Taranaki Regional Council

AGENDA
Policy & Planning

Tuesday 27 April 2021, 10.30am

Policy and Planning Committee Copy

27 April 2021 10:30 AM

Purpose of Policy and Planning Committee meeting

This committee attends to all matters of resource management, biosecurity and related environment policy.

Responsibilities

Prepare and review regional policy statements, plans and strategies and convene as a Hearing Committee as and when required for the hearing of submissions.

Monitor plan and policy implementation.

Develop biosecurity policy.

Advocate, as appropriate, for the Taranaki region.

Other policy initiatives.

Endorse submissions prepared in response to the policy initiatives of organisations.

Membership of Policy and Planning Committee

Councillor C L Littlewood (Chairperson)	Councillor N W Walker (Deputy Chairperson)
Councillor M G Davey	Councillor M J McDonald
Councillor D H McIntyre	Councillor C S Williamson
Councillor E D Van Der Leden	Councillor D N MacLeod (ex officio)
Councillor M P Joyce (ex officio)	

Representative Members

Councillor C Young (STDC)	Councillor S Hitchcock (NPDC)
Councillor G Boyde (SDC)	Mr P Moeahu (Iwi Representative)
Ms B Bigham (Iwi Representative)	Ms L Tester (Iwi Representative)

Health and Safety Message

Emergency Procedure

In the event of an emergency, please exit through the emergency door in the committee room by the kitchen.

If you require assistance to exit please see a staff member.

Once you reach the bottom of the stairs make your way to the assembly point at the birdcage. Staff will guide you to an alternative route if necessary.

Earthquake

If there is an earthquake - drop, cover and hold where possible.

Please remain where you are until further instruction is given.

Date 27 April 2021

Subject: **Confirmation of Minutes - 16 March 2021**

Approved by: A D McLay, Director - Resource Management

S J Ruru, Chief Executive

Document: 2751201

Recommendations

That the Policy and Planning Committee of the Taranaki Regional Council:

a) takes as read and confirms the minutes and resolutions of the Policy and Planning Committee of the Taranaki Regional Council held in the Taranaki Regional Council chambers, 47 Cloten Road, Stratford on 16 March 2021 at 10.30am

b) notes the recommendations therein were adopted by the Taranaki Regional Council on 6 April 2021.

Matters arising

Appendices/Attachments

Document 2730826: Minutes Policy and Planning Committee - 16 March 2021

Date 16 March 2021, 10.30am

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

Document: 2730826

Members	Councillors	C L Littlewood	Committee Chairperson
		N W Walker	Committee Deputy Chairperson
		M G Davey	
		M J McDonald	
		D H McIntyre	
		C S Williamson	
		E D Van Der Leden	Via Zoom
		D N MacLeod	ex officio
Representative Members	Councillors	C Young	South Taranaki District Council
		S Hitchcock	New Plymouth District Council
		G Boyde	Stratford District Council *(left 11.15am)*
	Mr	P Moeahu	Iwi Representative
	Ms	L Tester	Iwi Representative
	Ms	B Bigham	Iwi Representative
	Mr	P Muir	Federated Farmers Representative
Attending	Councillors	D L Lean	
	Messrs	M J Nield	Director – Corporate Services
		A D McLay	Director - Resource Management
		G K Bedford	Director - Environment Quality
		D Harrison	Director - Operations
		C Spurdle	Planning Manager
		C Wadsworth	Strategy Lead
		P Ledingham	Communications Officer
		S Ellis	Environment Services Manager
	Miss	L Davidson	Committee Administrator

One member of the media and one member of the public.

Apologies An apology was received and sustained from Councillor M P Joyce and it was noted that Councillor G Boyde (Stratford District Council) would have to leave at 11.15am.

1. Confirmation of Minutes – 2 February 2021

Resolved

That the Policy and Planning Committee of the Taranaki Regional Council:

a) takes as read and confirms the minutes and resolutions of the Policy and Planning Committee of the Taranaki Regional Council held in the Taranaki Regional Council chambers, 47 Cloten Road, Stratford on Tuesday 2 February 2021 at 10.30am

b) notes the recommendations therein were adopted by the Taranaki Regional Council on Tuesday 23 February 2021.

McDonald/Williamson

Matters arising

Correction of Councillor M G Davey's name on the minutes.

2. Engagement on the Long-Term Vision for Freshwater

2.1 Mr C Spurdle, Planning Manager, spoke to the memorandum introducing to Members, the engagement process on the long-term vision for freshwater that forms part of the review of the *Regional Policy Statement for Taranaki* (RPS).

2.2 It was noted that the Iwi Representatives would like to be included in the iwi engagement process and suggested that the marae around the region be considered as venues for the workshops.

Recommended

That the Taranaki Regional Council:

a) receives the agenda memorandum titled *Engagement on the Long-term Vision for Freshwater*

b) notes that that engagement with communities and tangata whenua on the development of the long-term vision for freshwater is a requirement under the *National Policy Statement for Freshwater Management*

c) notes that that initial phase of the engagement, the online survey, has already commenced alongside engagement on the *Long-term Plan*.

Walker/McDonald

3. Good Farm Management and Water Quality Improvements (Past and Potential)

3.1 Mr G K Bedford, Director – Environment Quality, spoke to the memorandum providing key findings presented in a suite of recently release research papers, concerning reductions in contaminant losses to water from pastoral farming in New Zealand that have been achieved to date, together with prospective future gains.

Recommended

That the Taranaki Regional Council:

a) receives the memorandum *Good Farm management and Water Quality Improvements (Past and Potential)*

b) notes its findings, that New Zealand has made demonstrable progress towards better fresh water quality, and has both some potential for future gains, and also some significant challenges if it is to meet the Government's NPS target

c) references the agenda memorandum and accompanying referenced documents at the time of any consideration of the sections of the Natural Resources Plan relating to methods for managing fresh water quality, and as occasion arises for consideration of national-level instruments.

McDonald/Young

4. Fonterra Co-operative Difference Payment Initiative

4.1 Mr A D McLay, Director – Resource Management, spoke to the memorandum introducing to members Fonterra's *Co-operative Difference Payment* initiative.

Councillor G Boyde – Stratford District Council left at 11.15am

Recommended

That the Taranaki Regional Council:

a) receives the agenda memorandum titled *Fonterra Co-operative Difference Payment Initiative*

b) notes that the environmental achievement area set out in the initiative aligns with and complements Council's expectations in relation to sustainable environmental management on dairy farms in Taranaki.

Williamson/Muir

5. Draft Submission on Climate Change Commission Draft Advice

5.1 Mr A McLay, Director – Resource Management, introduced the memorandum informing members of the Draft Submission, prepared on the Climate Change Commissions Draft Advice to the Government on possible transition pathways to a zero carbon economy. A presentation was made on the large submission by Mr C Wadsworth, Strategy Lead.

5.2 After discussion members considered the submission reflected the views of the region.

Recommended

That the Taranaki Regional Council:

a) receives this memorandum *Draft Submission on the Climate Change Commission Draft Advice*

b) adopts the Draft submission for presentation to the Climate Change Commission by the due date of 28 March

c) recommends sharing the submission with the three district councils, Venture Taranaki and iwi authorities to encourage a consistent approach to Government from the region

d) accepts minor amendments to be made by officers if appropriate to the submission following engagement with the district councils and other parties.

McDonald/Walker

6. Key Native Ecosystems Programme Update

6.1 Mr D Harrison, Director – Operations, spoke to the memorandum presenting for Members' information an update on the identification of twelve new Key Native Ecosystem (KNE) sites. A presentation on the programme was made by Mr S Ellis, Environment Services Manager, to respond to requests from iwi members. Their response was positive and the Council was encouraged to engage more with iwi and hapu groups.

Recommended

That the Taranaki Regional Council:

a) receives this memorandum and the attached inventory sheet for Messengers Bush, Meier QEII, Base Camp QEII, Van der Poel's Bush, Watsons Hill Bush, Twin Giants, Menzies Road Hill Bush, Lucas Block, Hyview, Eight Hundred Trust KNE, Wild Earth, and Pete's Spot.

b) notes that the aforementioned sites have indigenous biodiversity values of regional significance and should be identified as Key Native Ecosystems.

Williamson/McIntyre

There being no further business the Committee Chairman, Councillor C L Littlewood, declared the meeting of the Policy and Planning Committee closed at 12.06pm. The meeting closed with a karakia.

Confirmed

Policy and Planning

Chairperson: _____

C L Littlewood

27 April 2021

Date 27 April 2021

Subject: **MfE Proposals to impose national regulatory control on fossil fuels in industry**

Approved by: G K Bedford, Director - Environment Quality

S J Ruru, Chief Executive

Document: 2750434

Purpose

1. The purpose of this memorandum is to inform the Committee of a consultation document that has been released by the Ministry for the Environment (MfE), '*Phasing out fossil fuels in process heat*' (MfE 8 April 2020), and to introduce the recommendations of officers for the content of a submission by the Council. Officers have not had the time between receipt of the consultation document and preparation of the Committee agenda to prepare a full draft submission for the consideration of the Committee.
2. It is proposed that following feedback at today's meeting, officers will prepare a draft submission as directed by the Committee, and then present it to the Ordinary Meeting of the Council on 18 May for ratification /final editing prior to lodging it with MfE. Submissions close on 20 May.

Executive summary

3. The Government proposes to ban new and medium temperature coal-fired boilers as of 31 December 2021; to progressively phase out existing low and medium temperature coal-fired boilers as existing consents expire but by no later than 2037; to require the phasing out of other fossil-fuelled processes unless certain specific exclusions apply. They will also require large industrial sites to have and implement an emissions plan encouraging energy efficiency, best practice to reduce greenhouse gas (GHG) emissions, and a transition to low-emission fuel alternatives.
4. These requirements arise because the Government has amended the RMA and in doing so created a regulatory gap in the consideration of GHG discharges, to take effect from 31 December this year. Previously, councils were not allowed to consider GHG effects when assessing discharges to air. This restriction was removed by the Government last year, thus spawning the situation where pre-existing council rules and policies, designed when the prohibition was in place, are now deemed inadequate for managing GHG emissions (to which they were never meant to apply). The Government acknowledges that this means it will be very difficult, expensive, and complex for councils, the public, and applicants to assess discharge applications on an ad hoc basis, and to arrive at

decisions consistent with the Government's intentions and policy direction. It is therefore moving to provide regulatory direction to councils, in order to reduce uncertainty in outcomes and consenting processing costs.

5. Having regard to present usage of coal in the region (low), the reliance of industries in Taranaki on other fossil fuels (especially natural gas), the questionability of an expanded renewable electricity network being available in the future, and the Council's long-established experience of consenting GHG emitters in the region in a manner that drives efficiency, officers are suggesting that for the reasons set out further below, the Council can:

   - support but with clarification, the proposal to ban any new low or medium temperature coal boilers;
   - support the proposal to phase out existing low or medium temperature coal boilers;
   - oppose unless modified, the proposal to phase out industrial processes fuelled by other fossil fuels;
   - support with additional information, the proposal to require energy efficiency and GHG emission reductions at industrial sites;
   - support in principle, the idea of the government providing non-statutory guidance on assessing GHG emissions within planning and consenting processes.

Recommendations

That the Taranaki Regional Council:

a) receives the memorandum '*MfE Proposals to impose national regulatory control on fossil fuels in industry*'

b) notes the recommendations of officers concerning suggested content of a future submission

c) directs officers to prepare a submission aligned with this memorandum (*alternatively* as amended by the Committee), for further consideration at the Ordinary Meeting of 18 May 2021

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

e) determines that it 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, determines 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.

Background

6. In the 1990s, this Council along with a couple of others was routinely involved in complex and frustrating consenting processes for fossil-fuelled industrial activities. In due course the Government recognised that the responsibility of dealing with the global effects of GHG emissions lay appropriately with the Government rather than with individual councils, and amended the RMA to remove any consideration of climate change effects from the environmental matters to be considered by councils when assessing discharges. However, the Randerson review of the RMA last year proposed that new legislation be developed in due course to better address GHG emissions and

climate change effects. The Government has subsequently amended the RMA (to take effect from 31 December this year) and thus re-introduced climate change as a matter for councils to consider, but with a void of any new supporting policy direction or implementation framework. It is therefore now moving to provide regulatory direction to councils, to reduce the complexity and uncertainty in outcomes and attendant consenting processing costs in the new framework it has brought about.

7. Given the Council's previous experiences in this field, a national regulatory and policy framework that provides consistency, certainty and clarity are supported in principle.

8. Media attention on the proposals has focused on the intention to ban new coal-fired processes. The Committee should note that the proposals are much broader than this. Indeed, for Taranaki, the proposals that address phasing out other fossil-fuelled processes at existing sites are much more significant. These matters are expanded on below.

9. In terms of consents issued within Taranaki that provide for coal burning, there are two consents. Taranaki Sawmills holds a consent for a wood-drying kiln that is fired on wood wastes and/or coal. This consent was issued in 2004 and is due to expire in ten years' time (2032). Fonterra hold a consent for a 250 MW co-generation plant at their Whareroa site. The consent allows for the co-gen plant to be either gas-fired or coal-fired. At the time of the consent application, the company was in dispute with their gas supplier over contract costs, and wished to retain the option of switching fuels prior to the facility being constructed. In the event, the facility was subsequently constructed as a combined gas-fired power station/steam generation facility, but the consent retains the alternative fuel source as an alternative. The consent was issued in 2005 and is due to expire in 2034.

10. There are numerous air discharge consents in the region for discharges from natural gas-fired processes: well sites, hydrocarbon production stations, and downstream petrochemical plants.

11. In considering the Government's proposals, the Committee can note that the Fonterra plant would not be affected by any deadline, as it is a co-generation plant and thus exempted from the suite of controls relating to coal (see next paragraph). However, it would still be caught by associated provisions proposing the obligatory adoption and reporting of best practice management of emissions, together with having to prove at re-consenting that there are no technically and economically viable alternative fuels (see further below).

