Taranaki Regional Council

AGENDA
Policy & Planning

Tuesday 14 March 2023, 10.30am

Policy and Planning Committee

14 March 2023 10:30 AM

Whakataka te hau

Karakia to open and close meetings

Whakataka te hau ki te uru	Cease the winds from the west
Whakataka te hau ki te tonga	Cease the winds from the south
Kia mākinakina ki uta	Let the breeze blow over the land
Kia mātaratara ki tai	Let the breeze blow over the ocean
Kia hī ake ana te atakura	Let the red-tipped dawn come with a sharpened air
He tio, he huka, he hauhu	A touch of frost, a promise of glorious day
Tūturu o whiti whakamaua kia tina.	Let there be certainty
Tina!	Secure it!
Hui ē! Tāiki ē!	Draw together! Affirm!

Nau mai e ngā hua

Karakia for kai

Nau mai e ngā hua	Welcome the gifts of food
o te wao	from the sacred forests
o te ngakina	from the cultivated gardens
o te wai tai	from the sea
o te wai Māori	from the fresh waters
Nā Tāne	The food of Tāne
Nā Rongo	of Rongo
Nā Tangaroa	of Tangaroa
Nā Maru	of Maru
Ko Ranginui e tū iho nei	I acknowledge Ranginui above and
Ko Papatūānuku e takoto ake nei	Papatūānuku below
Tūturu o whiti whakamaua kia tina	Let there be certainty Secure it!
Tina! Hui e! Taiki e!	Draw together! Affirm!

Date 14 March 2023

Subject: **Policy and Planning Committee Minutes – 7 February 2023**

Approved by: A D McLay, Director - Resource Management

S J Ruru, Chief Executive

Document: 3152263

Recommendations

That the Taranaki Regional Council:

a) takes as read and confirms the minutes of the Policy and Planning Committee meeting of the Taranaki Regional Council held in the Taranaki Regional Council chambers, 47 Cloten Road, Stratford on Tuesday 7 February 2023 at 10.30am

b) notes the recommendations therein were adopted by the Taranaki Regional Council on Tuesday 28 February 2023.

Matters arising

Appendices/Attachments

Document 3143031: Minutes Policy and Planning – 7 February 2023.

Date 7 February 2023

Venue: Taranaki Regional Council Boardroom, 47 Cloten Road, Stratford

Document: 3143031

Present		C S Williamson	*Committee Chairperson*
		D M Cram	
		A L Jamieson	
		D H McIntyre	
		C L Littlewood	*ex officio*
		N W Walker	*ex officio*
		E Bailey	Iwi Representative
		P Moeahu	Iwi Representative
		M Ritai	Iwi Representative
		C Filbee	South Taranaki District Council
		G Boyde	Stratford District Council
		B Haque	New Plymouth District Council
		L Gibbs	Federated Farmers
Attending	Mr	S J Ruru	Chief Executive
	Mr	A D McLay	Director - Resource Management
	Ms	A J Matthews	Director – Environment Quality
	Mr	M J Nield	Director – Corporate Services
	Ms	L Hawkins	Planning Manager
	Mr	R Phipps	Manager – Science and Technology
	Mr	C Woollin	Communications Adviser
	Miss	N A Chadwick	Executive Assistant to CE
	Mrs	M G Jones	Governance Administrator
	Mr	S Tamarapa	Iwi Communications Officer (Joined meeting at 11.20am)

1 member of the media
2 members of the public

Apologies
Apologies were received and sustained from B J Bigham and S W Hughes.

Conflicts of Interest
No conflicts of interest

1. Confirmation of Minutes Policy and Planning Committee 22 November 2022

Recommended

That the Taranaki Regional Council:

a) takes as read and confirms the minutes of the Policy and Planning Committee of the Taranaki Regional Council held 1pm on 22 November 2022 at Taranaki Regional Council 47 Cloten Road Stratford

b) notes the recommendations therein..

Boyde/Cram

2. Inhalable Particulate ($PM_{2.5}$) State of the Environment Monitoring Report

2.1 Mr R Phipps, Manager – Science and Technology Spoke to the memorandum to provide the Committee with an update of the continuous monitoring of airborne particulate matter in urban New Plymouth.

Recommended

That the Taranaki Regional Council:

a) received the memorandum – *Inhalable Particulate ($PM_{2.5}$) State of the Environment Monitoring Annual Report*

b) noted the recommendations therein.

Bailey/Cram

3. Submission on Enabling Investment of Offshore Renewable Energy

3.1 Mr A D McLay spoke to the memorandum to seek the Committee Members' endorsement of the submission *Enabling Investment in Offshore Renewable Energy*.

Recommended

That the Taranaki Regional Council:

a) received the memorandum entitled *Submission on Enabling Investment in Offshore Renewable Energy*

b) noted the attached *Submission on Enabling Investment in Offshore Renewable Energy - Discussion Document*

c) adopted the submission, subject to adding text addressing decommissioning, allowing for wider community engagement and the limited capacity of the regional electricity network

d) determined that the decision be recognised as not significant in terms of section 76 of the *Local Government Act 2002*

e) determined that is has complied with the decision- making provisions of the *Local Government Act 2002* to the extent necessary in relation to this decision; and in accordance with section 79 of the Act, determined that it does not require further information, further assessment of options or further analysis of costs and benefits, or advantages and disadvantages prior to making a decision on this matter.

Littlewood/McIntyre

4. Offshore subtidal Rocky Reefs of Pātea Bank

4.1 Ms A J Matthews spoke to the Memorandum and gave a presentation to provide the Committee with an overview of an Envirolink-funded report *Offshore subtidal Rocky reef Habitats on Pātea Bank, South Taranaki,*

Recommended

That the Taranaki Regional Council:

a) received this report titled *Offshore subtidal Rocky reef habitats on Pātea Bank, South Taranaki*

b) noted the findings in the report.

McIntyre/Cram

5. Submission on Natural and Built Environment Bill and Spatial Planning Bill

5.1 Mr S J Ruru spoke to the Memorandum and gave a presentation, providing an insight into the Spatial Planning and to seek approval of the Council Submission on the Spatial Planning Bill and Natural and Built Environment Bill.

Recommended

That the Taranaki Regional Council:

a) received the Memorandum *Submission on Natural and Built Environment Bill and Spatial Planning Bill*

b) approved the submission on Natural and Built Environment Bill and Spatial Planning Bill subject to a Sub Committee and Iwi Representatives meeting post the Committee meeting to resolve any issues

c) determined that this decision be recognised as not significant in terms of section 76 of the *Local Government Act 2002*

d) determined that it has complied with the decision-making provisions of the *Local Government Act 2022* to the extent necessary in relation to this decision; and in accordance with section 76 of the Act, determined that is does not require further information, further assessment of options or further analysis of costs and benefits, or advantages and disadvantages prior to making a decision on this matter

Walker/Bailey

11.56am B Haque NPDC Representative left meeting

12.28am Mr M Nield left meeting

12.30 Ms C Filbee STDC Representative left meeting

12.40 Mr P Moeahu Iwi Representative left meeting

There being no further business the Committee Chairperson, Councillor C Williamson, declared the meeting of the Policy and Planning Committee closed at 12.46pm. The meeting closed with a karakia.

Policy and Planning Chairperson: _____

C Williamson

Date 14 March 2023

Subject: **Freshwater Programme Overview**

Approved by: A D McLay, Director - Resource Management

S J Ruru, Chief Executive

Document: 3149668

Purpose

1. The purpose of this memorandum is to provide an overview of the Essential Freshwater Programme, as it relates to the progress and challenges associated with policy development.

Executive summary

2. The Government's Essential Freshwater Package, released in late 2020, requires the Council to give effect to numerous elements, from plan writing to enforcing regulations. These tasks cross multiple Council teams and require input from iwi, community and stakeholders. To effectively manage the implementation, a project plan has been prepared and regular updates against that plan are provided to this Committee. This report however, focusses specifically on the programme relating to policy preparation.
3. The policy programme aims to achieve notification of a new Natural Resources Plan, including freshwater components by the end of 2024. Progress is being made with science work underway to determine necessary baseline states in accordance with the NPS-FM and consultation completed at the end of 2022 on key aspects of the policy framework. Additional consultation stages are planned to be undertaken this year.
4. The most recent work has focussed on developing a partnership with iwi to facilitate meaningful and timely input. This work is predominately being led by the two Pou Taiao planners, with support from the TRC policy and science teams.
5. Although progress is being made, there are number of risks and challenges presenting, compounded by the tight timeframe to meet NPS-FM requirements. On-going management of these risks and challenges will be required.

Recommendations

That the Taranaki Regional Council:

a) receives the memorandum *Freshwater Programme Overview*

b) notes the contents of the memorandum and the programme provided.

Background

6. Updating Councils freshwater policy is a key deliverable of giving effect to the NPS-FM. For TRC this will result in an updated Regional Policy Statement and Freshwater Plan. This is part of the overarching policy development programme bringing all policy documents together into a combined Natural Resources Plan(NRP). This wider piece of work is being undertaken to align with the requirement to notify freshwater policies by the end of 2024.

7. There are key principles from the NPS-FM including giving effect to Te Mana o te Wai, the hierarchy of obligations and the national objectives framework (NOF). All aspects, involve working closely with tangata whenua and engaging with the community. The NOF process itself is made up of a number of individual components including the identification of Freshwater Management Units (FMU), long-term visions for each FMU, values identification (compulsory and non-compulsory), environmental outcomes, baseline states, attributes, target attribute states and limits on resource use. These components form part of the policy framework and are supported by scientific investigations. This requires working across multi-disciplinary teams.

Discussion

8. A key component of giving effect to the NPS-FM is successfully implementing the NOF. NOF sets out a key process of individual steps that must be undertaken, set out in the paragraphs below. The process of stepping through NOF must be informed by Te Mana o Te Wai and must apply the hierarchy of obligations.

9. Council is making good progress through the steps of NOF and is taking a sequential approach, building upon data, investigations and knowledge of the region. Specifically, the following tasks are underway.

<u>FMU, Visions and Values</u>

10. These are foundational and cascading steps to implement NOF, and they will ultimately lead to suite of plan provisions. The FMU, provides the spatial lens for which long-term visions are written. These visions set ambitious but reasonable goals for freshwater, to be achieved within a specific timeframe. The identification of values (both those compulsory within the NPSFM and non-compulsory) are then required to guide the development of environmental outcomes.

11. Developing the FMU boundaries has occurred over a number of years. Council initially undertook this task in 2015, but reviewed the approach in 2022 following feedback from some iwi and other stakeholders. The principles that now underpin the proposed FMUs are:

    - 'ki uta ki tai' – source to sea approach
    - Go with the wai – catchment boundaries should be used rather than property boundaries to delineate FMUs
    - Designed to enable freshwater accounting requirements for limit and target setting
    - Keep it simple – fewer FMUs will reduce complications and ensure NOF is workable.

12. In November and December 2022 Council consulted online, in schools and at the Stratford A&P Show on proposed FMU boundaries and sought the identification of

values and visions for the FMU. A good level of feedback was received. More detail regarding the reach is provided later in this memorandum. A review of the information is now being undertaken. Once input from iwi is received on these matters, staff will work to finalise the FMU boundaries, drafting relevant visions and identifying any non-compulsory values that need to be considered. This work will be done in conjunction with the Pou Taiao planners.

Science investigations

13. *Science theme groups* – A significant part of implementing the requirements of the NPS-FM and developing the NOF is understanding the environmental baseline, identifying attributes, setting target states for those attributes and developing limits on resource use to support target states to be achieved. To facilitate this work, theme groups have been set up, led by the science team. They are cross disciplinary teams and focus on eight different freshwater themes (*Water quantity, Sediment, Bacteria, Ecosystems, Fish Passage, Nutrients, Urban Water Quality and Contaminated land and Mahinga Kai*). These groups are well underway in developing and delivering their work programmes.

14. Supporting this work is a comprehensive science programme, which incorporates a mix of data collection and analysis (the State of Environment Monitoring Programme) and modelling work. This body of work is summarised below:

    - Modelling work completed or underway:
        - Environmental flows and ecological impacts (Ian Jowett)
        - Spatial modelling of regional water quality (Land Water People (LWP)
        - Sediment – SedNetNZ (Manaaki Whenua)
        - Nutrients – SCAMP model (LWP and RMA Science)
        - Bacteria (*E. coli*)
            - load and load reduction required to achieve targets (LWP)
            - CLUES modelling (NIWA – joint model development project with Horizons).
    - Full review of freshwater SoE monitoring programmes underway, with a specific focus on NPS-FM requirements.
    - New regional lake monitoring programme underway of six key lakes, with programme in place by the end of 2023.

Partnering with iwi

15. Two Pou Taiao planners have been on board since August 2022. These roles represent a signed agreement between TRC and eight iwi authorities to enable meaningful input from iwi in the plan development process. The positions are funded by TRC. The agreement sets out clear tasks and deliverables, and staff have been working closely with the Pou Taiao to develop a work programme that will achieve these deliverables and ensure timely input. A series of monthly wananga have been set up with key themes and discussion topics identified. This programme aligns with the broader freshwater implementation programme and will facilitate the Pou Taiao in their work with iwi, but to also be part of the plan drafting and development processes.

16. In February, the Pou Taiao began discussions Ngā iwi o Taranaki around Te Mana o Te Wai, the proposed FMU framework and sought direction on values and freshwater visions. This work will continue at the March wananga.

17. In addition to working with the Pou Taiao planners, TRC staff are in the process of meeting with all iwi to understand the best way to work with hapu and to ensure the opportunity for hapu to provide input is provided. The approach varies between iwi, with some iwi authorities working directly with their hapu and then through the Pou Taiao, and others having a desire for TRC to provide the opportunity directly to hapu to be involved if they so desire.
18. On both fronts considerable progress has been made, but it is important to acknowledge the timing pressures of the freshwater programme and the resourcing constraints that both Council and iwi have. It has taken the Pou Taiao time to get the wananga series off the ground, for many reasons not least it being a complex and detailed work programme. Staff have supported this need for extra time to build the programme and partnership, and will continue to do so. However, there is likely to be a crunch point where the programme will need to continue to evolve and not all issues may have been able to be explored or resolved.
19. In addition to freshwater specific requirements, the Pou Taiao agreement includes a deliverable responding to the requirements of the planning standards. This is to develop a statement of Resource Management Issues for iwi. This has been completed in draft by the Pou Taiao, following input from iwi. This statement, along with the statement of Significant Resource Management Issues prepared by TRC staff, form the basis for policy development across the NRP. Essentially these are the issues, which the policy framework will need to respond to achieve the integrated management of natural and physical resources of the region.
20. Iwi management plans are also a key consideration in the process. Staff are considering the plans as they investigate options for policy development.

<u>Consultation with community, special interest and technical groups</u>

21. Engagement with the community, special interest and technical groups is critical through this process. A number of consultations have already been undertaken with information informing the process. A brief summary is provided below:
    - *Community wide - Region wide Freshwater Vision* – this occurred late 2021 and featured a combination of community meetings and online input.
    - *Special Interest Group - Water Takes discussions* – occurring in 2021, this consultation focused on industry groups and began to unpack issues and considerations around water demand and use for the rural community.
    - *Community wide – FMU, visions and values.* In November – December 2022 a consultation which focussed online, in schools and at the Stratford A&P show asked the community for their feedback on the FMU boundaries, the region wide vision for freshwater, and what they value in relation to freshwater. Five hundred and twenty responses were received across all mediums from surveys filled in to post-it note commentary at the A&P show. There was good geographical coverage across the region, with feedback received from all FMUs.
22. Consultation is planned over the coming 12 – 18 months, and will focus on the following key stages and engagement groups:
    - *Special Interest Groups* – from industry representatives to environmental NGO's it will be important to obtain input and test approaches in policy development. This consultation stage will likely take place in the form of face to face meetings, and will

focus around key policy development outputs such as environmental outcomes, target attribute states and mitigation measures. This consultation period will take place around the middle of this year, and is a critical point of feedback ahead of wider community consultation.

- Community consultation - A closing the loop engagement piece will be completed upon receipt of iwi input on FMU, values and visions and once policy drafting has been done in conjunction with Pou Taiao. Consultation on the limits, targets and mitigations will occur with the community in the 4th quarter of this year. This consultation will be face to face and is a critical stage to test options for policy development with the community.
- Formal Clause 3 and 4a consultation – once the policy development is completed in first draft, and ahead of notification, consultation will be undertaken in accordance with Clause 3 and 4a of Schedule 1 of the Resource Management Act 1991. These two stages are focussed consultation, the first (clause 3) with interested parties identified by Council and the second (clause 4a) focused on iwi. Written feedback will be sought, and potential supporting workshops or information sessions may accompany the approach. This is planned to occur in the 2nd and 3rd quarters of 2024.

Challenges and risks

23. As with any large and complex programme there will be challenges and risks. These are set out in the following paragraphs.
24. *Acting on best available information* - The NPS-FM is clear that councils must use the best information available to give effect to its requirements. Decision-making cannot be delayed on the basis of having incomplete or uncertain information. The Council holds limited information for a number of attributes specified in the NOF and, in some instances, there is no information available at all. This is due in part to the relatively modest coverage of state of the environment monitoring programmes for some attributes across the region, but also because the NPS-FM includes a number of new and novel attributes. While using physical monitoring data to inform implementation of the NOF is the preferred approach, the lack of available date will in some instances, require the use of modelled data, expert opinion and professional judgement. As a result of the inherent limitations in available information, decision making will be required in the face of significant uncertainty around current state and how effective interventions (including limits) may be in achieving target states, and how quickly. Uncertainty warrants a precautionary approach, rather than using it as a reason to not act or to gather more information before acting. The fundamental concept, objective and policy direction of the NPS-FM is to give effect to Te Mana o te Wai means that information must be interpreted in a way that provides first for the health and well-being of the water body.
25. *Timing* – the deadline to notify the new NRP by the end of 2024 will be challenging. There is considerable work to be undertaken in relation to investigations, consultation and policy drafting. It will require the team to work as closely to the work programme as possible, and at times this may mean that concurrent processes will need to be undertaken or decisions will need to be made to move on ahead of the completion of existing stages. This will require staff, iwi partners, stakeholders and community to be agile and flexible in approach.

26. *Effective partnership building with iwi* - staff desire and are conscious of building meaningful and effective partnerships with iwi. The two Pou Taiao planners provide valuable resource and expertise to assist in this approach. However, a challenge remains in relation to tight timeframes, which may place pressure on the ability of staff and iwi to engage with one another fully. This pressure may lead to a misalignment between the TRC and iwi/hapu that may create tension. There is also likely to be the areas where there is a misalignment between desired approaches of TRC and iwi. Where this occurs staff will work closely with iwi and where appropriate Pou Taiao planners to resolve differences as best they can, but there may be instances where this cannot be achieved, particularly if there are added time pressures. In these instances, differences will need to be documented.
27. *Staffing and retention* – In the current employment market, there is a high demand for a number of the key roles required to deliver this programme. This has meant that many employers have been experiencing higher than usual turnover rates. As well as creating gaps or making new roles hard to fill, where there is a level of turnover, new staff take time to come up to full effectiveness. This period limits some team outputs, both due to the new staff and the need to devote experienced staff to training duties. The policy team will shortly be at full complement, however there are some vacancies sitting within the science team.

Financial considerations—LTP/Annual Plan

28. This memorandum and the associated recommendations are consistent with the Council's adopted Long-Term Plan and estimates. Any financial information included in this memorandum has been prepared in accordance with generally accepted accounting practice.
29. To cover the increasing workload for the policy team until notification, and to cover an existing employee reducing hours, an additional 2 year fixed term policy analyst position has been created and is expected to be filled shortly.

Policy considerations

30. This memorandum and the associated recommendations are consistent with the policy documents and positions adopted by this Council under various legislative frameworks including, but not restricted to, the Local Government Act 2002, the Resource Management *Act 1991* and the *Local Government Official Information and Meetings Act 1987*.

Iwi considerations

31. This memorandum and the associated recommendations are consistent with the Council's policy for the development of Māori capacity to contribute to decision-making processes (schedule 10 of the *Local Government Act 2002*) as outlined in the adopted long-term plan and/or annual plan.
32. The memorandum incorporates further detail with regard to how staff are working with iwi to develop a partnership approach, and meaningful and valuable input into the development of the Natural Resources Plan.

Community considerations

33. This memorandum and the associated recommendations have considered the views of the community, interested and affected parties and those views have been recognised in the preparation of this memorandum.

34. An engagement plan has been prepared to support the policy development programme. This plan considers a variety of options to facilitate the involvement and feedback from the community in policy development.

Legal considerations

35. This memorandum and the associated recommendations comply with the appropriate statutory requirements imposed upon the Council.

Date 14 March 2023

Subject: **Submission on the Review of the Resource Management Infringement Offences Regulations**

Approved by: A D McLay, Director - Resource Management

S J Ruru, Chief Executive

Document: 3150715

Purpose

1. The purpose of this memorandum is to seek Members' endorsement of the submission on the *Review of the Resource Management Infringement Offences Regulations* (Discussion Document).
2. The deadline for submissions is 31 March 2023.

Executive summary

3. The intent of the discussion document is to outline why the instant fines issued by Councils needs to be updated and provides options for infringement notice offences.
4. The current infringement fines are set at a level that is too low for them to be effective in deterring further offending and to cover Council's costs.

Recommendations

That the Taranaki Regional Council:

a) receives the memorandum entitled, *Submission on the Review of the Resource Management Infringement Offences Regulations*

b) notes the attached Submission on the Review of the Resource Management Infringement Offences Regulations.

Background

5. In 2016, the Ministry for the Environment completed a report on compliance, monitoring and enforcement by councils under the RMA. The report noted that many councils felt that infringement fines were set too low to be an effective deterrent for breaches to the RMA.
6. A copy of the Discussion Document is attached.

