sediment and nutrients, to inform the development of an estuary monitoring programme for 40 estuaries across the region. Five of the 40 estuaries were identified as being moderately to highly vulnerable to excess nutrient and sediment loads, two estuaries were assessed as having moderate vulnerability and 27 considered to be of low to moderate vulnerability. The remaining six have low vulnerability.

Further to this, a case study of the Manawatū Estuary (internationally recognised under the Ramsar Convention as a wetland of international importance), suggests that further action is required to minimise ongoing fine sediment in order to prevent deterioration in the health of the estuary. While not currently a significant issue in the estuary itself, high nutrient concentrations flushing through the estuary may be contributing to impacts in coastal areas outside the estuary.

SoE summary

Overall the water quality results for coastal water and estuary water quality are mixed with some parameters being met at some sites and not others. There are only two estuary sites meeting all four water quality targets. However, like the lakes programme, estuary and coastal monitoring is relatively new when compared to rivers and groundwater and long term trends are not able to be determined.

11.3.2 Horizons 2020 Catchment Stocktakes

The 2020 Catchment Stocktakes undertaken by Horizons Policy & Strategy and Science teams also consider the water allocation status for each FMU in the region. These stocktakes provide a more recent snapshot of the current state of knowledge of the region's catchments and drill down into water quality trends by catchment (FMU). At the time of preparing this evaluation, the stocktakes

represented the most recent available information on the state of each catchment[62]. The following is a summary of the allocation status and water use in each of the FMUs identified in the Catchment Stocktakes.

The following summarises the findings from Horizons 2020 catchment stocktakes for coastal water quality based on FMU catchments.

Ngā wai o Manawatū

The Manawatū River delivers large nutrient and sediment loads through the Manawatū Estuary, an area of high ecological value. The impact is limited by tidal flushing, except in the Foxton Loop. Nutrients and sediment carried out the river mouth will affect the coastal environment; however, currently there is limited coastal data to understand these effects properly.

The Manawatū Estuary is influenced by tides for about 11km upstream of the river mouth. Reporting indicates that the Manawatū Estuary has a high mud content (17–27 per cent) and high nutrient load due to it being at the bottom of a large catchment with significant urban populations and agricultural areas. It is not, however, highly susceptible to eutrophication, likely because it is regularly flushed by the tide. This means fine sediment and nutrients largely pass directly through the estuary and out to the open coast.

Reporting suggests that concentrations of toxicants, such as heavy metals within the sediment, are not at levels that pose a threat to aquatic life. The estuary water meets the One Plan targets for dissolved oxgen saturation, average ammoniacal nitrogen and temperature; it does not meet the target for average chlorophyll-*a*. Sampling of macroinvertebrates living in and on the surface of sediments indicates the estuary is in moderate–poor ecological condition. This finding is relatively common in large tidal river estuaries as the dominant species are tolerant to mud and organic enrichment.

At the end of each summer bathing season, weekly sampling results are aggregated into an overall 'suitability for swimming' assessment. This rating is based on the previous three years of data. The table below outlines the overall faecal indicator bacteria risk grade (suitability for swimming) as assigned by LAWA[63] based on national recreational water quality guidelines. These are the results for the coastal sites in Ngā wai o Manawatū. It is important to note that sites may be safe to swim some (or even much) of the time, but not consistently throughout the bathing season.

Site name	Overall bacterial risk
Manawatū River at Foxton	Poor
Tasman Sea at Foxton Beach	Good

Table 42: Ngā wai o Manawatū coastal sites - overall suitability for swimming based on LAWA guidelines

Kai Iwi

The Kai Iwi area contains the Kai Iwi and Mōwhānau Estuaries. Both are relatively small: the Kai Iwi estuary is 1.7 ha in size, while the Mōwhānau Estuary is 1.1 ha. Their mouths occasionally close with sand naturally, and they can become brackish (low salinity but not quite freshwater) when seawater is retained in them. These estuaries can also become stratified, with seawater being trapped below flowing freshwater from the stream.

Mōwhānau Estuary achieves the One Plan targets for average ammoniacal nitrogen and temperature, but does not meet the target for dissolved oxygen saturation. The overall conditions of Kai Iwi and Mōwhānau Estuaries have been assessed as 'good', with no significant symptoms of

[62] Noting at the time of completion of this report, the Oranga Wai information had been released providing further information on catchment trends but due to timing has not been considered in this evaluation.
[63] Land, Air, Water Aotearoa

eutrophication. This is consistent with long-term water quality data for this area, and suggests that regular flushing at both estuaries is reducing the impact of high nutrient inputs from streams. A more detailed overview for different indicators is shown below:

Indicator	Condition	
	Kai Iwi	**Mōwhānau**
Mud content	Poor	Good
Depth of sediment oxygenation	Poor	Very good
Total nitrogen	Moderate	Very good
Total organic carbon	Moderate	Very good
Trace elements	Very good	Very good
Dissolved oxygen	Very good	Very good
Phytoplankton	Very good	Moderate
Mud extent	Poor	Very good
Macroalgae	Very good	Very good
Salt marsh extent	Moderate	Poor
200 m terrestrial margin	Poor	Poor
Sedimentation rate	Poor	Poor

Table 43: Estuary condition indicators for the Kai Iwi and Mōwhānau Estuaries

Whangaehu

The Whangaehu Estuary sits at the bottom of the Whangaehu River, measuring around 73 ha in size. It has identified recreation, fishing, white-baiting and riparian values, and forms an important habitat for freshwater fish and birds. The estuary's mouth is always open, which frequently flushes the estuary of excess upstream nutrients and therefore reduces its vulnerability to eutrophication While the Whangaehu estuary is not vulnerable to eutrophication, it is susceptible to sedimentation, with consistently poor scores for sediment depth and mud content. Early research results suggest the current sediment load could be 10 times greater than the predicted natural load due to farming dominating catchment land use.

Rangitīkei-Turakina

There are two estuaries within the Rangitīkei-Turakina FMU: the Rangitīkei Estuary, 118 ha in size and located near Tangimoana, and Turakina Estuary, 59 ha in size and located near Koitiata village.

The Rangitīkei Estuary has identified biodiversity, whitebaiting, recreation and riparian values in the One Plan. It experiences a high nutrient input, but its strong flushing prevents issues with algae making it low risk for eutrophication. Sediment input to the estuary is also high, and it has been identified as high-risk for substrate oxygen depletion. Reporting notes muddy estuaries tend to have lower biodiversity, and low oxygen levels can exacerbate this. The predominant land use of the estuary's catchment is grassland and pasture, with only 0.5 per cent of land occupied by urban settlements. The main pressures on the Rangitīkei Estuary are from vehicles, exotic species such as common reed, and nutrients.

Overall, the Rangitīkei Estuary meets the One Plan targets for average chlorophyll *a*, dissolved oxygen saturation and average ammoniacal nitrogen, but not for temperature at the river mouth. Reporting indicates that on the whole, the Rangitīkei Estuary is in a moderate state.

The Turakina Estuary is valued for its bathing, whitebaiting and aesthetic appeal, and is also important for freshwater fish and birds despite the loss of most of its vegetated margin. The estuary catchment land use is primarily farming, leading to high nutrient loads.

Despite these high nutrient loads, Turakina Estuary's strong flushing means that it has low susceptibility to eutrophication. However, nuisance algae can sometimes bloom in poorly-flushed areas. This strong flushing also reduces the estuary's vulnerability to sedimentation. The current suspended sediment load is estimated to be 10 times higher than the predicted natural load, but most of this is washed out to sea.

The overall bacterial risk status for contact recreation at the Rangitīkei Estuary is poor, although reporting notes that often this site may be safe for swimming some times throughout the bathing season.

Whanganui

The Whanganui Estuary lies at the mouth of the Whanganui River. It is a large, shallow, generally well flushed tidal river estuary. It has a large freshwater inflow which, along with the tidal inflow (approx. 11 km upstream) and permanently open mouth, is expected to flush most nutrients and fine sediment from the Estuary[64]. A catchment summary for the Whanganui catchment, specifically information relating to coastal water quality, had not been completed at the time of undertaking this evaluation. Conclusions cannot be reached regarding coastal water quality in the Whanganui Catchment.

Ngā wai o Waiopehu (Horowhenua)

There are five estuaries within the Waiopehu area: Waikawa, Ōhau, Waiwiri, Hōkio and Wairarawa. All five of the estuaries are often brackish, where the salinity (saltiness) of the water lies between that of freshwater and saltwater. They provide food, habitat and breeding grounds for rare birds and indigenous fish such as the red-billed gull and īnanga.

The **Waikawa Estuary** is approximately 3 km in length and can be poorly flushed when its mouth naturally closes, which makes it vulnerable to eutrophication. Mixed native forest, exotic forest, dairying, and sheep and beef farming characterise the estuary's catchment and pressures include residential land use, garden weeds and poor water quality. The estuary has low amounts of trace elements and a high percentage of salt marsh, however it is rated as poor for dissolved oxygen and chlorophyll *a* levels. Phytoplankton (chlorophyll *a*) indicators are also high, meaning Waikawa Estuary is likely to experience big swings in dissolved oxygen levels that impact the survival of fish and other aquatic organisms.

Overall, the Waikawa Estuary at the Footbridge monitoring site meets the One Plan targets for average ammoniacal nitrogen and temperature, but not for average chlorophyll-a and dissolved oxygen saturation. It is, however, rated as having a relatively high restoration potential.

The **Hōkio Estuary** is a moderate length, shallow, poorly-flushed, brackish tidal river estuary that is located primarily on the beach near the Hōkio settlement and is the only outlet for Lake Horowhenua. This estuary is valued for its bathing, whitebaiting and aesthetic appeal. The Hōkio Estuary is characterised by farmland and the catchment has a history of diffuse land and stormwater inputs resulting in a decline in water quality at the estuary. Most notably, the estuary experiences elevated levels of nitrogen and phosphorous, problem algae and there is advanced decline of indigenous fish. The area also has extensive weed problems from pampas grass,

[64] Information sourced from Horizons, Manawatū-Whanganui Regional Estuaries Habitat report dated September 2016

monkey musk and reed sweetgrass. Hōkio Estuary is estimated to have a low to moderate vulnerability to sedimentation with moderate restoration potential.

The **Ōhau Estuary** is a relatively long, shallow, moderately flushed tidal river estuary that extends approximately 3 km inland. The pressures facing this estuary include residential development, trail bikes disturbing habitat, and moderate amounts of weeds. Levels of trace elements rank low, while nutrient levels are moderate. This estuary is relatively low-risk for eutrophication because of its flushing ability, however, heightened chlorophyll *a* levels indicate it is still vulnerable. Dissolved oxygen levels are very low, and the upstream agricultural land use has a disproportionately large effect on the lower reaches. Early results suggest the Ōhau Estuary meets the One Plan target for average ammoniacal nitrogen and temperature, but not for average chlorophyll *a* and dissolved oxygen saturation. Overall, the Ōhau Estuary is in moderate condition but is on the cusp of poor condition.