12. The consultation document notes that process heat is New Zealand's second largest source of energy-related emissions after transport, and generates about 8% of our GHG emissions. It should be noted that the proposals do not cover all emissions associated with process heat. Low and medium process heat facilities are those used for providing hot water and space heating, and heat for drying of products such as wood and milk powder. It excludes processes requiring heat of greater than 300˚ C, such as thermal power generation and co-generation (combined steam and electricity generation, even if the steam is then used for product drying purposes at low and medium temperatures), metal refining, landfill gas combustion, and chemical manufacturing.

13. It is also important to note separately that there are a number of recent articles exposing how woefully under-prepared New Zealand is to supply any increase in demand for renewable electricity, especially within the context of proposals to provide process heat through conversion from fossil fuels to electricity (such as the current consideration), or for any scenarios involving the large-scale replacement of the internal combustion fuel

vehicle fleet with electric vehicles within two decades. Neither the existing or planned generation capacity, the availability of capital and skills, nor the distribution network, are deemed capable of delivering the anticipated demand[1, 2]

Issues

14. The proposal by the government to phase out the use of fossil fuels for generating low/medium process heat would affect the implementation of rules within the Regional Air Quality Plan (RAQP), with consequences for operators and the Council alike, and would dictate rules and measures within the proposed Natural Resources Plan. If the Council decides to respond to the proposal by seeking changes to the proposal, it needs to determine its stance on several matters. These matters are outlined below.

Discussion

Proposal to ban new low/medium temperature coal boilers

15. The proposal is that emissions from new coal-fired assets for the generation of low and medium temperature process heat should be prohibited, through a National Environmental Standard (NES).

16. The rationale for the proposal is that the most stringent measures in the new policy instruments should target coal, as the highest emitter of GHG. A fuel type-based approach is seen as administratively efficient, aligned with current rules in regional air plans across the country, and an effective incentive to avoid new emissions-intensive facilities. Because of coal's low cost, a regulatory intervention is necessary in order to prevent continuing investment in coal-fired facilities, even though several large processors have already announced their intention to voluntarily withdraw from coal as a fuel.

17. An NES provision to this effect is direct and immediate. It would apply in industrial and trade premises (section 15 RMA does not apply to air emissions from residential or agricultural properties).The alternative, an NPS provision, would require councils to undertake changes to regional plans over an extended period and at their own cost.

18. Officers note that it has been close to two decades since any industry in Taranaki sought approval to operate a new coal-fired process. Therefore, this proposal is seen as having little adverse impact in the region. While noting there are growing concerns about long-

---

1 For example, NZ Listener editorial, 27 March 2021: '*Not since 2006 has this country imported more coal than in the last year….Buying dirty coal is the last thing any New Zealander wants, but a perfect storm of adverse climatic conditions and gas scarcity has created a generation shortage*'

2 '*If, by 2050, we have a net-zero carbon emissions economy in New Zealand, we will have…electrified industrial and residential heat, (and) greatly expanded the electricity sector in terms of generation, transmission and distribution…we will need to install extra capacity equal to 120% of total hydroelectricity usage today just to power transport. We will need another 50% to cover commercial and domestic heating…the investment in the generation, transmission and distribution of electricity will need to be eightfold greater in each of the next 30 years than the average level of investment in the grid over the past 30 years….where will all the extra professional and skilled trade engineers come from?*' (Michael Kelly, professor emeritus of technology, University of Cambridge, in the Listener, 27 March 2021)

term gas availability, this proposal would at least allow natural gas or LPG to be an energy source for any new facility in the meantime, alongside electricity.

19. Rules 5 and 6 of the Council's Regional Air Quality Plan for Taranaki allow the burning of coal in small to medium-sized facilities as a permitted activity, subject to performance conditions. This permitted category would be over-ridden by an NES, in the case of any future facility.
20. What is unclear from the proposal is how it would be interpreted in the case of a facility where a consent for coal burning has already been issued but the facility itself has not yet been constructed/operated as a 'new' coal-fired asset; or even the consent might allow the option of utilising either gas or coal as the fuel. The facility might subsequently have been constructed as a gas facility but with the continuing back-up option of switching to coal in the future. (This Council's consent for Fonterra allows this switch, although it should be noted again that the Fonterra facility is exempt from the coal proposal).
21. It is suggested that the Council should request clarification around interpretation of this proposal.

Proposal to phase out most existing low/medium temperature coal boilers by 2037, or on consent expiry if sooner

22. The proposal is for an NES that would not allow discharge permits for most coal-fuelled process heat to be exercised past 2037.
23. Any existing consented sites expiring pre-2037 would be able to apply for a short-term renewal up to but not past 2037, thus allowing a transition process to be implemented if needs be. Consents expiring post 2037 would be allowed to continue but under extra and more stringent controls and only until the current consent expires; existing activities currently permitted under regional plan rules would have to apply for consent within six months of the promulgation of the NES. These latter consents could not be granted for any duration extending past 2037, and must be for the shortest period 'practicable'.
24. The suggested 2037 termination date is not yet definitive, and is subject to further consideration of the future electricity supply market in New Zealand. Ongoing reviews are suggested as a way to address this uncertainty around the ultimate deadline.
25. Officers note there is one consented facility in Taranaki that would be affected by this policy instrument. A consent allowing combustion of various fuels including coal for the purpose of generating heat for wood drying was granted to Taranaki Sawmills in 2004 and is due to expire in 2032, 28 years later. Staff have contacted the Company to determine their views. It is anticipated that by 2032, the combustion equipment might well be at the end of its economic life; it is hard to predict what fuel future technology might require.
26. The RAQP for Taranaki allows burning of coal as a permitted activity subject to size (less than 5 MW per combustion chamber or 10MW per site) and environmental performance conditions. It is not known how many coal-burning activities, currently permitted, will be obliged to seek a consent (or an alternative fuel) if this provision is enacted; it is envisaged the number will be small given the wide-spread existing use of natural gas in the region, and if so, the effect will be small.
27. It is suggested that the Council could accept this provision as it stands.

Proposals re discharges from new fossil-fuelled new low/medium temperature process heat assets (other than coal)

28. The proposal is that any emissions of GHG from new fossil-fuelled assets to be used for low to medium process heat, other than those fuelled by coal, should be prohibited unless there are no feasible alternatives. This policy would require new fossil-fuelled assets to be deemed restricted discretionary activities. It would be applied to all assets over a certain threshold of size (still to be determined). Councils would then have to determine on a case by case basis, whether there were 'feasible alternatives' to allowing GHG emissions.
29. The 'feasible alternatives' (eg the burning of biomass instead of fossil fuels, or the use of electricity instead of any on-site fuel combustion) must not be economically or technically feasible, if the council were to allow the application to be granted. If the application to burn fossil fuels was then granted, then a condition of the consent must be that the operator prepares and delivers on an emissions plan demonstrating the minimisation of GHG emissions. The duration of consent would be strictly limited (to a period that is still to be decided)
30. MfE considered and rejected the option of a total ban on all new fossil-fuelled process heat, other than for critical industries and infrastructure in specific circumstances. It was deemed too difficult to identify appropriate exemptions without creating unintended loopholes or unintended consequences, and increasing the likelihood of councils being caught up in litigation.
31. Officers note that the wording in the discussion document around 'alternatives' is vague. For example, it talks initially about 'economical and technical' alternatives. Then later it refers to 'the potential for significant negative economic and social impact'. So on one hand, the requirement is absolute- 'no feasible alternatives'; but then it becomes a judgement around scale of impact- 'significant negative impacts'. And are 'social' impacts included in or excluded from 'economic and technical' considerations? Does 'economic' refer to the industry or to the local community? At what level of risk should the probability of being unable to operate due to doubts over the future reliability of electricity, become a decisive factor in 'economic and technical' assessments?
32. Further, the restriction is to be applied above a threshold, still to be fixed. The discussion document suggest as examples, a heat capacity of 50kW, or 2 MW, or an emissions threshold of 100 tonne CO2-equivalent per year per heating unit. Back-up or emergency generation facilities for process heat operating for limited hours only would also be excluded.
33. The discussion document notes that this proposal depends on certainty around availability of and the economic viability of alternative energy supplies (biofuels or electricity) if the policy is to be meaningful and effective. Otherwise, any applications for emissions of GHG must simply and inevitably be approved in every case.
34. Officers note that this Council's submission to the CCC draft advice to Government highlighted the current poor planning and lack of resourcing at national level for any expansion of electricity supply in New Zealand to the degree required to cope with meaningful changes to our energy sources. The footnotes earlier in this memo reinforce the point. Our CCC submission stressed the need to ensure resilience for critical infrastructure and strategic industries that need energy supply. The CCC advice itself highlighted the need to ensure meaningful supply of natural gas into the energy supply market for at least the next couple of decades.

35. Officers further note that the RAQP currently allows as a permitted activity, combustion of hydrocarbon fuels up to a heat release capacity of 10 MW per unit or 30 MW per site. These limits reflect the lack of local effects of facilities below these thresholds. Officers consider that the proposed threshold of 50 kW (0.05 MW) or 2 MW per unit is too onerous by comparison. Further, these future assets would be indirectly compensating for climate change responsibilities through ETS-imposed costs on their fuel. A new consenting obligation imposes no environmental benefit, but creates a continuing economic burden (initial consenting application and processing costs and then ongoing administrative and transaction costs for monitoring and reporting).
36. Further, the proposal omits any awareness of the current emphasis upon hydrogen as a fuel for the future. There is currently widespread promotion of hydrogen as a meaningful alternative to natural gas or other fossil fuels; but one of the two primary means of generating hydrogen is through synthesis from natural gas. So is hydrogen to be deemed a fossil fuel or not? If the answer is 'no', then we have the illogical situation in which the burning of natural gas for low temperature heat, which is more efficient, is to be constrained, while the burning of hydrogen synthesized from natural gas, which is much less thermally efficient, is permitted.
37. Officers therefore suggest that given the clearly identified national vulnerabilities around electricity generation and transmission for the foreseeable future, and the administrative and interpretative burdens of this policy proposal, it should be opposed in terms of immediate implementation. It should instead be deferred and re-visited until there is certainty and meaningful commitment around providing the economically, technically, and socially acceptable alternatives to on-site combustion of fossil-fuels for process heat, on a national scale. Otherwise the provision would be largely meaningless in its implementation in practice, and therefore bring the policy into disrepute (as well as putting the Council and applicants into an invidious position whenever a consent application was being considered).

Requiring larger industrial sites to implement energy efficiency, best practice reduction of emissions, and transition to lower-emission energy

38. The proposal is that there should be a long-term plan to phase out the use of other fossil fuels. This provision differs from those discussed earlier, if that it is intended to capture not only discharges from combustion for process heat, but from all major industrial sites- eg gas production stations, power stations, petrochemical plants, dairy factories, abattoirs, and so on.
39. The discussion document recognises the danger of a 'strong' phase-out date due to the lack of alternative fuel options making some operations unviable. The discussion document envisages a core '*role for natural gas in manufacturing in the medium to long term…other fossil fuel assets sometimes play an important role for back-up or peaking services, but overall do not emit significant quantities of GHG emissions… for some manufacturers who use natural gas, no economic alternatives exist in New Zealand*'[3]. It therefore is structured to provide some flexibility at the same time as a policy direction.
40. The proposal entails a requirement for activities above a threshold size, to demonstrate there are no technically and economically viable alternative fuels to any continuing use of fossil fuels, and to prepare a GHG emissions plan that incorporates best practice,

3 Pg 37 of the discussion document

minimises GHG emissions, and shows a plan for transition over time. A need for providing flexibility in implementation timeframes is acknowledged, because of the need to continually re-assess energy supply markets and capacity.

41. Officers note that these provisions essentially add little to the provisions the Council has attached to consents for significant discharges to air, as a matter of longstanding practice. This Council has been monitoring consent holder performance against equivalent criteria for several decades without issues.

42. It is suggested that the Council could offer the benefit of its valuable experience to MfE if this provision is to be progressed.

Providing direction on assessing GHG emissions

43. The proposal is that the Government will prepare non-statutory guidance, primarily for the use of consent authorities.

44. The guidance would be considered interim until legislation evolves, and could address matters such as how cumulative effects can be considered within the context of individual site consenting applications, the interpretation of the legal principle of *de minimus*, how instruments prepared under other legislation should be considered within the RMA processes (eg 'have regard to'), how effects (global effects) should be considered if those effects are ex-regional, and the interpretation of the concept of the permitted baseline.

45. Officers note that these are matters that this Council has had to struggle with and apply ever since the RMA came into effect and assigned the consenting of air discharges to councils. Notwithstanding our experience and legal precedents, national consistency and transparency of interpretation by way of non-binding guidance is welcomed in principle, for the sake of all. The Council could offer to assist MfE in developing the guidance details.

Options

46. Options are for the Council to do nothing about the proposals, or to advocate more stringent and urgent impositions upon consent holders, or to oppose the proposal in its entirety. The first two alternatives to the course of action outlined above for the Council would each entail additional costs and uncertainties for the Council and regional sector, and abdicate the Council's regional advocacy role. Opposing the proposal in full (if successful) would mean that GHG emissions in the region from the sources under discussion would be managed solely through the initiatives (or lack thereof) of the operators concerned, and is inconsistent with the Council's approach to matters of GHG emissions and climate change responsibilities.

Significance

47. The Government's proposals for phasing out fossil fuels within low/medium heat processes would affect the manner in which current consenting, monitoring and enforcement activities are delivered. However, the decisions to be made by the Council in respect of the Government's proposals are not significant in terms of the Council's Significance and Engagement Policy.

Financial considerations—LTP/Annual Plan

48. 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

49. 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

50. 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. In particular, iwi participated in the preparation of the RAQP, whose provisions would be subject to amendment if the Government's proposal proceeds, and this memorandum is to be considered by the Policy and Planning Committee which includes iwi representation.