Submission

7. The submission is in support of the increase in fines and in particular, supports option two which increases all fines to the current maximum fine level and has higher fines for two offences being, contravening land use rules under an NES and contravening an abatement notice.
8. Previously the fines ranged from $300 to $2000. Under option 2 the fines range from $600 to $4000. A summary of the possible fines under each option in the discussion document is shown on page 17.

Financial considerations—LTP/Annual Plan

9. This memorandum and the associated recommendations are consistent with the Council's adopted Long-Term Plan and estimates. Any financial information included in this memorandum has been prepared in accordance with generally accepted accounting practice.

Policy considerations

10. This memorandum and the associated recommendations are consistent with the policy documents and positions adopted by this Council under various legislative frameworks including, but not restricted to, the *Local Government Act 2002*, the *Resource Management Act 1991* and the *Local Government Official Information and Meetings Act 1987*.

Iwi considerations

11. This memorandum and the associated recommendations are consistent with the Council's policy for the development of Māori capacity to contribute to decision-making processes (schedule 10 of the *Local Government Act 2002*) as outlined in the adopted long-term plan and/or annual plan.

Community considerations

12. This memorandum and the associated recommendations have considered the views of the community, interested and affected parties and those views have been recognised in the preparation of this memorandum.

Legal considerations

13. This memorandum and the associated recommendations comply with the appropriate statutory requirements imposed upon the Council.

Appendices/Attachments

Document 3149429: Submission on the Review of the Resource Management Infringement Offences Regulations

Document 3150859: Discussion Document - Review of the Resource Management Infringement Offences Regulations

14 March 2023
Document: 3149429

Review of the Resource Management Infringement Offences Regulations
Policy Implementation and Delivery Division
Ministry for the Environment
P O Box 10362
Wellington 6143

Dear Sir/Madam

Submission on the Review of the Resource Management Infringement Offences Regulations

Taranaki Regional Council (TRC) thanks the Ministry for the Environment (MfE) for the opportunity to make a submission on the Review of the Resource Management Infringement Offences Regulations (the Review).

In fulfilling our functions under the Resource Management Act (RMA), TRC has for over 30 years made use of the full suite of available enforcement tools in order to promote and, if required enforce, compliance. Unless circumstances require a stronger approach at the first instance, we seek to use education and a "carrot before the stick" approach to ensure compliance.

In that capacity, TRC finds that infringement notices are a valuable tool in the Council's toolkit, for those instances were education or abatement notices are not sufficient. As a result, we have issued an average of 108 infringement notices per year over the past five years.

TRC finds that infringement notices are a useful tool and a strong deterrent for most people. However, for those resource users who habitually breach rules or for whom the benefits of breaching are high, the level of the fines is insufficient to be a deterrent. TRC would submit that, as the Review notes, the length of time since the last review of fine levels has been too long. Inflation has eroded some portion of the deterrent effect. It is therefore important that the Review makes a strong statement and brings the fines back in line with both economic reality and the general view of society about consequences for breaching environmental rules and bottom lines.

Against that background, TRC wishes to express our strong support for the Review, and for Option Two in particular.

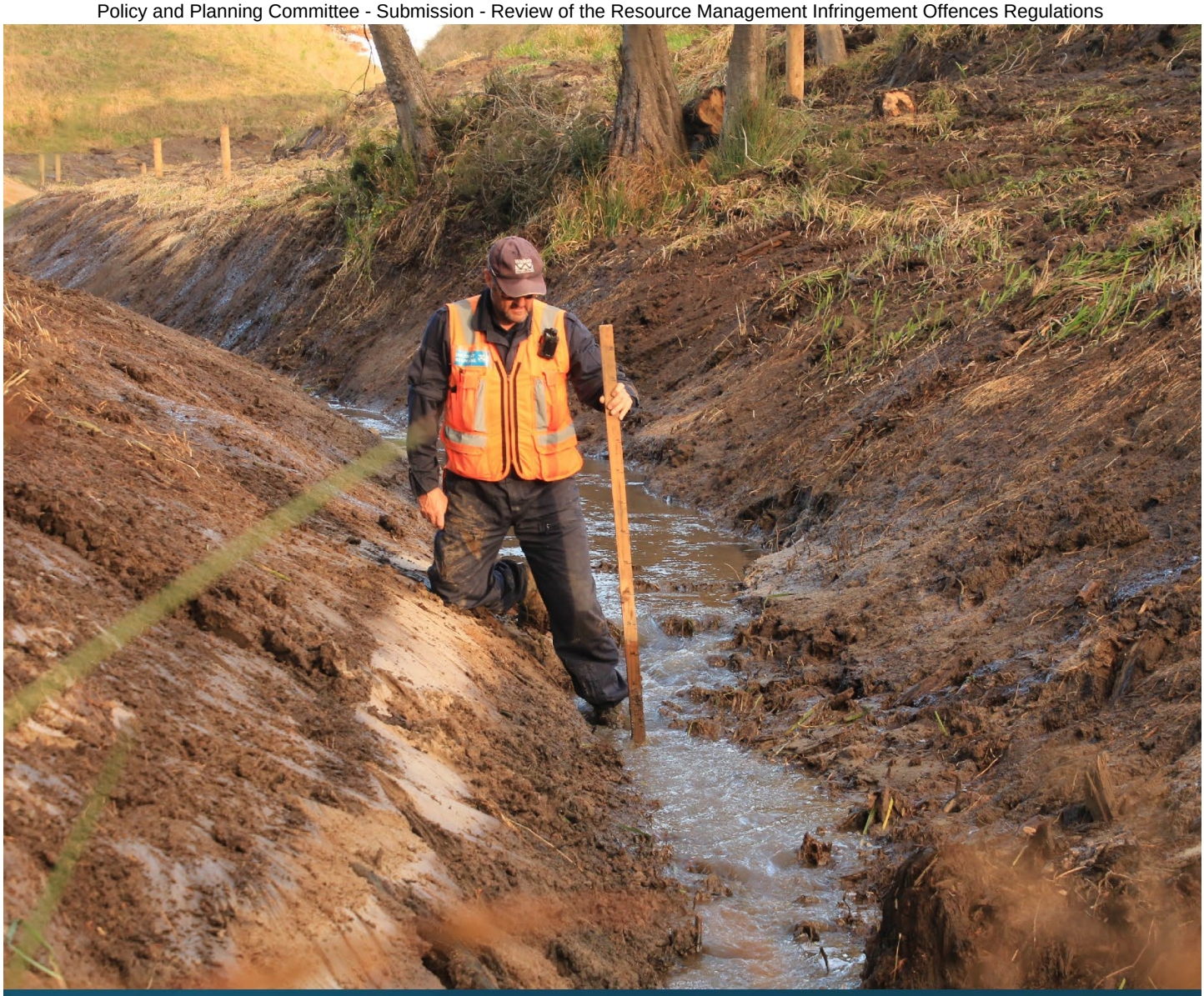
47 Cloten Road · Private Bag 713 · Stratford 4352 · New Zealand
T: 06 765 7127 · F: 06 765 5097 · E: info@trc.govt.nz · www.trc.govt.nz
www.facebook.com/TaranakiRegionalCouncil twitter.com/TaranakiRC
Please quote our document number in your reply

It is also important that the infringement notice fines cover the reasonable cost of a council investigating and issuing the notices. The current fine levels are insufficient to cover these cost.

In conclusion, TRC supports the Review and welcomes MfE's recognition of the role that enforcement and compliance can play in promoting sound environmental outcomes. We would strongly support MfE ensuring that intervals for future reviews of fine levels, whether under the RMA or any subsequent legislation, are shorter than in the current instance. Doing so will ensure that infringement notices remain a useful tool in councils' toolkit.

Yours faithfully
S J Ruru
Chief Executive

per: A D McLay
Director - Resource Management



Discussion Document

Review of the Resource Management (Infringement Offences) Regulations 1999

Ministry for the Environment
Manatū Mō Te Taiao

Te Kāwanatanga o Aotearoa
New Zealand Government

Disclaimer

The information in this publication is, according to the Ministry for the Environment's best efforts, accurate at the time of publication. The Ministry will make every reasonable effort to keep it current and accurate. However, users of this publication are advised that:

The information does not alter the laws of New Zealand, other official guidelines, or requirements.

It does not constitute legal advice, and users should take specific advice from qualified professionals before taking any action based on information in this publication.

The Ministry does not accept any responsibility or liability whatsoever whether in contract, tort, equity, or otherwise for any action taken as a result of reading, or reliance placed on this publication because of having read any part, or all, of the information in this publication or for any error, or inadequacy, deficiency, flaw in, or omission from the information in this publication.

All references to websites, organisations, or people not within the Ministry are for convenience only and should not be taken as endorsement of those websites or information contained in those websites nor of organisations or people referred to.

This document may be cited as: Ministry for the Environment. 2022. *Review of the Resource Management (Infringement Offences) Regulations 1991.* Wellington: Ministry for the Environment

Cover photo credit: Robert Isaac, Waikato Regional Council

Published in February 2023 by the
Ministry for the Environment
Manatū Mō Te Taiao
PO Box 10362, Wellington 6143, New Zealand

ISBN: 978-1-99-102563-0

Publication number: ME 1672

This document is available on the Ministry for the Environment website: environment.govt.nz.

Contents

Tables

Message from the Minister

The RMA provides local authorities with a range of powers to take enforcement action when there is non-compliance with the RMA, rules in a plan or conditions in a resource consent. The purpose of enforcement action is to punish offenders, deter future offending, and/or direct remediation of the damage.

Prosecution via the courts is sometimes disproportionate to the offence. It is costly both for councils and offenders. In such situations, Councils can issue an infringement notice, which acts as an “instant fine”, at the time (or soon after) an infringement offence has been committed. Notices can only be issued by an enforcement officer.

The RMA’s infringement notice structure was last amended in 1999, and the fines are now too low to discourage non-compliance with plan rules or consent conditions.

In some cases, the fine associated with an infringement notice is less than the cost of getting a resource consent, meaning it can be cheaper to just pay the fine than to follow the rules. This puts our environment at risk and is unfair on the thousands of New Zealanders who use our natural resources sustainably, and within the law.

This document sets out several options for updating infringement notice offences and fines to make them a more meaningful consequence for those who fail to meet their environmental obligations.

We would value your feedback on what the fines should be, and what we should be considering as we review them.

Hon David Parker

Minister for the Environment

Section 1: What we are consulting on

Proposed changes to infringement fines

The Ministry for the Environment (the Ministry) is consulting on the infringement fines that councils can issue for environmental non-compliance.

The Resource Management Act 1991 (RMA) provides councils with a range of powers to take enforcement action when they find environmental non-compliance. Non-compliance means any breach of a rule, condition, standard, direction or regulation made under the RMA.

A range of non-statutory and statutory enforcement tools are available to councils to respond to non-compliance, so they can tailor their response to the nature and severity of any offending. The purpose of enforcement action is to punish offenders, deter future offending and/or direct remediation of the damage. The RMA provides statutory enforcement tools that are either:

- punitive (including infringement notices and prosecutions) or
- directive (abatement notices and enforcement orders).

This consultation is about infringement notices. An infringement notice is an 'instant fine' for environmental non-compliance that is serious enough to need a penalty, but not serious enough to warrant prosecution in court. When an infringement notice is issued, no conviction is imposed, and the infringement fines are paid to the council that issued the infringement notice (RMA, section 343D).

The maximum fine[1] that can be set for an infringement offence is prescribed in primary legislation, under section 360 of the RMA. That maximum fine was increased in 2020. However, the individual offences for which infringement notices can be issued – and the associated fine for each of these offences – are set in secondary legislation, the Resource Management (Infringement Offences) Regulations 1999 (the Regulations).

We are now consulting on options for how the Regulations could be updated to give effect to the change in maximum infringement fine introduced in the 2020 amendments to the RMA. This document presents the options alongside some preliminary analysis.

What's the problem?

The current fines are not effective

There is concern that the existing Regulations are now out of date, and that the infringement fines are set at a level that is too low to be effective.

[1] Section 360 uses the term "infringement fee" for what is commonly referred to as a "fine". In this document, we use the word "fine" or "infringement fine" to describe the fee associated with an infringement notice.

In 2016, the Ministry for the Environment produced a report on compliance, monitoring and enforcement by councils under the RMA. This research found that many councils and stakeholders considered that the infringement fines set in the Regulations were too low. It was suggested that infringement fines should be higher for companies – as occurs with penalties in prosecutions – to provide a more effective deterrent for companies.

The New Zealand Productivity Commission also noted in its 2013 report[2] that the "low level of fees that have not been reviewed for many years, are reducing the effectiveness of enforcement strategies". For example, in that report, Auckland Council notes that an infringement notice for the breach of a land-use rule in a district plan incurs a $300 fine. They stated that the cost of applying for a resource consent is usually more than ten times this amount. Therefore, they considered the deterrent effect of the current infringement fines is minimal and is not sufficient to deter non-compliant behaviour for some offenders.

The fines can be higher under the RMA

In the 2020 amendment to the Resource Management Act, Parliament increased the maximum fines that can be set for infringement notices and introduced different maximum fines of $2000 for individuals and $4000 for companies[3]. Currently, the Regulations do not include different fines for individuals and companies, and the maximum infringement fine in the current Regulations is much lower than the maximum fines that are now allowed by the RMA.

The fines are inconsistent

Currently, the regulations prescribe one fine for contraventions of land-use rules, irrespective of the type of land-use rule being contravened. However, since the Regulations were introduced in 1999, regional land-use rules for improving water quality have been introduced by some councils and the Resource Management (National Environmental Standards for Freshwater) Regulations 2020. The fine for contravening a land-use rule developed to improve or protect the water quality in a waterway is much lower than the fine for discharging contaminants directly into the same waterway.

The fine for breaching an abatement notice is currently set at 75 per cent of the previous maximum value. This is inconsistent with the significance of the offence, as breaching a formal notice from an enforcement officer can be considered deliberate, and deliberateness makes an offence more serious, which warrants a higher fine.

What needs to be done?

The Regulations are out of date, and infringement fines are too low to be an effective penalty for non-compliance. This means council use of infringement notices are less effective at deterring environmental non-compliance and reducing environmental harm.

[2] New Zealand Productivity Commission. 2013. Towards Better Local Regulation. Wellington: Productivity Commission.

[3] Strictly, the $2000 maximum applies to a "natural person", and the $4000 maximum applies to a "person other than a natural person". We have used the term 'individual' and 'company' for simplicity.

The Regulations need to be reviewed to ensure infringement fines are fit for purpose, consistent, provide an appropriate level of deterrence and are aligned with the empowering sections of the RMA.

Scope

The maximum infringement fines are set in the RMA. The recent decision by Parliament to increase the maximum infringement fines was made on the expectation that a review of the Regulations' infringement fines would follow.

The 2020 RMA amendments limit the scope of this review, as well as the options this review may consider. The infringement fines cannot be increased beyond the statutory maximum of $2000 for individuals and $4000 for companies.

The scope of potential change in the fines therefore ranges between making no change, and an increase to the maximum amount allowed in legislation.

Resource Management Reform

The Regulations will be transitioned to be regulations under the new Natural and Built Environment Act (NBA), which is planned to replace the RMA. Any changes that are made to the Regulations will have effect under the new legislation.

There is potential that the NBA could include new offences that are suitable to be prescribed as infringement offences. If so, these new infringement offences, and associated fines, could be introduced through transitional provisions, or through future amendments to the Regulations.

Section 2: Proposed policy options

Table 1: Outline of the proposed options

Option[4]	Description
Option 1:	Option 1 is a proportional increase to fines. This means that the fines for each offence would increase proportionally, so the new fine remains the same proportion of the new maximum as the current fine is of the previous maximum.
Option 2:	Option 2 proposes the same proportional increase as option 1, except that the fine for two offences would be increased to be a higher proportion of the maximum: (a) the fine for contravening land-use rules created under an NES or under a regional plan would be increased from the current 30% of the maximum to 75% of the new maximum, which is $1500 for natural persons or $3000 for companies (b) the fine for contravening an abatement notice (a tool used to require non-compliant operators to comply) would be increased to 100% of the maximum, which is $2000 for natural persons or $4000 for companies.
Option 3:	Option 3 proposes to increase each infringement fine up to the maximum amount for every offence. All infringement offences would incur a fine of $2000 for individuals and $4000 for companies.

[4] A comparison of the existing and new fines under each option is set out in appendix 1.

Section 3: Preferred option

Preferred option: Option 2

Option 2 best reflects the policy intent of the increases to the fine maximum in the legislation, but also addresses two specific internal consistency issues where circumstances have changed since the regulations were first introduced and where a change to the relative size of the infringement fine is appropriate. The fine increases are broadly consistent with inflation since 1999, except in the two specific cases where a higher than inflation adjustment is appropriate.

Option 1 maintains the current relativity between the existing fines and increases the fines in a way that is consistent with the amendments to the legislation. However, it does not reflect the increased use of landuse rules to protect water quality in Regional Plans and National Environmental Standards, and it doesn't adequately resolve the need for stronger denunciation and deterrence for breaching an abatement notice.

Option 3 removes the relativity that currently exists between the different infringement offences and maximises the deterrent value of the infringement regime. Having the same fine for all offences would make the administration of the infringement regime simpler. However, under this option, the fines for offences that currently have a lower rate (relative to the maximum) would increase by considerably more than the rate of inflation since the fines were last adjusted. This option treats all infringement offences as being equally serious.

Section 4: Options we are not considering

We are not considering linking the fine value to the severity of the non-compliance, as measured in compliance inspection grading. We think that this approach would create unnecessary implementation challenges and may introduce complexity and significant subjectivity back into a system.

Stock-exclusion offences and fines

Changes to schedule 1A – which sets out offences and infringement fines against the Resource Management (Stock Exclusion) Regulations 2020 (SE Regulations) – are considered out of scope for this review. This is because schedule 1A was introduced in 2020 and therefore already makes use of the RMA 2020's increased fine maximum. Note that in the SE Regulations exclusions, the fines are all set at the maximum amount available. This reflects that there are no prosecution options available for schedule 1A offences, which contrasts with the offences set out in schedule 1 that are the subject of this discussion document.

Furthermore, given that schedule 1A was inserted into the Regulations by the SE Regulations, any review of the stock-exclusion infringement offences would be more appropriately undertaken as part of a review of the SE Regulations, due to the SE Regulations' close links to the stock exclusion policy framework.

Section 5: Preliminary impact analysis

The Regulations were introduced as a cost effective and efficient way for councils to respond to minor environmental offending in cases where some enforcement action was appropriate, but which did not warrant a time-consuming and expensive prosecution process. The purpose of an infringement notice is to punish minor offending and deter future offending. Having an effective and credible infringement regime is an important part of a well-functioning resource management system.

This is the first time the fines have been reviewed since 1999 and a wide range of stakeholders have indicated that the current fines are too low. Increasing the fines is intended to make the penalty more meaningful in today's dollar-value terms. An increase in fines would provide greater specific and general deterrence value to the infringement-notice regime.

None of the three options above would increase in the costs faced by regulated parties who are compliant. Individual resource users can personally control the effect of the fine increases, by ensuring that they comply with the applicable regulations.

All three options will significantly increase the costs for resource users who receive infringement notices (at least doubling or quadrupling the current fine, or even more under option 3). The increase in cost will only be incurred by resource users who receive infringement notices for contravening environmental rules – rules that have been put in place to protect natural resources and allow equitable access to use of natural resources for private gain.

Impacts for local government

There is wide support from local government and its representative organisations (Local Government New Zealand, and Taituara (formerly the New Zealand Society of Local Government Managers)) for higher infringement fines. Many local government organisations submitted on the 2020 amendments to the RMA that increased the maximum fines, concerned that current fines were too low, and noting the need to review the Regulations to enable the higher fine amounts.

The changes will have some impacts upon local government, as it is the primary administrator of the resource management infringement-notice system. The degree to which local government is impacted will depend on the extent to which individual local authorities make use of the infringement-notice system. The national monitoring system[5] indicates that nearly a quarter of local authorities issued no infringement notices over the period 2014 to 2019, while another quarter issued one or less notices per year over the same period.

For those councils that do make use of the infringement-notice system, the increase in fines will represent a small increase in revenue used to offset compliance service costs, which reduces ratepayer funding. An increase in infringement fines will increase the contribution

[5] The national monitoring system is the annual dataset that the Ministry collects from local authorities relating to their RMA implementation activities, and includes information about enforcement activity, such as issuing of infringement notices.

from those causing the need for the compliance activities, which is consistent with the polluter-pays principle.

It is expected that the increase in fines will encourage greater compliance, which will lead to better performance and less non-compliance with environmental protection rules. Better compliance with environmental rules leads to improved environmental outcomes and reduces the pressure our environment faces from the way we use natural resources.

Higher fines are likely to reduce the risk that resource users view infringement notices as a 'minor licensing fine' that is less expensive than obtaining an appropriate resource consent or authorisation. The resulting increase in applications for appropriate authorisations is likely to contribute to an overall better functioning resource management system.

An increase in the infringement fines may contribute to an increase in non-payment of infringement notices issued by councils. Currently, unpaid infringement fines are lodged for recovery with the Ministry of Justice's (MOJ) fine-recovery service. An increase in non-recovery would contribute to a greater workload for MOJ. However, given the current volume of infringement notices issued in the resource management system is small, in comparison to the overall volume of fines dealt with by MOJ, this impact is expected to be small.

Councils may face more frequent legal challenges to the infringement notices they issue, particularly if the fines are perceived to be unreasonably high. This is a potential impact that is more likely with option 3, where the fine for a breach of a district plan land-use rule would incur the same fine as a discharge to water from an industrial or trade premise. An increase in legal challenges would add costs and administrative burden on issuing councils, and, if the challenges were frequent and successful, this could have the unintended effect of dissuading some councils from issuing infringement notices.

Impacts for regulated parties

As discussed earlier in this section, none of the three options outlined in this document would impact on most resource users, who comply with their regulatory obligations. It is worth noting, also, that only a small fraction of resource users receive infringement notices each year. For example, in 2020/21, the regional sector issued infringement notices in around 3.5 per cent of the more than 60,000 consent-monitoring inspections and environmental incidents they attended.