The **Wairarawa Estuary** drains the lagoons behind the Waitarere settlement and is small. The estuary is valued for its whitebaiting, fishing and bathing. Wairarawa Estuary has a severe problem with weeds including exotic tall fescue and buffalo grass. With farming and exotic forestry being the main land uses in the catchment, Wairarawa Estuary receives a high nutrient load. It's at low risk of eutrophication because when not dried out, it is well-flushed.

Estuary	Ecological values (low-moderate-high)	Eutrophication risk (low-moderate-high)
Waikawa Estuary	Moderate	Moderate-high
Ōhau Estuary	Moderate	Low
Waiwiri Estuary	Low-moderate	Low-moderate
Hōkio Estuary	Low-moderate	Moderate
Wairarawa Estuary	Low-moderate	Low-moderate

Table 44: Summary of ecological values and eutrophication risk for Waiopehu Estuaries

Puketoi ki Tai (Coastal Tararua)

Puketoi ki Tai has two main estuaries, Ākitio and Owahanga. Ākitio Estuary measures around 58 ha in size and Owahanga is slightly larger at 64.5 ha. Ākitio and Owahanga are similar in many ways – both are moderately flushed with their mouths always open, have elevated phytoplankton levels, and are at moderate risk for eutrophication (a build-up of nutrients). Their natural vegetated margins have been lost, with Owahanga now grazed by stock. Sedimentation is the main issue at Ākitio and Owahanga Estuaries. Current suspended sediment load at both locations could be five times higher than the predicted natural load, leading to moderate levels of muddiness being detected.

Ākitio Estuary at Coast Road Bridge currently achieves all four One Plan targets that it is measured against: average chlorophyll *a*, dissolved oxygen saturation, average ammoniacal nitrogen, and temperature. Water quality in the Owahanga Estuary is not currently monitored.

Ākitio Beach at the Surf Club achieves One Plan targets for chlorophyll *a*, ammoniacal nitrogen and total nitrogen. It does not achieve the target for total phosphorous. While there is currently insufficient data for a statistically robust analysis, there are early suggestions that the Enterococci target is not met in either the bathing and non-bathing seasons.

11.3.3 Coast freshwater quality – summary of findings

The SoE monitoring provides useful information on the state of coastal quality in the Horizons Region. Likewise, the catchment stocktakes provide a useful snapshot of trends within each FMU and represent the most up-to-date information for water quality in the region. Overall the findings

from both SoE monitoring and the catchment stocktakes align, with no significant difference in the findings of each.

When comparing the last five years of coastal water quality data with One Plan values, all beach sites meet the criteria for ammoniacal nitrogen but most fail to meet the criteria for Chlorophyll *a* and total phosphorus. Ākitio Beach is the only site to meet the total nitrogen and Chlorophyll a targets. Monitoring of the region's estuary water quality has been underway since 2015. The primary issues for the region's estuaries appear to be associated with de-vegetation of the margins resulting in high sediment and nutrient loads at a number (although not all) sites. Monitoring is varied and reporting indicates that the duration of monitoring means that robust conclusions cannot be drawn with regards to long term trends in estuarine and coastal water quality.

Ultimately, the One Plan sets a reasonable foundation for monitoring coastal and estuarine water quality across the region though establishment of water quality management targets in Schedule I. However, continued monitoring will be key to understanding the long term trends. Estuarine water quality is varied and influenced by characteristics of the upstream catchment. The monitoring period is limited but results do indicate issues at a few sites. While some sites do not pass the One Plan Schedule I targets, there is little evidence of degradation (or improvement) in coastal or estuarine water quality across the region.

11.4 Plan effectiveness summary

Are the anticipated environmental results and objectives being achieved?

<table>
<tr><th colspan="3">One Plan Coastal Framework Linkages (water quality only)</th></tr>
<tr><th>Objective (RPS)</th><th>Indicators</th><th>Anticipated Environmental Results</th></tr>
<tr><td>8-1: Integrated management of the coastal environment

Achieving integrated management of the coastal environment by:

(a) Providing a consistent, efficient and integrated management framework, and
(b) Recognising and managing the effects of land uses and freshwater based activities (including discharges) on the CMA.</td><td></td><td rowspan="2">By 2017, water quality in the open sea is generally suitable for the specified Values at all times. Water quality in estuary areas is no worse than it was prior to this Plan becoming operative</td></tr>
<tr><td>8-3: Water Quality

Water quality in the CMA is managed in a manner that has regard to the values set out in Schedule I: Part C so that:

(a) Water quality is maintained in those parts of the CMA where the existing water quality is sufficient to support the water management values of the relevant area in the CMA set out in Tables I.2 and I.3 and the water quality targets in Tables I.4 to I.7 of Schedule I; and
(b) Water quality is enhanced in those parts of the CMA where the existing water quality is not sufficient to</td><td>• Measured water quality compared to water quality targets in Schedule I, especially measures for "safe swimming", "safe food gathering" and "aquatic ecosystem health"

• Incidents where water quality in the CMA is confirmed as unfit for use</td></tr>
</table>

One Plan Coastal Framework Linkages (water quality only)		
Objective (RPS)	**Indicators**	**Anticipated Environmental Results**
support the water management values of the relevant area in the CMA set out in Tables I.2 and I.3 and the water quality targets in Tables I.4 to I.7 of Schedule I.		

Table 45: One Plan Coastal Water quality linkages

It is considered that the AER and objectives associated with coastal water quality are, on balance, likely **not being achieved**. There are a number of sites which do not meet all of the Schedule I targets meaning that there are times that coastal water quality is not suitable for the specified values (e.g. contact recreation). In relation to estuary water quality, it is not possible to draw a conclusion as to whether the water quality is no worse than at the time the plan became operative, due to monitoring commencing in 2015 (after the Plan became operative). In terms of the objectives, estuary water quality does not appear to be degrading but again it is not possible to draw any robust conclusions. More monitoring is required to be able to establish the long term trends.

Given the link between freshwater upstream and coastal water quality, the holistic approach for catchment management provided in the current Plan is considered appropriate, however refinement of the Objectives and Anticipated Environmental Results to better reflect and separate coastal and estuarine environments would likely be useful.

It is also worth noting that the One Plan does not appear to include an AER relating to coastal water quality within the CMA. The existing AER only addresses values in the "open sea" and estuary areas. This gap will require addressing to align with the NPS-FM (specifically the integrated resource management approach) and provide a measurable assessment for coastal water quality in the CMA area.

Do the provisions give effect to the NPS-FM?

- Does it give effect to Te Mana o Te Wai?
- Does it give effect to the hierarchy of obligations?

As with all other freshwater provisions in the One Plan, the coastal objectives, policies, rules and methods were developed under the previous planning regulations which did not place the same hierarchy of obligations on water quality as Te Mana o te Wai (the fundamental concept of the NPS-FM). As mentioned previously in this report, it is not clear whether coastal water is intended to be addressed under the NPS-FM. However, given the way the One Plan is framed (recognising the integrated catchment management approach of the NPS-FM), this evaluation has considered the water quality of coastal water, specifically estuaries. Given the potential impact upstream activities and water quality can have on estuarine environments, consideration of the policy framework is considered necessary.

In terms of the NPS-FM, there is potential for coastal freshwater environs (e.g. estuaries) to be considered under a similar framework and hierarchy of obligations. Assessing against the lens of the NPS-FM, the existing provisions (above) are in general alignment but should be strengthened to place greater emphasis in the health and wellbeing of the water and ecosystems over health, social, economic and cultural wellbeing.

There is also the requirement of the NPS-FM to take an integrated approach to water quality. This means Councils also think about the use of a resource on a whole catchment basis, considering the relationship between surface water and groundwater, land use, and estuaries rather than in individual silos (i.e. allocation of nutrient loads). The relationship between estuaries and the wider catchment will need exploration as part of the Oranga Wai package of work. Under this approach,

the Schedule I values associated with coastal water quality will need updating to align with changes to Schedule B.

Do the plan provisions have the support of users – is the plan perceived to work, are the provisions enforceable?

- Can the Plan reasonably be implemented?

Discussions with members of the consents and compliance teams have not raised any issues relating to the implementation of the existing plan provisions relating to coastal water quality. There are known issues with other sections of the coastal chapters; however, these largely relate to coastal occupation, marine activities, reclamation and new activity management areas. All of these topics are considered to be outside of the scope of this freshwater evaluation and so from the perspective of the coastal water quality provisions, there are no known issues with implementation.

Other than those related to the NPS-FM requirements, are there other emerging issues relating to freshwater that are not being addressed?

None have been identified, although a review of the One Plan freshwater provisions may provide an opportunity to consider the manner in which the One Plan gives effect to the New Zealand Coastal Policy Statement 2010 (NZCPS). This will also be addressed in greater detail through the separate section 35 evaluation relating to coast.

11.5 Efficiency assessment

Costs and resourcing

There are a number of activities undertaken by Horizons staff in relation to the provisions of Chapters 8 and 18. The primary activities involve water quality sampling and monitoring within the coastal catchments. In addition, there are regulatory costs associated with processing and monitoring compliance of resource consents for activities that require resource consent. This part of the evaluation is limited to the efficiency of the freshwater provisions as they relate to the effects experienced downstream in the coastal marine environment. The efficiency of those freshwater provisions have already been addressed in earlier sections of this report and are not repeated here.

The cost of delivering the coastal water quality programme is wrapped up into the wider water quality monitoring programme. Monitoring includes the coastal habitat mapping and habitat characterisation following a ten year work-rotating monitoring programme. Costs associated with the coastal monitoring programme (split by water quality and contact recreation monitoring are outlined below.

	Coastal water quality monitoring	Contact recreation monitoring	Total
2019-20	$81,370.75	$112,072.17	$193,442.92
2020-21	$126,480.74	$238,045.76	$364,526.50

Table 46: Coastal water quality monitoring costs

The overall efficiency of these provisions should be considered in conjunction with the wider coastal chapter provisions to gain a holistic approach as to the efficiency of the provisions.

11.6 Overall assessment of Plan effectiveness and efficiency (Coast)

In general, it is difficult to reach a conclusion regarding the effectiveness and efficiency of the water quality provisions in the coastal environment. The NPS-FM guides some change around

considering catchments holistically from source to sea. The One Plan's current approach aligns with this. Moving forward, there may be some changes made to the coastal freshwater provisions and values in light of the review of freshwater values in Schedule B.