Community considerations

51. 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

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

Appendices

Statement from the Ministry for the Environment: Phasing out fossil fuels in process heat

Statement from the Ministry for the Environment: Phasing out fossil fuels in process heat

(https://consult.environment.govt.nz/climate/phasing-out-fossil-fuels-in-process-heat/)

Overview

Climate change is a global problem that is having significant impacts on the environment, people and economies across the world. To limit the most harmful impacts of climate change, all countries need to contribute to reducing greenhouse gas emissions.

New Zealand is committed to supporting a just transition to a low-emissions economy.

Under the Climate Change Response (Zero Carbon) Amendment Act 2019, the Government has set a 2050 target of net zero GHG emissions (other than biogenic methane) and a framework to guide domestic climate actions as they transition into a low-emissions economy.

Currently under the Resource Management Act 1991 (RMA), regional councils are prevented from considering the effects of greenhouse gas emissions on climate change when making air discharge rules and considering applications for air discharge permits.

These barriers will be removed on 31 December 2021 following changes to the RMA. The changes will allow local authorities to consider the effects of GHG emission on climate change in RMA decision-making, and to "have regard to" emission reduction plans and national adaptation plans when preparing RMA plans and policy statements.

Read our proposal on phasing out fossil fuels in process heat [PDF 2.6MB]

Why we are consulting

The Ministry for the Environment is developing a new national direction - either a national environment standard, national policy statement or both - to help councils' decision-making on greenhouse gas discharges to air.

The national direction will be used as a regulatory tool to develop nationally-consistent rules, with a focus on decarbonise process heat. The proposals include:

- Implementing the Government's commitment to ban new low and medium temperature coal boilers;
- Phasing out coal in existing sites by 2037 for low and medium temperature process heat, through re-consenting;
- Phasing out use of other fossil fuels such as diesel and natural gas by requiring a switch to less emissions intensive fuels such as electricity, unless no economically or technically viable alternatives exist; and
- Requiring industrial sites above a threshold to have an emissions plan to encourage energy efficiency, best practice, and transition to low-emission fuels.

We are also seeking feedback on releasing non-statutory guidance alongside national direction, which will support decisions under the RMA on all GHG emissions (direct and indirect sources). This would act as interim direction to guide decisions related to GHG emissions until the new resource management system is in place.

The consultation seeks to:

1. Achieve national consistency and certainty in the management of industrial greenhouse gas emissions under the RMA; and

2. Reduce industrial GHG emissions to mitigate the adverse effects of climate change and support New Zealand's transition to a low emissions economy.

The Government is undertaking a comprehensive review of the resource management system which will provide opportunities for reducing emissions in an integrated way.

Date 27 April 2021

Subject: **Making of the amended *Regional Pest Management Plan for Taranaki***

Approved by: D Harrison, Director - Operations

S J Ruru, Chief Executive

Document: 2724959

Purpose

1. The purpose of this memorandum is to seek Members' agreement to make and adopt the revised *Regional Pest Management Plan for Taranaki 2018* (RPMP) to include mustelids.
2. The full Council has managed the review process to date and it is considered appropriate to pass the matter back through the Policy and Planning Committee, for any input, before a final decision is made by the Council. The Committee has been kept informed about the plan revision process and what the issues are.

Executive summary

3. On 7 November 2020, the Taranaki Regional Council (the Council) publicly notified the proposal to review and amend the RPMP under the *Biosecurity Act 1993* (BSA).
4. The public consultation process for the review concluded on 24 December 2020. The Council received eight submissions on a proposal to declare mustelids (ferrets, stoats and weasels) as 'pests' in the RPMP and include new rules for their sustained control.
5. On 23 February 2021, at its Ordinary meeting, Council met as a Hearing Committee, to hear the submissions and make its decisions.
6. Pursuant to section 75 of the BSA, the Council notified its Decision Report (which includes its reasons for accepting or rejecting the submissions) on 27 February 2021. Council also sent a copy of the Report to each submitter and thanked them for their submission.
7. Pursuant to section 76 of the BSA, any submitter may refer an application to the Environment Court appealing the Council's decisions within 15 working days after the date of the public notice, (i.e. by 19 March 2021).
8. Officers confirmed with the Environment Court that no submitters lodged appeals on the revised RPMP within the prescribed timeframe.
9. Public consultation on the RPMP review is now complete.

10. Council may now 'make' the revised RPMP under section 97(5) of the BSA, by affixing the Common Seal and deeming it operative. It must then give public notice of the making of the revised RPMP and its commencement date.

Recommendations

That the Taranaki Regional Council:

a) receives this memorandum titled *Making of the amended Regional Pest Management Plan for Taranaki*

b) notes that the Council prepared its Decision Report, publicly notified its decisions, and provided a copy to each submitter and to the public in February 2021

c) notes that no applications were lodged in the Environment Court by the deadline which ended on 19 March 2021

d) agrees that the Common Seal be affixed to the Plan and that Council make and adopt the amended *Regional Pest Management Plan for Taranaki*.

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

f) determines that it 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, determines 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.

Background

11. The current RPMP was adopted by Council and made operative on 20 February 2018 following a comprehensive public process under the BSA.

12. The RPMP is the region's rulebook for pest management and empowers the Council to exercise the relevant enforcement and funding provisions available under the BSA to eradicate or ensure the sustained control of specified pest animal and plant species.

13. Of note, at that time, the Council also prepared its Biosecurity Strategy, which stated that it would investigate and trial expanding the Self-help Possum Control Programme to target other pests and, if appropriate, consider the inclusion of predator control rules as part of a RPMP review.

14. Subsequently, the Council undertook that pest review and determined that amendments to the current RPMP were necessary.

15. The pest review involved preparation and consultation on a proposal for new rules requiring mustelid (weasels, stoats and ferrets) control. The proposal involves the inclusion of a new sustained control programme that will deliver regulatory mustelid control in defined parts of Taranaki. The Council has identified 'Predator Control Areas' where land occupiers in a locality agree to participate in the programme. In each of the Predator Control Areas, the Council will undertake initial predator control targeting mustelids. After initial predator control work has been undertaken, occupiers within the area will be required through rules to control and maintain mustelid numbers at the reduced levels.

16. The proposal did not otherwise seek to amend the RPMP except for minor consequential changes necessary to recognise the outcomes of the review.

17. On 7 November 2020, the Council publicly notified the proposal and invited submissions on it. The submission period concluded on Friday 24 December 2020. The Council received eight submissions. While submitters sought some specific changes, additions, and deletions, generally the response was positive and indicated broad support for the proposal.
18. At its Ordinary meeting on 23 February 2021, Council met as a Hearing Committee, to hear the submissions and to makes its determination. Two submitters – these being Federated Farmers and Royal Forest and Bird Society of New Zealand – appeared at the Hearing to present further written or oral evidence in support of their written submissions.
19. At the Hearing, Council considered all submissions and agreed to adopt the recommendations in the *Officers Report*. This included adopting a revised RPMP as per the proposal and subject to those changes agreed to in response to submissions.
20. Section 75 of the BSA relates to making a decision on the RPMP. Pursuant to that section of the Act, the Council prepared a written report on the Proposal (i.e. the Taranaki Regional Council's Decisions Report), which set out its reasons for accepting or rejecting the submissions, and its decisions. As required by the BSA, the Council publicly notified its Decision Report on 27 February 2021. Council also sent a copy of the Report to each submitter and thanked them for their submission.
21. Notification of the Council's decisions and notice for making an application to the Environment Court was placed in the Taranaki Daily Newspaper and the Council's website was updated to include a section on this matter.

Environment Court process

22. Pursuant to section 76 of the BSA, any submitter may make an application to the Environment Court to amend the RPMP within 15 working days after the date of the public notice, (i.e. by 19 March 2021).
23. No appeals were lodged in the Environment Court. This concluded the public process of adopting the Proposal in to the RPMP.

Final adoption of the Plan

24. The pest review is now also complete. All revisions to the RPMP incorporating changes through the submission process have now been finalised.
25. Officers recommend that the Council affix its Common Seal to the amended RPMP and deem it operative.
26. Once the Plan is operative, the Council must give public notice of the making of the Plan and its commencement date. It is suggested that this is done following confirmation of this Committee's minutes at the Council's next full meeting on 18 May 2021.
27. A public notice will be published in the Taranaki Daily News on 22 May following the adoption of Policy and Planning Committee recommendations at the Ordinary meeting. The revised RPMP will become operative on 1 June 2021, and the website will be updated accordingly.

Issues

28. The public consultation process has concluded and the RPMP is ready to become operative. The full Council may now 'make' the revised RPMP and agree that the Common Seal be affixed to the Plan and that amendments be adopted.

Options

29. There are two options that the Council can consider. These include the following:

    Option 1 (and preferred option) - Amend the RPMP to include mustelids: Adopting changes would see mustelids included as a 'pest' species in the RPMP and rules for their sustained control. This option will ensure the sustainability and public investments in the already successful *Towards Predator Free Taranaki* programme. This option gives best effect to the reliefs sought through the public consultations process.

    Option 2 - Not adopt the Proposal to include mustelids in the RPMP: Mustelid control is dependant upon voluntary control and it may not be effective or sustainable in the long term resulting in poorer biodiversity outcomes. This was not the preferred option through the public consultation process and is not recommended by Council officers.

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 in that the existing plan will be updated to reflect the decisions that Council makes through these hearings.

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. Similarly, iwi involvement in adopted work programmes has been recognised in the preparation of this memorandum.

33. Iwi authorities were consulted prior to public notification of the proposal and subsequently as part of the public process. No feedback prior to public notification was made.

34. Through the public process, Ngāruahine and Te Atiawa made submissions on the proposal. However, it is noted that the aims and intent of the proposal are consistent and give effect to many of the aspirations set out in iwi management plans relating to biodiversity.

Community considerations

35. 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

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

Date 27 April 2021

Subject: **Intensive Winter Grazing Update**

Approved by: A D McLay, Director - Resource Management

S J Ruru, Chief Executive

Document: 2748642

Purpose

1. The purpose of this memorandum is to update members on changes to the Government's intensive winter grazing regulations.

Executive summary

2. Intensive winter grazing (IWG) can present high risk to water quality and therefore it is important that IWG is well-managed and well-regulated. The National Environmental Standards for Freshwater (NES), which came into force on 3 September 2020, introduced new regulations for intensive winter grazing. Many aspects of these regulations received heavy criticism from councils and the farming community for being impractical. Changes have been proposed that defer the start date for parts of the IWG regulations for one year (from 1 May 2021 until 30 April 2022) and provide the option of addressing these requirements through certified freshwater farm plans rather than via a consent. However, the Council has additional monitoring and reporting requirements.

Recommendations

That the Taranaki Regional Council:

a) receives this memo *Intensive Winter Grazing Update*

b) notes the amended timeframes for intensive winter grazing regulation and additional monitoring and reporting responsibilities for the Taranaki Regional Council.

Discussion

3. Intensive winter grazing can present high risk to water quality and therefore it is important that IWG is well-managed and well-regulated. The activity has received negative publicity in Southland and elsewhere, mainly in the South Island , but is not a major resource management issue in this region.

4. The National Environmental Standards for Freshwater (NES), which came into force on 3 September 2020, introduced new regulations for intensive winter grazing. Many

aspects of these regulations received heavy criticism from councils and the farming community for being impractical. See the attached document for the NES IWG regulations.

5. In December 2020, the Southland Intensive Winter Grazing NES Advisory Group (SAG) presented the Minister for the Environment and the Minister of Agriculture with a report which advised on the implementation of IWG regulations. The SAG report is attached to this memorandum.
6. In response to SAG advice, the Minister for the Environment decided to defer the start date for parts of the IWG regulations (i.e. for permitted activities and related resource consents) for one year (from 1 May 2021 until 30 April 2022). NES-F regulations that control further expansion of IWG have not been deferred and still need to be enforced by the Council.
7. The deferment is in return for regional council and the farming sector committing to:
    7.1. improve IWG practice during the year by rapidly deploying an IWG module that will be a prototype for inclusion in the certified freshwater farm plan regime (currently under development)
    7.2. undertake increased monitoring and reporting to ensure there are measurable improvements in IWG practice during the year.
8. In addition to the above conditions, the Minister has also stated that his expectations of councils and the farming sector are:
    8.1. demonstrable early progress in deploying the IWG module
    8.2. farmers putting in place better practices such as providing appropriate buffers that are uncultivated and ungrazed around waterways and critical source area, as recommended in the SAG report; and retiring steeper slopes that are unsuitable for IWG
    8.3. councils carrying out more monitoring if IWG practices and taking compliance action against breaches of the law
    8.4. more effective monitoring by councils of receiving environments such as rivers and estuaries to show if their health is improving, i.e. whether significantly less sediment and other contaminants are ending up in them
    8.5. council monitoring of the hectares in IWG, and enforcement of the rule against the area in IWG increasing on any one farm
    8.6. quarterly progress reporting to the Minister for the Environment on the above points i.e. on 1 August and 1 November 2021, and 1 February and 1 May 2022.
9. The Ministry for Primary Industries will also be responding to animal welfare complaints and prosecuting as appropriate where breaches of the law occur.
10. Once IWG regulations come into force from 1 May 2022, farmers will have the option of undertaking IWG through a certified freshwater farm plan as an alternative to complying with the default permitted activity pathway in the regulations, or obtaining a resource consent.
11. In addition, any changes (if desirable) to rules associated with the default, permitted activity pathway will have been progressed by this time.
12. The Council's draft Long-Term Plan made provision for the Council to be able to recover the reasonable costs associated with monitoring IWG. The work was going to be

undertaken by the Land Management section. The new monitoring and reporting requirements will be developed and implemented in an efficient manner, possibly using a sample based, rather than an entire IWG activity, survey.

13. The Council had also made provision for additional consent resources to process IWG applications. However, this has not been implemented given the strong possibility of changes to the regulations.
14. The Council has not yet received any further guidance or information from the Ministry regarding the changes to IWG regulations. Therefore, at this time, officers are unable to provide members with any further details regarding the monitoring and reporting requirements of the Council.

Financial considerations—LTP/Annual Plan

15. 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

16. 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

17. 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.