The most obvious impact on regulated parties will be the increased fines that those contravening their obligations may face.

- Under option 1, fines either double (for individuals) or quadruple (for companies). Under option 2, most fines would either double or quadruple, except for the fines for contraventions of section 9(1) or 9(2), which would increase five-fold from $300 to $1500 (for individuals) and ten-fold from $300 to $3000 (for companies).
- Under option 2, fines for contraventions of an abatement notice would increase by around 30 per cent more than would occur under option 1.
- Under option 3, fines would increase by a variable proportion, ranging from a doubling through to a nearly seven-fold increase (for individuals) and ranging from a quadrupling through to a nearly fourteen-fold increase (for companies).

To put these increases in context, it is helpful to compare them to inflation over the period since 1999. The comparison uses wage inflation, as infringement fines would generally be paid

from a person's earnings. Over the period 1999 to 2022, wage inflation has increased by approximately 108 per cent.[6] This means that $300 in wages in 1999 would have the equivalent buying power of $625 in 2022. This means:

- Option 1 represents a similar, or slightly lower, fine for individuals (and an approximate doubling for companies) in today's dollar terms, compared to the fine originally levied in 1999.
- Option 2 results in the same fine increase as option 1 for most fines, except for two offences where the proposed fine is increased relative to inflation.
- Option 3 results in a large increase in fines (above the rate of inflation), noting that the most significant increases under option 3 would apply to those infringement offences with lower fines, that have historically been considered less serious.

Deterrence

Agencies use enforcement tools to encourage good behaviour and discourage (or deter) poor behaviour. There are two types of deterrence that are considered: general and specific. Both are important to a compliance regime's effectiveness.

Infringement notices are specific deterrence tools, targeted at deterring the behaviour of the individuals undertaking the behaviour.

It is generally accepted that deterrence is determined by three factors:

- the certainty of getting caught in breach of the rules
- the swiftness with which a consequence is delivered
- the size or severity of the penalty.

Infringement notices enable an enforcement officer to issue a consequence at the time or shortly after becoming aware of non-compliant behaviour. All the options presented in this discussion document increase infringement fines, with the express expectation that higher fines will promote higher compliance, through greater deterrence. In considering the deterrence value of infringement notices, it is important to remember that infringement notices are intended as responses to non-compliance that is not serious enough to warrant prosecution, but that still requires appropriate denunciation. The fines need to be high enough to be meaningful to the individual (or company) receiving them.

Who is likely to be affected?

Resource management infringement notices are issued for non-compliance with resource management laws, regulations, rules, and resource consents. Therefore, any user of the resource management system is potentially affected by these changes, if they contravene any regulatory requirements. Given that we all interact with natural resources to some extent, the application of these changes is very broad. Those parties could include infrastructure providers, farmers, contractors, companies, and homeowners.

[6] Calculated using the Reserve Bank's inflation calculator, under the category "Wages", for the period Q4 1999 to Q1 2022.

Section 7: How to have your say

Consultation questions

You are welcome to provide feedback on any part of the proposal to review the Regulations. We have prepared some questions you might like to consider as you prepare your submission.

- Do you agree that the fines need to increase? If not, why not?
- Are there any fines that shouldn't increase? Which ones? And why?
- Are there other options for increasing the fines that we haven't considered? What are they? And why would they be better?
- Do you agree with our preferred approach? If not, why not? What approach should we take instead, and why?
- Are there impacts from increasing the fines that we haven't considered? What are these?

Timeframes

This discussion document was published on 7 February 2023. We are accepting submissions between 7 February 2023 and 6 March 2023.

When the consultation period has ended, we will analyse feedback and provide advice to Ministers on next steps.

How to provide feedback

You can make a submission in two ways.

- Use our online submission tool. **This is our preferred way to receive submissions.**
- Write your own submission.

  In your submission, please make sure you include:

  - the title of the consultation
  - your name or organisation
  - your postal address
  - your telephone number
  - your email address.

If you are posting your submission, send it to:
Review of the Resource Management Infringement Offences Regulations
Policy Implementation and Delivery Division
Ministry for the Environment
PO Box 10362
Wellington 6143

If you are emailing your submission, you can send it to rmior.consultation@mfe.govt.nz as a:

- PDF
- Microsoft Word document (2003 or later version).

When emailing your submission, please use add 'Resource Management Infringement Offences Regulation Review' in the subject line.

Submissions close on 6 March 2023.

More information

Please send any queries to:

Email: rmior.consultation@mfe.govt.nz

Post: Review of the Resource Management (Infringement Offences) Regulations, Policy Implementation and Delivery team, Ministry for the Environment, PO Box 10362, Wellington 6143

Publishing and releasing submissions

All or part of any written comments (including names of submitters) may be published on the Ministry for the Environment's website, environment.govt.nz. Unless you clearly specify otherwise in your submission, the Ministry will consider that you have consented to website posting of both your submission and your name.

Contents of submissions may be released to the public under the Official Information Act 1982 following requests to the Ministry for the Environment (including via email). Please advise if you have any objection to the release of any information contained in a submission and, in particular, which part(s) you consider should be withheld, together with the reason(s) for withholding the information. We will take into account all such objections when responding to requests for copies of, and information on, submissions to this document under the Official Information Act.

The Privacy Act 2020 applies certain principles about the collection, use and disclosure of information about individuals by various agencies, including the Ministry for the Environment. It governs access by individuals to information about themselves held by agencies. Any personal information you supply to the Ministry in the course of making a submission will be used by the Ministry only in relation to the matters covered by this document. Please clearly indicate in your submission if you do not wish your name to be included in any summary of submissions that the Ministry may publish.

Appendix 1: Fines under the proposed options

Table 2: Comparison between the existing fines and the new fines for each option

General description of offence	Existing fine ($)	Fine under Option 1 ($)		Fine under Option 2 ($)		Fine under Option 3 ($)	
		Individual	Company	Individual	Company	Individual	Company
Contravention of section 9(1) and 9(2) (restrictions on use of land)	300	600	1200	1500	3000	2000	4000
Contravention of section 9(3) and 9(4) (restrictions on use of land)	300	600	1200	600	1200	2000	4000
Contravention of section 12 (restrictions on use of coastal marine area)	500	1000	2000	1000	2000	2000	4000
Contravention of section 13 (restriction on certain uses of beds of lakes and rivers)	500	1000	2000	1000	2000	2000	4000
Contravention of section 14 (restrictions relating to water)	500	1000	2000	1000	2000	2000	4000
Contravention of section 15(1)(a) and (b) (discharge of contaminants or water into water or onto or into land where contaminant is likely to enter water)	750	1500	3000	1500	3000	2000	4000
Contravention of section 15(1)(c) and (d) (discharge of contaminants into environment from industrial or trade premises)	1000	2000	4000	2000	4000	2000	4000
Contravention of section 15(2) or (2A) (discharge of contaminant into air or onto or into land)	300	600	1200	600	1200	2000	4000
Contravention of an abatement notice (other than a notice under section 322(1)(c))	750	1500	3000	2000	4000	2000	4000
Contravention of a water shortage direction under section 329	500	1000	2000	1000	2000	2000	4000
Contravention of section 15A(1)(a) (dumping of waste or other matter from any ship, aircraft, or offshore installation)	500	1000	2000	1000	2000	2000	4000
Contravention of section 15B(1) and (2) (discharge in the coastal marine area of harmful substances, contaminants, or water from a ship or offshore installation)	500	1000	2000	1000	2000	2000	4000
Contravention of section 22 (failure to provide certain information to an enforcement officer)	300	600	1200	600	1200	2000	4000
Contravention of an excessive noise direction under section 327	500	1000	2000	1000	2000	2000	4000
Contravention of an abatement notice for unreasonable noise under section 322(1)(c)	750	1500	3000	1500	3000	2000	4000

Appendix 2: Option analysis

Table 2 sets out a comparative analysis of the options against the assessment criteria.

Table 3: Analysis of the proposed options

Criteria	Option 1: Proportional increase in fines for all offences	Option 2: Increase in fines for two offences and proportional increase for remaining offences	Option 3: Increase fines to maximum for all offences
Practical Ensures consistency between primary legislation and regulations Easy for councils to implement and does not require major changes to existing systems and processes Increases the quality of monitoring and compliance approaches by councils	**++** Option 1 would result in consistency between regulations and primary legislation, but some fines may not reflect the relative importance of current policy direction. There may be an impact on councils to update their templates and systems to reflect the new fine amounts, but this option does not require major changes to existing systems and processes. The increased fines would better reflect the actual cost to councils of issuing infringement notices, which would reduce the funding burden on ratepayers for addressing non-compliance.	**+++** Option 2 would result in consistency between regulations and primary legislation, as well as reflect the importance of current policy direction. There may be an impact on councils to update their templates and systems to reflect the new fine amounts, but these options do not require major changes to existing systems and processes. The increased fines would better reflect the actual cost to councils of issuing infringement notices, which would reduce the funding burden on ratepayers for addressing non-compliance.	**++** Option 3 would result in consistency between regulations and primary legislation but may be perceived as being too onerous by some users. Having a single fine for all offences would simplify the infringement system. There would still be an impact on councils to update templates and systems, but no major changes are required. The increased fines would better reflect the actual cost to councils of issuing infringement notices, which would reduce the funding burden on ratepayers for addressing non-compliance.
Effective Strengthens deterrence of non-compliance with the RMA by users of the system Supports compliance monitoring and enforcement objectives Supports protection of resources	**+** Option 1 would provide stronger deterrence, in that all fines would be increased, but fines for offences with similar effects may be inconsistent with each other. Promotes the objectives of maximizing compliance for most infringement offences, but fines for some offences may be too low. Maintains a hierarchy of fines that is consistent with the previous regulations' but may not reflect the most up-to-	**++** Option 2 would provide stronger deterrence in that all fines would be increased and would result in similar fines for offences with similar effects. Increased fines better reflect seriousness and provide a logical hierarchy of increasing penalty. Option 2 goes further than option 1 and provides an opportunity for a more detailed consideration of the levels of individual fines. This better reflects the relative importance of	**++** Option 3 would provide the strongest deterrence but makes all fines the same even though the seriousness of the effects of non-compliance may be perceived to be quite different. May set fine levels at a level that is perceived to be unfair for some offences, increasing the number of legal challenges. More serious offences are more appropriately managed through prosecution.

Criteria	Option 1: Proportional increase in fines for all offences	Option 2: Increase in fines for two offences and proportional increase for remaining offences	Option 3: Increase fines to maximum for all offences
	date views of resource protection.	those offences to which fines relate.	Option 3 would not maintain existing relativity, therefore would not reflect the seriousness of different offences.
Reasonable Targeted to those who are contravening environmental rules Reflects the relative importance of the offending and the associated environmental effects Treats regulated parties who must comply with environmental laws fairly	**+** Only those who contravene environmental laws will be subject to the increased costs. Maintains the existing relative importance between offences set in 1999. Simply adjusts previous fines for inflation, so existing hierarchy is maintained. May not reflect the increased effort applied by many resource users to be compliant.	**+++** Only those who contravene environmental laws will be subject to the increased costs. Reflects the relative importance of offences, the decreased societal acceptance of environmental offending, and the importance of protecting water quality. Better reflects compliance efforts of existing resource users and inflation adjusts the remaining fines.	**+** Only those who contravene environmental laws will be subject to the increased costs. Treats all offences as being equal in terms of their seriousness. Increases most fines by considerably more than the rate of inflation over the period.

Appendix 3: Submissions from the 2020 legislative amendment

The majority of submissions in the 2020 amendment on the proposal to increase the fine maximum were in support. The majority of respondents to the New Zealand Planning Institute (NZPI) member survey supported the proposal (73.8 per cent), while a small proportion opposed (2.98 per cent).

Support

1. Those in support included councils, Local Government New Zealand and the Society of Local Government Managers. These submitters generally voiced categorical support for the proposal and some noted that the proposed uplift had been advocated for by local government for several years. Support for the proposal also come from iwi, NGOs, and individuals.
2. Many individual submitters stated that they wished to see much stronger infringement penalties – in some cases up to $100,000.
3. A number of submitters in favour of the proposal also noted that the Resource Management (Infringement Offences) Regulations 1991 will need to be updated before the new maximums have any practical effect.
4. Comments of support from respondents to the NZPI survey included the following themes:
   - support for stronger deterrence
   - concern that low fines were seen merely as licensing fees or business costs
   - concern about the adequacy of resourcing for compliance and enforcement services
   - the need to balance strong deterrence of deliberate or reckless offending while also taking broad collaborative non-regulatory approaches to improve outcomes
   - the low value of the fines in comparison with the value of the resources being used unlawfully
   - the need to develop new regulations to make the proposed maximum fines effective
   - support for further changes (such as prohibiting insurance for RMA fines).

Opposition

5. A few submissions in opposition of the proposal included Federated Farmers of New Zealand, Eastland Generation Limited, and two individuals. These submissions asserted that the current infringement penalties are appropriate and sufficient.
6. Federated Farmers of New Zealand noted that the proposed increase would exceed the recommended maximum infringement fine of $1000 cited in the Legislation Design and Advisory Committee Guidelines. This submission also asserted that infringement offences are “absolute” and do not allow for any avenue to challenge or query infringement notices.
7. Comments of opposition from respondents to the NZPI survey included the following themes:

- current fines are adequate
- futile to raise infringement fines if there is insufficient resourcing for compliance and enforcement services
- scepticism that stronger fines will change non-compliant behaviour
- a need to collaborate with non-compliant parties and only use escalated enforcement against deliberate, repeat or reckless offenders.

Date 14 March 2023

Subject: **Spatial Planning Gap Analysis**

Approved by: AD McLay, Director – Resource Management

S J Ruru, Chief Executive

Document: 3149211

Purpose

1. The purpose of this memorandum is to provide an overview of the spatial planning gap analysis project currently underway.

Executive Summary

2. This item summarises the joint project with District Councils to undertake a gap analysis of information that may be required for future spatial planning work, with information currently collected within the region.

Recommendations

That the Taranaki Regional Council:

a) receives the memorandum Spatial Planning Gap Analysis

b) notes the joint work being prepared with District Councils.

Background

3. The Government announced an intention to reform the RMA in February 2021. Central to the reform proposal is splitting the RMA into separate acts:

   3.1. The Spatial Planning Act (SP Bill) – covering overarching, regionally focused spatial planning processes that would identify and guide things like development corridors infrastructure needs and areas of regional significance. The output will be a Regional Spatial Strategy (RSS).

   3.2. The Natural Built Environment Act (NBE Bill) - the primary replacement for the RMA. It will incorporate the functions of current regional and district plans into single, regionally focused natural and built environment plans. The output will be Natural Built Environment Plans (NBE Plans).

4. Following an 'exposure draft' of the NBE bill released for public consultation in mid-2021, both the NBE Bill and SP Bill were tabled in Parliament in December 2022. The

submission period for this has now closed, with TRC lodging a submission at the start of February 2023.

5. Regardless of how the Bills may change through the process of being considered by the Select Committee, it is clear that a stronger focus on spatial elements of planning and resource management are key to a new system. Spatial Planning is not necessarily something new to the resource management system, the very nature of what planners do is spatial. However, the formal requirement and the format under the new bill is.
6. There are a number of benefits of spatial planning at regional level, including those below:
    - Sets long term direction for at least 30 years and as such is informed by longer term data and evidence as appropriate.
    - Sets long term objectives for growth and land use change, responding to climate change and the identification of areas inappropriate for development.
    - Integrate planning with implementation to link funding processes with the objectives of the spatial plan.
    - Provide clear direction, consistency and integration to the development of future Natural Built Environment Plans.
7. Considerable work will be required to develop a RSS, and in moving to the new system, transition between the RMA and the new system will need to be navigated. This may take some years, potentially in the order of 7-10 years, for the region to have prepared and implemented a RSS and NBE Plans. In this time councils will still be required to ensure they fulfil requirements of the RMA with regard to plan making.
8. TRC currently has an extensive policy development programme underway. This programme includes the review of the Regional Policy Statement, as part of the Natural Resources Plan development. The current work programme will see the NRP notified at the end of 2024.
9. The RPS, provides an overview of the resource management issues of the region, and sets out objectives, policies and methods to achieve the integrated management of natural and physical resources of the whole region. It is an important document for the region, as lower order plans such as regional plans or district plans must give effect to the policy direction within the RPS. The RPS can also direct future work and approaches, both regulatory and non-regulatory, through its methods, and although not a spatial plan, it provides policy direction at the regional level.
10. As part of the policy development programme, TRC staff have regular meetings with the planning staff from the District Councils. These meetings have a particular focus on the development of the RPS and are cognisant of ensuring the policy approach is future proofed as best it can be with regard to the likely future legislative environment.
11. This means developing an approach to work at a regional scale with a spatial lens as best possible, so as to provide a platform for any future RSS to be developed. To do this it is important to understand how spatial plan ready the region is, and to identify where the gaps are.

Discussion

12. TRC and the District Councils have jointly appointed BECA (by cost share arrangement) to assist to take proactive steps to align regional spatial processes across the existing and proposed resource management systems. This work is essentially a gap analysis of both policy drivers and GIS layers in relation to spatial planning.

13. The purpose is to assist the region to understand its spatial plan readiness as is a foreshadowed requirement for regional spatial strategy (RSS) development within the resource management reforms, but to also support the development of the RPS to align as best it can with any future spatial process.

14. The output will primarily be used to inform:

    14.1. the conversations across the region as any process under the new reforms gets underway and the Regional Planning Committees, or similar, are stood-up; and

    14.2. the policy direction for the TRC in relation to the RPS review.

15. Work will be facilitated through a series of workshops, meetings and desktop analysis by BECA. Set out below are the key steps BECA will be undertaking:

Stage	Intent	Timing
1) Instigation and information gathering	Obtain existing data sets and identify common aspirations.	January – March 2023
2) Investigations	Identify what data is currently available, levels of consistency between existing data and what further data we could need to meet RSS requirements.	February – May 2023
3) Confirming additional data requirements	Collaborative working to confirm data requirements – approach, timing, costs, partnerships. Preparation of a report summarising the gap analysis.	April – June 2023

16. It is important to support and facilitate iwi involvement in this process. As such TRC is undertaking individual meetings with each iwi authority. These meetings are in the process of being set up, with some already undertaken, and amongst other things will discuss how iwi would like to be involved. Already, the identification of GIS layers by some iwi have been provided for inclusion in the assessment, although it should be noted it is not appropriate to share the data itself. Iwi management plans will also be included in the assessment, and will be reviewed by BECA.

17. It is important to be clear that the outcome of this process is not a spatial plan or provide any management direction from a spatial perspective. It will however, provide a baseline to guide work to meet requirements in Taranaki to deliver a future RSS. It will also be a useful input in the development of the RPS through the identification of information gaps and aligned aspirations for the region.

Financial considerations – LTP / Annual Plan

18. This memorandum and the associated recommendations are consistent with the Council's adopted Long-Term Plan and estimates. Any financial information included

in this memorandum has been prepared in accordance with generally accepted accounting practice.

19. As set out in the memorandum, a cost share arrangement has been agreed between TRC and the District Councils. TRC has agreed to pay 1/3 of the costs, with the remainder 2/3 being shared between the District Councils with cost apportioned to population.

Policy Considerations

20. This memorandum and the associated recommendations are consistent with the policy documents and positions adopted by this Council under various legislative frameworks including, but not restricted to, the Local Government Act 2002, the Resource Management Act 1991 and the Local Government Official Information and Meetings Act 1987.

Iwi considerations

21. This memorandum and the associated recommendations are consistent with the Council's policy for the development of Māori capacity to contribute to decision-making processes (schedule 10 of the *Local Government Act 2002*) as outlined in the adopted long-term plan and/or annual plan. Similarly, iwi involvement in adopted work programmes has been recognised in the preparation of this memorandum.

22. As set out in the memorandum, individual meetings are being set up with each iwi authority to discuss the best approach for the involvement of iwi, and to gather an initial indication of the information which iwi hold relevant to the project. The approach to iwi engagement is on ongoing.

Community considerations

23. This memorandum and the associated recommendations have considered the views of the community, interested and affected parties and those views have been recognised in the preparation of this memorandum

Legal considerations

24. This memorandum and the associated recommendations comply with the appropriate statutory requirements imposed upon the Council.

Date 14 March 2023

Subject: **Periphyton State of the Environment Monitoring Technical Report 2018-2021**

Approved by: AJ Matthews, Director - Environment Quality

S J Ruru, Chief Executive

Document: 3150301

Purpose

1. The purpose of this memorandum is to provide the Committee with an overview of the report: *Periphyton State of the Environment Monitoring Technical Report 2018-2021*.
2. A copy of the technical report accompanies this memorandum, and a copy is also available on the Taranaki Regional Council (the Council) website.

Executive summary

3. Periphyton is the 'slime' and algae found on the beds of lakes and rivers. This is a component of a healthy system and forms the base of the food web. However, under certain conditions excessive growth of periphyton can occur, forming a nuisance bloom which may have a negative impact on ecosystem health and water quality as well as on a range of values including aesthetics, contact recreation, fishing, irrigation, industrial uses and potable water supply.
4. The National Policy Statement for Freshwater Management 2020 (NPS-FM) includes a requirement for Councils to undertake monthly monitoring of periphyton biomass. Under the National Objectives Framework (NOF) set out in the NPS-FM, councils are required to measure periphyton, as chlorophyll-a, at representative river sites within each region. The NOF sets out a national bottom line of 200 mg chlorophyll-a per square metre for periphyton, requiring improvement if nuisance algal blooms occur regularly or for extended periods. Periphyton biomass is categorised in the NOF with bands ranging from A (minor periphyton growth) to D (failing to achieve the national bottom line).
5. In 2018, Council has initiated the current monthly SoE periphyton monitoring programme, tailored to the requirements of the NPS-FM, at twelve sites in the Taranaki region. In addition to monitoring periphyton state, the monitoring programme was also designed to assess potential drivers of periphyton growth. These drivers were assessed via physicochemical monitoring (nutrients), hydrological monitoring and habitat assessments. The report that is the subject of, and is accompanying this memorandum, is

the inaugural report for this programme, and covers monitoring results from July 2018 to June 2021.