- More monitoring is required to better understand the coastal water quality and measure the impacts upstream activities and water quality may be having on coastal systems.
- The water quality values in Schedule I will need updating to reflect and align with any changes to values in Schedule B.
- The provisions have not been effective in achieving the Anticipated Environmental Result however, this is based on limited data and so may not be wholly ineffective. Regardless, the wording of the AER will require updating to establish the baseline year in alignment with when monitoring commenced and set a new target year (given 2017 has passed).
- Given the link between freshwater upstream and coastal water quality, the integrated approach for catchment management provided in the current Plan is considered appropriate, however refinement of the Objectives and Anticipated Environmental Results to better reflect and separate coastal and estuarine environments would likely be useful.

Underpinning this entire section of the report, is the underlying question of whether coastal water systems should be considered under the NPS-FM framework. This is discussed in greater detail under section 11.1.1 of this report. Based on the interaction between estuaries and upstream freshwater sources, the objectives and policies of Chapters 8 and 18 and values in Schedule I have been included in this evaluation. The evaluation is limited to the provisions that relate to estuaries and coastal water. It does not evaluate any provisions within these chapters relating to use or occupation of the CMA, earthworks or any other coastal land use provisions.

12 Concluding statements

This section 35 evaluation has focused on the freshwater provisions of the One Plan. Its purpose has been two-fold. One is to evaluate whether the freshwater provisions in their current form are effective and efficient (as is required by section 35 of the RMA). The second focus has been to compare the provisions against the National Policy Statement for Freshwater, 2020 and identify any gaps in the current Plan.

Overall the One Plan is performing reasonably well and Horizons is well positioned to implement the new requirements of the NPS-FM into the current planning framework.

From an effectiveness point of view, the Plan is partially effective. There are areas where water quality and outcomes do not meet the anticipated environmental results or have not been able to be implemented as intended. In some cases, this is because analysis against the AER has not been possible, either because monitoring information is not available or the AER itself is unmeasurable. There are a number of areas where changes are required to improve Horizons' ability to implement the Plan. Other than the nutrient management provisions, none of these changes are considered significant but will require some careful consideration from experts.

The table in Appendix 3 provides a complete list of the issues identified through implementation and where relevant some suggested changes to be made.

From an efficiency aspect, the efficiency assessment of this evaluation has been limited. Data availability and integrity was constrained which made it difficult to draw a robust conclusion. However, at a high level, it is considered that the freshwater provisions of the Plan are generally efficient. Moving forward it will be important to consider how consenting and compliance information is recorded to ensure information on plan objectives, policy and rule implementation, along with consent processing data (processing costs, timeframes etc) and compliance monitoring is readily available. Without this, evaluating the effectiveness of a RPS and/or Regional Plan is difficult and unlikely to result in robust findings.

From a NPS-FM point of view, the One Plan goes some way to meeting the requirements of the NPS-FM but there are a number of areas where the Plan will require updating. The key areas of change which apply across many of the freshwater chapters in the One Plan are summarised below:

- Identification of Freshwater Management Units, attributes and limits: this introduces a new way of framing the current Schedule A and B format. The NPS-FM aims to have at least 90% of specified rivers and lakes within the yellow, green and blue categories by 2040. The One Plan surface water and lakes provisions and associated values in Schedule B and E will need to be reviewed with this requirement in mind. The NPS-FM also requires establishment of baseline states and plans to state the timeframes for achieving the targets (where not met) and where met, a timeframe from which the target must be met.
- Action Plans: the NPS-FM requires Action Plans to be prepared for whole, part or multiple FMUs in certain circumstances. The One Plan in its current form does not consider or provide for catchments that may have an Action Plan in place as a result of the NPS-FM. In addition, the One Plan does not explicitly state or link to the NPS-FM equivalent limits or targets, nor does it state timeframes for addressing over-allocation (for nutrient targets) where it is identified. This is a gap that will need to be addressed through the next review of the One Plan and if nothing else will need to be outlined in the Action Plans required by the NPS-FM.
- Integrated management of freshwater catchments: the NPS-FM requires Councils to consider the relationship between surface water and groundwater, land use, and estuaries rather than in individual silos (i.e. allocation of nutrient loads). The One Plan policy provides a good framework for integrated management of resources but needs to take the next step to consider this more holistically.

- Te Mana o Te Wai and the hierarchy of obligations: For the most part, the One Plan provisions do not give effect to the hierarchy of obligations in that the provisions place the ability of people and communities to provide for their social, economic and cultural wellbeing higher than the health and wellbeing of water bodies and freshwater ecosystems. This observation is not intended as a criticism of the One Plan which was developed under a completely different planning framework. However, for the purposes of the Oranga Wai NPS-FM plan change, the content of the chapters evaluated in this report will need to be re-considered through the lens of Te Mana o Te Wai and the hierarchy of obligations.
- There are a number of other specific considerations, such as providing for and recording natural inland wetlands, fish passage (and in some cases prevention), management of over-allocated catchments and specific wording to be incorporated into the One Plan. In some cases the wording changes will be picked up through Plan Amendment 2 (which was notified late 2022) and the rest will be subject to the 'freshwater review' of the One Plan as required through the NPS-FM 2020.

The Oranga Wai NPS-FM freshwater review will provide an opportunity to review and update other freshwater provisions and implementation issues identified through this evaluation.

Lastly, it is acknowledged that the government is in the process of completing its Resource Management reforms which propose a new regulatory and policy framework. The RMA will be replaced with three documents, the Spatial Planning Act, Natural and Built Environment Act and Climate Adaptation Act. Information released to date indicates the role of regional councils in regulating biodiversity is likely to change, with territorial authorities being responsible for this. While wetlands are clearly in the realm of freshwater and clearly addressed through the NPS-FM, it is unclear whether their protection will remain the responsibility of regional council. As more information comes to light and the reforms move forward in the enactment process, consideration will need to be given to the role of biodiversity in the One Plan.

Appendix 1: Evaluation Scope and guiding principles

Section 35 Desktop Evaluation of One Plan Freshwater Provisions

Project Scope| February 2021

Project purpose

The purpose of the project is to evaluate whether the current One Plan freshwater provisions are still fit for purpose since they became operative in 2014 and in light of recently released national planning instruments. Under section 79 of the Resource Management Act, 1991 Horizons Regional Council must commence a review of the provisions of the One Plan if the provisions have not been subject to a proposed policy statement or plan, review or change by the Council in the previous 10 years.

Under Section 35(2)(b) of the Resource Management Act, 1991 Horizons Regional Council is required to monitor the effectiveness of the policies, rules and other methods in the One Plan, and to prepare a report on the results of this monitoring every five years as per Section 35(2A). Monitoring the efficiency and effectiveness of policies, rules and other methods is an ongoing process from plan implementation to plan review. Such monitoring helps determine when different actions are required and whether the level of policy intervention needs to be changed so that the RPS and Plan objectives can be achieved. Reviewing the state of the current freshwater provisions in the One Plan will allow Horizons' Policy Team to plan for future work programs by understanding how much or little alteration current provisions require and the size of this program of work.

In addition, undertaking the review within the 10 year timeframe ensures Horizons Regional Council avoids any legal action by maintaining consistency with the timeframes set out in s79 of the RMA. The One Plan was made operative in November 2014, on this basis a review under S79 needs to be undertaken by November 2024. However S79 is not the only driver behind the need to review the One Plan. Section 80A (4) of the Resource Management Act requires Horizons Regional Council's freshwater planning instruments to undergo the freshwater planning process, with notification of the freshwater planning instrument by 31 December 2024. The purpose of this is to implement the NPS-FM, and means the One Plan needs to be reviewed and any Plan Changes proposed need to be publicly notified by 31 December 2024.

While s35(b) is a statutory obligation for Council, it is also a useful management tool to assess and better understand how well our current provisions are achieving anticipated outcomes and whether they can be improved in future plan change work programmes. Given the drive generated by s80A, this section 35 evaluation of the One Plan is an important input into the wider review and any potential Plan Change required to give effect to the NPS-FM. In order to meet the timeframes directed by s80A (4), the s35 evaluation needs to be done now in order to fit within the work programme.

This report outlines the scope and timing of the s35 monitoring assessment of the One Plan freshwater provisions. It is separate to another assessment being undertaken on the iwi/hapū provisions of the One Plan.

Background

The Resource Management Act, 1991 outlines how the environment should be managed. The RMA purpose is to promote sustainable management of natural and physical resources which means managing the use, development and protection of the natural and physical environment in a way that enables people and

communities to provide for their social, cultural, economic well-being and cultural and for their health and safety, while:

a. Sustaining the potential of natural and physical resources (excl minerals) to meet the reasonably foreseeable needs of future generations;
b. Safeguarding the life supporting capacity of air, water, soil, ecosystems; and
c. Avoiding, remedying, or mitigating any adverse effects of activities on the environment.

The RMA provides a framework with a hierarchy of functions, powers and duties to local authorities. The functions of regional councils is outlined in section 30 of the Resource Management Act, 1991, along with the statutory instruments it is required to develop and implement. Under s30 Councils are required to develop RPSs, Regional Plans and Coastal Plans to fulfil their functions listed in this section. Horizons Regional Council's One Plan is a combined RPS, Regional Plan and Coastal Plan designed to fulfil the Regional Council's statutory obligations under section 30.

RPSs and regional plans are one of the primary mechanisms for councils to give effect to the RMA, councils must ensure that these documents evolve over time to continue to give effect to higher order policy and are the most efficient and effective way for councils to deliver its functions, powers and duties. As outlined above, the Resource Management Act 1991 directs (in section 79) a council to commence a review of its policy statements and plans at least every 10 years in order to review and then amend provisions that are no longer the most appropriate way for the Council to carry out its responsibilities.

This s. 35 evaluation of the One Plan's freshwater provisions is a part of a wider work programme. This wider programme of work includes reviewing the One Plan in its entirety, and then amending the One Plan to implement the findings of those reviews. Horizons Regional Council must also give effect to National Policy Statements, and National Environmental Standards that have come into effect since the One Plan was made operative. In addition the Council must ensure the One Plan is consistent with any other national regulations and standards.

The most recent suite of national regulations, the NPS-FM and NES-F are driving the focus of this s35 evaluation and as such the programme is limited to the freshwater provisions of the One Plan. The table below outlines a high level overview of the wider provisions of the One Plan (some not subject to this evaluation). A detailed analysis of the programme of work for the s35 evaluation of the One Plan freshwater provisions is included in Annex 1.