Community considerations

18. 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

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

Appendices/Attachments

Document 2753532: *Resource Management (National Environmental Standards for Freshwater) Regulations 2020, Subpart 3 - Intensive winter grazing*

Document 2753533: *Southland Intensive Winter Grazing NES Advisory Group* (SAG Report).

Resource Management (National Environmental Standards for Freshwater) Regulations 2020

Subpart 3—Intensive winter grazing

26 Permitted activities

(1) The use of land on a farm for intensive winter grazing is a permitted activity if it complies with the applicable condition or conditions.
(2) The following discharge of a contaminant is a permitted activity if it complies with the applicable condition or conditions:

- **(a)** the discharge is associated with the use of land on a farm for intensive winter grazing; and
- **(b)** the discharge is into or onto land, including in circumstances that may result in the contaminant (or any other contaminant emanating as a result of natural processes from the contaminant) entering water.

Conditions

(3) The condition is that the intensive winter grazing must be undertaken in accordance with the farm's certified freshwater farm plan if—

- **(a)** the farm has a certified freshwater farm plan that applies to the intensive winter grazing; and
- **(b)** a certifier has certified that the adverse effects (if any) allowed for by the plan in relation to the intensive winter grazing are no greater than those allowed for by the conditions in subclause (4).

(4) In any other case, the conditions are that,—

- **(a)** at all times, the area of the farm that is used for intensive winter grazing must be no greater than 50 ha or 10% of the area of the farm, whichever is greater; and
- **(b)** the mean slope of a paddock that is used for intensive winter grazing must be 10 degrees or less; and
- **(c)** on a paddock that is used for intensive winter grazing,—
  - **(i)** pugging at any one point must not be deeper than 20 cm, other than in an area that is within 10 m of an entrance gate or a fixed water trough; and
  - **(ii)** pugging of any depth must not cover more than 50% of the paddock; and
- **(d)** livestock must be kept at least 5 m away from the bed of any river, lake, wetland, or drain (regardless of whether there is any water in it at the time); and
- **(e)** the land that is used for intensive winter grazing must be replanted as soon as practicable after livestock have grazed the land's annual forage crop (but no later than 1 October of the same year).

(5) But *see* regulation 29 (permitted activities and restricted discretionary activities: temporary further conditions).

Enforcement officer may require information

(6) A person undertaking a permitted activity under this regulation must provide any information reasonably required by a regional council enforcement officer for the purpose of monitoring compliance with the condition in subclause (4)(a), (d), or (e).

Temporary extension for replanting on farms in Otago and Southland

(7) If the farm is in the region of the Otago Regional Council or the Southland Regional Council, the latest date by which the land must be replanted under subclause (4)(e) is 1 November of the same year (rather than 1 October).

(8) This subclause, subclause (7), and the heading above subclause (7) are revoked on 1 May 2024.

Regulation 26(4)(c)(i): replaced, on 28 August 2020, by regulation 6 of the Resource Management (National Environmental Standards for Freshwater) Amendment Regulations 2020 (LI 2020/228).

27 Restricted discretionary activities

(1) The use of land on a farm for intensive winter grazing is a restricted discretionary activity if the use does not comply with the applicable condition, or any of the applicable conditions, in regulation 26(3) or (4).

(2) The following discharge of a contaminant is a restricted discretionary activity if it does not comply with the applicable condition, or any of the applicable conditions, in regulation 26(3) or (4):

(a) the discharge is associated with the use of land on a farm for intensive winter grazing; and

(b) the discharge is into or onto land, including in circumstances that may result in the contaminant (or any other contaminant emanating as a result of natural processes from the contaminant) entering water.

(3) But *see* regulation 29 (permitted activities and restricted discretionary activities: temporary further conditions).

Matters to which discretion is restricted

(4) The discretion of a consent authority is restricted to the following matters:

(a) the adverse effects of the activity on ecosystems, freshwater, and water bodies:

(b) the adverse effects of the activity on the water that affect the ability of people to come into contact with the water safely:

(c) the adverse effects of the activity on Māori cultural values:

(d) the susceptibility of the land to erosion, and the extent to which the activity may exacerbate or accelerate losses of sediment and other contaminants to water:

(e) the timing and appropriateness of the methods (if any) proposed to avoid, remedy, or mitigate the loss of contaminants to water.

Intensification: temporary standards

28 When regulations 29 and 30 do not apply

(1) Regulations 29 and 30 do not apply if the relevant regional council has publicly notified the amendments required by section 55(2B) of the Act to give effect to the National Policy Statement for Freshwater Management.

(2) In subclause (1), **publicly notified the amendments** means that the proposed policy statement or plan containing the amendments has been publicly notified in accordance with clause 5 of Schedule 1 of the Act.

Regulation 28: replaced, on 28 August 2020, by regulation 7 of the Resource Management (National Environmental Standards for Freshwater) Amendment Regulations 2020 (LI 2020/228).

29 Permitted activities and restricted discretionary activities: temporary further conditions

(1) To be a permitted activity, an activity described in regulation 26(1) or (2) must also comply with the conditions in subclause (3) of this regulation (in addition to the applicable condition, or applicable conditions, in regulation 26(3) or (4)).

(2) To be a restricted discretionary activity, an activity described in regulation 27(1) or (2) must comply with the conditions in subclause (3) of this regulation.

Further conditions

(3) The conditions are that—

(a) land on the farm must have been used for intensive winter grazing in the reference period; and

(b) at all times, the area of the farm that is used for intensive winter grazing must be no greater than the maximum area of the farm that was used for intensive winter grazing in the reference period.

(4) To avoid doubt, the activity must comply with the conditions in subclause (3) of this regulation even if the maximum area used in the reference period was less than the applicable area under regulation 26(4)(a).

Enforcement officer may require information

(5) A person undertaking a permitted activity under regulation 26 must provide any information reasonably required by a regional council enforcement officer for the purpose of monitoring compliance with the conditions in subclause (3) of this regulation.

30 Discretionary activities

(1) The use of land on a farm for intensive winter grazing is a discretionary activity if it does not comply with either of the conditions in regulation 29(3).

(2) The following discharge of a contaminant is a discretionary activity if it does not comply with either of the conditions in regulation 29(3):

(a) the discharge is associated with the use of land on a farm for intensive winter grazing; and

(b) the discharge is into or onto land, including in circumstances that may result in the contaminant (or any other contaminant emanating as a result of natural processes from the contaminant) entering water.

Conditions on granting resource consent

(3) A resource consent for the discretionary activity may be granted only if the consent authority is satisfied that granting the consent will not result in an increase in—

(a) contaminant loads in the catchment, compared with the loads as at the close of 2 September 2020; or

(b) concentrations of contaminants in freshwater or other receiving environments (including the coastal marine area and geothermal water), compared with the concentrations as at the close of 2 September 2020.

Term of resource consent

(4) A resource consent granted for the discretionary activity must be for a term that ends before 1 January 2031.

Revocations

The following are revoked on 1 January 2025:

(a) regulation 26(5):

(b) regulation 27(3):

(c) the cross-heading above regulation 28:

(d) regulations 28 to 30:

(e) this regulation.

Southland Intensive Winter Grazing NES Advisory Group

10 December 2020

OBSERVERS: Ministry for the Environment, Ministry for Primary Industries, Te Ao Marama Incorporated (TAMI), Local Government New Zealand

Executive Summary

Intensive winter grazing (IWG) can present high risk to water quality and therefore it is important that IWG is well-managed and well-regulated. This must ensure the expectations of farmers are clear, practicable and enforceable and water quality is appropriately protected[1].

The Southland NES Advisory Group (the Group) brought together a diverse range of perspectives and values and the members are unanimous in their view that the current National Environment Standard for Freshwater[2] (NES-FW) does not deliver the required quality of regulation. To ensure effective management and to avoid risk of perverse outcomes[3], change is required.

The Group is strongly of the opinion that freshwater farm plans (FFPs) that provide farm-specific solutions to the risks posed by IWG are the best way to protect freshwater. While a pathway already exists through the NES-FW for IWG that is undertaken according to an FFP, that route is currently unavailable and will remain unavailable until Government has promulgated further regulations to bring into operation Part 9A of the Resource Management Act (RMA).

Accordingly, the Group's **primary recommendation** is to institute an *interim* regime that will allow IWG to occur as a permitted activity provided it is undertaken consistent with the farm-specific IWG module (for an example of these see Appendix 1). The group also advises that the IWG Plan become part of the certified FP or a module within them.

The IWG Module would require farmers to identify risks and mitigations at the paddock scale and show that any departure from the standard conditions of the NES-FW (Regulations 26(4) and 29 (3)) will not result in greater risk to freshwater health than would occur with compliance with those standard conditions. Specific guidance and direction on how to do that will be required, although many tools are already available (including the template included as Appendix 1). An interim IWG Module will need to be submitted to the regional council and be subject to an audit regime.

The Group also acknowledges that the NES-FW provides a pathway for IWG by way of resource consent. However, as outlined within this report, due to the perverse outcomes this could lead to and the scale of consenting task for the regional council(s)[4], – for a temporary period, until FFPs are in place – this pathway should be the exception than the norm.

While the issues with the NES-FW would be largely overcome by the adoption of the interim approach outlined above, the Group considers that changes are also required to the standard conditions (Regulations 26 (4)). In particular, the Group considers that freshwater health outcomes would be improved by a requirement to protect *critical source areas* (CSAs) but that with such a requirement several of the existing standard conditions that are impractical to apply may be dispensed with. Others need minor amendment or clarification to resolve identified issues. These are detailed in the recommendations.

[1] There will also be benefits to animal welfare but the Group has not considered these benefits in detail
[2] Specifically, Regulations 26-29.
[3] See Table 1 for summary of practical issues and potential perverse outcomes
[4] Southland Regional Council has estimated that without change, it would need to process between 800-1500 additional consent applications next year.

Recommendations

The Group recommends that government:

1. **A - Where Permitted Activity (PA) conditions cannot be met, an alternate PA pathway is provided via an IWG module. These modules would need to be submitted to the regional council and be subject to audit processes. An example template is provided (see Appendix 1) to assist with the development of these modules. OR**

   B - Defer the application of the Regulations 26 (4) until such time as FFPs are in place

2. **Amend condition 26 (4) (b) IWG must not be conducted on slopes greater than 15 degrees.**
3. **Delete the pugging conditions (Regulation 26 (4) (c)) and replace with a requirement to protect critical source areas (see Recommendation 6)**
4. **Delete the replanting date condition (Regulation 26 (4) (e)) and replace with a requirement to protect critical source areas (see Recommendation 6)**
5. **Clarify that reference to 'drains' in Regulation 26 (4) (d) does not include sub surface drains**
6. **An additional condition is inserted that requires Critical Source Areas in intensive winter grazing area(s), must be protected (uncultivated and ungrazed).**
7. **Amend Regulation 29(3) so that it applies as a further condition of Regulation 26 (4) and can accordingly be departed from if the IWG is undertaken in accordance with a FFP or IWG module.**

Key quotes from Group members:

"We've got a strong track record of seeing marked improvements when we work together – cross industry and with our communities."

"We are all focused on improving outcomes and it's just the how."

"There is low tolerance, by farmers, for farmers who are not improving their intensive winter grazing practice as they are seen to be "letting the side down" and bringing the practice into disrepute."

Introduction

The Southland NES Advisory Group AKA 'The Group'

The Group was set up following on from the hui with Ministers O'Connor and Parker in September and is made up of 2 Southland farmers (1 sheep and beef, 1 dairy); Beef and Lamb NZ, Dairy NZ, Environment Southland, Federated Farmers, Fish and Game, with iwi (Te Ao Marama Incorporated, TAMI) and staff from LGNZ, Ministry for Environment and Ministry of Primary Industries as observers.

The Group met early in October and agreed their purpose to produce concise, practical recommendations to address implementation concerns with the NES Freshwater, with their focus being the Intensive Winter Grazing elements. They have been working closely together since then to seize the opportunity, to provide suggestions to the Ministers.

The Group has applied a Southland view to the work that is the majority of the members' expertise, however the recommendations have been shared with other regions and the opportunities that are suggested could apply nationally.

Background

"Intensive winter grazing is defined in the NES-FW as "grazing livestock on an annual forage crop at any time in the period that begins on 1 May and ends 30 September of the same year". Intensive winter grazing (IWG) is a common practice used to feed cattle, sheep and deer outdoors throughout Southland, much of Otago and other parts of New Zealand during the winter months.

Why do we need IWG and how is it done in Southland?

The Commissioners Hearing Report on the proposed Southland Water and Land Plan stated that "due to low pasture growth during winter months and large areas of poorly draining soils, intensive winter grazing forms an integral part of pasture based livestock systems in Southland."[5]

Southland farmers spend most of the year preparing for the winter by growing feed that can be used during the winter period. This includes crops like swedes, kale and fodder beet which grow through summer and autumn, and hold their condition through the winter. These crops provide much more feed per hectare than grass, meaning that stock can be fully fed for the winter on a smaller area of the farm, leaving the grass paddocks undamaged for the spring, when many animals are producing milk. Other feed is also harvested during the growing months and fed to stock during the winter, including grass in the form of silage, baleage or hay, as well as straw from arable crops.

There are alternative options to managing stock during the winter but these are limited. They could include; wintering on grass with supplementary feed or indoor wintering, but implementing these systems to the scale required would pose feed supply challenges during winter and spring, particularly in case of poorer growing seasons.

Research conducted by Environment Southland shows that approximately 68,000ha of fodder crop are grown annually for IWG across approximately 3,000 farms in the Region.

[5] pSWLP Hearing Commissioners Report available here

What are the risks and how is Southland addressing them?

Despite the utility of IWG to farmers and therefore the region more widely, it is acknowledged to be high risk activity with regards to freshwater health. Some of the environmental risks, in particular relate to:

- Condensing a large number of animals into relatively small areas can result in the accumulation of nitrate beyond the soil's ability to retain it, at that time of year;
- The bare soil left by the intensive grazing of crops can result in the risk of sediment and other nutrients being carried off the paddock into waterways.