6. Monitoring results show that all sites comply with the national bottom line for periphyton biomass as set out in the NOF. Five sites were graded within the A band, three sites in the B band and four sites in the C band. At five of these sites, the gradings must be considered provisional as there were fewer than the 36 samples required.
7. Periphyton cover was compliant with aesthetic guideline values for weighted composite cover (WCC) throughout the reporting period at seven of twelve sites, while the guideline was exceeded at the remaining five sites ranging between 10 and 29% of sampling occasions. When assessed against the recreational guidelines, cyanobacteria cover was below the action threshold at all sites throughout the reporting period, while alert level was reached at five sites.
8. Trends in periphyton biomass and cover over time were not assessed due to the short time period available for analysis. Trends will be assessed once sufficient data is available.
9. Under the NPS-FM, councils are required to set limits on instream concentrations of nitrogen and phosphorus in order to achieve their target attribute state for freshwater attributes affected by nutrients, such as periphyton. Understanding spatial patterns in instream nutrient availability is an important first step towards fulfilling this requirement. For example, in catchments with volcanic acidic geology, management actions which decrease available nitrogen concentrations are more likely to effectively limit periphyton growth than actions which decrease available phosphorus concentrations; due to instream concentrations of phosphorus already being naturally elevated.
10. The analysis undertaken in the report showed that relationships between periphyton biomass and nutrients show that patterns are site specific. Similarly, relationships between periphyton biomass and stream flow (in terms of accrual period, or days since the last flushing flow), were also site specific.
11. Nutrient limitation occurs when concentrations of available nutrients are lower than the capacity of the periphyton to use the nutrients. This can vary as other factors change, for example shading. An assessment of the nutrient data found that nutrient limitation varied between sites, with some nitrogen limited, some phosphorus limited, and others limited at times by both nutrients. Phosphorous was not found to be a limiting nutrient at any of the sites with volcanic acidic geology; owing to the naturally elevated phosphorous concentrations in those rivers and streams.
12. The report sets out a number of recommendations to consider, including a recommendation to review of the programme in light of recent developments with national monitoring standards and the Council's NPS-FM implementation.

Recommendations

That the Taranaki Regional Council:

a) receives the technical report, Periphyton State of the Environment Monitoring Technical Report 2018-2021 and notes the recommendations therein.

Background

13. Section 35 of the Resource Management Act (1991) requires local authorities to undertake monitoring of the region's environment, including land, air, and fresh and marine water quality. To this effect, the Council has established a state of the environment (SoE) monitoring programme for the region.

14. The Council's SoE programme encompasses a number of individual monitoring activities, many of which are undertaken and managed on an annual basis (from 1 July to 30 June). The purpose of SoE reporting is to summarise and interpret regional environmental monitoring activity results and report on any changes (trends) in these data. One of these activities is a monitoring and reporting programme to assess the state and trends in periphyton within the region.

15. Periphyton is the 'slime' and algae found on the beds of lakes and rivers. The periphyton community is composed predominantly of algae and cyanobacteria (blue-green algae) but also contains heterotrophic bacteria and fungi. This is a component of a healthy system and forms the base of the food web. However, under certain conditions excessive growth of periphyton can occur, forming a nuisance bloom which may have a negative impact on ecosystem health and water quality as well as on a range of values including aesthetics, contact recreation, fishing, irrigation, industrial uses and potable water supply.

16. There are a number of factors that have the potential to influence periphyton growth. At the larger scale, factors include the catchment geology and climate. Whereas at a reach scale, factors such as stream flow, light, nutrients, water temperature, substrate composition and grazer density influence periphyton growth.

17. The NPS-FM includes a requirement for Councils to undertake monthly monitoring of periphyton biomass. Chlorophyll-a is the primary pigment used by plants, including periphyton, for photosynthesis and is commonly assessed to estimate periphyton biomass in a waterbody. Under the NOF set out in the NPS-FM, councils are required to measure periphyton, as chlorophyll-a, at representative river sites within each region.

18. The NOF sets out a national bottom line of 200 mg chlorophyll-a per square metre for periphyton, requiring improvement if nuisance algal blooms occur regularly or for extended periods. Periphyton biomass is categorised in the NOF with bands ranging from A (minor periphyton growth) to D (failing to achieve the national bottom line).

19. In 2018, Council initiated the current monthly SoE periphyton monitoring programme, tailored to the requirements of the NPS-FM, at twelve sites in the Taranaki region. In addition to monitoring periphyton state, the programme was also designed to assess potential drivers of periphyton growth. These drivers were assessed via physicochemical monitoring (nutrients), hydrological monitoring and habitat assessments. The report that is the subject of, and is accompanying this memorandum, is the inaugural report for this programme, and covers monitoring results from July 2018 to June 2021.

20. Although the primary purpose of this monitoring programme is to assess periphyton biomass in the region with respect to the NPS-FM, the programme also allows for additional assessments to be made against separate aesthetic and recreational guidelines.

Discussion

21. Monitoring results show that all sites comply with the national bottom line for periphyton biomass as set out in the NOF (Figure 1). Five sites were graded within the A band, three sites in the B band and four sites in the C band. At five of these sites, the gradings must be considered provisional as there were fewer than the 36 samples required.

22. Periphyton cover was compliant with aesthetic guideline values for weighted composite cover (WCC) throughout the reporting period at seven of twelve sites, while the guideline was exceeded at the remaining five sites ranging between 10 and 29% of sampling occasions. The results demonstrate that WCC provides a more precautionary assessment of nuisance periphyton cover, compared to treating the cover of thick mats and long filaments separately.

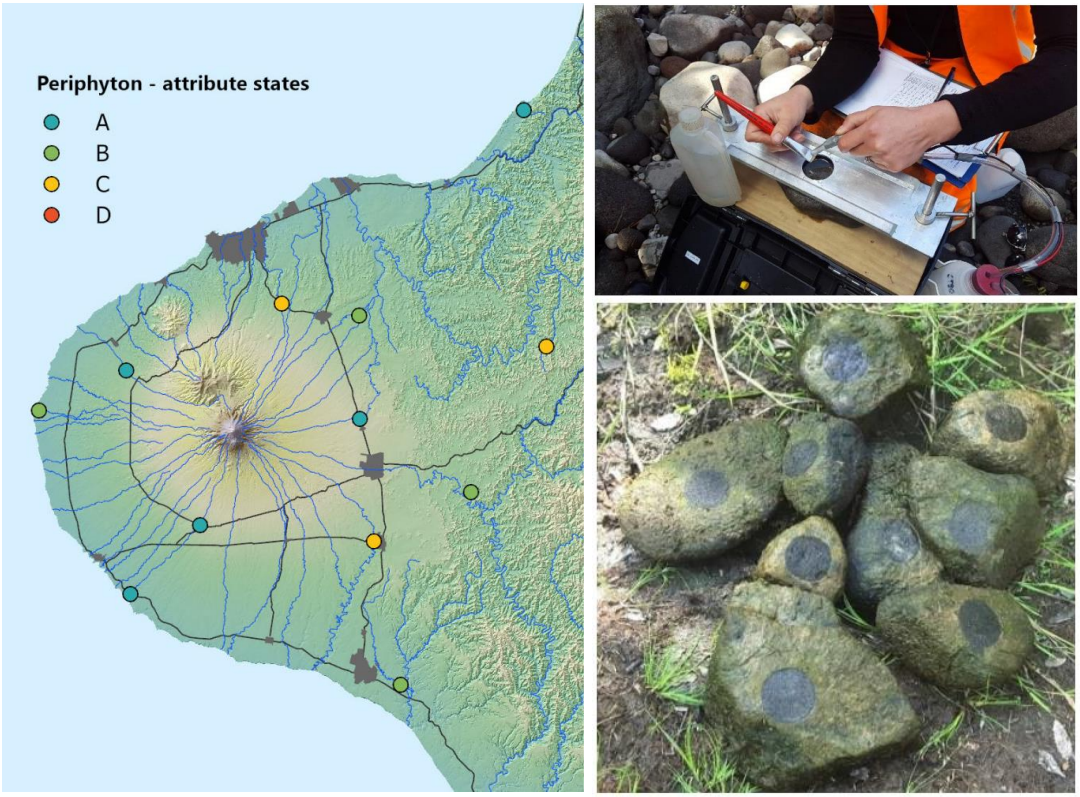


Figure 1 Current assessment of periphyton monitoring sites against the NOF bands (left); Periphyton biomass sampling system developed by Council (top right); rocks which have had periphyton biomass samples removed (bottom right)

23. When assessed against the recreational guidelines, cyanobacteria cover was below the action threshold at all sites throughout the reporting period, while alert level was reached at five sites.

24. Trends in periphyton biomass and cover over time were not assessed due to the short time period available for analysis. Trends will be assessed once sufficient data is available.

25. Under the NPS-FM, Councils are required to set limits on instream concentrations of nitrogen and phosphorus in order to achieve their target attribute state for periphyton biomass. Understanding spatial patterns in instream nutrient availability is an important first step towards fulfilling this requirement.
26. For example, in catchments with volcanic acidic geology, management actions which decrease available nitrogen concentrations are more likely to effectively limit periphyton growth than actions which decrease available phosphorus concentrations; due to instream concentrations of phosphorus already being naturally elevated. However, it should be noted that there are other factors which control periphyton growth, including shade and temperature, which should be considered in conjunction with the nutrient limit setting process.
27. Relationships between periphyton biomass and nutrients show that patterns are site specific. Simililarly, relationships between periphyton biomass and stream flow (in terms of accrual period, or days since the last flushing flow), were also site specific.
28. When nutrient limitation was assessed, nitrogen alone was the limiting nutrient at four sites, and phosphorous was the limiting nutrient at two sites. There was one site were periphyton growth was limited by both nitrogen and phosphorous. At the remaining five sites, the concentrations of both nitrogen and phosphorous were above the limitation thresholds. Phosphorous was not a limiting nutrient at any of the sites with volcanic geology; owing to the naturally elevated phosphorous concentrations in those rivers and streams.
29. The report sets out a number of recommendations to consider, including a recommendation to review of the programme in light of the recent developments with monitoring standards and the NPS-FM.

Financial considerations—LTP/Annual Plan

30. This memorandum and the associated recommendations are consistent with the Council's adopted Long-Term Plan and estimates. Any financial information included in this memorandum has been prepared in accordance with generally accepted accounting practice.

Policy considerations

31. This memorandum and the associated recommendations are consistent with the policy documents and positions adopted by this Council under various legislative frameworks including, but not restricted to, the *Local Government Act 2002*, the *Resource Management Act 1991* and the *Local Government Official Information and Meetings Act 1987*.

Iwi considerations

32. This memorandum and the associated recommendations are consistent with the Council's policy for the development of Māori capacity to contribute to decision-making processes (schedule 10 of the *Local Government Act 2002*) as outlined in the adopted long-term plan and/or annual plan.

Community considerations

33. This memorandum and the associated recommendations have considered the views of the community, interested and affected parties and those views have been recognised in the preparation of this memorandum.

Legal considerations

34. This memorandum and the associated recommendations comply with the appropriate statutory requirements imposed upon the Council.

Appendices/Attachments

Document 3140213: Periphyton State of Environment Monitoring Technical Report 2018-2021

Periphyton

State of the Environment Monitoring Technical Report 2018-2021

Technical Report 2022-103

Working with people | caring for Taranaki

Taranaki Regional Council

Taranaki Regional Council
Private Bag 713
Stratford

ISSN: 1178-1467 (Online)
Document: 2545753 (Word)
Document: 3140213 (Pdf)
March 2023

Periphyton

State of the Environment Monitoring

Technical Report

2018-2021

Technical Report 2022-103

Periphyton

State of the Environment Monitoring
Technical Report
2018-2021

Technical Report 2022-103

Taranaki Regional Council
Private Bag 713
Stratford

ISSN: 1178-1467 (Online)
Document: 2545753 (Word)
Document: 3140213 (Pdf)
March 2023

Executive summary

Section 35 of the *Resource Management Act 1991* (RMA) requires local authorities to undertake monitoring of the region's environment, including land, air, and fresh and marine water quality. Accordingly, this report describes the results of the Taranaki Regional Council's State of the Environment (SoE) Periphyton Monitoring Programme from the 2018-2021 period.

Periphyton is the 'slime' and algae found on the beds of lakes and rivers. This is a component of a healthy system and forms the base of the food web. The periphyton community is composed predominantly of algae and cyanobacteria (blue-green algae) but also contains heterotrophic bacteria and fungi. Under certain conditions excessive growth of periphyton can occur, forming a nuisance bloom which may have a negative impact on a range of values including ecosystem health, aesthetics, contact recreation, fishing, irrigation, industrial uses and potable water supply.

There are a number of factors that have the potential to influence periphyton growth. At the larger scale, factors include the catchment geology and climate. At a reach scale, factors that influence periphyton growth include stream flow, light, nutrients, water temperature, substrate composition and grazer density.

The *National Policy Statement for Freshwater Management* (NPS-FM) includes a requirement for Councils to undertake monthly monitoring of periphyton biomass. Under the National Objectives Framework (NOF) set out in the NPS-FM, councils are required to measure periphyton, as chlorophyll-*a*, at representative river sites within each region. The NOF sets out a national bottom line for periphyton, requiring improvement if nuisance algal blooms occur regularly or for extended periods.

In 2018, Council initiated a monthly SoE periphyton monitoring programme, tailored to the requirements of the NPS-FM, at twelve sites in the Taranaki region. This inaugural report covers the monitoring results from July 2018 to June 2021. The monitoring data presented here are primarily assessed against the requirements of the NOF in the NPS-FM, although additional assessments are made with regards to separate aesthetic and recreational guidelines.

Monitoring results show that all sites comply with the national bottom line of 200 mg chl-*a*/m^2 for periphyton biomass as set out in the NOF. Five sites were graded within the A band, three sites in the B band and four sites in the C band. At five of these sites, these gradings must be considered provisional as there were fewer than the 36 samples required.

Periphyton cover was compliant with guideline values for weighted composite cover (WCC) throughout the reporting period at seven of twelve sites, while the guideline was exceeded at the remaining five sites ranging between 10 and 29% of sampling occasions. The results demonstrate that WCC provides a more precautionary assessment of nuisance periphyton cover, compared to treating the cover of thick mats and long filaments separately. Cyanobacteria was below the action threshold at all sites throughout the reporting period, while alert level was reached at five sites.

Trends in periphyton biomass and cover over time were not assessed due to the short time period available for analysis. Trends will be assessed once sufficient data is available.

Relationships between periphyton biomass and nutrients show that patterns are site specific. When nutrient limitation was assessed, nitrogen alone was the limiting nutrient at four sites, and phosphorous was the limiting nutrient at two sites. There was one site where periphyton growth was limited by both nitrogen and phosphorous. At the remaining five sites, the concentrations of both nitrogen and phosphorous were above the limitation thresholds. Phosphorous was not a limiting nutrient at any of the sites with volcanic geology; owing to the naturally elevated phosphorous concentrations in those rivers and streams.

The report contains recommendations to review the current monitoring programme in light of the recently released Periphyton National Environmental Monitoring Standard (NEMS), as well as updates related to the Council's NPS-FM implementation.

Table of contents

List of tables

List of figures

1 Introduction

1.1 General

The *Resource Management Act 1991* (RMA) sets out requirements for local authorities to undertake environmental monitoring. Section 35 of the RMA requires local authorities to monitor, among other things, the state of the environment of their region or district, to the extent that is appropriate to enable them to effectively carry out their functions under the Act.

To this effect, the Taranaki Regional Council (Council) has established a state of the environment monitoring (SoE) programme for the region. Council's SoE programme encompasses a number of individual monitoring activities, many of which are undertaken and managed on an annual basis (from 1 July to 30 June). Where possible, individual consent monitoring programmes have been integrated within the SoE programme to save duplication of effort and minimise costs. The purpose of SoE reporting is to summarise and interpret regional environmental monitoring activity results and report on any changes (trends) in these data. These reports in turn provide key information for Council's regional State of Environment report, which is published every five years. Copies of these reports, including the most recent report *Our Place – Taranaki State of Environment 2022*, are made available on the Council's website.

This report summarises the results of the SoE Periphyton Monitoring Programme over the 2018-2021 monitoring period.

1.2 National Policy Setting

The National Policy Statement for Freshwater Management 2020 (NPS-FM) sets out requirements for councils and communities to maintain or improve freshwater (where it is degraded). The NPS-FM provides a National Objectives Framework (NOF) that specifies nationally applicable standards for particular water quality parameters (referred to as 'attributes'), to assist regional councils and communities to more consistently and transparently work toward their freshwater objectives. The NPS-FM acknowledges iwi and community values by recognising the range of iwi and community interests in fresh water, including environmental, social, economic and cultural values.

The NPS-FM identifies four compulsory values and nine further values that must be considered by the regional council. Ecosystem health is one of four compulsory values that apply to all freshwater bodies. Periphyton is one of the attributes relating to ecosystem health that must be monitored and reported against. The NPS-FM includes a requirement for Councils to undertake monthly monitoring of periphyton biomass at representative sites within each region[1]. In response to this requirement, the Council implemented a pilot monthly monitoring programme to understand the current state of ecosystem health, with specific regard to periphyton, in the 2017-2018 monitoring year.

Table 1 sets out the NOF attribute criteria for periphyton. There are two numeric attribute states: a default class and a productive class. The productive class applies to streams and rivers which have naturally high levels of nutrient enrichment, or experience dry climate – as defined by the River Environment Classification (REC). All monitored sites in the Taranaki region are in the default class for assessment of periphyton against the NOF attribute. Therefore any reference to the NOF attribute state in the remainder of this report is to the default class, unless otherwise stated.

[1] Councils can also undertake monitoring using visual estimates of periphyton cover at sites where there is a low risk of exceeding the relevant periphyton abundance threshold.

Table 1 Periphyton attribute table (NPS-FM, 2020)

NOF Band	Default Class (mg chl-a/m^2)	Productive Class (mg chl-a/m^2)	Narrative attribute state
	Exceeded in no more than 8% of samples	*Exceeded in no more than 17% of samples*	
A	≤50	≤50	Rare blooms reflecting negligible nutrient enrichment and/or alteration of the natural flow regime or habitat.
B	>50 and ≤120	>50 and ≤120	Occasional blooms reflecting low nutrient enrichment and/or alteration of the natural flow regime or habitat.
C	>120 and ≤200	> 120 and ≤200	Periodic short-duration nuisance blooms reflecting moderate nutrient enrichment and/or moderate alteration of the natural flow regime or habitat.
National Bottom Line	**200**	**200**	
D	>200	>200	Regular and/or extended-duration nuisance blooms reflecting high nutrient enrichment and/or significant alteration of the natural flow regime or habitat.

* The productive class is defined by River Environment Classification (REC) types, with a combination of dry climate categories and soft-sedimentary, volcanic acidic and volcanic basic geology. All sites that do not fall in these categories are in the default class.

1.3 Periphyton

Periphyton is the 'slime' and algae found on the beds of lakes and rivers. This is a component of a healthy system and forms the base of the food web. The periphyton community is composed predominantly of algae and cyanobacteria (blue-green algae) but also contains heterotrophic bacteria and fungi. These heterotrophic microbes comprise only a small proportion of the periphyton communities, and consequently periphyton monitoring uses algal pigments (chlorophyll-a) to measure the biomass. Under certain conditions excessive growth of periphyton can occur, forming a nuisance bloom which may have a negative impact on a range of values including aesthetics, contact recreation, fishing, irrigation, industrial uses and potable water supply.

Ecosystem health can also be impacted, with effects such as reduced macroinvertebrate biodiversity due to alteration of available habitat and impairment of habitat for native fishes. Water quality can also be impacted by factors such as increased suspended detritus, increased pH and ammonia fluctuations, and anoxia within the interstitial spaces of the stream bed.

There are a number of factors that have the potential to influence periphyton growth. The interaction between these factors can act to limit periphyton growth. At the larger scale, factors include the catchment geology and climate. At a reach scale, factors that influence periphyton growth include stream flow, light, nutrients, water temperature, substrate composition and grazer density.

Stream flow is one of the key drivers of periphyton biomass. Of particular importance is the frequency of fresh events which may remove algae. The accrual period is particularly important, and can be defined as the period of periphyton growth since a flushing flow event. The effective flushing flow is the flow required to remove periphyton from rocks as a result of scouring. Previous work has considered a flow of three times the median flow to be the most likely flushing flow (Biggs, 2000). However, more recently it has been recognised that the magnitude of flow required for periphyton removal can vary considerably between

rivers and sites. This is largely a function of the physical characteristics of a site, such as substrate size (Hoyle et al. 2017).

Light is required for photosynthesis and hence for periphyton growth to occur. The amount of light reaching the streambed may be affected by shading of the water, as well as light attenuation through the water column. Light attenuation may be increased as a result of turbidity or colour in the water.

Nutrients are important to periphyton growth, particularly when in inorganic form. The major nutrients required for all plants are nitrogen and phosphorus, and a lack of either of these nutrients may limit periphyton growth. It is also important to note that the measured nutrient levels in the water column may themselves be affected as a result of uptake by periphyton.

1.3.1 Periphyton guidelines

A number of periphyton guidelines exist, primarily relating to aesthetics and recreational use (Table 2). These include visual assessment of the cover long filamentous periphyton and the cover of thick mats (Biggs, 2000). These guidelines require less than 60% cover of mats thicker than 3 mm and less than 30% cover of filaments longer than 2 cm.

As a result of these guidelines addressing the cover of thick mats and long filaments separately, it is possible to have moderately high cover of both periphyton forms which do not breach either threshold whilst together presenting an aesthetic nuisance. To address this issue, a weighted composite cover (WCC) metric was developed as a review of the instream plant and nutrient guidelines (Matheson et al. 2012). The WCC metric considers the two growth forms in conjunction with one another and can be used to assess both aesthetic guidelines and ecological condition.