Provisions in the One Plan:	Provisions to be reviewed:	Date provisions were made operative:	Date for review commencement
Review of freshwater provisions	• Chapter 4: Land • Chapter 5: Water • Chapter 6: Indigenous biological diversity, landscape and heritage • Chapter 8: Coast • Chapter 9 (limited) • Chapter 13: Land use activities and indigenous biological diversity • Chapter 14: Discharges to land and water	• Plan Change 2 provisions reviewed July 2019 (nutrient management provisions i.e. some of Chapters 5, and 14). Decision on this imminent • Provisions related to production forestry - August 2018	November 2024 • In addition a plan change giving effect to the NPS-FM must be publically notified by December 2024 • Production forestry

	• Chapter 16: Takes, uses and diversions of water, and bores • Chapter 17: Activities in artificial watercourse, beds of rivers and lakes, and damming • Chapter 18: Activities in the CMA • Schedules A - G and I	• Other provisions 2014	provisions (that were subject to plan amendment 1) August 2028
Review of iwi/hapū provisions	- Chapter two: Te Ao Māori – s35 review being undertaken simultaneously	- November 2014	November 2024
Review of remaining provisions of the One Plan	• Chapter 1: Setting the scene • Chapter 7: Air • Chapter 9: Natural Hazards (those not captured by freshwater) • Chapter 10: Administration • Chapter 11: Introduction to Regional Plan • Chapter 12: General objective and policies • Chapter 15: Discharges to Air • Chapter 19: Financial contributions • Schedules H & J • Glossary (remaining)	• November 2014	November 2024

Table 1: Overview of One Plan provisions and timing for s79 review vs s80A (4) under the RMA

National planning direction/instruments that have recently come into effect and are yet to be implemented within the One Plan are:

- National Policy Statement for Freshwater Management, 2020
- National Policy Statement for Urban Development, 2020
- Resource Management (National Environment Standards for Freshwater) Regulations, 2020
- Resource Management (Stock Exclusions) Regulations, 2020
- Ministry for the Environment, National Planning Standards, 2019

Scope

The project will review the freshwater provisions in the One Plan. These provisions can be found within Chapters 4, 5, 6, 14 and 17 of the One Plan. Freshwater provisions are also addressed to a lesser extent in Chapters 2, 8, 9, 13 and 18 of the One Plan through coastal, land use regulation (nutrient management provisions) and iwi/hapū. It is identified that the National Policy Statement for Freshwater Management and its requirement to give effect to the concept of Te Mana o te Wai, along with a new hierarchy of obligations will result in significant changes to the One Plan. To ensure the operative statutory provisions give effect to Te Mana o te Wai, Horizons Regional Council will need to review the One Plan. The hierarchy of obligations under the National Policy Statement for Freshwater Management presents a different lens from the one through which the One Plan was developed and therefore misalignment between the One Plan and NPS-FM is expected. Further, given the breadth of Te Mana o te Wai, it is assumed that some aspects of that review will be covered in this project and that other parts, such as administrative sections and natural hazards will likely fall outside of the project scope. For the avoidance of doubt, the work program to give effect to the findings of the section 79 report are considered to be outside of the scope of this project.

Approach

The review will be a desk-top exercise to evaluate the efficiency and effectiveness of current freshwater provisions in the One Plan, having particular regard to the new 'lens' required by the NPS-FM 2020 (i.e. Te Mana o te Wai and the hierarchy of obligations). The project will be undertaken in four phases, outlined in the table below.

Project Phase	Steps	Activity
Phase 1: Project Development (January – February 2021)	Step 1: Project brief	• Complete project brief • Receive feedback and amend project brief • Circulate project brief with internal teams (i.e. Abby, Tom, Mel, Charlotte)
Phase 2: Research (February – March 2021)	Step 2: Undertake research and possible workshops	• Consult with internal teams (identified above, see Community Engagement section) • Confirm what must be included and covered in section 35 review (in order to make conclusions on effectiveness and efficiency of provisions what must be considered)
Phase 3: Analysis April – May 2021)	Step 3: Section 35 evaluation	• Desktop analysis of freshwater provisions in One Plan • Assess data and analysis provided by internal freshwater team to help inform review.

	Step 4: Report writing	• Evaluate whether provisions are fit for purpose or will require alteration • Prepare report including whether the existing provisions should be retained or amended. • Include assessment of any gaps within the One Plan in relation to the NPS-FM requirements
Phase 4: Dissemination (May 2021)	Step 5: Present report	• Disseminate report internally

Communication and Internal engagement

This project will predominantly be a desktop study, informed by research and data collected by various internal teams within Horizons. Internal engagement within and beyond the Policy Team will be necessary to collect and understand the data available to then inform the overview of Plan monitoring and effectiveness. This will then inform any potential plan changes required. The key groups identified for engagement are as follows:

1. Natural Resources and Partnerships Group
    a. Science and Innovation Team (Abby Matthews)
    b. Freshwater and Partnerships Team (Logan Brown)
    c. Biodiversity Team (Rod Smillie)
2. Policy Team – specifically Mel/Jerald in relation to iwi/hapū provisions and cross-over with freshwater review.

In addition to the above key groups, consultation with other teams such as Resource Consents, Consents Monitoring, Field staff, Land team (working on the SLUI programme) and biodiversity teams will also provide valuable understanding and working knowledge of the One Plan provisions in practice. Internal consultation across the organisation will ensure the outcomes of the review are robust and holistic in that it considers the practical application of the One Plan provisions, not just theoretical.

It is important to note that this evaluation will not involve external engagement with other stakeholders. Normally a s35 evaluation such as this would include engagement and feedback from iwi and other stakeholders. However, because this evaluation is being driven in large part by the NPS-FM, it is a small part of a much wider programme of work to give effect to the NPS-FM. The wider programme includes a comprehensive engagement strategy being implemented to support the freshwater futures programme being rolled out by Horizons Regional Council. The outputs of this s35 evaluation will inform the wider engagement planned under the freshwater futures programme.

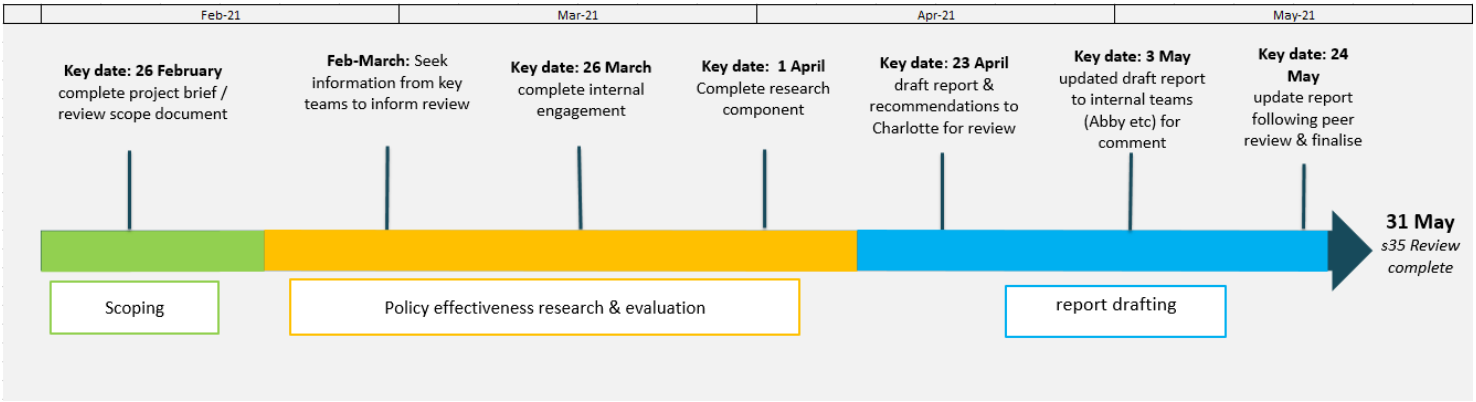
Deliverables and Timeline

An evaluation report will be produced which will document the process and findings of the review, it is the sole deliverable of this project. The report will cover the following:

- reasons for undertaking the review (statutory and context),
- detailed outline of the provisions subject to review,
- analysis of data and findings in relation to the effectiveness of the provisions;
- recommendations on which provisions will require alterations under the Schedule 1 process and which provisions are still fit for purpose.

The outcomes of the evaluation report will inform Horizons Regional Council decisions on any future plan changes needed to implement the NPS-FM 2020. It will do this by identifying misalignment and gaps on the operative One Plan framework and indicate the scope of changes necessary for the section 32 report. The report will be delivered at the conclusion of the s35 evaluation scheduled for 31 May 2021.

The timeline below provides a visual indication of key work streams and deliverable dates:



Roles and responsibilities

The scope of the project is limited to the freshwater provisions of the One Plan and is therefore ring fenced to some extent. It is expected that the review can be undertaken using a mixture of internal and external (contracted) resources and under the guidance of Christine Foster as Lead Strategic Planner and Charlotte Almond as Policy and Strategy Manager.

Project Lead: Leana Shirley

- responsible for sourcing information, undertaking analysis and completing a report covering evaluation of the effectiveness and efficiency of the One Plan freshwater provisions, pursuant to s35(2)(b) of the RMA.

Project technical support (as required and by area of expertise): Abby Matthews, Mel McCormick, Logan Brown, Consents team.

- Responsible for providing technical information and data as needed to assist with policy effectiveness evaluation

Project Planning support: Christine Foster (Principal Consultant Planner)

- Responsible for providing strategic planning oversight of the NPS-FM implementation programme. Will provide high level direction on this project as it relates to the NPS-FM programme and planning support as required.

Project owner: Charlotte Almond

- Responsible for peer review and general guidance over the course of the project as required.

Constraints & Dependencies

The following constraints and dependencies have been identified:

- Alignment and consistency with wider work program, particularly the s35 review of iwi/hapū provisions and how the provisions will be assessed against Te Mana o te Wai. There may potential for the two reviews to overlap and will require the two authors to work closely together.

- This work will impact on the wider NPS-FM implementation programme being carried out simultaneously to this project. Alignment and consistency with the wider NPS-FM implementation programme will need to occur.

- Although the completion of this project does not delay work beginning on Our Freshwater Future (OFWF) programme, having the evaluation completed in a timely manner is important given it is identified as an input to the wider programme.

- It is identified that there are tight timeframes to adhere to, given that central government has set the deadline for notifying plan change(s) that gives effect to the NPS-FM as 31 December 2024.