Appeals on the proposed Southland Water and Land Plan are currently before the Environment Court. The Plan is a significant step on the Region's journey to implement the National Policy Statement for Freshwater Management (NPSFM) and applies controls for IWG across high risk areas or undertaken in risky ways, and farmers are required to demonstrate that mitigation measures will decrease sediment and nutrient losses to waterways[1]. Since 1 May 2019, IWG is linked to a requirement for a Farm Environmental Management Plan, and requires good management practice including back fencing breaks, riparian buffer zones, and progressively grazing slopes from the top to the bottom.

In Southland, awareness of the associated risks has heightened dramatically over the last 5 years, resulting in many farmers making significant changes to their practice, without regulatory requirement. It is now common to see a range of good management practices implemented in a bespoke, farm specific way, including the protection of critical source areas, wide buffers adjacent to waterways, minimum tillage, catch crops, back fencing, strategic grazing of stock towards waterways, and use of portable water troughs.

Compliance Monitoring

There is general agreement that there remain some farmers who need to improve the management of their IWG to protect freshwater health. There is acceptance that for some of those, it will take regulation and enforcement to force a change in practice.

During the 2019 IWG season (May – September) Environment Southland undertook compliance flights to monitor farmers' implementation of required good management practices. They found there was widespread evidence of poor practice and this was reinforced by members of the public and the media. On the ground inspections and enforcement action where necessary, followed on from the flights.

As good management practices were not being consistently applied, Environment Southland and a range of industry groups (DairyNZ, Beef + Lamb NZ, Federated Farmers MfE and MPI) worked together to ensure a consistent and proactive approach to getting the message out to farmers about the required good management practices. All parties have worked hard to help farmers lift their performance through providing advice and making information available; as well as implementing a solution to modify consent conditions for farmers struggling with excess stock due to a slow down at processing plants because of COVID-19.

This year, cultivation flights were completed before grazing started to identify high risk areas and those landowners were offered specific assistance. This was supported by communications across parties to ensure consistent messaging. This was then followed up with aerial inspection flights by the compliance team during the season. The inspections showed considerable improvement in the adoption of good management practices than in the previous year with only a small number of properties requiring follow-ups, mostly relating to education around critical source areas and back fencing. This joint initiative is ongoing, with the industry groups working together to ensure farmers make good plans for next year's winter grazing season.[7]

[6] See Appendix N and rule 20 of the pSWLP
[7] Extract from Compliance Monitoring report (2020)

This has been supported by the initiation of a pilot app which has been trialled by farmers in the Aparima Community Environment project. The further development of this tool is an opportunity to link to the expediting of the recommendations in this report.

These examples shows how regulations can be combined with education to improve freshwater health.

Methodology

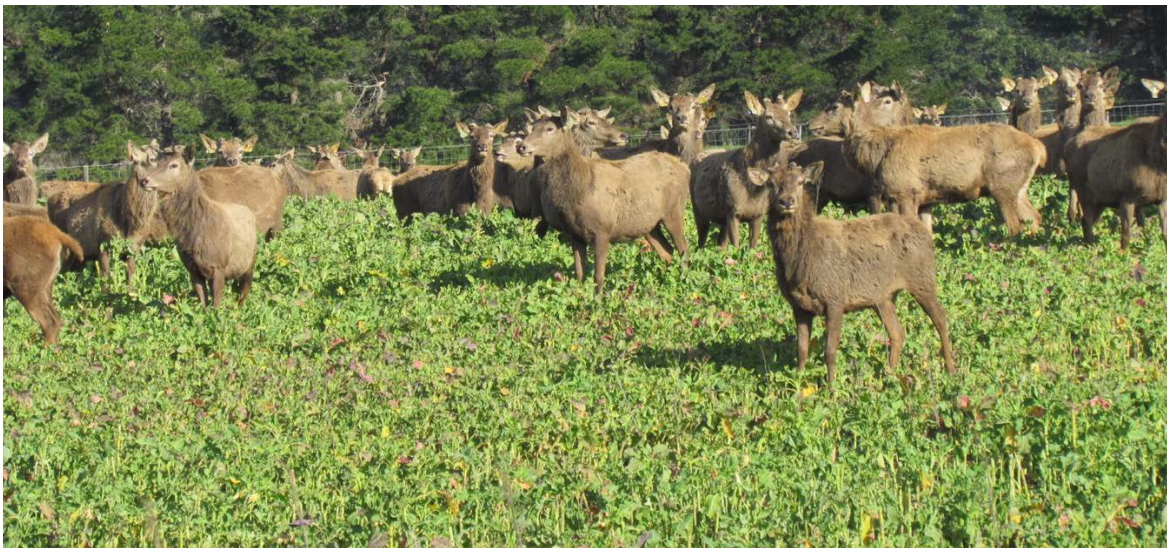
The Group was asked to provide a review and practical recommendations for implementation of the NES-FW. Their concerns stemmed from the impact on both the community and Council of imposing one-size-fits-all restrictions on farmers some of whom are already taking the right steps to protect the environment.

The approach the Group took to this task was:

1. Review the Intensive Winter Grazing (subpart 3) elements of the National Environmental Standards (gazetted 3 August 2020) with an effects-based lens and to assess how could the rules be implemented as they are;
2. Analysis of the Permitted Activity standard criteria
3. Propose recommendations to:
    a. Make minor alterations to the regulations to:
        i. Improve practical implementation and enforcement;
        ii. Reduce risks of perverse outcomes;
        iii. Improve environmental benefits.
    b. Identify any specific points that aren't addressable via 1 and 2
4. Throughout this process the Group members have been liaising with their organisations, as well as the sector more widely to discuss issues, and test possible solutions.

There are widespread concerns that aspects of the IWG regulations in the NES for Freshwater will be challenging or impossible to implement, as well as potentially causing perverse freshwater health outcomes and undermining the positive effects being achieved by large numbers of farmers.

This report has been provided to make recommendations to Ministers on how the NES could be improved to achieve reduced risk to freshwater health through targeted and appropriate regulation.



Recommended Approach

The NES Intensive Winter Grazing regulations (subpart 3) come into force on 1 May 2021 and has a three pathway approach:

1. Enables the lowest risk winter grazing to be carried out as a permitted activity within specified conditions (Clause 26(4)).
2. Allows those who cannot meet the specified conditions to show how adverse effects will be mitigated via a certified freshwater farm plan, and therefore proceed, with that, as a permitted activity.
3. Where specified conditions cannot be met, and where adverse effects from those cannot be shown to be mitigated in a certified freshwater farm plan, a restricted discretionary consent is required.

IWG activities that cannot meet permitted activity standards can continue temporarily without a consent if all conditions in s20A(2) RMA apply. However, any consent application must be made within 6 months of subpart 3 coming into force, i.e. by 31 October 2021. Advice provided to the Group indicates that the FFP process will not be available for some time, leaving an 'interim' issue with the implementation of the NES-FW ie. the absence of the second pathway above. This means that IWG grazing activities will need to either comply with standards in Reg 26(4) or require a consent application to be submitted by 31 October 2021 at the latest.

The group considers the second pathway to be **essential** as it will enable conditions to be relatively stringent, providing additional oversight of most winter grazing, without creating an overly bureaucratic regime and perverse outcomes that would otherwise arise. Without this pathway, the NES will drive very large numbers of consents to be required, including from those operating in accordance with industry best practice.

It is also important to note, farmers generally wish to avoid the uncertain costs and outcomes associated with the consent process. Therefore, actions likely to benefit freshwater health can be incentivised by enabling them to be pursued without a resource consent. Some of the recommendations have been proposed with this in mind.

Intensive Winter Grazing Modules

We recommend a new, interim step is introduced in the form of an intensive winter grazing module of a freshwater farm plan (FFP), until a process for certified freshwater farm plans is available.

These need to be prioritised and rolled out, prior to the wider certified FFP structure being in place. A number of versions of these exist and are used by Industry and Regional Councils – e.g. Appendix 1.

The introduction of these modules would ensure farms which cannot meet the conditions – Clause 26(3) – can improve the management and outcomes associated with their IWG activities in the meantime (i.e. prior to certified FFPs being available. But avoiding the need for communities and Regional Councils to establish complex consenting and enforcement procedures, for a short-term, temporary period.

Requirements and Suggested Content

These modules would require farmers to:

- Identify the elements of IWG activity which generate the most risk for their property;
- Outline their plans to mitigate these specific risks; and
- Demonstrate that any adverse effects will not be greater than if they had met the specified conditions, as per the requirements of a certified freshwater farm plan in 26(3)(b).

Where that is not possible (i.e. appropriate mitigations are not able to be implemented), a consent would be used ensuring a necessarily high bar for highest risk IWG, in line with the stated purpose of the NES.

A number of matters that an IWG module would be required to address should be outlined. The group recommends the following critical matters:

1. Paddock risk assessment / selection (identify the risk factors associated with a paddock[8])
2. Crop establishment / paddock set up (mitigation of risk factors through buffers, exclusion of CSAs, cultivation methodology, trough and supplementary feed placement plan)
3. Strategic crop grazing (plan for strategic grazing to mitigate risks)
4. Post crop grazing management (planned next crop, mitigation of risks until re-sowing)

These plans would need to be bespoke and regionally adaptable to enable farmers to be proactive about managing their specific risks and ensure their focus is directed at freshwater health rather than just regulation adherence.

Audit and Assurance

The IWG module (e.g. Appendix 1) could be the certified Freshwater Farm Plan to manage IWG activities, until certified FFPs are available. In the meantime, these modules would need to be submitted to Council so that they can be audited. The audit approach would need to be determined and could either apply to all farms or a sample of them, which could be chosen at random or selectively (e.g. if issues arise during the season). Environment Canterbury's audit standards[9] could be made use of in order to fast-track this element.

Regulatory oversight and assurance needs to be provided for, to give Regional Councils, the Ministry and industry confidence that this interim step will deliver the desired outcomes and contribute to halting further decline in freshwater health. To enable this the Group suggests that an additional clause is added to the NES-FW clause 26 (4) to enable IWG modules to be enacted, for a temporary period of time, in advance of the FFPs.

Implementation Suggestion

An IWG module could be put in place relatively quickly, and they could then form part of the broader FFP once they are established (or be superseded once the FFP are in place) and a wider certification approach is available. An example of a national template that could be easily rolled out – adapted to regional needs and apply local values etc. – is attached at Appendix 1.

In addition to Appendix 1 there are a number of other existing examples of similar templates that could also be made use of which would ensure fast roll out and uptake of these modules. These could be rolled out (to some degree) via the use of an app similar to the one currently in development in Southland[10].

Recommendation 1

A. Where Permitted Activity (PA) conditions cannot be met, an alternate PA pathway is provided via an IWG module. These modules would need to be submitted to the regional council and be subject to audit process. An example template is provided (see Appendix 1) to assist with the development of these modules. OR

B. Defer the application of the Regulations 26 (4) until such time as certified FFPs are in place

[8] As range of these of these resources exist e.g. Horizons.
[9] https://www.ecan.govt.nz/document/download?uri=3759146
[10] How to use the winter grazing app - https://youtu.be/N_BEdESmGP4

Permitted Activity Conditions

The Group recommends some alterations to the conditions to ensure that they are practical and effects focused. Each of the existing conditions and high-level feedback about them are each outlined below.

Mean Slope

'The mean slope of a paddock that is used for intensive winter grazing must be 10 degrees or less'

The use of mean slope, and paddock scale to drive this condition create a number of challenges:

- large parts of Southland (and New Zealand's) farmland is very undulating - any one paddock can have a lot of variation throughout. Therefore calculation of the "mean slope" is problematic for both farming and consenting purposes;
- the paddock scale of this condition may limit positive strategic practices within a paddock, and could also create loopholes leading to farmers 'gaming the rules' by moving or removing fences;
- use of 'mean slope' may enable steep slopes to be cultivated if they only form a small portion of a paddock;
- stringent conditions based on slope may drive more intensive grazing to lower slope but "leakier" soils.

Determining absolute slope is straightforward for farmers and regulators through use of a free clinometer mobile phone app.

The proposed Southland Water and Land Plan has a maximum allowable slope (20 degrees) for cultivation enabling the low slope parts of a paddock to be cultivated, but steep areas must be left uncultivated. This solution focuses on the risk posed by cultivating steep slopes, is simple for farmers and regulators to determine, and encourages farmers to remain focussed on the use of lower risk land for intensive winter grazing.

If a farmer did wish to include steeper slopes in their intensive winter grazing area, there are mitigations available that would need to be outlined in the IWG module as outlined above. These may include the use of minimal tillage techniques (direct drill) which also protect soil structure, increased buffer zones along waterways to accommodate increased risk of nutrient run-off associated with steeper areas and strategic grazing of the crops.

Further to recommendations below, the Group has also recommended an additional condition regarding the management of critical source areas (Recommendation 6) which could include increased vegetated buffers. This will further strengthen the requirement to mitigate risks of intensive winter grazing on slopes.

Recommendation 2

Amend condition 26 (4) (b) IWG must not be conducted on slopes greater than 15 degrees.

Pugging and Replanting Date

'On a paddock that is used for intensive winter grazing, pugging at any one point must not be deeper than 20 cm; and pugging of any depth (5cm+) must not cover more than 50% of the paddock.'

'On a paddock that is used for intensive winter grazing, the land that is used for intensive winter grazing must be replanted as soon as practicable after livestock have grazed the land's annual forage crop (but no later than 1 October of the same year).'

Both these conditions have difficulties in terms of practical implementation, consenting or enforcement perspective, and as they are will have minimal benefit to freshwater health. Further, compliance (or absence of) is likely to be very difficult to prove and defence may exist under s351 (natural event).

They aim to manage the effects of bare soil being left for long periods, by minimising overland flow and sediment run off. Once stock are removed from an intensive winter grazing area, the ground can quickly harden which reduces the likelihood of run-off and the highest risk period for any paddock is when it is freshly cultivated as the fine soil is more mobile. This risk is not addressed by these conditions.