Table 2 Periphyton guidelines in New Zealand

Value	Measure	Threshold	Source
Aesthetic	Long Filaments	30% cover	Biggs, 2000
	Thick Mats	60% cover	Biggs, 2000
	WCC	30	Matheson, 2012
	Chlorophyll-a	120 mg/m^2	Biggs, 2000
Ecological (Trout habitat)	Long filaments	30% cover	Biggs, 2000
Public Health	Cyanobacteria Mats (alert)	20% cover	MfE & MOH, 2009
	Cyanobacteria Mats (action)	50% cover	MfE & MOH, 2009

Cyanobacteria guidelines are also presented. It is important to note that these include cover and additional assessments to determine the state in relation to these guidelines. Therefore the assessments of cover only (as undertaken in this programme), may underestimate the number of times alert and action states are reached.

2 Monitoring methodology

2.1 Program design

The pilot monitoring programme was designed to monitor periphyton, as well as the potential drivers of periphyton biomass at 12 river or stream locations across the region. The monitoring programme includes sampling for a range of physicochemical parameters, hydrological monitoring and habitat assessments.

2.1.1 Site locations

Periphyton monitoring sites are listed in Table 3 and represented spatially in Figure 1.

Table 3 Sites monitored in the monthly periphyton monitoring programme

River	Site	Site Code	GPS location
Kapoaiaia Stream	Cape Egmont	KPA000950	E1665690 N5652452
Manganui River	Midhirst	MGN000195	E1708871 N5651282
Mangaehu River[1]	Raupuha Road	MGH000950	E1726300 N5639062
Makuri Stream[1]	Raupuha Road	MKR000495	E1723795 N5641478
Maketawa Stream	Tarata Road	MKW000300	E1708784 N5665231
Matau Stream	Matau Road	MTA000068	E1733965 N5661062
Punehu Stream	Wiremu Road	PNH000200	E16873232 N5637020
Punehu Stream	SH45	PNH000900	E1677946 N5627786
Hangahatua (Stony) River	Mangatete Road	STY000300	E1677420 N5657868
Tawhiti Stream	Duffy's	TWH000435	E1714287 N5615551
Waingongoro River	Eltham Road	WGG000500	E1710694 N5634849
Waiwhakaiho River	Egmont Village	WKH000500	E1698297 N5666893
Waikaramarama Stream	Waikaramarama Road	WMR000100	E1730866 N5692865

[1] The Mangaehu River was removed from the monitoring programme due to Health and Safety concerns in September 2018. The Makuri Stream was introduced as a safer alternative site in November 2018.

The site selection process was weighted to incorporate a number of factors, as set out below:

1 Potential soft-bottomed sites were excluded because they are generally not considered able to support conspicuous periphyton growth. Furthermore, monitoring techniques are not sufficiently refined to collect chlorophyll-*a* samples in soft-bottomed streams.
2 Many larger rivers were excluded on the basis that they could not be safely monitored year round due to depth and/or swiftness of stream flow. A maximum safe wading depth for periphyton sampling is generally considered to be 0.6 m.
3 Preference was given to sites where data associated with explanatory variables such as nutrients and flow was already being collected under other monitoring programmes.

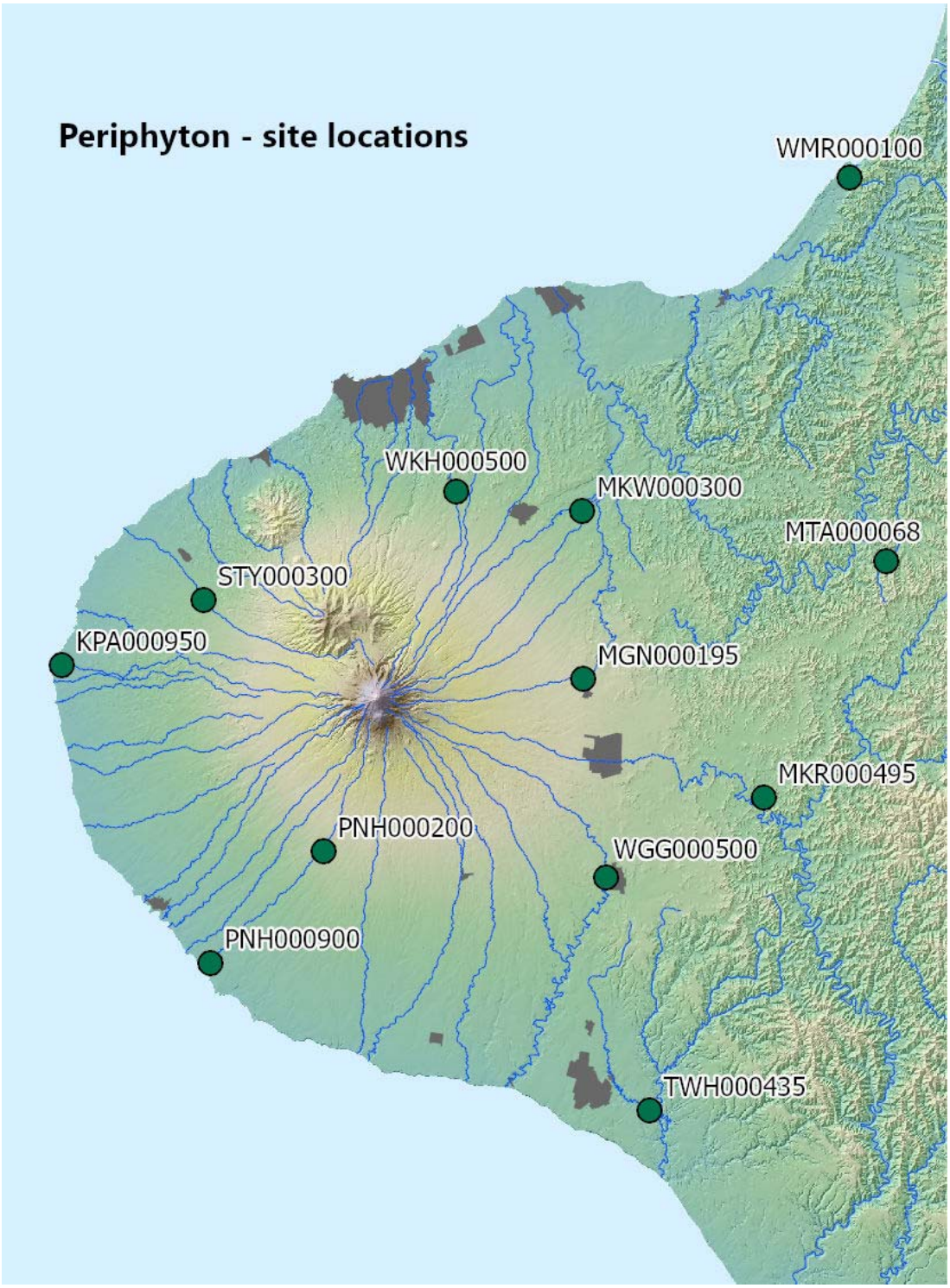


Figure 1 Periphyton monitoring sites in Taranaki

It should be noted that all of the sites monitored fall into the default class specified in the NPS-FM periphyton attribute table, as discussed in section 1.2. Investigation of potential sites prior to the implementation of this monitoring programme determined that the majority of stream reaches in Taranaki

which would be classed as productive were soft-bottomed and therefore not capable of supporting conspicuous periphyton growth.

2.2 Sample collection and analysis

Monthly sampling was undertaken at the selected sites, usually in run meso-habitat. Where no run habitat was available, sampling was undertaken in riffle meso-habitat instead. Periphyton biomass samples were collected at all sites using a modified version of quantitative method 1b (QM-1b) of the Stream Periphyton Monitoring Manual (Biggs & Kilroy 2000). These samples were processed for chlorophyll-*a* to provide an assessment of ecosystem health. Visual estimates of periphyton cover were made concurrently using rapid assessment method 2 (RAM-2) of the Stream Periphyton Monitoring Manual (Biggs & Kilroy 2000), providing assessment of aesthetic values. Where flow conditions prevented safe monitoring, neither periphyton biomass or periphyton cover were assessed. On occasion, periphyton biomass was assessed, while periphyton cover was not undertaken due to poor visibility preventing an accurate assessment from being carried out.

Additional physicochemical monitoring is carried out at sites which are not monitored under the physicochemical water quality SoE programme. The physicochemical parameters monitored were reviewed in June 2019 and a number of additional parameters were added in the 2019-2020 monitoring year. All sites where this physicochemical monitoring is not undertaken have the same parameters monitored as a part of the physicochemical water quality SoE programme. Physicochemical monitoring was undertaken when flow conditions prevented safe periphyton monitoring. Sites and physicochemical parameters monitored as a component of this programme are listed in Table 4.

Table 4 Physicochemical monitoring undertaken as a component of the monthly periphyton monitoring programme

Sites with additional physicochemical monitoring	Parameters monitored for the 2018-2021 period	Additional parameters monitored from July 2019
KPA000950	Black disc	Absorbance at 340 nm
MGN000195	Conductivity	Absorbance at 440 nm
MKR000495	Ammoniacal nitrogen	Absorbance at 770 nm
MTA000068	Nitrate-nitrite nitrogen	Total nitrogen
TWH000435	Dissolved inorganic nitrogen	Total phosphorus
WMR000100	Dissolved reactive phosphorus	Turbidity
-	pH	-

Prior to June 2018, all physicochemical testing was carried out in the Taranaki Regional Council laboratory. Following the closure of this laboratory all analysis has been performed by RJ Hill Laboratories, with the exception of chlorophyll-a testing which has been carried out by the Bay of Plenty Regional Council. Limited inter-laboratory comparisons were undertaken prior to the change in laboratory provider. However, these comparisons determined that the results from the two labs were not comparable. Subsequent inter-laboratory comparisons have determined that there was good agreement between the new provider and results from other laboratories included in the comparison, particularly those using ethanol as the extractant as is the case for the Council's samples (Kilroy and Daly 2020). As a result of these findings, and to prevent the possible step changes in reported results hindering analysis, periphyton monitoring data from June 2017 to June 2018 is not presented or analysed in this report.

2.3 Hydrological monitoring

Continuous flow data is required to estimate the periphyton accrual period. For the majority of sites, a suitable hydrological monitoring station with a long term flow record already existed. A further two sites did not have a hydrological recording station, but sufficient flow gaugings were undertaken and a suitable record exists to allow a synthetic flow to be modelled from a nearby monitoring station. Continuous water level monitoring in conjunction with quarterly flow gaugings were undertaken at the three sites where no suitable hydrological monitoring station existed to either measure or model the flow prior to the commencement of this monitoring programme.

Continuous temperature monitoring was also recorded at 15 minute intervals for all monitored sites, either as a component of the hydrological monitoring station or recorded separately using a tidbit temperature logger.

2.4 Analysis

The site MGH000950 has been excluded from the following analysis because this site was removed from the monitoring programme in September 2018, only three months into this reporting period and only one sample was collected from this site during these three months.

Additionally, trend analysis has not been undertaken as the three year data record from July 2018 is considered insufficient for meaningful trend detection. Trend analysis will be undertaken in future reports once sufficient data exists to allow detection of meaningful trends.

2.4.1 Periphyton cover

Periphyton cover was assessed via the weighted composite cover (WCC) metric, which is calculated by adding the percentage cover of long filaments and half the percent cover of thick mats together. An aesthetic nuisance guideline of ≥30% is suggested for this metric (Matheson et al. 2012).

2.4.2 Periphyton biomass

Site performance was assessed against the NOF periphyton attribute using the Hazen 92nd percentile of chlorophyll-*a* concentration (mg/m^2) over the three year monitoring period. Hazen percentiles are non-parametric and provide a more precautionary approach than parametric methods of percentile calculation. Hazen percentiles are widely used in freshwater reporting in New Zealand and has been used to represent peak chlorophyll-*a* concentration throughout this report.

In the assessment of the NOF periphyton attribute, when high flow conditions have prevented sampling, the consequent missing data point has been replaced with an imputed data point. Samples that were missed for reasons other than high flow are not imputed. The underlying assumption behind this is that flow conditions that are high enough to prevent sampling will cause algal removal, and thus the missed sample can be imputed with a low value. This approach is recommended in several publications. The National Environmental Monitoring Standards for Sampling and Measuring Periphyton in Wadeable Rivers and Streams (NEMS, 2022) recommends that data points missing due to high flows are substituted with a chlorophyll value of <5 mg/m^2. However, in recognition that several monitored sites have particularly low overall chlorophyll levels, we have followed the approach taken by Northland Regional Council (Kilroy & Stoffels, 2019) and instead substituted the 5th percentile of the data for a particular site. This was considered to be more appropriate, particularly for sites that have a 92nd percentile value below 5 mg/m^2.

2.4.2.1 Comparison between sites

The River Environmental Classification (REC) has 6 six factors which can be hierarchically used to classify river segments, based on the upstream catchment. These are summarised in Table 5. For analytical

purposes, the landcover class has been modified by grouping together indigenous forest (IF) and scrub (S) as natural (N) landcover. This is consistent with the REC user manual, which considers these two classes, together with tussock (not represented in Taranaki) to be natural or largely undisturbed land cover (Snelder et al 2004).

Table 5 River Environment Classification (REC) classes and categories within each class. Classes not represented within the monitoring network are italicised

Climate	Source of Flow	Geology	Landcover	Network Position	Valley Landform
Warm-extremely wet (WX)	*Glacial-mountain (GM)*	*Alluvium (Al)*	*Bare Ground (B)*	*High Order (HO)*	*High Gradient (HG)*
Warm-wet (WW)	*Mountain (M)*	*Hard sedimentary (HS)*	Indigenous Forest (IF)	Middle Order (MO)	Medium Gradient (MG)
Warm-Dry (WD)	Hill (H)	Soft Sedimentary (SS)	Scrub (S)	Low Order (LO)	Low Gradient (LG)
Cool- extremely wet (CX)	Low elevation (L)	*Volcanic Basic (VB)*	*Tussock (T)*	-	-
Cool-wet (CW)	*Lake (Lk)*	Volcanic Acidic (VA)	Pastoral (P)	-	-
Cool-dry (CD)	*Spring (Sp)*	*Plutonics (Pl)*	*Exotic Forestry (EF)*	-	-
-	*Wetland (W)*	*Miscellaneous (M)*	*Urban (U)*	-	-
-	*Regulated (R)*	-	-	-	-

An analysis comparing peak chlorophyll-a concentration between River Environment Classification (REC) classes has been undertaken. Further, a Kruskal-Wallis test was used to compare groups, followed by a Dunn's test where significant differences between groups were detected.

2.4.3 Drivers of periphyton biomass

Exploratory analysis has been undertaken in order to assess correlations between periphyton biomass and variables which are potential drivers of periphyton biomass. These include flow and accrual period, key physicochemical drivers (nutrients) and shading. Initial investigation considered light at streambed as a modelled driver (Matheson et al. 2012), however the available solar radiation data was of insufficient spatial resolution to continue with this and therefore semi-quantitative assessments of shading were used.

Continuous stream temperature monitoring and habitat assessments were also conducted throughout the monitoring period, however, these parameters have not been analysed in this report. It is recommended that this information is assessed during the next round of reporting.

2.4.3.1 Flow

Hydrographs and dates where samples were collected or were unable to be collected are provided for each site except the Stony River in Appendix I. Bed instability in the Stony River has prevented an accurate flow record from being maintained at the monitoring site in this river. Accrual period was investigated for each site using three times and seven times median flow thresholds and the relationship between periphyton biomass and accrual period was assessed.

2.4.3.2 Physiochemical parameters

The relationship between periphyton biomass (chlorophyll-*a*) and nutrients was assessed through the Pearson correlation coefficient.

3 Results

3.1 Periphyton cover

Periphyton cover is assessed against aesthetic guidelines (Biggs & Kilroy, 2000; Matheson et al. 2012) in Figure 2 and Table 6.

Table 6 Proportion of samples exceeding aesthetic and public health guidelines from July 2018 to June 2021

Site	No. visual assessments	% of samples exceeding guidelines				
		Weighted Composite Cover	% Thick Mats	% Long Filaments	Cyanobacteria - alert	Cyanobacteria - action
KPA000950	32	19	0	13	6	0
MGN000195	31	0	0	0	0	0
MKR000495	26	19	0	19	23	0
MKW000300	30	10	0	7	13	0
MTA000068	34	29	18	6	6	0
PNH000200	34	0	0	0	0	0
PNH000900	33	0	0	0	0	0
STY000300	28	0	0	0	0	0
TWH000435	23	0	0	0	0	0
WGG000500	31	0	0	0	3	0
WKH000500	29	14	0	7	0	0
WMR000100	33	0	0	0	0	0

The guideline for weighted composite cover was exceeded on occasion at five sites over the 2018-2021 monitoring period. The proportion of exceedances at these sites ranged from 10% to 29% of sampling occasions, while the remaining seven sites complied with the guidelines on all sampling occasions.

The guideline for cover of thick mats was exceeded at only one site, in the Matau Stream (MTA000068). The proportion of exceedances at this site was 18% of sampling occasions. The guideline for cover of long filaments was exceeded at five sites. The proportion of exceedances at these sites ranged from 6% to 19% of sampling occasions. This demonstrates that at all sites except MTA000068, the weighted composite cover was influenced primarily by long filamentous periphyton. Additionally, the table demonstrates that weighted composite cover generally provides a more precautionary assessment than treating long filament and thick mat guidelines separately.

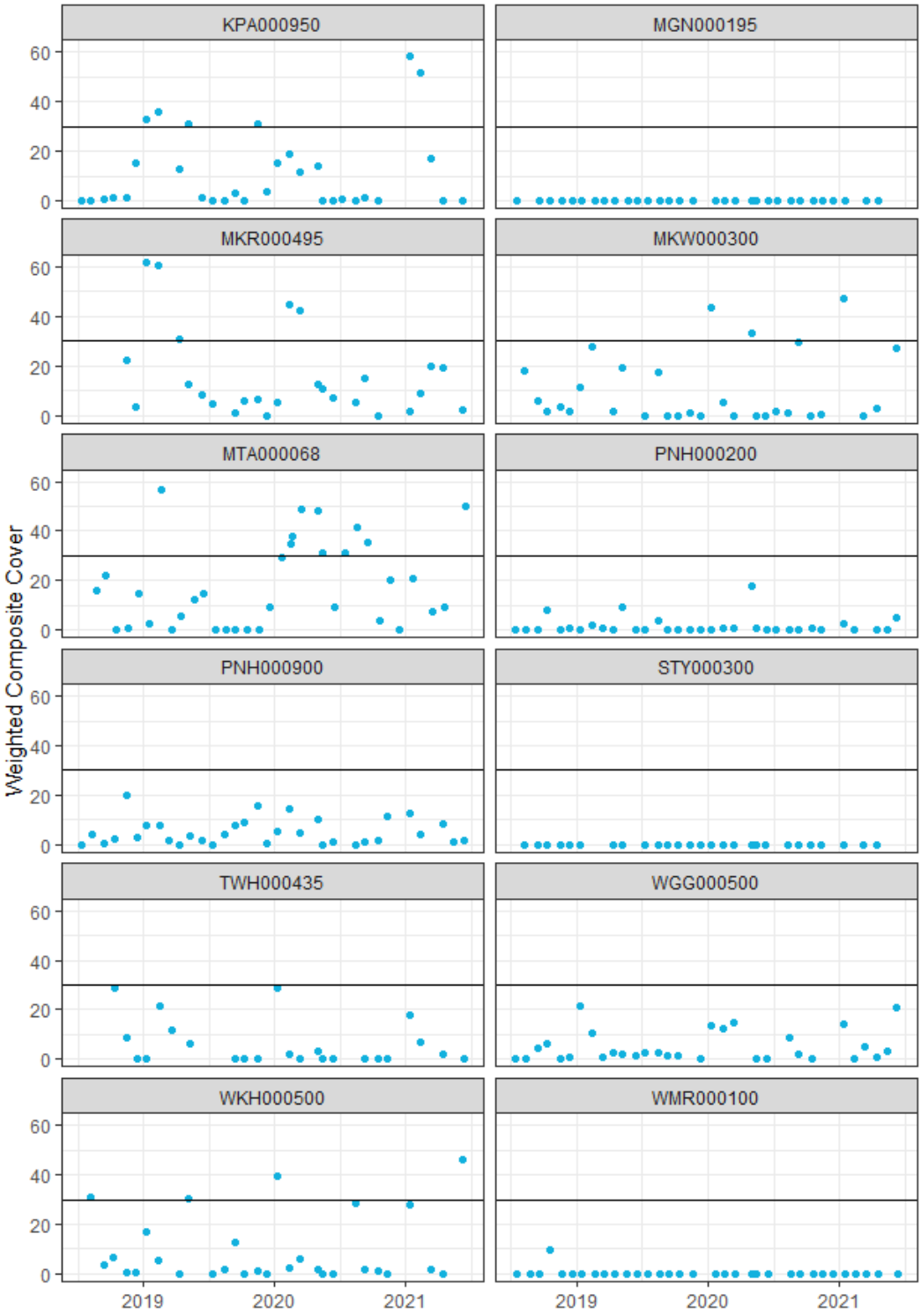


Figure 2 Weighted composite cover (WCC) at individual sites. Horizontal lines indicate the guideline for aesthetic values, which is set at 30 WCC (Matheson et al. 2012)