Risks

The following are some identified risks that could occur throughout the project:

- **Late supply of information**: The project is reliant on information from other teams who have their own workloads and resource pressures. If the information required to support this project is not available at the time it is needed, the timeframes on the project will slip.
- **Timeframes:** given the tight timeframes associated with the NPS-FM programme (must be complete by Dec 2024), individual projects (such as this) within the wider programme must be completed on time or risk compromising Council's obligations.
- It is identified that future national direction poses a risk in terms of the potential impact on resourcing and current workloads. There are several pieces of national direction that are forecast to be released in the next 12-24 months including the National Policy Statement for Indigenous Biodiversity, and the regulation of three waters (Taumata Arowai), and the RMA reform.

Prepared by: Leana Shirley	Approved by:
Date: 26 February 2021	Date:

Annex 1: One Plan Freshwater s. 35 Review – Specific Provisions

One Plan Chapter to be reviewed:	Specific provisions subject to review	Comment
• **Chapter 2: Te Ao Maori**	TBC	This has been included as a placeholder acknowledging that a separate review of this chapter is being undertaken, however Chapter 2 is intrinsically linked to freshwater management and some cross over is expected.
• **Chapter 4: Land**	• Full chapter. • Objectives 4-1 & 4-2 • Policies 4-1, 4-2 & 4-3 • Methods 4-1, 4-2, 4-3 and 4-4	This chapter deals with management of hill country land use by encouraging and supporting sustainable land management to reduce erosion and sediment loss. While not directly related to freshwater, it holds significant importance to overall water quality in that it seeks to reduce sediment losses to water (a known issue for the region). For this reason, I believe this chapter should be incorporated into the review to provide a holistic picture of freshwater management in the region.
• **Chapter 5: Water**	• Full chapter • Objectives 5-1, 5-2, 5-3, 5-4 • Policies 5-1, 5-2, 5-3, 5-4, 5-5, 5-6, 5-7, 5-8, 5-9, 5-10, 5-11, 5-12, 5-13, 5-14, 5-15, 5-16, 5-17, 5-18, 5-19, 5-20, 5-21, 5-22, 5-23, -24, 5-25, 5-26, 5-27 • Methods 5-1, 5-2, 5-3, 5-4, 5-5, 5-6, 5-7, 5-8, 5-9, 5-10, 5-11 • Anticipated Environmental results	Policy 5-8 (Regulation of Intensive Farming land use activities affecting groundwater and surface water quality) has been included on the basis that PC2 was acknowledged as an interim initiative, pending the wider freshwater futures review.
• **Chapter 6: Indigenous biological diversity, landscape and heritage**	• Objective 6-2 • Policies 6-2, 6-8, 6-9, 6-10 • Method 6-1, 6-3, 6-4, 6-5	It could be determined that the provisions within this chapter are out of scope, particularly given an updated NPS for Indigenous Biodiversity is expected to be released later this year. However the chapter includes specific provisions relating to wetlands, sites of significance aquatic and riparian which all relate directly to freshwater and are addressed by the NPS-FM. For this reason, specific provisions from this chapter have been included within the scope of this project.
• **Chapter 8: Coast**	• Objectives 8-1, 8-2, 8-3 • Policies 8-1, 8-2, 8-6 • Methods 8-2, 8-4 • Anticipated environmental results	The NPS-FM relates to freshwater management. The Coastal Environment is regulated by the NZ Coastal Policy statement which is a separate document with the Coastal Marine Area of a river or stream generally falling outside the definition of 'freshwater'.

		However, a recent decision of the Environment Court (2021 NZEnvC006) provides greater clarity as to the intent and scope of freshwater as it relates to the coastal area. Based on the findings of the Environment Court, waters within the CMA upstream of the river mouth are subject to the NPS-FM 2020. If we are to apply the findings of this decision to our own S35 freshwater evaluation, Chapters 8, 18 and I are within scope of this review insofar as they relate to the freshwater reform.
• **Chapter 9**	• Policy 9-5	This policy relates to climate changes which is addressed under Policy 4 of the NPS-FM 2020. It is for this reason it is considered within scope. The remainder of Chapter 9 is deemed to be out of scope for this evaluation.
• **Chapter 12**	• Policy 12-5 and 12-6 • Table 12.1 (common catchment expiry dates)	These provisions have tentatively been included within scope as consent duration has a direct impact on freshwater outcomes.
• **Chapter 13: Land use activities and indigenous biological diversity**	• Objectives 13-1, 13-2 • Policy 13-1, 13-2, 13-3, 13-4, 13-5 • Rules 13-1, 13-2, 13-4, 13-5, 13-6, 13-7, 13-8	Rule 13-3 (Forestry) has been excluded from the scope of this review due to it being updated as per PC 1 (August 2018). However, as the review progresses it will become apparent whether sections of Rule 13-3 (as they relate to water quality) require updating and therefore will be subject to review.
• **Chapter 14: Discharges to land and water**	• Objective 14-1 • Policies 14-1, 14-2, 14-3, 14-4, 14-5, 14-6, 14-7, 14-8, 14-9 and Tables 14.1 and 14.2 • Land discharge Rules 14-1, 14-2, 14-3, 14-4, 14-5, 14-6, 14-7, 14-8, 14-9, 14-10, 14-11, 14-13, 14-14, 14-15, 14-16, 14-21, 14-22 • Water discharge Rules 14-12, 14-17, 14-18, 14-19, 14-20, 14-23, 14-24, 14-25, 14-26, 14-28, 14-29, 14-30	• **Nutrient management provisions:** Policies 14-5 and 14-6, Tables 14.1 and 14.2 and Rules 14-1, 14-2, 14-3 and 14-4 have been included on the basis that PC2 was acknowledged as an interim initiative, pending the wider freshwater futures review. • **Rules** 14-7, 14-8, 14-9, 14-10, 14-13, 14-14, 14-15, 14-16 14-21, 14-22 relate to the discharge of contaminants to land. They do not specifically relate to dairy farm activities and their inclusion within the scope of this review is questionable given they do not allow for discharges to water from the activity and are not expressly covered by the NESFW or NPS-FM provisions. However, they have been tentatively included because they do include buffer distances to water and if mis-managed have the potential to impact ground and surface water quality. Rule 14-27 has been excluded on the basis that it refers explicitly to contaminants not entering water
• **Chapter 16: Takes, uses and diversions of water, and bores**	• Full Chapter • Objectives 16-1 • Policies 16-1, 16-2, 16-316-4, 16-5, 16-6, 16-7, 16-8, 16-9	

	• Rules 16-1, 16-2, 16-3, 16-4, 16-5, 16-6, 16-7, 16-8, 16-9, 16-10, 16-11, 16-12, 16-13, 16-14, 16-15	
• **Chapter 17: Activities in artificial watercourse, beds of rivers and lakes, and damming**	• Objective 17-1 • Policies 17-1, 17-3, Table 17.2 (general conditions) • Rules 17-1, 17-2, 17-3, 17-4, 17-5, 17-6, 17-7, 17-8, 17-9, 17-10, 17-11, 17-12, 17-13, 17-14, 17-15, 17-16, 17-17, 17-18, 17-19, 17-21	Policy 17-2, Rule 17-20 – have been excluded as they relate to artificial watercourses which are not included in the NPS FM
• **Chapter 18: Activities in the Coastal Marine Area**	• Objective 18-2 • Policy 18-1, 18-2, 18-3, 18-4, 18-10, 18-11, 18-12, 18-13, • Rules 18-1, 18-2, 18-3, 18-4, 18-5, 18-29, 18-30, 18-31, 18-33 18-34, 18-35, 18-36, 18-37, 18-38, 18-39, 18-41	See above comments under chapter 8. The link in some of these policies/rules to freshwater is a bit tenuous so we may decide to remove as we get further into the process
• **Schedules A – G, and I**		
Chapters out of scope		
• **Chapter 7: (Air)** • **Chapter 15 (Air discharges)** • **Schedule H (airsheds)**		
• **Chapter 9 (natural hazards)** • **Schedule J (Floodways and areas prone to flooding)**		While these provisions relate to freshwater bodies, they are designed to manage natural hazard risks and therefore don't fall within the gambit of the NPS-FM or NESFW. It is recommended they be excluded from this review.
• **Admin chapters (1, 10, 11 and 12**		Noting that some provisions of Chapter 12 have been included within scope.

Appendix 2: One Plan provisions relating to Chapters 4 and 13

LAND – Chapters 4 and 13

Objective 4-1: Managing *accelerated erosion**	By the year 2017, 50% of farms within hill country *land*^ subject to an elevated risk of *accelerated erosion** will have in place, or be in the process of putting in place, farm-wide sustainable *land*^ management practices to minimise *accelerated erosion** and to provide for the Surface *Water*^ Management Values set out in Schedule B by reducing sediment loads entering *water bodies*^ as a result of *accelerated erosion**.

Policy 4-1: Encouraging and supporting sustainable *land*^ management	The Regional Council will encourage and support the adoption of sustainable *land*^ management practices by: (a) working with relevant owners and occupiers of farms within hill country *land*^ subject to an elevated risk of *accelerated erosion** to prepare voluntary management plans under the Council's Sustainable Land Use Initiative or Whanganui Catchment Strategy, which identify sustainable *land*^ management practices for each farm and work programmes for implementing any agreed changes, (b) monitoring the implementation of voluntary management plans and sustainable *land*^ management practices within hill country *land*^ subject to an elevated risk of *accelerated erosion** and reporting this information on a two-yearly basis, and reviewing the effectiveness of the sustainable land management practices, and Land (c) responding to requests from owners or occupiers of *land*^ that is not within hill country *land*^ subject to an elevated risk of *accelerated erosion** to prepare a management plan, provided this does not impede the achievement of (a).

Objective 4-2: Regulating potential causes of *accelerated erosion**	*Land*^ is used in a manner that ensures: (a) *accelerated erosion** and increased sedimentation in *water bodies*^ (with resultant adverse *effects*^ on people, buildings and *infrastructure*^) caused by *vegetation clearance**, *land disturbance**, *forestry**, or *cultivation** are avoided as far as reasonably practicable, or otherwise remedied or mitigated, and (b) sediment loads entering *water bodies*^ as a result of accelerated erosion are reduced to the extent required to be consistent with the *water*^ management objectives and policies for *water*^ quality set out in Chapter 5 of this Plan.