Pugging

There are a number of implementation challenges for this condition, from a farming and an enforcement perspective, including:

- Determining depth of a single hoof print is challenging due to the soil displacement that occurs with each hoof placement and the settling effect that occurs once the ground is left undisturbed (i.e. at which point in the winter period does the definition apply?)
- Determining the scale across a paddock to e.g. cover more than 50% also challenging, but would be required to enable enforcement of this condition.
- The ability of farmers to comply with this condition is largely weather dependant which could make enforcing this element highly problematic and possibly challengeable under s341 of the RMA.
- Farmers are encouraged to utilise portable troughs to enable cattle to be kept off previously grazed areas – but this discourages that practice by providing an exception only for permanent troughs.

Replanting Date

The practical implementation concerns include:

- Perverse outcomes can arise from the planting of some crops too early. For example: brassicas will mature too early if they are frosted at a young age; grass struggles to compete with weeds if planted in cooler soils and therefore requires more weed spraying.
- Replanting decisions are determined by weather conditions including soil moisture and temperature and therefore are very hard to predict and obtain advance consent for.
- Climate change and national variability make these dates even harder to predict.
- Non-compliance would be virtually impossible to monitor, prove and therefore enforce.

Basing sowing decisions on an arbitrary date could cause more harm than good. This is highlighted by some perverse outcomes and other negative consequences that the condition in its current form, may cause:

- It will encourage heavy machinery use on paddocks when soil conditions are not appropriate – i.e. too wet or cold.
- This may result in soil damage, crop failures (creating an additional high risk in the post-cultivation period) and additional weed spraying.

- It may also result in more bare soil if farmers are pushed to avoid second cropping winter crop paddocks in an attempt to meet this condition, they may instead need to cultivate new paddocks.

In addition, behaviour change education and the sharing of examples of good practice such as direct drilling, under-sowing and cut and carry crops is also necessary. There are many examples of support available to industry such as the ECan Winter Forage Crop grazing and Wet Weather Management guidance[11]

The Group suggests that the risks and environmental outcomes such as minimising sediment run-off, can be better addressed by critical source area management (Recommendation 6) – which could include the provision of mandated buffer(s) – and that these conditions should therefore be removed.

Recommendation 3

Delete the pugging conditions (Regulation 26 (4) (c)) and replace with a requirement to protect critical source areas (see Recommendation 6)

Recommendation 4

Delete the replanting date condition (Regulation 26 (4) (e)) and replace with a requirement to protect critical source areas (see Recommendation 6)

Area of the Farm for IWG

'The area of the farm used for intensive winter grazing must be no greater than 50 ha or 10% of the area of the farm, whichever is greater.'

This condition will likely drive the wrong behaviours and could stifle innovation, such as encouraging farmers to operate their winter grazing more intensively to stay within the condition, and/or discouraging them from changing to lower yielding or mixed crops which may provide better environmental outcomes. An alternate improvement would be a focus on the amount of feed provided from the farm during the winter period.

Additional challenges associated with this condition are:

- Measurability in the field is very impractical from an enforcement perspective
- Flexibility for farmers is removed, fore example, in a poor growth year where crop yields are low, additional areas of alternative crops (such as turnips or rape) may need to be sown late to provide enough stock feed for the winter period.

However as long as the second pathway exists, enabling farmers to show how the use of larger land area for winter grazing may achieve better environmental outcomes, we are not recommending a change to it.

Buffers: Drain Definition

'On a paddock that is used for intensive winter grazing, livestock must be kept at least 5m away from the bed of any river, lake, wetland, or drain (regardless of whether there is any water in it at the time).'

[11] Available here - https://www.ecan.govt.nz/document/download?uri=3892930

Ungrazed buffers are an accepted and well understood good management practice. There are some concerns around the requirement to move existing fences but we have not made any recommendations in this regard as we believe this is a condition that can be lived with.

Currently the use of 'drain' in the NES-FW, refers to the National Planning Standard definition (*"any artificial watercourse designed, constructed, or used for the drainage of surface or subsurface water, but excludes artificial watercourses used for the conveyance of water for electricity generation, irrigation, or water supply purposes"*) can be interpreted to include subsurface drains i.e. tile and mole drains.

This inclusion would necessitate a 5m buffer from all parts of the extensive tile/mole drain network when intensive winter grazing and a 50m buffer from stockholding areas. This network has been established over several decades and cannot be practically mapped. However, experts have estimated that in Southland these drains cover approximately 200,000 hectares. As a result of how the rules are written very few farms would be able to meet the PA conditions, and IWG would be driven to free draining, leakier soils.

We seek clarification that this condition does not include subsurface drains, as this would be unworkable from both implementation and enforcement perspectives. A consenting pathway to meet this condition would also be problematic due to the absence of required information (huge amounts of unmapped tile draining was carried out by previous generations).

The Group understands from Ministry officials that subsurface drains weren't intended to be captured.

Recommendation 5

Clarify that reference to 'drains' in Regulation 26 (4) (d) does not include subsurface drains

Critical Source Area Management

Critical source area (CSA) management is not currently covered by the regulations, however, substantial evidence[12] shows that the practices addressing CSA's and the avoidance, or interception of, overland flow result in the reduction of multiple contaminants associated with IWG activities (phosphorus, sediment and faecal microbe losses). Studies looking at CSA management during grazing of a winter forage crop by dairy cows in South Otago found that sediment losses could be reduced by c.80% and phosphorus by c.60-70%.[13]

Critical source area definition from the proposed Southland Water and Land Plan:

(a) a landscape feature like a gully, swale or a depression that accumulates runoff (sediment and nutrients) from adjacent flats and slopes, and delivers it to surface water bodies (including lakes, rivers, artificial watercourses and modified watercourses) or subsurface drainage systems; and

(b) areas which arise through land use activities and management approaches (including cultivation and winter grazing) which result in contaminants being discharged from the activity and being delivered to surface water bodies.

[12] See MFE Chapter 17 Regulatory Impact Statement
[13] Monaghan et al., 2017

It is important to note that this definition focuses on critical source areas which are connected to waterways and if farmers focus their efforts in these locations (see Appendix 2 and referred to there as 'contaminant transfer zones'), freshwater health outcomes will improve.

Existing Good Management Practice[14][15] supports the avoidance of cultivating these areas and leaving them in pasture to protect soil structure and reduce surface runoff and there are straightforward mechanisms to determine the size of buffer areas required in these cases, as outlined in the Land and Water Science letter. The IWG module or FFP would give farmers the opportunity to outline those alternative mitigations if they were implemented.

The management of critical source areas may not address the nitrate loss risk which this condition also attempts to mitigate. However nitrate loss mitigation is very farm, crop and season specific and is more appropriately addressed via bespoke farm plans or the recommended IWG module.

We recommend all CSAs, in IWG area(s), be identified[16] prior to any cultivation and a minimum width of 5m be left uncultivated and ungrazed, therefore providing a filter for any sediment runoff that occurs. This could be managed via the Intensive Winter Grazing Module (as per recommendations 1.)

The strengthened management of CSAs will provide improved freshwater health outcomes, be more practical for implementation and enforcement, have wider benefits beyond IWG, and contribute significantly, towards addressing the effects which the pugging and re-sowing date and slope conditions intend to manage.

Recommendation 6

An additional condition is inserted that requires Critical Source Areas in intensive winter grazing area(s), must be protected (uncultivated and ungrazed).

Reference Period

Rule 29(3) restricts the use of permitted and restricted discretionary activity rules to the land used for IWG during the reference period. This limits the area of land able to be used for IWG to a maximum area of the farm as was used for that purpose during that period.

This rule could result in a worse environmental outcomes and stifle innovation or better practices. For example, it may encourage farmers to use the maximum amount of an IWG area of the farm during the reference period to avoid losing the ability to do so. This discourages farmers from changing to lower yielding or mixed crops which may provide better outcomes.

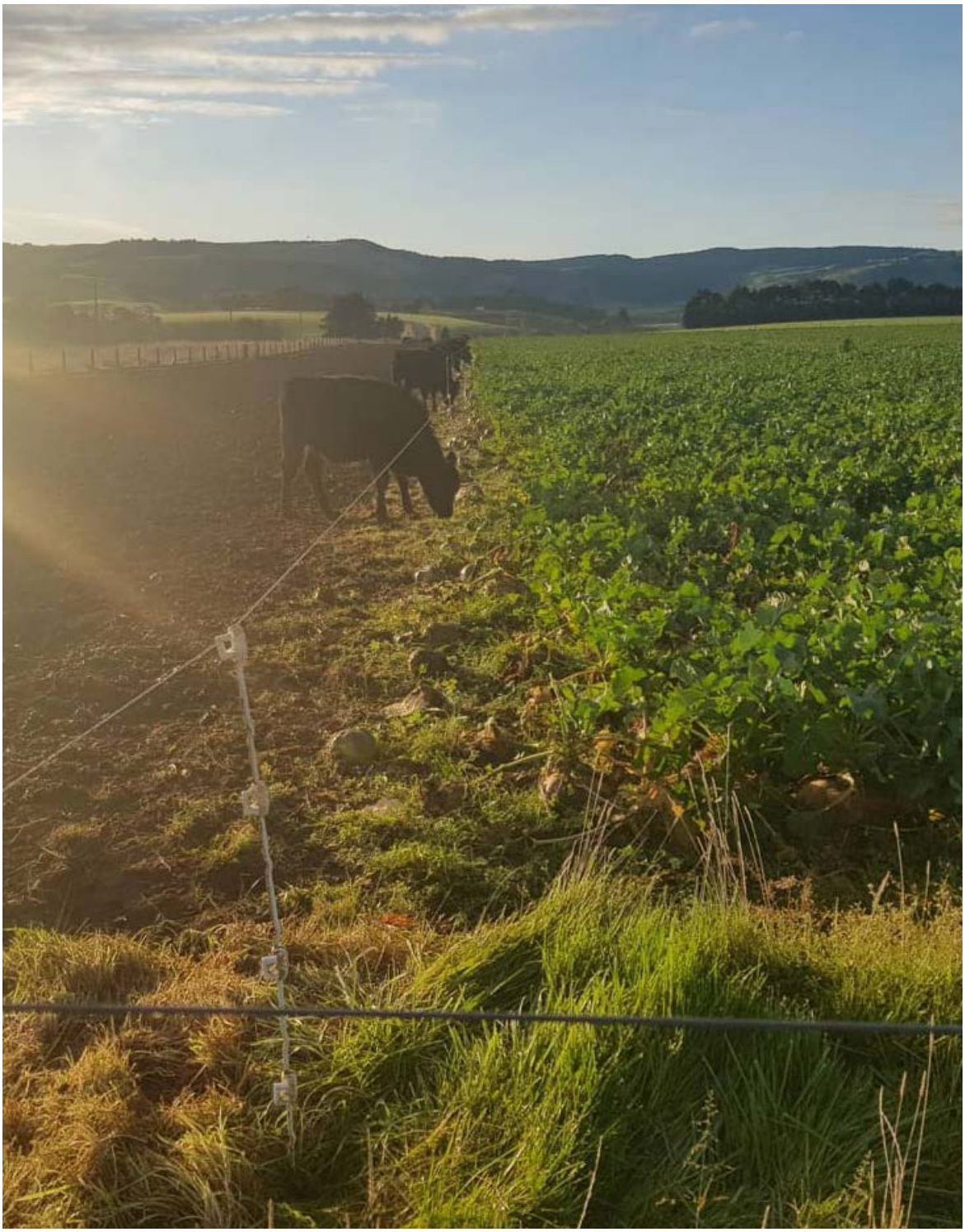
We recommend an amendment to the reference period condition in Rule 29(3) be provided to enable an exception if there are clear freshwater health benefits. For example, if a farmer wanted to shift their existing intensive winter grazing from a high leaching location to a lower leaching location (e.g. lower rainfall, flatter land, heavier soils or lower attenuation), the regulatory pathway should encourage improved outcomes. This could be achieved through an IWG module or certified FFP. On the other hand, the requirement to obtain a resource consent (and the associated uncertainty and cost) may be a barrier to making this positive change.

[14] Industry agreed GMP's available here: https://beeflambnz.com/knowledge-hub/PDF/industry-agreed-good-management-practices-relating-water-quality.pdf and the IWG Pan Sector Policy Guidelines
[15] Dairy NZ supporting information wintering-standard-operating-procedure.pdf (dairynz.co.nz) and break-fed-wintering.pdf (dairynz.co.nz)
[16] Digital Elevation Models (DEM) can be used to objectively identify CSA's for the purpose of excluding these areas from intensive winter grazing.

Where the benefits are not clear, or adverse effects not able to be clearly mitigated, the “third pathway” (resource consent) would still be required, enabling much more scrutiny.

Recommendation 7

Rule 29(3) becomes a further condition, rather than a standard which automatically causes the activity to become non-permitted.



Appendix 1

Draft Intensive Winter Grazing Module

Note: These modules would need to be bespoke and regionally adaptable to enable farmers to be proactive about managing their specific risks and ensure their focus is directed at freshwater health rather than just regulation adherence.

Purpose: To support farmers undertaking winter grazing activities. This completed module should provide sufficient detail and content required by Councils for managing winter grazing activities based on regional and national rules.

How to use this: This document is not a tick box exercise and will require you to think through why and how you will be doing what you plan to do. The end result should be fewer environmental impacts, better animal health, and increased soil health. Note that this will be a starting point and further detail will likely be required depending on the location, form, and extent of winter grazing occurring within the farming system. If you are intending to expand your winter grazing activities, this will definitely be the case.

Context: At a high level, what a Council is trying to assess is what effects are likely to come from your winter grazing activities. This will depend on the land you are farming as well as your management of it. This module will provide you, and them, with assurance that you are doing a good job managing the risks that are present in your specific situation. These plans would need to be bespoke and regionally adaptable to enable farmers to be proactive about managing their specific risks and ensure their focus is directed at freshwater health rather than just regulation adherence.