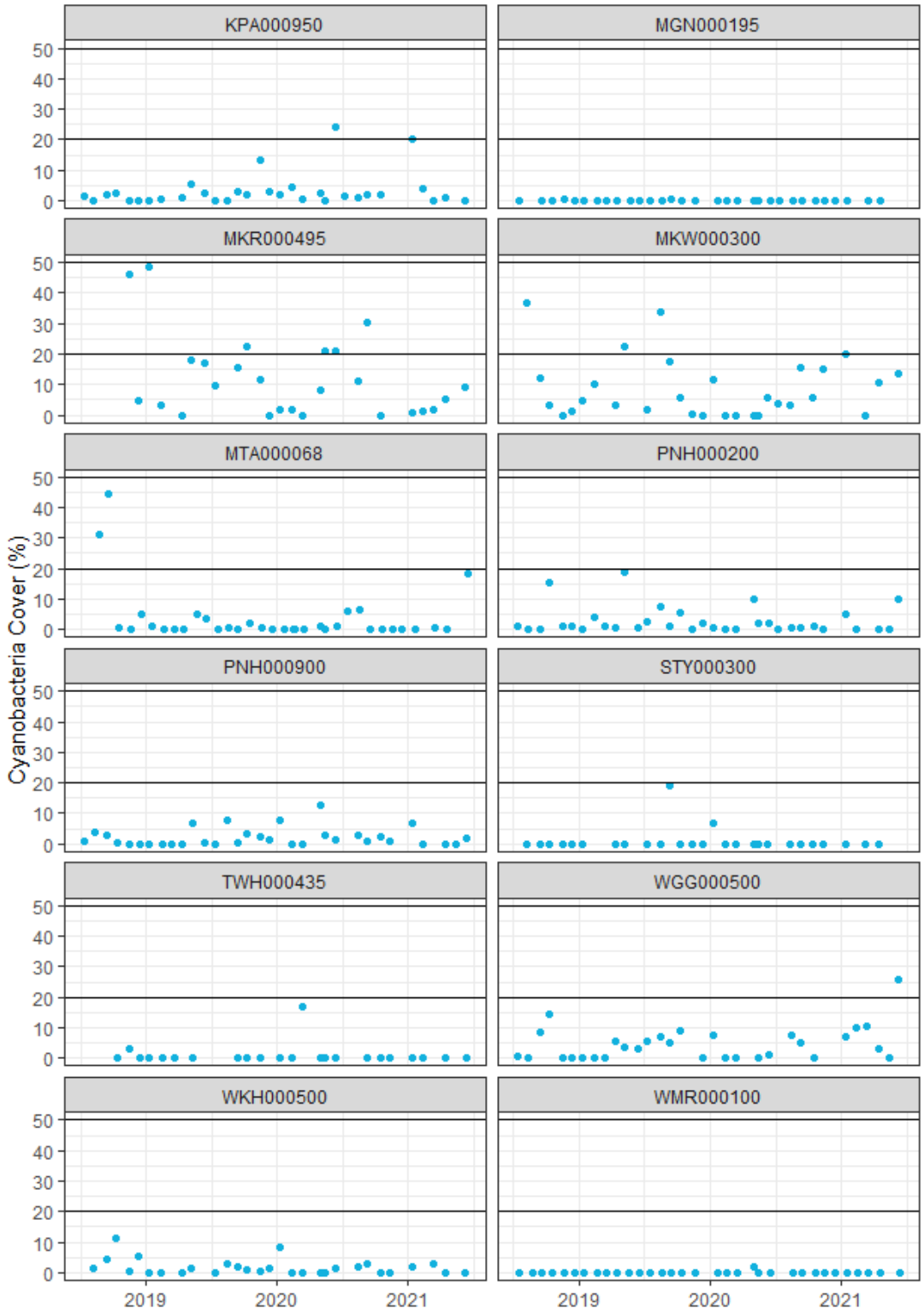


Figure 3 Cyanobacteria cover at monitoring sites. Horizontal lines indicate the alert (20%) and action (50%) levels in the interim cyanobacteria guidelines (MFE/MoH 2009)

Cyanobacteria cover was also assessed in Table 6 and is shown in Figure 3. No exceedances of the action level were recorded in the three year period, while the alert level was reached on fifteen occasions across five sites. The proportion of exceedances at these sites ranged between 3% and 23% of sampling occasions, with a 10% difference between the highest and second highest proportion of exceedances. It should be noted that the periphyton assessment was not specifically targeted at cyanobacteria, and therefore no assessment of exposed or detaching mats was made. Consequently, these results likely underestimate the number of occasions where the alert or action threshold was reached.

3.2 Periphyton biomass

Periphyton biomass, measured as chlorophyll-*a* (mg/m^2), is used as a representation of ecosystem health and is presented in Figure 4, while the attribute state for the monitored sites is presented spatially in Figure 5. Numbers on the plot represent the number of monthly data points used to calculate the NOF grade for each site. This number includes imputed values which have been calculated for monthly data points which were not sampled due to high stream flows. See methods section 2.4 and discussion for further details of the method used to impute data points and the rationale for doing so. A summary of available data is provided in Table 7. After values were imputed, site TWH000435 was missing five monthly data points over the 36 month period, or 14% of data for this site, which relates primarily to difficulties accessing the site during or following wet weather. A further three sites were missing one data point, again due to difficulties with site access (in these cases relating to either access permission being temporarily refused due to COVID concerns by the landowner or due to stock impeding access).

Table 7 Number of visual assessments and chlorophyll-a samples collected at each site during the period 2018-2021

Site	Visual Assessments	Biomass Samples		
	N	Collected	Imputed	Total
KPA000950	32	33	2	35
MGN000195	31	31	5	36
MKR000495*	26	26	6	32*
MKW000300	30	30	6	36
MTA000068	34	35	0	35
PNH000200	34	34	2	36
PNH000900	33	33	2	36
STY000300	28	29	7	36
TWH000435	23	29	2	31
WGG000500	31	31	4	35
WKH000500	29	29	7	36
WMR000100	33	36	0	36

* Site has been monitored for thirty-two months of the thirty-six month/three year monitoring period.

The NOF attribute state for periphyton is based on no more than 8% of samples exceeding a threshold at each site. This is equivalent to the 92nd percentile when there are 36 samples, and should be considered indicative for sites where there are fewer than 36 samples.

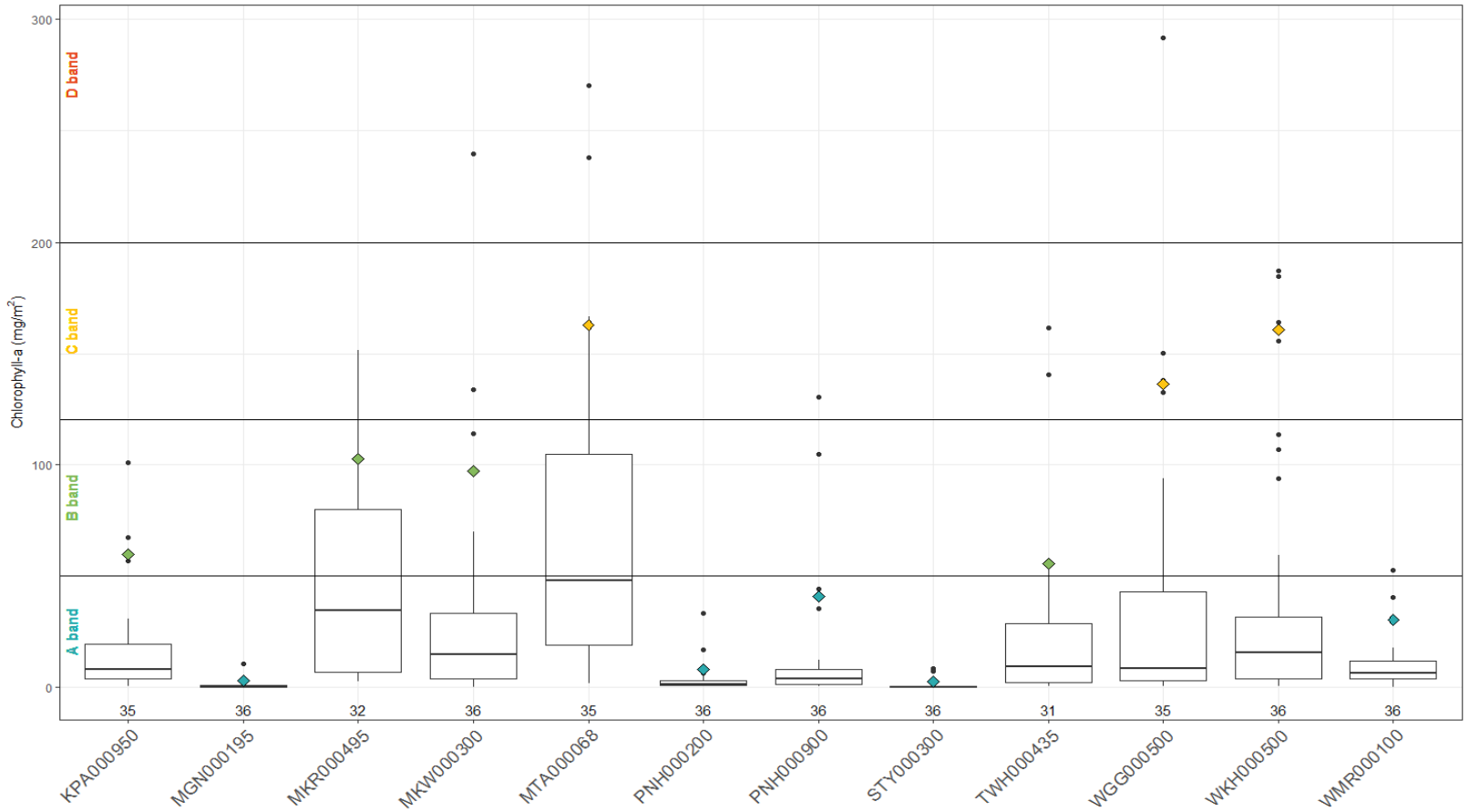


Figure 4 Periphyton biomass measured as chlorophyll-*a* during the period July 2018 to June 2021. Diamonds represent the Hazen 92nd percentile of the data, which value determines the attribute state

Horizontal lines represent the thresholds between NOF bands. The number of values used to calculate the percentile at each site is shown on the graph (including imputed data points). Note that where there are fewer than 36 data points the NOF band is indicative.

Five sites are categorised as within the A band, four in the B band and three within the C band. As all sites are C band or higher, all monitored sites meet the national bottom line for the periphyton attribute. Three sites have extremely low 92nd percentiles of under 10 mg/m^2 chlorophyll-*a*, with no samples exceeding the 50mg/m^2 threshold. These three sites are in the mid to upper reaches of streams arising in Te Papakura o Taranaki (formerly Egmont National Park). Two of the sites within the C band are in the mid reaches of large rivers arising within Te Papakura o Taranaki, while the third site is in a small hill country stream.

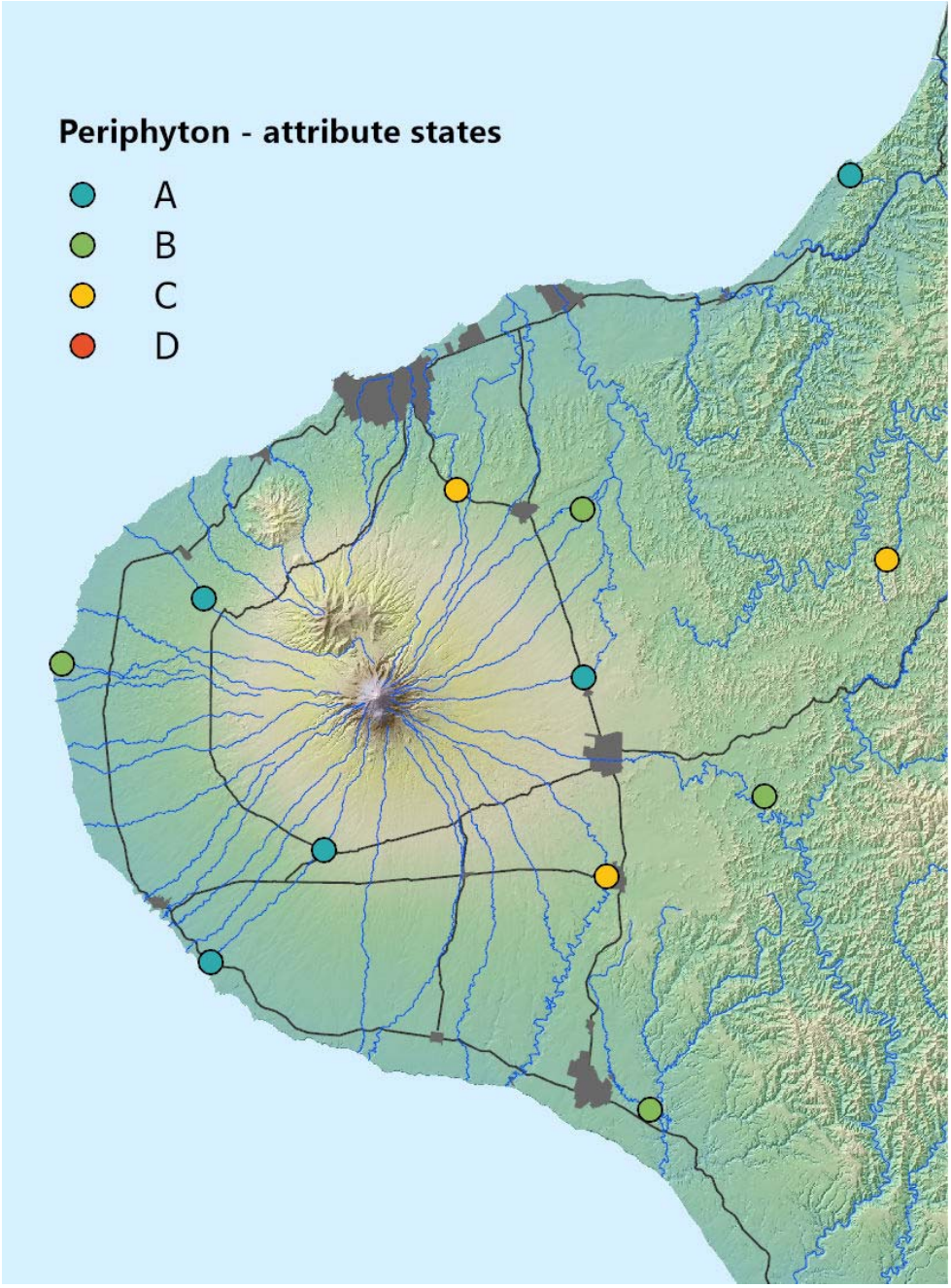


Figure 5 Periphyton attribute state at monitoring sites in Taranaki. Note that the reported state is indicative for sites with fewer than 36 data points

3.2.1 Comparisons between sites

Comparisons of peak chlorophyll-a (92nd percentile) have been made between classes for each of the six REC categories (Figure 6). Land cover was the only REC factor where a significant difference between classes was recorded. Peak chlorophyll-*a* was significantly lower at sites where the upstream catchment was dominated by natural land cover compared to pasture (p=0.01). This pattern would be expected to be caused by differences in other variables which are themselves influenced by land cover such as shading, water temperature and nutrient concentrations.

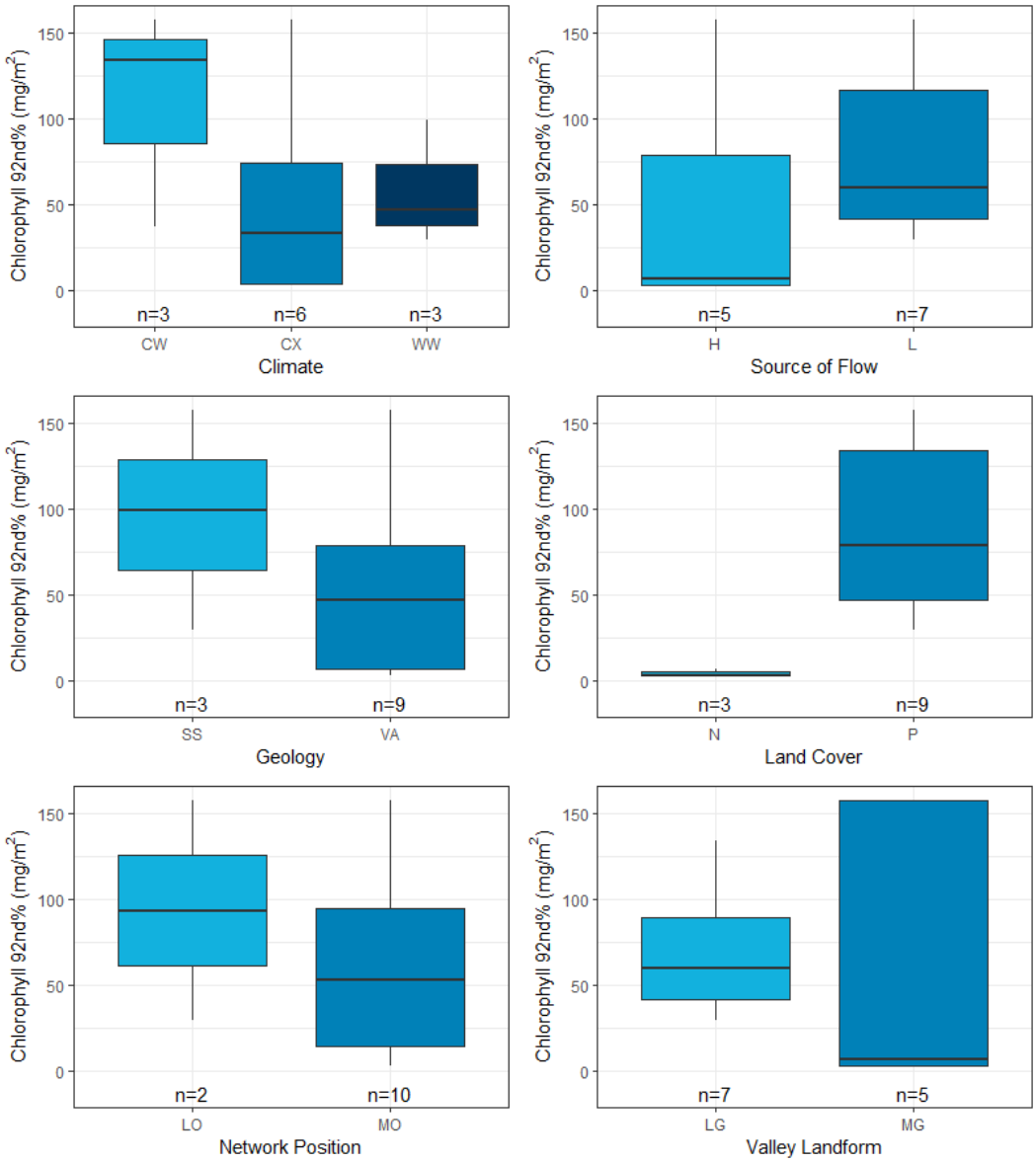


Figure 6 Peak chlorophyll-a (92nd percentile) for REC classes represented by the monitored sites for each of the six REC factors. A significant difference between groups was recorded for the factor land cover (CW=Cool-Wet, CX = Cool-Extremely wet, WW = Wet-Warm, H = Hill, L = Low elevation, SS = Soft Sediment, VA = Volcanic acidic, N = Natural land cover, P = Pastoral, LO = Low order, MO = Middle order, LG = Low gradient, MG = Medium gradient)

3.3 Drivers of periphyton biomass

3.3.1 Flow

The relationship between periphyton biomass and accrual period (based on a 3 times median flow being a flushing flow) is presented in Figure 7. It is evident from this basic analysis that the effective flushing flow (EFF) required to reset the accrual period is site specific and using these pre-determined flow thresholds is not appropriate to analyse EFF. Further analysis has been hindered by the limited data available. This will be investigated further in the next triennial report or once a minimum of five years of data has been collected, using an approach similar to that used by Northland Regional Council (Kilroy & Stoffels, 2019).

3.3.2 Physicochemical parameters

The results of the Pearson correlation analysis between periphyton biomass and nutrients are shown in Table 8. It should be noted that the nutrient variables in the table are not independent, with correlations expected between the various nitrogen forms, and also between the phosphorus forms. Conductivity is included because there is often a correlation between periphyton and conductivity, and this may be stronger than relationships with individual nutrients. This may relate to availability of trace nutrients. Negative correlation coefficients indicate that periphyton is increasing as nutrients decrease, i.e. the uptake of nutrients by periphyton is greater than the replenishment of nutrients from upstream, while positive coefficients show that periphyton increases as nutrients increase, so the supply of nutrients is greater than uptake by periphyton.

Dissolved nutrients are in a form available for utilisation by plants, while total nutrient concentrations may show stronger correlations with periphyton biomass at some sites. This is likely to relate to nutrient uptake/replenishment dynamics. Nutrients are constantly being supplied from upstream while at the same time being utilised by periphyton and plants. This dynamic means that nutrient concentrations in a sample reflects the balance of these factors at a specific time and place rather than the total available nutrients for periphyton growth.