Policy 4-2: Regulation of	(a) In order to achieve Objective 4-2 the Regional Council must regulate *vegetation clearance**, *land disturbance**, *forestry** and *cultivation** through *rules*^ in this Plan and decisions on *resource consents*^, so as to minimise the

***land^* use activities**	risk of accelerated erosion, minimise discharges of sediment to water, and maintain the benefits of riparian vegetation for *water bodies^*. (b) *Territorial Authorities^* may regulate, through *rules^* in *district plans^* and decisions on *resource consents^*, the actual or potential *effects^* of the use, development, or protection of *land^*, in order to achieve Objective 4-2. However, *Territorial Authorities^* must not have *rules^* that are contradictory to the *rules^* in this Plan that control the use of *land^*. (c) The Regional Council will generally allow small scale *vegetation clearance*, land disturbance*, forestry** and *cultivation** to be undertaken without the need for a *resource consent^* if *conditions^* are met. *Vegetation clearance** and *land disturbance** require a *resource consent^* if they are undertaken adjacent to some *water bodies^* (including certain *wetlands^*) in *Hill Country Erosion Management Areas** or in *coastal foredune** areas. Any other large scale *land disturbance** will also require a *resource consent^*.

Policy 4-3: Supporting codes of practice, standards, guidelines, environmental management plans and providing information on best management practices	The Regional Council must, and *Territorial Authorities^* may: (a) support the development of codes of practice, standards, guidelines and other sector-based initiatives targeted at achieving sustainable *land^* use, (b) recognise appropriately developed and administered codes of practice, standards, guidelines or environmental management plans targeted at achieving sustainable *land^* use, and incorporate them within the regulatory framework where applicable, and (c) make information describing best management practices for reducing erosion and maintaining *water^* quality and soil health available to all relevant landowners, occupiers, asset owners, consultants, developers and contractors.

Objective 13-1 *Accelerated erosion - regulation of *vegetation clearance**, *land disturbance**, *forestry** and *cultivation****	The regulation of *vegetation clearance**, *land disturbance**, *forestry** and *cultivation** in a manner that ensures: (a) *accelerated erosion** and any associated damage to people, buildings and *infrastructure^* and other physical resources of regional or national importance are avoided as far as reasonably practicable or otherwise remedied or mitigated, and (b) increased sedimentation in *water bodies^* as a result of human activity is avoided as far as reasonably practicable, or otherwise mitigated.

Policy 13-1 *Regional rules^ for vegetation clearance*, land disturbance*,	The Regional Council must: (a) regulate *vegetation clearance**, *land disturbance**, *forestry** and *cultivation** through *regional rules^* in accordance with Objectives 12-1, 12-2 and 13-1 and Policies 12-1 to 12-8, and (b) manage the *effects^* of *vegetation clearance**, *land disturbance** and *cultivation** by requiring *resource consents^* for those activities:

forestry* and cultivation*	(i) adjacent to some *water bodies^,* (ii) involving the removal of some *woody vegetation** in *Hill Country Erosion Management Areas*,* (iii) involving *land disturbance** or *cultivation** in *Hill Country Erosion Management Areas**, (iv) involving large-scale *land disturbance**, or (v) within the *coastal foredune**

Policy 13-2 **Consent decision-making for *vegetation clearance*, land disturbance*, forestry** and *cultivation******	For *vegetation clearance**, *land disturbance**, *forestry** or *cultivation** and ancillary discharges to and diversions of surface *water^* that requires *resource consent^* under Rule 13-2, Rule 13-6 or Rule 13-7, the Regional Council must make decisions on consent applications and set consent *conditions^* on a case-by-case basis, having regard to: (a) the Regional Policy Statement, particularly Objective 4-2 and Policies 4-2 and 4-3, (b) managing the *effects^* of *land disturbance**, including large-scale earthworks, by requiring *Erosion and Sediment Control Plans** or other appropriate plans to be prepared, (b) managing the *effects^* of *forestry** by requiring sustainable *forestry** management practices to be adopted and *Erosion and Sediment Control Plans** or other appropriate plans to be prepared, (d) managing the *effects^* of *cultivation** on *water bodies^* through the use of sediment run-off control methods and setbacks from *water bodies^*, (e) the appropriateness of establishing *infrastructure^* and other physical resources of regional or national importance as identified in Policy 3-1, (f) generally allowing the clearance of *woody vegetation** on established pasture if that clearance will not lead to *accelerated erosion** or the increased sedimentation of *water bodies^,* (g) generally allowing activities that are for the purpose of managing *natural hazards^*, including the reduction of flood risk, (h) generally allowing *forestry** for soil conservation purposes, (i) generally allowing activities that result in improved *land^* stability or enhanced surface *water^* quality, (j) any relevant codes of practice, standards, guidelines, or environmental management plans and accepting compliance with them to the extent that they can be used as *conditions^* on *resource consents^*, (k) sediment and erosion control measures required to reasonably minimise adverse *effects^*, including those caused by rainfall and storm events, (l) achieving integrated management through consents that are Region-wide or cover large areas for activities that are widespread and undertaken by or on behalf of a single consent holder including, but not limited to, *infrastructure^* and other physical resources of regional or

	national importance, or *forestry**, provided any such consents are subject to *conditions*^, including review provisions, enabling *site**-specific matters to be addressed as necessary, and (m) for activities involving an ancillary *discharge*^ to surface *water*^, the matters in Policy 14-9. **Advice note:** The *rules*^ in this *regional plan*^ do not authorise the modification or disturbance of any archaeological or registered *waahi tapu** sites within the area of activity. Written authority from the Heritage New Zealand is required prior to any destruction, damage or modification of an archaeological or registered *waahi tapu** site or an area where there is reasonable cause to suspect there is an archaeological site. Should any artefacts, bones or any other sites of archaeological or cultural significance be discovered within the area affected by the activity, written authorisation should be obtained from the Heritage New Zealand before any damage, modification or destruction is undertaken.

Appendix 3 Implementation issues and potential changes to provisions

Land: implementation issues with rule and policy framework		
Provision	**Issue/Suggested change**	**Reason**
Definitions of 'vegetation clearance' and 'land disturbance'	Amend exclusion (e) "the maintenance or upgrade of existing tracks, structures (including fences) or infrastructure". This is also implicated in the definition of land disturbance which is bundled into the definition of vegetation clearance. The Land	The current definition is test-based and therefore not clear, particularly when applied to a permitted activity.
Definition of 'Hill Country Erosion Management Area'	Refer only to land with a pre-existing slope of 20 degrees, or insert a comma following "cultivation".	The current definition is confusing.
Definitions of 'maintenance' and 'upgrade'	Consider amending to make more certain when an activity is maintenance or an upgrade.	Test based – have to do an assessment of effects to decide whether consent is required. Links to exclusions in other definitions, i.e. land disturbance.
Definition of 'Erosion and Sediment Control Plan'	Update reference to the *Erosion and Sediment Control Guidelines for the Wellington Region* (Sept 2002).	These have been superseded and are no longer considered best practice.
Land disturbance and cleanfill	Clarify (possibly through the rule guides) when land disturbance and cleanfill rules will apply, and consider inserting a standard in relation to soil contamination in the cleanfill rule.	If the cut and fill occur on one land parcel then the activity would be consented by a land disturbance consent. If the cut occurred on a separate land parcel then the filling would be consented by a cleanfill consent and the cut consented by a land disturbance consent. The reason for this is that the cleanfill rule has control over the importation of contaminated soil to the fill site.
Earthworks rule 13-2 and 'land disturbance' definition	Consider amendments to prevent sequential exposure of a large area (such as a hillside) over a period of years. Consideration of the 2,500m^2 permitted activity	Rule refers to disturbance of an area greater than 2500m^2 / yr. There is no explicit restriction on the amount that can be exposed at any time; the area can be accumulated each year

Land: implementation issues with rule and policy framework		
Provision	**Issue/Suggested change**	**Reason**
	threshold and whether it is still appropriate is also required.	so that considerably more than 2500m^2 is exposed at one time. Land disturbance definition focuses on physical means of disturbance, rather than simply: exposed.
Riparian planting and vegetation clearance	Consider a permitted activity for this activity.	Planting in riparian margins and removing plants such as willows requires consent in some circumstances. The approach is not consistent across the plan; for example, it may be unregulated in 'riparian margin' at risk habitat (adjacent to a Site of Significance – Aquatic) for enhancement, but require a consent if carried out for the same purpose within 5 m of a waterbody with no Schedule B Values.
Land and BRL provisions – disturbance works in the riparian margin	**Land disturbance and vegetation clearance adjacent to waterbodies associated with works in the bed:** Currently, land disturbance and vegetation clearance adjacent to a waterbody requires consent, even if it's ancillary to a work in the bed such as installing a culvert or bridge, or constructing a drain or diversion. Consider incorporating into the BRL rules. Consideration is also required regarding the impact of associated land disturbance from bed activities on the ECOP River Works and ability to operate under Rule 17-13 as a permitted activity. **Review the rules in the land and BRL chapters. Determine the best way to address disturbance in these areas.** Permitted or otherwise, the ECOP may require updating to be consistent.	Inconsistent that essentially the same activity, with the same effects (potential discharge of sediment to water) is permitted if it occurs in the higher risk area within the bed, but requires a consent outside the bed. Also inconsistent with the intention that these activities be permitted where environmental effects will be minor. Rule 17-5 also enables minor bed disturbance and removal of plants in the bed as a permitted activity, however does not extend to land immediately adjacent to the bed – meaning these works require resource consent. This issue likely arose as an unintended consequence of more restrictive land disturbance rule regime arrived at through the appeal process. Previously the land disturbance regime was quite permissive up to 2,500 m^2, in the Decisions POP.
Rule 13-1 & 13-2 (Land disturbance rules)	Consider whether it would be sensible to have a restricted discretionary activity rule for	There is a high risk of potential environmental effects from larger-scale land disturbance which may

Land: implementation issues with rule and policy framework		
Provision	**Issue/Suggested change**	**Reason**
	larger areas (eg over 1 ha), and/or whether 2,500 m^2 is appropriate for the PA rule.	make a more onerous activity status desirable.
Rule 13-2 Large-scale land disturbance	Require the preparation of the Erosion and Sediment Control Plan as a rule condition or standard.	The Plan should be submitted as part of the application; therefore should be a condition. At present the timing of its preparation [and submission] is a matter of control [along with additional content and standard to which it must be prepared, and its implementation].
Rule 13-4 Cultivation	Update document incorporated by reference *Code of practice for commercial vegetable growing in the Horizons Region* (Horticulture NZ).	This document has been superseded by a national code of practice.
Rule 13-3 Forestry	Consider making the activities controlled by conditions (i)(ii), (m) and (n) prohibited activities.	These conditions set out periods when activities must not happen within the bed of a river in reaches with particular Schedule B Values. If they cannot be avoided or the effects mitigated, then consider whether the activity need to be prohibited at those times.
Stopbank development and upgrade	When developing or upgrading stopbanks, Council often require resource consent to undertake large scale land disturbance under Chapter 13, specifically new stopbanks. Maintenance or upgrade of infrastructure meets the exclusion criteria under the land disturbance definition (in some cases). This will also need considering.. The Environmental Code of Practice for River Management is limited to works in the beds of rivers and lakes and does not address stopbank development which is another core role of the River Management Team.	If the Environmental Code of Practice for River Management (COP) provided for stopbank development and upgrade by Horizons, these activities may be addressed as permitted activities subject to specific controls. A cross reference to the COP would be required in Chapter 13. Consider whether the COP should be updated to include stopbank development and upgrade.