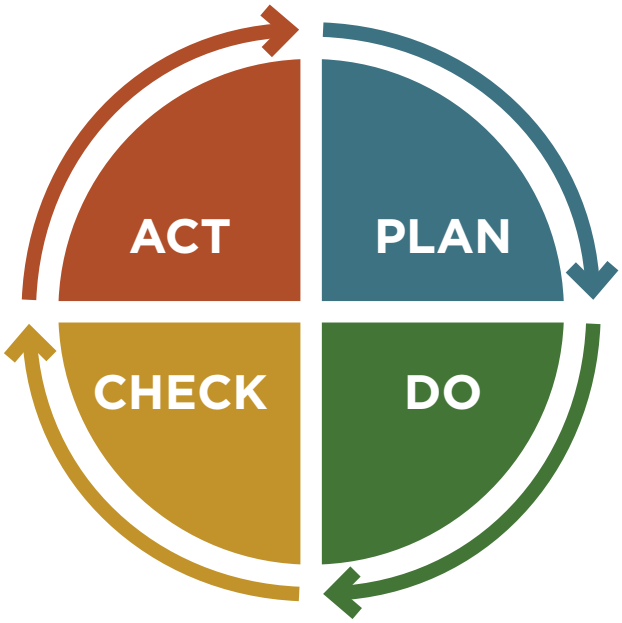
Process: This should be a 'living' document and adjusted overtime as needed. There are four main steps that this document takes you through:

Step 1: PLAN – This is where you gather information, assess what risks are present, and make a plan to manage the risks you identified. In this document, this is Parts 1 and 2.

Step 2: DO – This is where you implement your management actions and adverse weather plan. Make sure to monitor your impacts. In this document, this is Part 3.

Step 3: CHECK – This is where you, or a 3rd party, check up on the implementation of your management implementation and progress. In this document this is Part 4.

Step 4: ACT - This is where you review and adjust the plan as needed. In this document, this is Part 5. Then you start the process again.



Part 1: Farm And Cropping Overview

Years covered by this plan			
Farm Name:		• Water management zone:	
Owner:		• Water management sub zone:	
Manager:		• Ground water management zone :	
Contact details	Phone:	Email:	
	Mailing address:		
Location of property[17]:			
Legal Description and Agribase number:			
Total Farm area (ha):			
Average area used for wintering every year		Total Area (ha) used for wintering over 5 years.	

Crop and Animal Descriptions

Livestock	
List all possible animals you might have on a winter crop throughout the entire consent period. For each type of stock, list the expected number of animals grazing a winter forage crop on this property per year.	
Beef R1/R2 heifers	
Dairy R1/R2 heifers	
Beef adult cattle	
Dairy Adult cattle	
Lambs	
Mixed age sheep	
Deer Hinds	
Deer Stags	
Others	

Feed System			
List all possible crops and supplementary feeds (for intensive winter grazing) you might grow throughout the entire consent period. Note the expected area of each crop you would utilise on a yearly basis.			
Annual forage crop 1		Area (ha):	
Annual forage crop 2		Area (ha):	
Annual forage crop 3		Area (ha):	
Annual forage crop 4		Area (ha):	
Annual forage crop 5		Area (ha):	
Supplement feed 1:		Feeding location/ infrastructure	
Supplement feed 2:		Feeding location/ infrastructure	
Supplement feed 3:		Feeding location/ infrastructure	
Supplement feed 4:		Feeding location/ infrastructure	
Supplementary feed Comments			

[17] A different management plan is expected to be completed per property.

Part 2: Plan - Winter Grazing Content and Context

Goal Setting and Context

Please outline how winter grazing currently fits, or will fit into your farming system. You can write this out and/or tick the boxes below.

- ☐ **Pasture renewal:** to utilise forage crops as part of our pasture renewal programme with the aim of renewing all pastures over the next ___ years. This will be done in a way that enhances the production system without impacting our soils and waterways and supports healthy animals.
- ☐ **Resilient system:** to ensure the stock we carry through winter have adequate feed supply while ensuring that our cropping system supports healthy soils, healthy water, healthy people and healthy animals.

Farm Mapping and Paddock Selection

All areas proposed to be winter cropped and grazed on the farm need to be identified on a map. Use this section to include a Farm map showing paddocks to be used for wintering during the period being applied for. Please include key features like paddock boundaries and waterways, wetlands, bores, or drains

Risk Assessment

In order to manage the risks associated with your planned winter grazing activities, you must first know what risks are present, and what impact they can have. The table below takes you through aspects of a winter grazing activity increases the risks to waterway (as well as human) health and wellbeing.

This table can be completed at a paddock or Land Management Unit scale. A Land Management Unit is an area of land that can be farmed or managed in a similar way because of underlying physical similarities. For winter grazing activities, you can group together paddocks that have similar slope or soil characteristics.

In the next section, you will describe how you will be managing the risks associated with your planned winter grazing activities.

Risks	✓	Impact
Slope		Sediment or phosphorus potentially entering waterways
Steeper slopes (greater than 8 degrees -Class C[18]) are present within paddocks		
Steeper slopes (greater than 8 degrees) are intended to be cultivated		
Steeper slopes (greater than 8 degrees) will be winter grazed		
Steep slopes (between 8-15 degrees- Class C) will be winter grazed		
Steep slopes (greater than 16-20 degrees- Class D) will be winter grazed		
Steep slopes (greater than 21 degrees or more - Class E or higher) will be winter grazed		
Erosion		
Soils are identified as having erosion risks		
Soils have a moderate erosion risk		
Soils have a high erosion risk		
Erosion is visible within the paddock(s) to be cropped		
Overland transport of nutrients		
Waterway is within the paddock being winter grazed		
Water within paddock to be winter grazed flows into nearby waterway		
Cultivation is done via a method where soil is exposed (i.e. not direct drill)		
Cultivation is done down the slope rather than across it		
Presence of a Critical Source Area within the paddock		
Soils are heavy or poorly drained		
Paddock is prone to flooding		
Total risks present		
Scale of risks		(1-3 Low, 2-4 Medium, 4+ High)

Risks	✓	Impact
Contaminants		Contaminants, like pathogens such as E.Coli, potentially impacting on human health
Waterway is within or close by the paddock being winter grazed		
Drinking water bore or takes are close to paddocks or downstream of winter grazed area		
Stock have access to waterways (x2)		
Total risks present		
Scale of risks		(1 Medium, 2+ High)

[18] The 'Class B' and other Classes of slope in this section are based on the New Zealand Land Resource Inventory assessment. Ideally, these assessments would be made at paddock scale. LRI classes are based on the risk of erosion and how challenging it is for different machinery operations. Class A is 0-3degrees (flat to gently undulating), Class B is 4-7 degrees (undulating), Class C is 8-15 degrees (rolling), Class D is 16-20 degrees (strongly rolling), Class E is 21-25 degrees (moderately steep hill country), Class F is 26-35 degrees (steep hill country), and G is 35 degrees or greater (very steep cliffs). According to LUC handbook, slopes greater than 15 degrees are not particularly suitable for normal crop rotations and tend to have high cultivation costs. More information can be found in Appendix 1 (page 137-138): https://nzsss.science.org.nz/app/uploads/2016/04/luc_handbook.pdf

Risks	✓	Impact
Nutrient Leaching		Nitrogen potentially entering waterways
Winter grazing is occurring on free-draining/gravelly soils		
Subsurface drains within the paddock		
Nutrient concentration		
Animals are intensely concentrated in a small area while the soil is cold and wet		
Critical Source Areas will be cultivated or grazed		
Total risks present		
Scale of risks		(1 Low, 2+ High)

Risks	✓	Impact
Stock class type		Maintain soil health and structure
Sheep are winter grazed		
Young cattle are winter grazed (around 350kg) (x2)		
Cattle are winter grazed (above 350kg) (x3)		
Hinds are winter grazed (x2)		
Stags are winter grazed (x3)		
Soil type		
Soils are imperfectly draining		
Soils are poorly draining		
Crop type		
Kale crop		
Bulb Brassica crop like swede or fodder beet (x2)		
Total risks present		
Scale of risks		(1 Low, 2 Medium, 3+ High)

Risks	✓	Impact
Winter Grazing is occurring close to an area used to collect Mahinga kai		
Winter Grazing is occuring close to a wai tapu site		
Total risks present		
Scale of risks		(0 Low, 1+ High)

Summary of Risks In this section, tick the level of risk you identified based on each impact category			
	LOW	**MEDIUM**	**HIGH**
Sediment and Phosphorus impact			
Contaminant impact			
Nitrogen impact			
Soils impact			
Maori Values impact			

Risk Management

As you found when completing the risk assessment, some paddocks will pose higher risks than others based on the characteristics of the land, soil, and site. These are things that can't really be controlled but can be managed so that the risk to freshwater, soil, and human health is lowered. This section provides you with some context about what environmental management goals should be front of mind when grazing winter crops and provides a set of management options for you to reference. These are just that, options.

However, note that they do follow good management principles and are proven ways to reduce the risks posed by winter grazing activities. Discuss how you will be putting these into action on your farm (if suitable to your situation). Focus on how you will be managing the medium and high risk impacts you identified as part of the risk assessment.

You can check out these resources for more info: https://beeflambnz.com/knowledge-hub/PDF/winter-forage-crops-management-during-grazing.pdf and https://beeflambnz.com/knowledge-hub/PDF/ten-top-tips-winter-grazing-crops.pdf

Management Goal		Management Option[19]	Risk Assessment Value	Management Actions
Reduce the likelihood of sediment or phosphorus entering waterways	Slow the flow of water over the surface of exposed soils	Strategic grazing from top of paddock down the slope with long-narrow feed breaks	**Sediment and Phosphorus Risk Impact level**	
	Reduce the likelihood of contaminants entering waterways	Buffer strips are established at the base of large or steep slopes to slow the slow of water		
		Buffer strips established within paddock to slow the flow of water and trap nutrients		
		Riparian buffer strips or ungrazed areas established around Critical Source Areas and waterways (note this must be 5m width for waterways 1m or wider)		
	Reduce the time and extent of bare soil exposed to stock and the elements	Sowing of crops along, rather than up and down, the slope of the paddock where safe to do so		
		Use of direct or minimum till cultivation		
		Leave a 'buffer' between grazed area and the waterway or critical source area. Note, this must be 5m from a waterway that is 1m or wider.		
		Re-sow the paddock as soon as is it practical to do so (based on weather and soil moisture levels).		
		If Critical Source Areas have to be cultivated and grazed then grazing is done lightly and when soil and weather conditions allow and preferably at the end of the season (when the soil is at its driest).		
		Sediment is prevented from entering larger waterbody via sediment trap/dam		

Management Goal		Management Option[19]	Risk Assessment Value	Management Actions
Reduce the likelihood of contaminants, like E.Coli impacting on human health	Stock have limited or no access to waterways or contaminant transport pathways	Stock are excluded from waterways that are 1m or wider by a 5m buffer.	**Contaminant Risk Impact level**	
		Stock water reticulation system operating effectively and efficiently		
		Bailage/feed sites where stock tend to congregate are away from waterways and critical source areas		
Reduce the likelihood of Nitrogen entering waterways	Track the inputs, utilisation, and losses of nutrients from the farming system	Use of nutrient modelling tool to understand and manage nitrogen losses occurring on-farm	**Nitrogen Leaching Risk Impact level**	
		Soil nutrient status is used to guide post- grazing planting and plant nutrient requirements		
	Utilise excess nutrients	Establishment of 'catch crop' to soak up excess nutrients remaining in soil		
		For heavier soils, fallow periods are kept to a minimum		
	Limit risk of nutrient concentration transport via drainage	Treat drains as critical source areas and limit stock access		
Maintain soil health and structure	Limit stock movements and concentration	Secure (movable) stock water	**Soil Health and Structure Risk Impact level**	
		Back-fencing behind animals, especially cattle		
		Paddock has multiple entry/ exit points to prevent stock congregation around one gateway		
	Limit heavy machinery use on fragile soils	Place bailage/additional feed in paddock before it is too wet to access		
	Reduce structural damage risk to soils	Stock can be moved to an alternative area, such as a run-off block or laneway, to prevent damage to soil or animal health during storm events		

[19] These options are based on good management principles and practices within the Pan Sector Policy Guidelines (2018), Beef and Lamb NZ and DairyNZ resources, as well as findings from the Pastoral 21 Research programme

Adverse weather plan[20]

We can't predict the future, but we can plan for it. Note down what plans you have in place to identify when stock should be moved to an alternative location, what and where this area is, and any other actions you may take to reduce the risk to soil or animal health if there is a storm or adverse weather event.

Example: When a heavy rain is forecast, I will prepare laneways and grassed paddocks to take on stock as needed. If soils are becoming too pugged or stock health is at risk due to flood or excess water, I will shift them to a grassed paddock.

[20] More guidance to come in this space, e.g.https://www.dairynz.co.nz/media/253711/1-42_Wet_weather_strategies_to_minimise_pasture_and_soil_damage.pdf

PART 3: DO - Keeping to the Plan

This section should be used while implementing your winter grazing is activities. Below is a timeline guide for what you should be doing when.

TIMELINE

When?	What?
12-18 Months ahead of grazing	*Select your paddocks based on the risks they pose*
6-9 months ahead of grazing	*Choose your crop type and cultivation methods carefully. Plan how you will transition animals onto the crop.*
During grazing	*Utilise good grazing management principles and monitor stock and soil health*
Post- Grazing	*Regrass or re-sow as soon as practicable*

Keep your management plan and timeline on hand for yourself as well as others in your team who are supporting you. It will also help you meet the monitoring audit requirements by the Council. Note that this content does not need to be sent into the Council. Instead farmers keep a basic record, similar to how health and safety monitoring work. Monitoring records would be expected to be provided to the Council upon request.

Check out this resource for further information: https://beeflambnz.com/knowledge-hub/PDF/winter-forage-crops-management-after-grazing

1. Note down things that did not go as planned and how you managed this
2. Update the Council on any major changes to the management actions you submit to them.