Table 8 Pearson correlation coefficients between periphyton biomass and physicochemical variables. Significant correlations are indicated in bold ($p < 0.05$) or italics ($p < 0.01$)

Site	DIN	NH4	NNN	TN	DRP	TP	COND
KPA000950	**-0.349**	-0.160	**-0.348**	-0.383	0.150	0.060	0.222
MGN000195	-0.356	-0.186	-0.351	-0.345	-0.085	-0.166	0.058
MKR000495	-0.170	-0.158	-0.146	-0.204	-0.244	-0.235	0.139
MKW000300	-0.261	-0.208	-0.243	**-0.338**	-0.188	-0.231	0.130
MTA000068	0.014	**-0.347**	0.032	-0.048	0.049	0.221	0.067
PNH000200	0.077	0.084	0.070	0.159	-0.118	**0.358**	-0.054
PNH000900	-0.225	-0.173	-0.225	-0.202	-0.054	-0.087	-0.258
STY000300	-0.239	-0.128	-0.207	-0.095	0.003	-0.132	0.157
TWH000435	**-0.382**	-0.249	**-0.377**	-0.285	-0.090	-0.117	**0.383**
WGG000500	-0.221	0.010	-0.219	-0.206	-0.053	0.022	-0.061
WKH000500	-0.017	-0.292	0.012	-0.193	-0.072	-0.307	0.086
WMR000100	0.086	-0.194	0.089	0.238	***0.454***	0.022	0.179

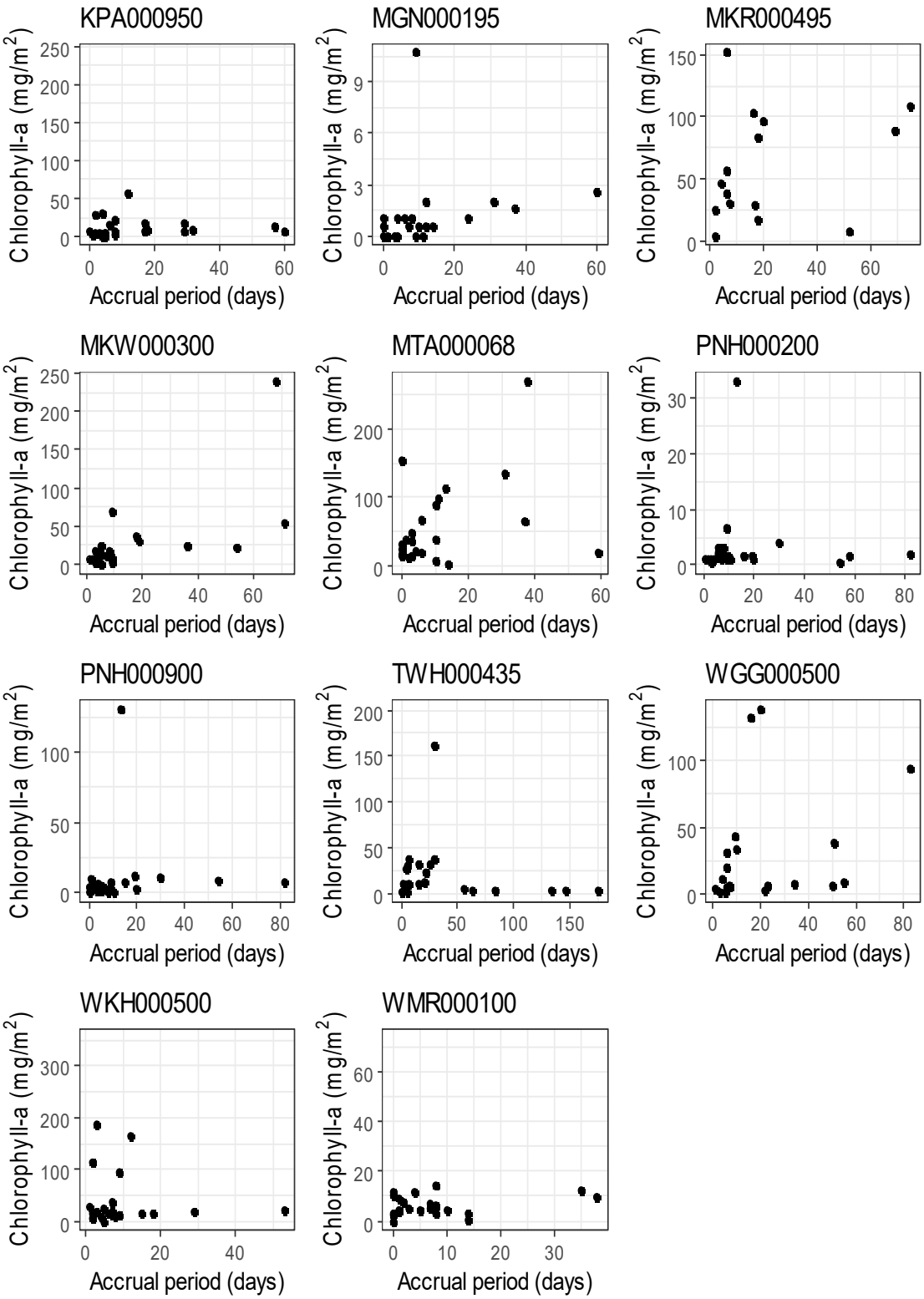


Figure 7 Periphyton biomass as a factor of the accrual period (days since 3x median flow)

At individual sites only KPA000950 and TWH000435 had a significant correlation between periphyton and DIN. Correlations of periphyton and NNN showed the same patterns which is expected because NNN is the major component of DIN and therefore these variables are not independent. Only one site, WMR000100, has a significant correlation with DRP, which was a strong positive correlation. Site MKW000300 had a significant correlation between periphyton and TN, while PNH000200 periphyton was strongly correlated with TP.

Nutrient limitation occurs when concentrations of available nutrients are lower than the capacity of the periphyton to use the nutrients. This can vary as other factors change, for example shading. Nutrient limitation is assessed based on assumed saturating concentrations of DIN and DRP in Figure 8. Thresholds of 0.295 g/m^3 for DIN and 0.01 g/m^3 DRP are used (Biggs, 2000). Points represent single samples, while site limitation is assessed based on a minimum of 55% of samples being limited by a particular nutrient or combination of nutrients.

Assessment of the nutrient limitation plots in Figure 8 shows that at the sites MGN000195, PNH000200, STY000300 and WKH000500 periphyton growth is limited by nitrogen, while site WMR000100 has phosphorus as the limiting nutrient for periphyton growth. At site MTA000068, both phosphorus and nitrogen concentrations may limit periphyton growth, while site MKR000495 is limited by phosphorus and at times nitrogen as well. The remaining five sites generally have DIN and DRP concentrations that do not limit periphyton growth. No sites with volcanic acidic geology are limited by dissolved reactive phosphorus concentrations.

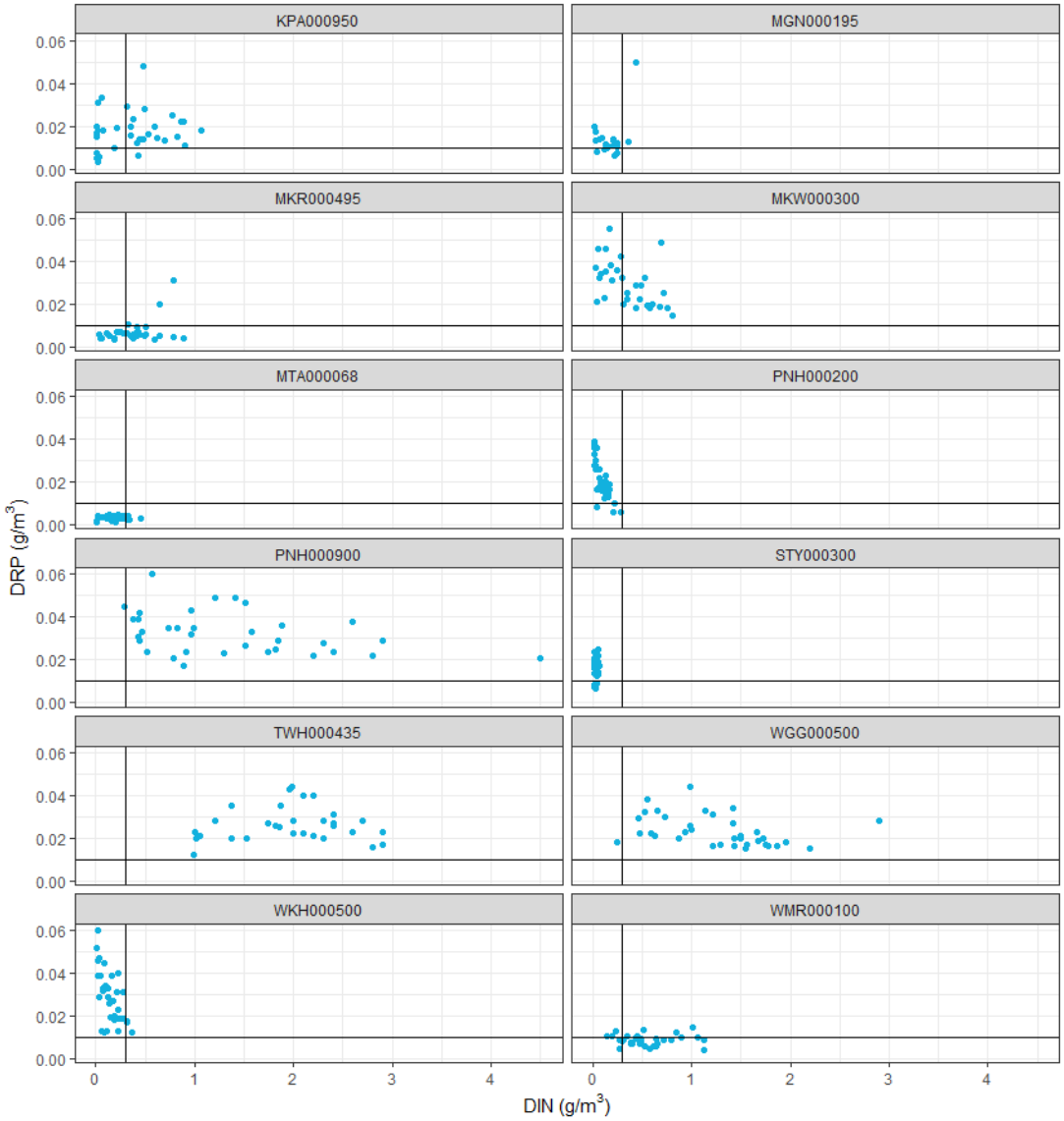


Figure 8 Nutrient limitation plots based on concentrations. For samples below the horizontal line periphyton growth is P-limited, while samples to the left of the vertical line are N-limited

4 Discussion

All monitored sites in Taranaki achieve at least C band for periphyton biomass and meet minimum national requirements (i.e. the periphyton national bottom line).

The NOF attribute is based on a maximum of 8% of samples exceeding particular thresholds. When 36 monthly samples are collected over the three year period, this is equivalent to a maximum of three samples (or one sample per year) over that period exceeding the threshold and is the same as comparing the 92nd percentile (MFE, 2022). However, when there are fewer than 36 samples, the 92nd percentile must be interpolated from the data that exists, rather than being the value of the third highest sample. In these cases the 92nd percentile is not equivalent to the maximum of 8% of samples exceeding criteria, therefore potentially altering the assessment of attribute state.

For the purpose of assessing site performance against the NOF periphyton attribute, when high flow conditions have prevented sampling, the consequent missing data point has been replaced with an imputed data point for chlorophyll-*a*. Samples that were missed for other reasons are not imputed. The underlying assumption behind this is that flow conditions that are high enough to prevent sampling will cause algal removal, and thus the missed sample can be imputed with a low value. This approach is used in several publications and is recommended in the NEMS (Kilroy & Stoffels, 2019; NEMS, 2022). The NEMS recommends that data points missing due to high flows are substituted with a chlorophyll value of <5 mg/m^2 (NEMS, 2022). However, in recognition that several monitored sites have particularly low overall chlorophyll levels, we have followed the approach taken for Northland Regional Council (Kilroy & Stoffels, 2019) and instead substituted the 5th percentile of the data for a particular site. This was considered to be more appropriate, particularly for sites that have a 92nd percentile value below 5 mg/m^2.

Periphyton cover data shows that a number of sites do not always meet aesthetic guidelines for the percentage of thick mats, long filaments or weighted composite cover. No sites which are classed as being within the NOF A band have exceeded any of these guidelines in the reporting period.

In general, the correlations between periphyton and nutrients did not align with the expected patterns based on concentrations of limiting nutrients. The sites where strong correlations with DIN were observed were both considered not to be nutrient limited. The exception to this pattern was site WMR000100 where dissolved reactive phosphorus showed a strong positive correlation with periphyton, and the periphyton growth was considered to be phosphorus limited.

The influence of underlying geology on nutrient concentrations can be examined by looking at the nutrient concentrations. The monitored sites are classed by REC as either having volcanic acidic (9 sites) or soft sedimentary (3 sites) geology. The sites with soft sedimentary geology can be classified as having periphyton growth limited either by phosphorus, or by both phosphorus and nitrogen. In contrast, the sites with volcanic acidic geology have periphyton growth limited either by nitrogen, or are not limited by either nitrogen or phosphorus. This clearly demonstrates the influence of the underlying geology, with volcanic geology having higher natural concentrations of phosphorus. The implication of this pattern, is that in areas with volcanic acidic geology, management actions which decrease available nitrogen concentrations are more likely to effectively limit periphyton growth than actions which decrease available phosphorus concentrations. In areas with soft sedimentary geology, the reverse applies. It should be noted that there are other controls on periphyton growth, such as shade and temperature. These should be considered in conjunction with nutrient limitation in respect to any potential management actions.

4.1 Site specific factors

There are also some specific issues which are impacting on particular sites.

The monitoring site in the Stony River is subjected to periodic headwater erosion events which result in a large amount of silt, sand and fine gravels moving through the river system. This high sediment supply causes significant scouring, limiting periphyton development. This also causes the riverbed to change periodically, and at times changes to the streambed have prevented sampling due to alterations to the channel shape and water depth limiting the wadeable area where sampling is possible. This is a separate issue to high flows preventing sampling. Furthermore, the channel instability in this river prevents maintenance of a rating curve. Flow data is consequently unavailable, limiting any future analysis of drivers of periphyton growth at this site. Given the importance of flow as a driver of periphyton growth and the relatively low levels of periphyton at this site, consideration should be given to removing this site from the monitoring programme. Any decision to retain the site should be made with the understanding that site-specific drivers cannot be fully assessed.

The Tawhiti Stream at Duffy's has had an increase in the cover of macrophyte beds since monitoring began (although only categorical macrophyte data is collected, preventing a full analysis of the extent of the change). It appears there has been a corresponding decrease in the measured periphyton chlorophyll-*a* concentrations and coverage of long filamentous periphyton over this time, although the limited data record prevents further analysis of this trend. There are two primary reasons why this might be the case, being that the macrophytes might limit periphyton growth through shading and competition for nutrients and space, and secondly because in a macrophyte dominated stream, macrophytes provide one of the largest habitat areas for periphyton to colonise. Periphyton growing on macrophytes is known as epiphyton, and is not included in chlorophyll-*a* measurements due to practical sampling difficulties. Macrophytes and periphyton both contain chlorophyll-*a*, and therefore macrophytes in a sample will elevate the measured concentrations of chlorophyll-*a*. Selection of sampled areas within a reach to exclude macrophytes potentially may introduce bias into the sampling, whilst shifting a sampling site may provide an alternative option. Consideration should be given to assessment of both periphyton and macrophytes at this site and any other site where significant macrophyte beds and periphyton growth co-occur. This is also recommended in the periphyton NEMS, which states that macrophyte abundance may also need to be recorded in stream reaches with high macrophyte cover, in order to adequately assess aquatic plant growth. Assessment of drivers of periphyton growth may be hindered where macrophyte beds occur, because macrophytes and periphyton are affected by the same factors. Consequently it may not be possible to separately account for the relationships of periphyton and macrophytes with environmental drivers at such sites.

4.2 Future proposed changes to periphyton monitoring

A number of recent developments will affect this monitoring programme. It is recommended that a review of the programme should be undertaken in light of these developments with a view to implementing changes in the next monitoring period.

A periphyton NEMS (National Environmental Monitoring Standard) was finalised in July 2022. There will be a number of changes to sampling procedures required to implement this standard. These affect mostly visual assessments, although site selection may also need to be reviewed to ensure that monitored reaches are representative of the river as a whole.

The periphyton monitoring network will also need to be reviewed in light of the Council's new proposed Freshwater Management Units (FMUs), which are a requirement of the NPS-FM. This will be necessary to ensure each FMU is adequately represented with monitoring sites. Further criteria to be considered, in terms of site representativeness, include stream order, REC class and overall spatial coverage.

Additional work could also be carried out in the future to spatially document stream reaches capable of supporting conspicuous periphyton growth. Currently, all sites monitored in the Taranaki region are in the default class. The region does have stream reach which is in the productive class, but an investigation of suitable sites prior to implementation of this programme found that the majority of rivers and streams in that area are soft bottomed and therefore not capable of supporting conspicuous periphyton growth. A more comprehensive investigation would be useful for supporting these findings.

5 Recommendations

1. THAT monthly SoE periphyton monitoring is continued.
2. THAT the SoE periphyton monitoring methodology is reviewed and procedures updated to ensure consistency with the periphyton NEMS.
3. THAT the monitoring sites are reviewed in light of both the periphyton NEMS and the update to the proposed Freshwater Management Units for the Taranaki region to ensure that suitable and representative monitoring sites are included for each FMU.
4. THAT mapping of stream reaches which are not capable of supporting conspicuous periphyton growth is undertaken to aid in selection of suitable monitoring sites and formally document stream reaches excluded from periphyton monitoring.
5. THAT consideration is given to macrophyte monitoring where this would be more informative than periphyton monitoring, or in conjunction with periphyton monitoring where warranted.

Bibliography and references

Biggs BJF & Kilroy C. 2000. Stream periphyton monitoring manual. Prepared for New Zealand Ministry for the Environment. 226p.

Biggs BJF. 2000. New Zealand Periphyton Guideline: detecting, monitoring and managing nutrient enrichment of streams. Ministry for the Environment. 122p.

Clapcott J. 2015. National rapid habitat assessment protocol development for streams and rivers. Prepared for Northland Regional Council. Cawthron report No. 2649. 29 p plus appendices.

Matheson F, Quinn J & Hickey C. 2012. Review of the New Zealand instream plant and nutrient guidelines and development of an extended decision making framework: Phases 1 and 2 final report. Prepared for the Ministry of Science and Innovation Envirolink fund. NIWA client report HAM2012-081.

Hoyle JT, Kilroy C, Hicks DM & Brown L. 2017. The influence of sediment mobility and channel geomorphology on periphyton abundance. Freshwater Biology 62: 258-273.

Kilroy C, Daly O 2020. Inter-laboratory comparison of analysis of chlorophyll-a from periphyton samples. Prepared for Envirolink (Tasman District Council). NIWA client report 2020321CH.

Ministry for the Environment 2022. Guidance on look-up tables for setting nutrient targets for periphyton: second edition. Wellington: Ministry for the Environment.

Kilroy C & Stoffels R. 2019. Periphyton growth in Northland rivers: Current status, and development of relationships for nutrient limit-setting. Prepared for Northland regional Council (Envirolink fund). NIWA client report 2019064CH.

Ministry for the Environment 2020. National Policy Statement for Freshwater Management 2020; Ministry for the Environment publication ME1518, August 2020.

Ministry for the Environment & Ministry of Health 2009. Cyanobacteria in Recreational Fresh Waters – Interim Guidelines. Prepared for the ministry for the Environment and the Ministry of Health by SA Wood, DP Hamilton, WJ Paul, KA Safi and WM Williamson. Wellington: Ministry for the Environment.

Snelder T, Biggs B & Weatherhead M. 2004. New Zealand River Environment Classification User Guide. March 2004 (Updated June 2010). Wellington: Ministry for the Environment.

Snelder T, Kilroy C & Booker D. 2022. Derivation of nutrient criteria for periphyton biomass objectives: using regional council monitoring data.

Taranaki Regional Council. 1996. *State of the Environment – Taranaki Region 1996.* TRC publication.

Taranaki Regional Council. 2003. *Taranaki – Our Place Our Future. Report on the state of the environment of the Taranaki region – 2003.* TRC publication.

Taranaki Regional Council. 2006. *Trends in the quality of the surface waters of Taranaki.* TRC Internal Report.

Taranaki Regional Council. 2009. *Taranaki Where We Stand. State of the Environment Report 2009.* TRC publication.

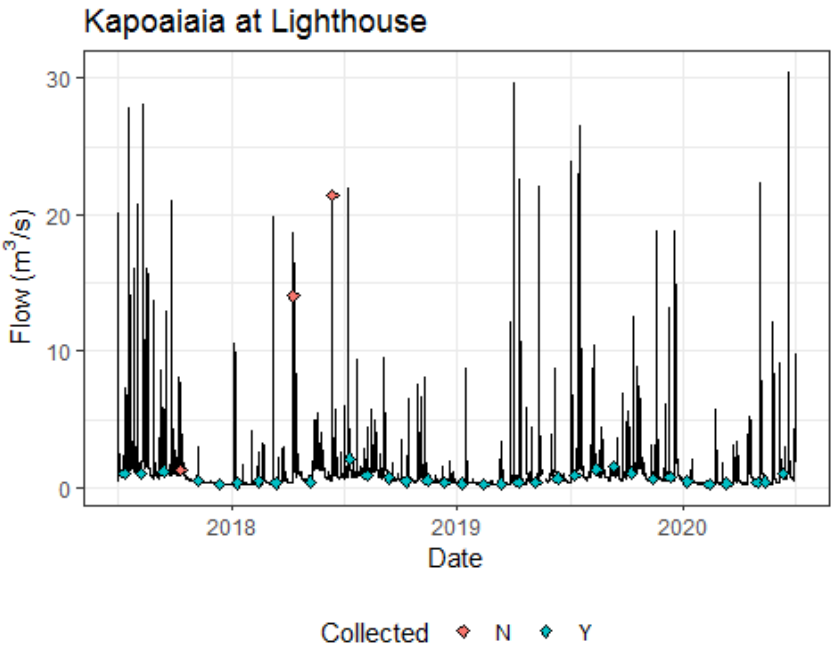
Taranaki Regional Council. 2015. *Taranaki – as one. State of the Environment Report 2015.* TRC publication.