Water Quality: Issues with rule and policy framework			
Subject / issue	**Reason**	**Background/explanation/ notes**	**Possible action**
Use of term 'saltwater' in relation to seawater intrusion into groundwater.	'Seawater intrusion' is the generally accepted term in New Zealand.	Blanket change from 'saltwater' to 'seawater' recommended. See Chapter 2 Resource issue of significance to hapū and iwi; throughout Chapter 5; Policy 16-7	Minor change. To be addressed through the review – **change salt water to seawater**
Discharges from composting toilets **Rules 14-13 and 14-14**	Technically these need a consent to discharge as the discharge is not a biosolid, domestic wastewater or compost. The wording in the rules are currently not explicit when it comes to composting toilets which is difficult to implement.	Section 7.6.2 of Auckland Regional Council's TP 58 is helpful. It says the material should be disposed of in the same way as domestic wastewater because the risk from human pathogens	Consider providing additional guidance and/or explicit wording in the rule and policy framework for domestic wastewater discharges to address discharges from composting toilets.
Discharges of contaminants removed from a domestic wastewater treatment system	These are not covered by the onsite wastewater rule stream; rules for discharges of contaminants to land apply. A rule guide would be useful		Develop a rule guide or provide additional context in the rule & policy framework to address
On-site wastewater systems / treatment – encouraging installation of secondary treatment **Rules 14-13 and 14-14**	On-site wastewater rules require systems to be secondary level treatment to be a permitted activity. If not secondary, the consent is required as a Restricted Discretionary Activity.	Currently it is a significantly less expensive option to pay for consent instead of installing a secondary treatment system. This should really only be occurring in exceptional circumstances, not 'an alternative pathway'. Current situation offers a loophole – potential for effects / cumulative effects (difficult to assess the latter) and is causing considerable workload.	Consider rule and policy wording to avoid this perverse outcome.
Onsite wastewater systems, minimum lot sizes **Rule 14-13 & 14-14**	Consenting of systems below the minimum lot size – debate about cumulative effects & appropriate minimum lot sizes for different areas and soil types	The minimum lot sizes in the One Plan are being challenged and consents issued for subdivisions in concentrated areas,	Consider a broader approach to determination of minimum lot size. This would need to be based on

Water Quality: Issues with rule and policy framework			
Subject / issue	**Reason**	**Background/explanation/ notes**	**Possible action**
		potentially resulting in cumulative effects. In addition, there is debate around the most appropriate minimum lot sizes specified in the Rule framework – comments that a one-size-fits-all approach isn't necessarily the most appropriate	science and information and put the onus on the applicant to provide an assessment for their site to show what the most appropriate size is. Re-vamp or update of the Onsite wastewater manual.
Onsite wastewater manual	Some sections don't link up with the rule requirements.		Need to ensure alignment in the Manual and rule framework to avoid inconsistency and confusion.
Fertiliser discharges (Rule 14-5(d))	Condition (d) requires a nutrient budget to be provided if the average annual limits are exceeded. Given the way fertiliser is applied, it cannot be planned in advance, therefore making compliance with this condition difficult.	Condition (d) states that, if the average annual limits will be exceeded, a nutrient budget must be undertaken to plan and carry out the discharge. If the discharge is incorporated into an intensive land use application, then the nutrient budget must be consistent with the nutrient management plan, and the discharge carried out in accordance with it. However, in practice fertiliser application will be dependent on factors such as weather conditions, so cannot be planned in advance to the extent required by this condition. It is therefore difficult to implement as written	Consider reviewing fertiliser application practices and the efficacy of this condition within the rule.
Discharge of persistent and harmful contaminants (Rule 14-24)	Radioactive waste is not included in the rule	Radioactive material is not covered by HSNO Act; covered instead by the Radiation Protection Act	Review rule 14-24 and relevant legislation to determine if radioactive waste needs to

Water Quality: Issues with rule and policy framework			
Subject / issue	**Reason**	**Background/explanation/ notes**	**Possible action**
		1965 and 1982 Regulations, which is administered by the Ministry of Health (Office of Radiation Safety). Clause 14 of the regulations covers disposal of radioactive waste. RMA only includes provisions 15C, which prohibit the dumping of radioactive material or waste from a ship, or storage or disposal of radioactive material or waste on or in any land or water in the CMA. Refers to s 257 of the Maritime Transport Act for the definition.	be included in the rule framework.
Map reference for the Hautapu/Rangitīkei confluence	The map reference is recorded differently within the Plan	Schedule A, Table A.3 and Schedule B, Table B.1 both refer to the confluence in the description for the Lower Hautapu (Rang_2g) as "approx. NZMS 260 T22:529-574". Table B.8 (trout fishery) has the location as "approx. NZMS 260 T22:528-573".	Minor correction to be addressed as part of the wider review
Schedule B, Table B.4 Tidal Rangitīkei	Reinstate SOS-R Value for this WMZ	Table B.1 includes SOS-R Value for both Coastal Rangitīkei and Tidal Rangitīkei WMS; however, Tidal Rangitīkei was deleted from Table B.4 in the decisions version (2010). Decisions on individual submissions show that the only submission on SOS-R, which included a request to remove the Value from the Rangitīkei River, was rejected. It appears this has been deleted from Table B.4 in error	Minor correction to be included as part of the wider review
Schedule B, Table B.8 Upper Whangaehu	Incorrect WMZ and WMS labels for Upper Whangaehu to Whau_1, Waitangi to Whau_1b and Tokiahuru to Whau_1c	Schedule A Table A:5 labels Waitangi and Tokiahuru as being in the Upper Whangaehu (Whau_1),	Correct the labels as part of the wider review

Water Quality: Issues with rule and policy framework			
Subject / issue	**Reason**	**Background/explanation/ notes**	**Possible action**
		Whau_1b and Whau_1c respectively	
Schedule B value "Whitebait migration"	The whitebait migration value should extend further upstream	The whitebait migration Value was originally "whitebait fishery"; however, Regional Councils don't have jurisdiction over fishing. Therefore it was changed to whitebait migration, but still really only applies to reaches to protect the fishing. Science view is that this value should apply further upstream (or even region-wide)	Consider the whitebait migration value and how far it should extend as part of the wider Plan review.
NPS- glossary of terms	The One Plan does not include the NPS-FM glossary terms for: effects management hierarchy; functional need; natural inland wetland & natural wetland	These defined terms appear in the NPS-FM mandatory policies to be inserted into the One Plan	Insert these terms as part of the One Plan review
Winter feeding regulations / intensive winter grazing.	One Plan should address winter feeding as part of the nutrient management/catchment approach.		Possibly already dealt with by Plan Amendment 2.
Stock exclusion	Currently only stock associated with intensive farming land use activities in target catchment are required to be excluded from surface water.	This is a gap. Recent evidence from Science shows the impact of stock on the Ototoka Stream, north of Whanganui (faecal source tracking – dry stock farm).	Stock Exclusion has been addressed by Plan Amendment 2, however consideration of the rule framework and whether this ought to be reviewed should occur
Policy 5-11 (Human sewage discharges)	It is likely that this policy is not given effect to because there are no explicit provisions.	Policy 5-11(b) states that by 2020 or upon renewal – whichever is earlier – existing plants must have changed to a treatment system that meets the requirements under (a) (or be applied to land, or flow overland).	Consider whether this policy is fit for purpose or needs to be reworded to achieve the desired intent – alternatively does the rule framework support it? In any case, the

Water Quality: Issues with rule and policy framework			
Subject / issue	**Reason**	**Background/explanation/ notes**	**Possible action**
		Policy 5-11 carries weight, because it is directive (Feilding WWTP decision), but Horizons' view is that it is still unenforceable against an unwilling applicant / respondent "There is no set mechanism within the plan to make existing consents not due for renewal carry out any needed upgrades."	2020 date needs to be revised.
Pond lining (Rule 14-16 (a))	The pond lining specification only applies to permitted activities.	The Plan does not specify any minimum standards for pond lining of wastewater treatment plants. The only specific regulations in relation to wastewater are: the suite of rules around discharges of onsite wastewater; Rule 14-16 Human effluent storage and treatment facilities (permitted); and Rule 14-17 Discharge of untreated human effluent directly to surface water (prohibited). The permitted activity regulates discharges "onto or into land of human effluent … for the purpose of storing or treating the effluent in ponds and any ancillary discharge to air". Therefore, most applications for discharges (etc) of municipal wastewater will be processed as discretionary activities under Rule 14-30.	Consider whether pond lining should be applied to all ponds regardless of whether consent is required or they are a Permitted Activity.

Water Quantity: Issues with rules and policy framework			
Subject / issue	**Reason**	**Background/explanation/ notes**	**Possible action**
Rule 16-1 (surface water abstraction) Permitted Activity	Allows abstraction for animal farming up to 30 m^3. All other uses are limited to 15 m^3.	Animal farming is not defined and it is unclear whether this applies to certain types of animal farming in particular or all.	Define animal farming
Rule 16-1 (surface water abstraction) Permitted Activity	The rate of take must not exceed 2 l/s. To assess compliance with this, the user would need to install a meter to monitor whether they are permitted.	The 2 l/s requirement is lower than current water abstraction regulations which specify a take rate of 5 l/s.	Consider whether the take rate should increase to 5 l/s in line with regulations
Rule 16-2 (groundwater abstraction) permitted activity	Associated with riparian bores where the abstraction is connected to surface water. The provisions within Rule 16-1 relating to volume should apply.	Needs to have an allowance to take up to the PA Surface water volume where the take is within 100m of a river or doesn't meet the 400 l/ha criteria.	Allow a take of 15-30 m^3/d as a Permitted Activity regardless of bore location same as the surface water rule (16-1).
Rule 16-5: End use of water abstraction and cultural effects	Controlled Activity status of Rule 16-5 does not enable consideration of cultural effects from an activity.	Recent consent application to take surface water for water bottling met all conditions to be a Controlled Activity under Rule 16-5. Iwi expressed concerns about the abstraction for this purpose, from a cultural perspective. The conditions and control/discretion outlined in Rule 16-5 does not provide a pathway for situations where an activity has cultural effects. Consideration of cultural impacts should also be a matter of discretion for groundwater abstraction.	Review the Conditions and matters of control under Rule 16-5 and consider whether an exception is needed where iwi identify cultural effects or if provision for cultural matters is a matter of discretion regardless. This potentially results in an adjacent issue surrounding activity status and could apply to other controlled activities in the Plan

Water Quantity: Issues with rules and policy framework			
Subject / issue	**Reason**	**Background/explanation/ notes**	**Possible action**
Rule 16-14 (controlled activity)	Drilling bores within setback (e.g. 20 m) is provided for under the Controlled Activity rule but taking water is not permitted. E.g. within 200 m of a wetland.		Consider including a setback in this rule too. Alternatively, include the exclusions in the consent application forms as it is something that can easily be missed.
Stock exclusion and water allocation	Exclusion of stock from the region's waterways is encouraged as it is an important tool in improving water quality. The NES for stock exclusion requires stock access to surface water to be prevented. In order to meet these provisions and still provide water for stock, owners will need to install reticulated systems and depending on stock numbers, may require resource consent	A number of catchments in the region are fully or over-allocated or nearing allocation limits. Consenting pathways for takes in full or over-allocated catchments (regardless of use) are difficult and there is no clear guidance within the rule for essential takes. Work need to be undertaken to identify the areas where this is likely to be an issue for current stock water takes, not regulated at present but requiring consent once stock exclusion is applied. Priority areas will be identified.	Consideration of defining 'default' core allocation limits following completion of study and identification of priority areas.
Schedule C cumulative allocable volumes	The cumulative allocable volumes (blue highlight in Schedule C) are missing for some sub-zones.	The blue highlighted cumulative limits in schedule C are there to recognise the interconnectedness between subzones. They are in addition to the whole zone (dark grey line) limits. Blue line limits are missing from (table C.1): • Upper Whakapapa (Whai_2b), Lower Whakapapa (Whai_2c), Piopiotea (Whai_2d) – There should be a blue line cumulative limit for these subzones equalling the allocation limit of Lower Whakapapa (Whai_2c). • Upper Ongarue (Whai_2f) and Lower Ongarue (Whai_2g) – There should be a blue line cumulative limit for these subzones equalling the allocation limit	Check schedule C limits and add 'blue line' cumulative limits for these sub-zones.

Water Quantity: Issues with rules and policy framework			
Subject / issue	**Reason**	**Background/explanation/ notes**	**Possible action**
		of Lower Ongarue (Whai_2g). • Upper Makotuku (Whau_3b), Lower Makotuku (Whau_3c), Upper Mangawhero (Whau_3d), Lower Mangawhero (Whau_3e), and Makara (Whau_3f) – There should be a blue line cumulative limit for these subzones equalling the allocation limit of Lower Mangawhero (Whau_3e).	

BRL: Implementation issues with rules and policy framework			
Subject / issue	**Reason**	**Background/explanation/ notes**	**Possible action**
Dams	Inconsistencies between One Plan provisions for dams in Chapter 17 and the Building Act 2004, especially around measuring the height of a dam and the point at which it becomes a 'large dam'.	Note also that Rule 17-7 condition (c) may be unworkable as it requires the depth of the water to be "measured from the natural ground level at the upstream toe of the dam structure", i.e. within the reservoir	Review in light of current dam requirements under the Building Act
Rule 17-8 Replacement consents for existing damming of water	Rule has controlled activity status but has a clause requiring notification of adversely affected parties.	Rule was inserted as a controlled activity by the Hearing Panel, without the notification clause. Amendments were made through the mediation process.	Consider appropriate activity status for this rule and if remains controlled remove affected parties requirement
Flood control & drainage schemes	Incorporate 'new' schemes into Schedule B.	Not all flood control and drainage schemes are identified in Schedule B as having the Flood Control and Drainage Value, because they did not exist when the One Plan was proposed and there was not scope to include them. This applies to all of the Lower Whanganui and Kahuterawa Schemes. Other pockets have also been identified around Foxton and Foxton Beach	Update Schedule B and consider how this rule could be made more adaptive to reflect any other new schemes that come on-line after the review
Rule 17-14 Activities undertaken by or on behalf of the Regional Council in	The rule allows Horizons (and those working on our behalf) to carry out work in accordance with the Environmental Code	The notified POP rule covered the area in and next to rivers with the Schedule B Value. However, this was	Consider rule and policy wording to avoid this outcome.

rivers with a Schedule B Value of Flood Control and Drainage	of Practice for River Works. However, the rule restricts the application of the Code to works within the bed of a river. It does not permit works on land adjacent to the bed.	narrowed down in the POP decisions version to only cover the bed. At the same time, the permissive approach to land disturbance and vegetation clearance activities would have meant most of those activities were permitted anyway, and consent would only be required in areas adjacent to SoS-A that met the criteria in Schedule F to be considered riparian habitat (at-risk). The decisions version of the Plan added considerable restrictions on the land rules for activities adjacent to waterways, introducing the need to get a consent for activities carried out by or on behalf of Horizons in these areas.	Consider whether the ECOP needs updating to be more adaptive and reflect the rule and policy framework in light of NPS-FM
Rule 17-14 (second issue)	One Plan refers to the 2010 version of the Code of Practice. The ECOP was updated in 2014 to enable Council to engage independent contractors to undertake the work and this is now the version River Management work under. The rule provides for works to be undertaken <u>on behalf of</u> the Regional Council in its description but Condition (a) requires compliance with a ECOP version that does not allow it. This is likely something that was missed when the rule was amended through One Plan hearings.	Rule 17-14 requires compliance with the Environmental Code of Practice for River Works (Horizons Regional Council, June 2010), which some River Management Team activities are not able to meet given they generally use independent contractors to undertake the work. Further, the Code of Practice was updated in 2014 and this is the version Council now uses, which makes the 2010 version redundant and consequently means Council cannot meet the conditions/standards of Rule 17-14.	Update Rule 17-14 to refer to updated ECOP.
Stopbank development and upgrade	When developing or upgrading stopbanks, Council often require resource consent to undertake large scale land disturbance under Chapter 13.	If the ECOP provided for stopbank development and upgrade by Council, these activities may be addressed as permitted activities subject to specific controls.	Consider whether the ECOP should be updated to include stopbank development and upgrade.

	The ECOP is limited to works in the beds of rivers and lakes and does not address stopbank development which is another core role of the River Management team	A cross reference to the ECOP would be required in Chapter 13	
Rule 17-17 Other gravel extraction	This is a discretionary activity, with the only condition being that it can't occur in a rare, threatened or at-risk habitat. Reverts to Rule 17-23 catch-all (also a discretionary activity) rather than Rules 13-8 and 13-9. Rule guide is potentially confusing / contradictory	History: rule was inserted by Hearing Panel as a RD activity with a very long list of matters for discretion (to be similar to operative BRL Rule 15). Activity status changed and other conditions removed during mediation	Consider refreshing the rule or providing clear rule guidance to create certainty for users.
Land & BRL riparian works	**Land disturbance and vegetation clearance adjacent to waterbodies associated with works in the bed:** Currently, land disturbance and vegetation clearance adjacent to a waterbody requires consent, even if it's ancillary to a work in the bed such as installing a culvert or bridge, or constructing a drain or diversion. Consider incorporating into the BRL rules? Also impact on the ECOP River Works	Inconsistent that essentially the same activity, with the same effects (potential discharge of sediment to water) is permitted if it occurs in the higher risk area within the bed, but requires a consent outside the bed. Also inconsistent with the intention that these activities be permitted where environmental effects will be minor. Suspected that this arose as unintended consequence of more restrictive land disturbance rule regime arrived at through the appeal process; previously the land disturbance regime was quite permissive up to 2,500 m^2, in the Decisions POP.	Review the rules in each chapter and determine the best way to address disturbance in these areas. Permitted or otherwise. COP may require updating to be consistent.
Disturbance of nesting sites & activities on surface of river (e.g. boating)	Vehicles accessing Sites of Significance – Riparian during nesting season. Information sheet tries to encourage behaviour that would protect these values through, such as limiting vehicle access and sticking to established tracks. Question whether Plan needs stricter controls	Use of the surface of the waterbody and controlling the effects of noise would be a TA function rather than a regional function. However, accessing the waterbody and associated disturbance is a regional function. We would need to **work closely with**	Review permitted activity rules in BRL and Coast chapters to consider whether more controls or regulation is required to protect birds and nesting sites from

	in this space to protect nesting sites. The current provisions are unlikely to provide comprehensive protection from some activities by river users, particularly boating, which would be considered as an activity on the surface of a waterbody (this is a territorial authority function under s31(e) RMA). Similarly, outside the CMA	**the TA's to develop a comprehensive set of protections**	vehicles and boating activities. Work closely with TAs when considering this.

Wetlands (Biodiversity): Issues with rule and policy framework		
Subject / issue	**Reason**	**Background/explanation/ notes**
Enhancement of lakes and wetlands	Where lakes are Schedule F habitat and works are proposed to enhance them, there is an inconsistency between the rules in Chapter 17 and Rules 13-8 & 13-9. Latter do not reference section 13 of the RMA, therefore disturbance of lake beds cannot be considered against them; Chapter 17 has to apply.	From the consent application to enhance Lake Koputara: The activity status of project activities involving removal of plants and ancillary activities is assessed as a Discretionary Activity under Rule 17-23 according to the following rationale: f. Rule 17-19 Plants Permitted Activity - Condition (e) cannot be complied with because the activity is in a *threatened habitat*. (Note: In all other respects the activity complies with the Permitted Activity conditions); g. Rule Guide refers activities undertaken in *threatened habitats* to regulation under Rule 13-9; h. Rule 13-9 Some activities in rare habitats and threatened habitats – This Rule excludes activities carried out for the purposes of protecting or enhancing the habitat; i. Unlike land use activities, there is a presumption in the RMA that an activity cannot be done unless allowed by a planning instrument, so the assessment returns to chapter 17; j. Activities that do not comply with other rules (in this case Rule 17-19) are dealt with as Discretionary Activities under Rule 17-23. It is therefore concluded that the removal of plants from the bed of Lake Koputara and ancillary activities requires resource consent. All other project activities (land disturbance and vegetation clearance) can be done as unregulated land use activities.

Wetlands (Biodiversity): Issues with rule and policy framework		
Subject / issue	**Reason**	**Background/explanation/ notes**
Heavily modified lakes with rare and threatened habitats	Lake Koitiata is heavily modified and is no longer classified as a lake, but still technically has rare and threatened status under Schedule F. Therefore any works in and around this area would require resource consent under rules 13-9 as a non-complying activity. There are likely other lakes or areas that will fall into this same category.	

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