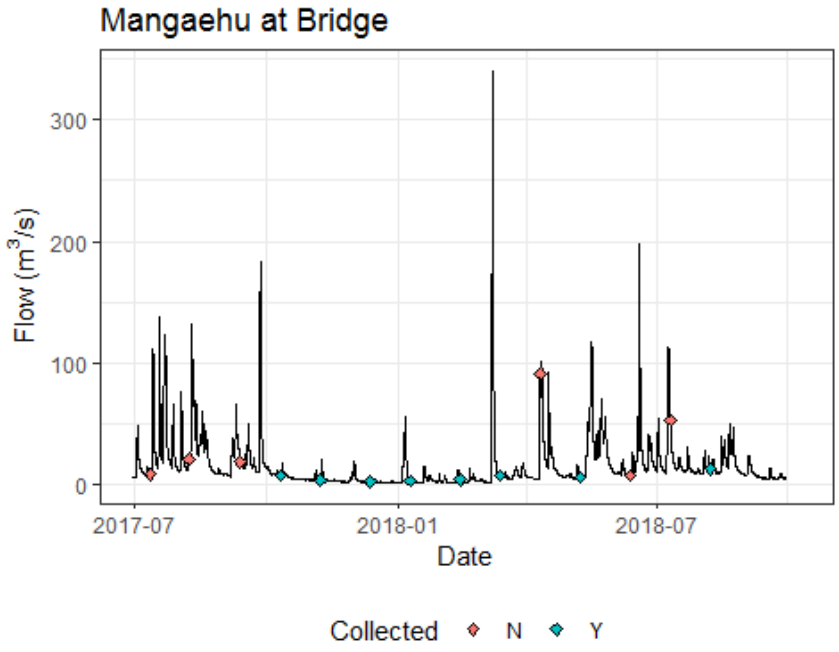
Glossary

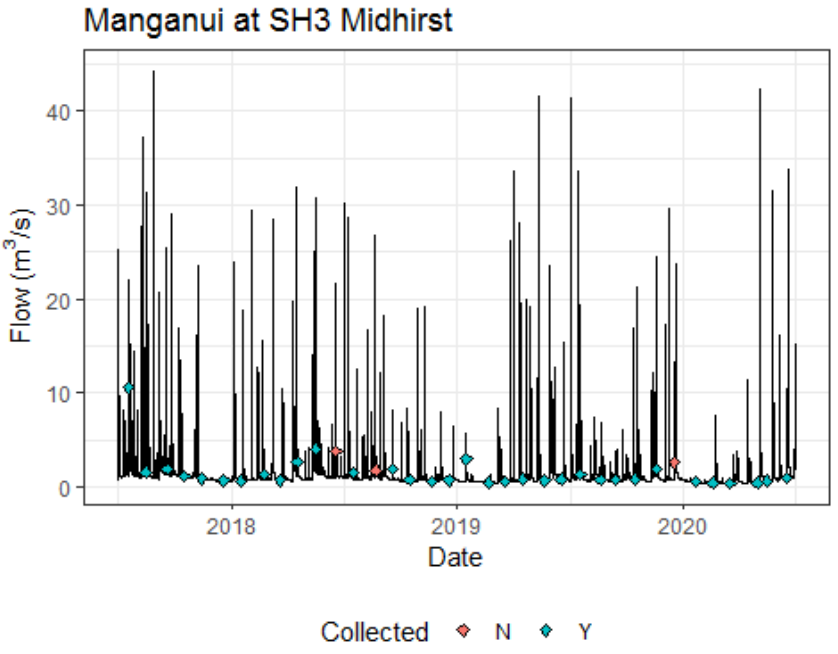
NPS-FM	National Policy Statement for Freshwater Management
FMU	Freshwater Management Unit
NOF	National Objectives Framework
NEMS	National Environmental Monitoring Standard
Chl-a	Chlorophyll-a; measured in in mg/m^2 (milligrams per square metre)
COND	Conductivity ; expressed as µS/cm at 25°C
DIN	Dissolved organic nitrogen (g/m^3 N)
DRP	Dissolved reactive phosphorus (g/m^3 P)
NNN	Nitrate-nitrite nitrogen (g/m^3 N)
NH4	Ammoniacal nitrogen (g/m^3 N)
TN	Total nitrogen (g/m^3 N)
TP	Total phosphorus (g/m^3 P)
QM-1b	Quantitative method 1b; a field method for collection of a periphyton biomass sample
RAM-2	Rapid assessment method 2; a field method for visual estimation of periphyton cover
Accrual period	The period since a flow event of sufficient magnitude to cause periphyton removal
EFF	Effective flushing flow; the flow magnitude required to cause algae removal
Epiphyton	Periphyton growing on macrophytes or other periphyton (instead of on rocks)
Strahler order	Method of reflecting catchment morphology. Headwater streams are assigned the order ‘1’. When two tributaries of the same order merge, the order increases by 1. When two tributaries of different orders merge, the higher order is retained. This can be used to approximate stream size and some hydrological characteristics.
REC	River Environment classification

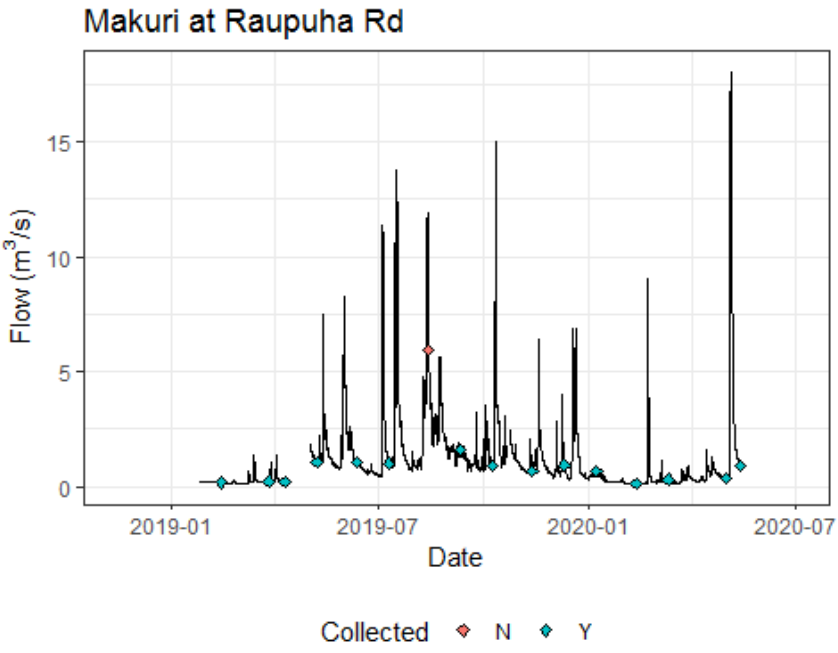
Appendix I

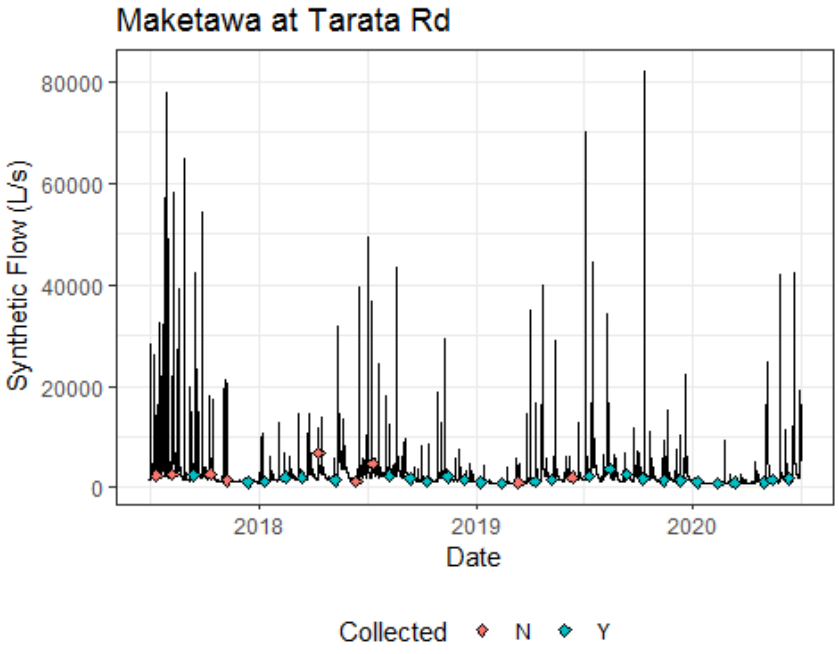
Periphyton Flow Sampling Dates

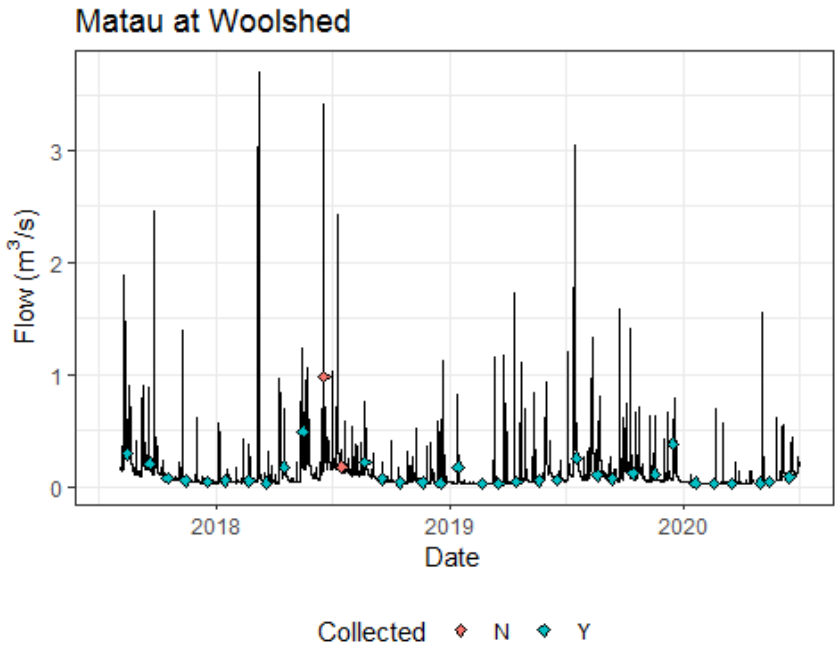

Kapoaiaia at Lighthouse
Flow (m3/s)
30
20
10
0
2018
2019
2020
Date
Collected
N
Y

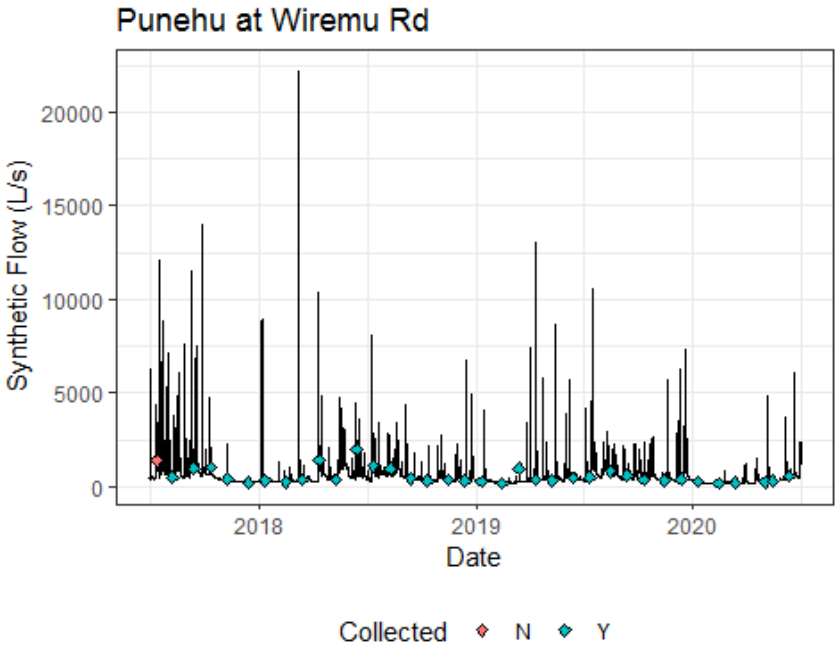

Mangaehu at Bridge
Flow (m3/s)
300
200
100
0
2017-07
2018-01
2018-07
Date
Collected
N
Y

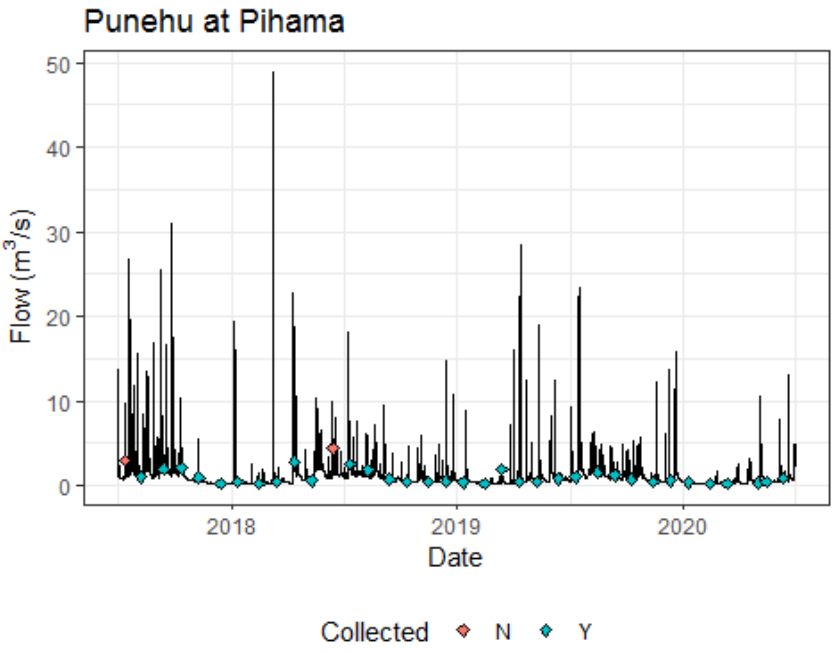

Manganui at SH3 Midhirst
Flow (m^3/s)
0
10
20
30
40
2018
2019
2020
Date
Collected
N
Y

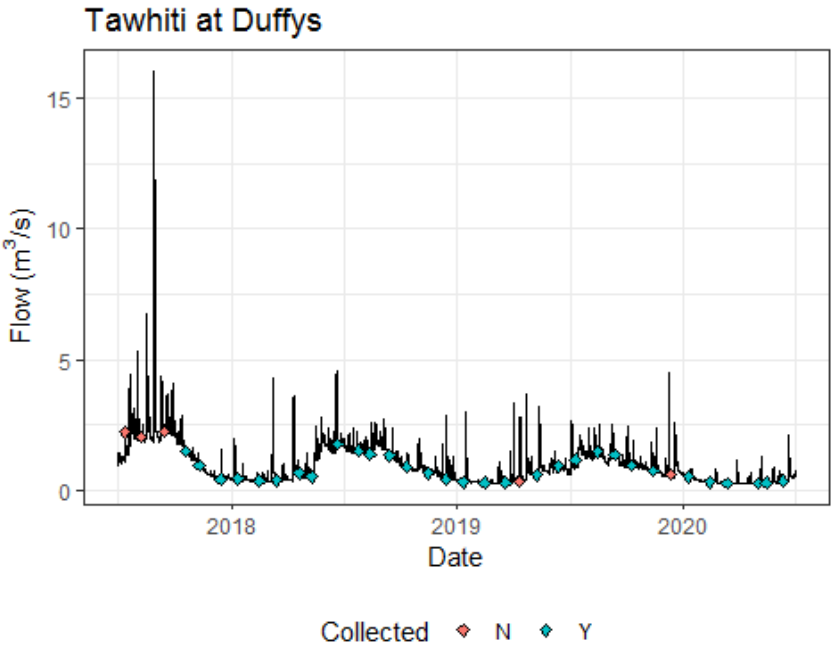

Makuri at Raupuha Rd
Flow (m^3/s)
0
5
10
15
2019-01
2019-07
2020-01
2020-07
Date
Collected
N
Y

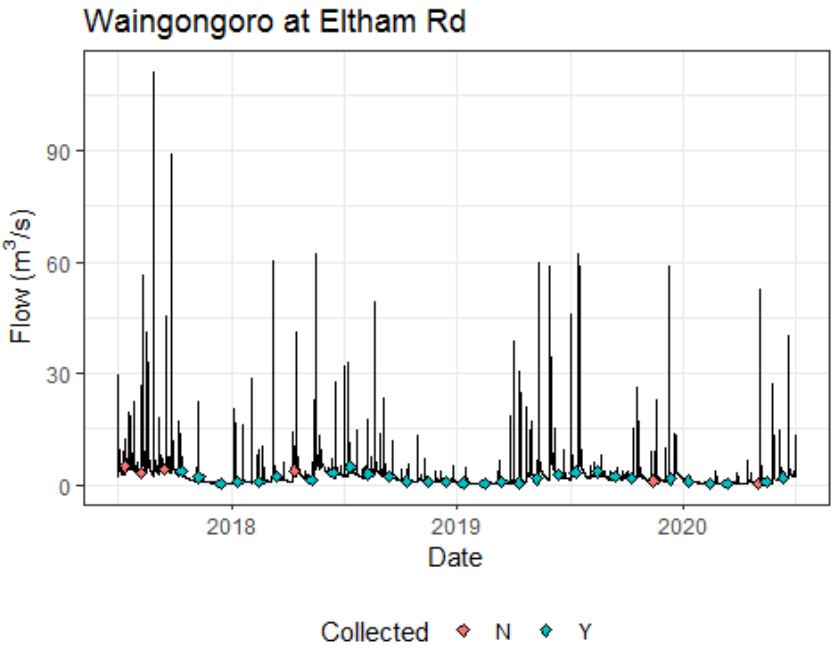

Maketawa at Tarata Rd
Synthetic Flow (L/s)
80000
60000
40000
20000
0
2018
2019
2020
Date
Collected
N
Y

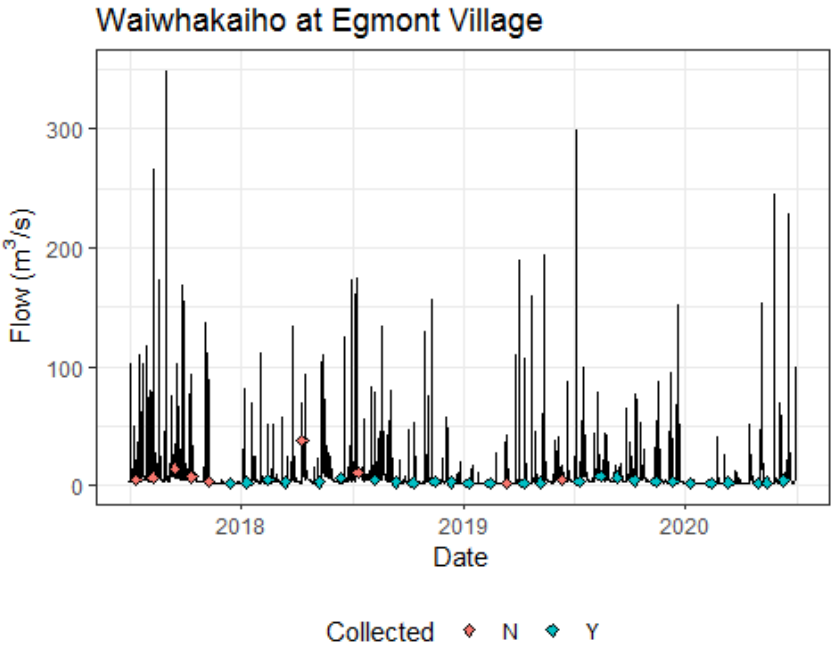

Matau at Woolshed
Flow (m3/s)
3
2
1
0
2018
2019
2020
Date
Collected
N
Y

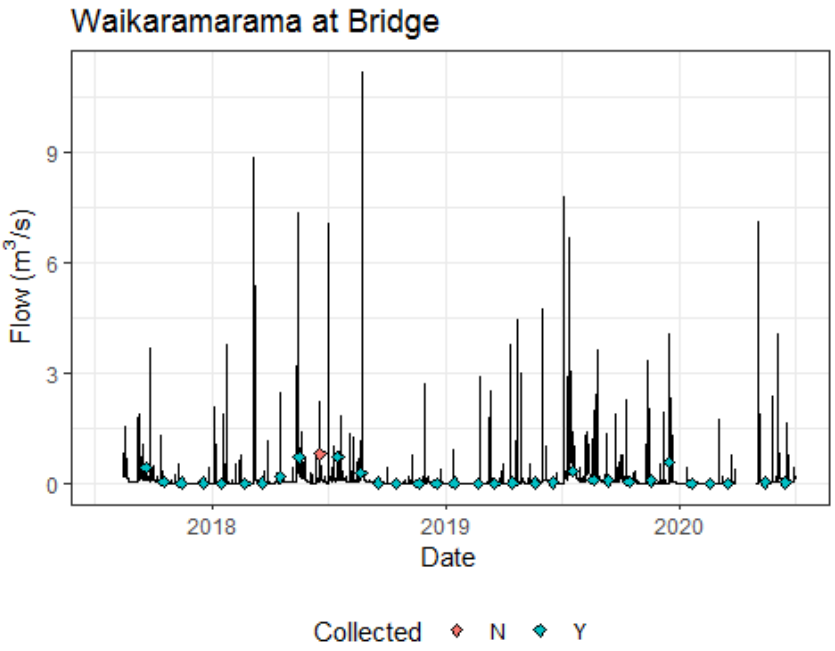

Punehu at Wiremu Rd
Synthetic Flow (L/s)
20000
15000
10000
5000
0
2018
2019
2020
Date
Collected
N
Y


Punehu at Pihama
Flow (m3/s)
50
40
30
20
10
0
2018
2019
2020
Date
Collected
N
Y


Tawhiti at Duffys
Flow (m^3/s)
15
10
5
0
2018
2019
2020
Date
Collected
N
Y


Waingongoro at Eltham Rd
Flow (m^3/s)
90
60
30
0
2018
2019
2020
Date
Collected
N
Y


Waiwhakaiho at Egmont Village
Flow (m^3/s)
300
200
100
0
2018
2019
2020
Date
Collected
N
Y


Waikaramarama at Bridge
Flow (m^3/s)
9
6
3
0
2018
2019
2020
Date
Collected
N
Y

AGENDA AUTHORISATION

Agenda for the Policy and Planning Committee meeting held on Tuesday 14 March 2023

Confirmed:

3 Mar, 2023 2:35:48 PM GMT+13

A D McLay

Director Resource Management

Approved:

5 Mar, 2023 3:10:18 PM GMT+13

S J Ruru

Chief Executive