Action	Dates Taken	Stored/Saved In:
Photos (geo-located[21]) of wintering paddocks prior to stock grazing		
Photos ((geo-located) taken during winter		
Photos (geo-located) taken at end of season		

3. Update the Council on any changes to location of winter grazing that you did not identify
4. Monitoring of practice and providing photographic proof. These should be on-hand in case you are audited.

[21] Guidance will be provided on how to 'geo-locate' photos as well as save them to a single folder in a smart phone.

PART 4: Check up how you did[22]

Once you have gone through a winter grazing season, it is important to reflect on what worked well, and what didn't. Did your management activities effectively manage the risks present? This should be done at the end of every winter grazing season. Note down the answers to the below questions to get your thoughts going...

1. Did you graze the number and type of animals you were intending to?	
2. Do you have photos of the paddocks grazed?	
3. How long were stock on the grazing block for?	
4. Was the location of water troughs and supplementary feed suitable to prevent substantial pugging damage?	
5. Was the paddock sown and grazed to plan?	
6. Did you need to implement any wet weather management?	
7. How are you planning to manage this block/s post-grazing.	

[22] The following sections (including appendixes) are very much work-in-progress. More than happy to receive feedback and work more with the Ministries and officials on these sections (and others).

PART 5: Review and Improve

Based on your Check, is there anything you would or should change in your management of the risk(s) present? Are there any issues with the grazing of these blocks? How have you overcome the issues?	

Appendix 2

Land and Water Science statement on identification of critical contaminant transfer to waterways

Land and Water Science
90 Layard Street
Invercargill 9810
New Zealand

03 214 3003
www.landwaterscience.co.nz

31st July 2019

Application of Digital Elevation Models (DEM) to identify zones of critical contaminant transfer to waterways

Using simple topographic and hydrological methods, it is possible to objectively identify and rank areas that represent a high risk to water quality from farm runoff. The following informal letter is in response to a request to provide a brief example of how Li-DAR could be used to identify 'critical transfer zones' to exclude these areas from intensive winter grazing. However, where Li-DAR is lacking, a similar albeit less resolved assessment can be undertaken utilising national scale Digital Elevation Models.

Here we propose that all of farm is potentially a 'source' of contaminants to waterways, but that the zone of contaminant transfer is where the greatest opportunity for mitigating any losses exists. Most commonly, contaminant transfer zones coincide with ephemeral watercourses that channel drainage from the land to open waterways during intermittent runoff events (Figures 1 and 2). Each ephemeral stream course and associated transfer zone has a corresponding catchment or watershed. When soils are saturated, or rainfall intensity exceeds the infiltration capacity of the soil within the capture zone area, ephemeral drainage pathways are activated. The episodic channelisation of overland flow via the ephemeral drainage network has long been recognised as a key control over nutrient, sediment, and microbial export from farm directly to waterways.

Leaving the transfer zone as a vegetated buffer can aid in the reduction of contaminant export via physical filtering and the reduction of runoff velocity. In Figure 3, arbitrary buffer zones of 5, 10 and 30 m around the ephemeral drainage network (critical transfer zone) are provided as an example of how DEM derived mapping can be used to identify these high-risk areas objectively. Buffer widths can be further refined using soil hydrological properties and slope to allow a variable width buffer along the length of the critical transfer pathway. Further, the flow accumulation area may be used as a threshold for how much of the ephemeral network requires a vegetative buffer (Figure 2). Importantly, the widely used River Environment Classification (REC), a landscape-based classification of surface waterways, was not designed to identify ephemeral waterways or associated capture zones.

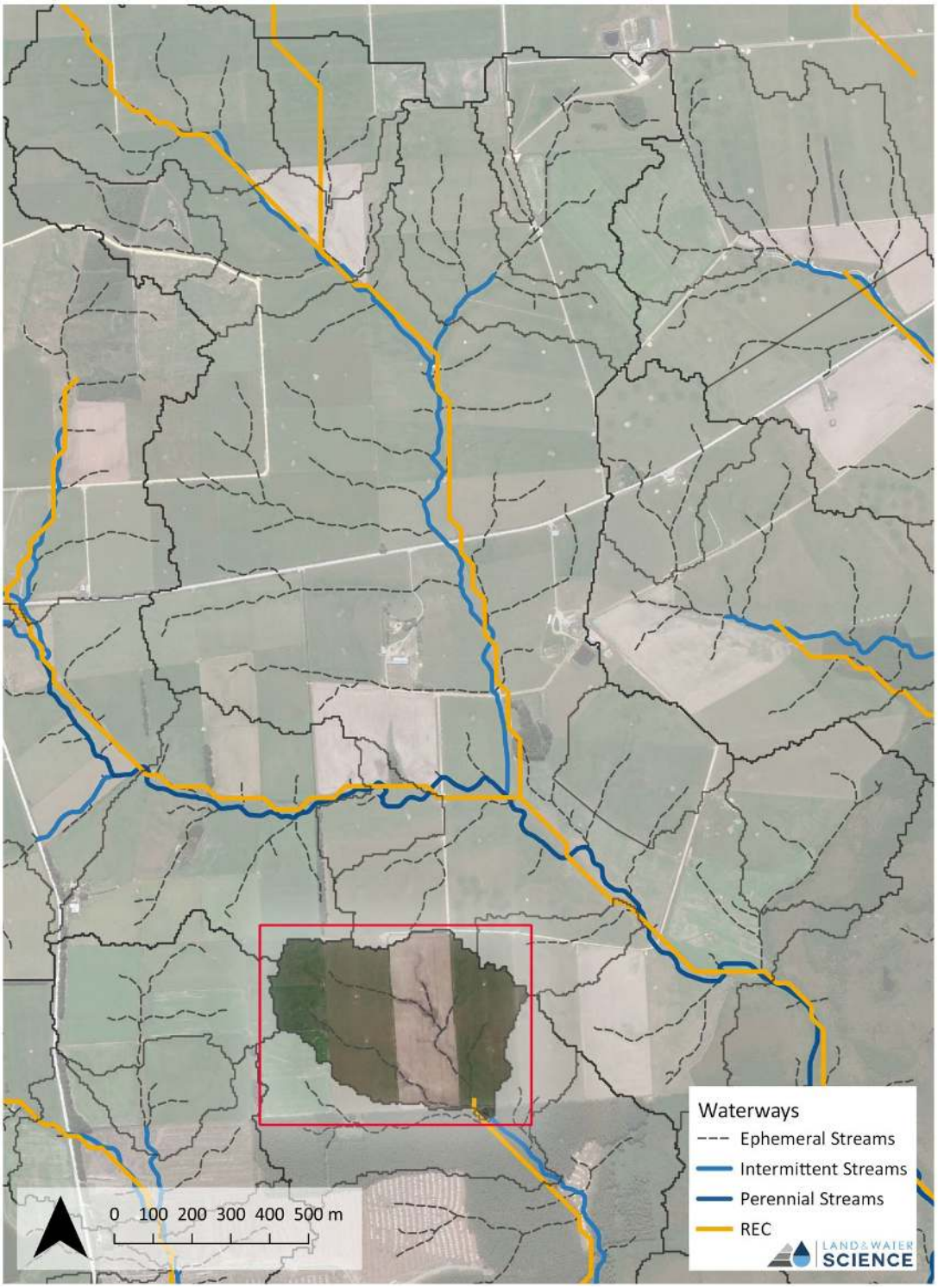


Figure 1: Drainage shed (unshaded = 22.5 Ha), associated ephemeral drainage network (dashed black lines) and their connection to the intermittent and perennial stream network. The drainage shed includes an area of winter grazing that drains directly to the surface water network. Here the lower reaches of the ephemeral drainage network act as transfer zones. The waterways are derived from LiDAR, where REC is the national River Environment Classification for comparison.

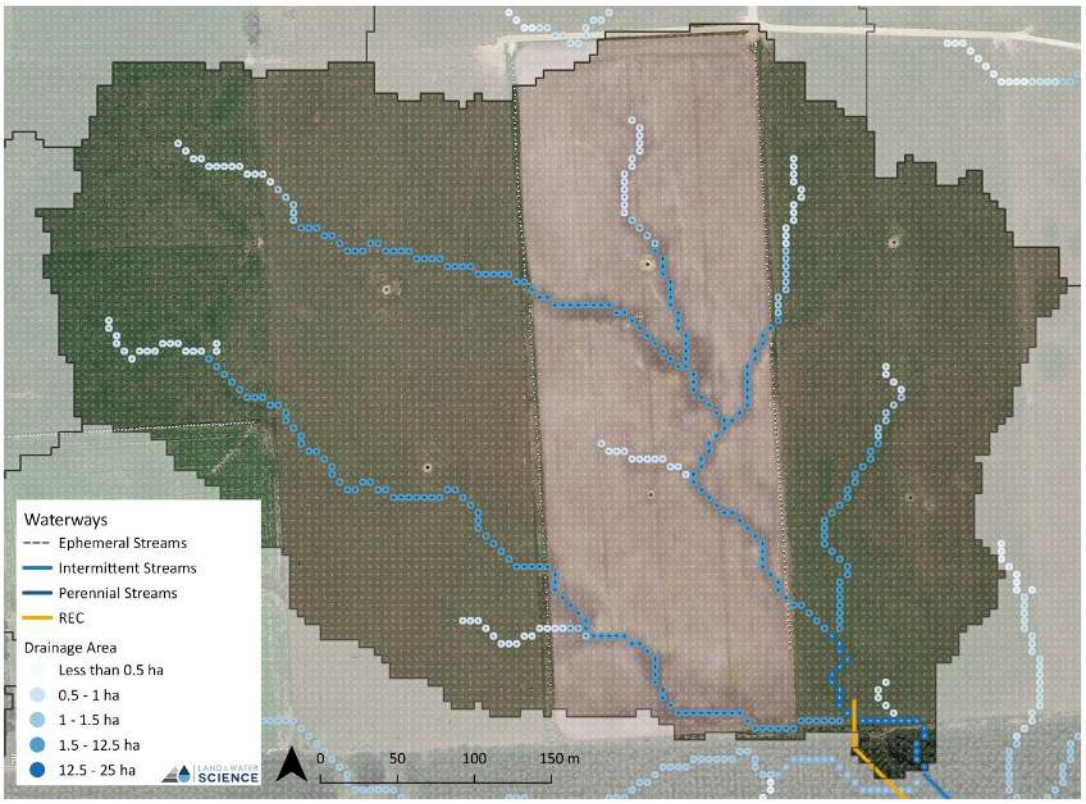


Figure 2. Close up of ephemeral drainage pathways and associated drainage area (unshaded) and their connection to the stream network. Note the area of winter grazing (bare ground) directly within the ephemeral drainage network. Small arrows (1 m^2) depict drainage water flow direction, and coloured circles denote flow accumulation, which increases downgradient towards the intersection with the intermittent and perennial stream network. Flow accumulation area may be used as a threshold for how much of the ephemeral network should be left vegetated.

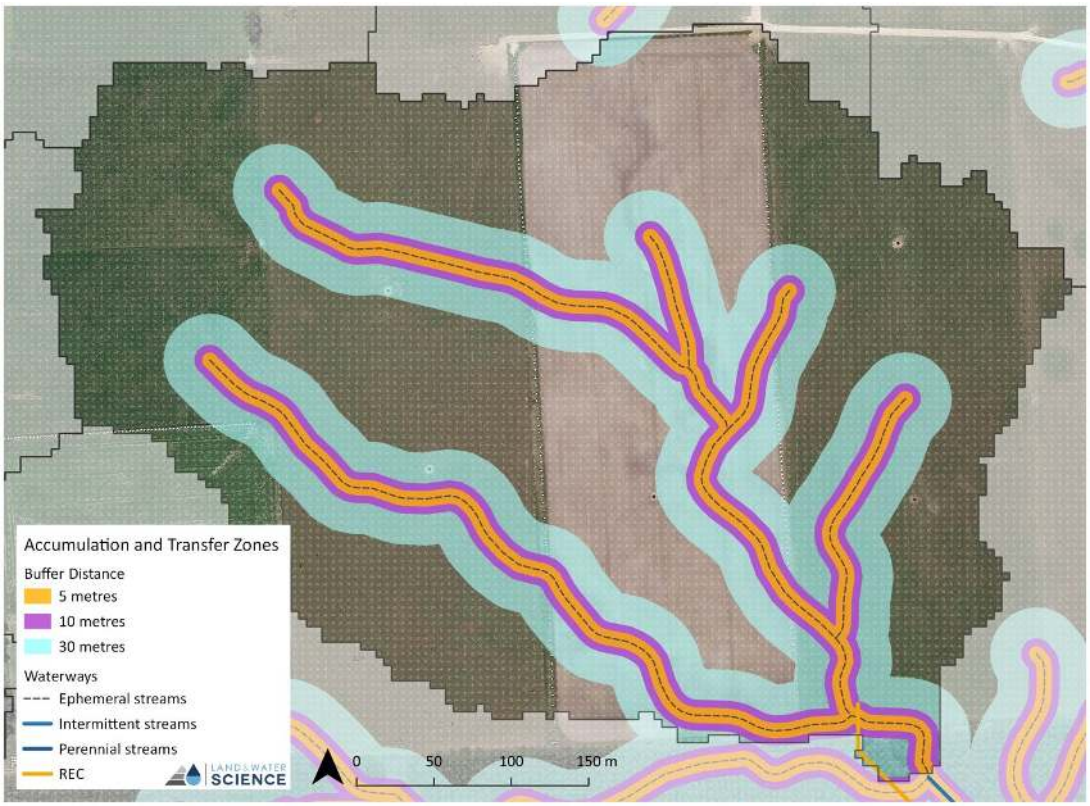


Figure 3. Arbitrary buffers of *five, ten and thirty-meter width around the ephemeral stream network that acts as critical transfer zones to surface waters. Various management practices may be used to trap or filter out contaminants within these transfer zone areas. Buffer widths can be refined according to local soil and topographic properties. Further, the area of flow accumulation may be used as a threshold for how much of the ephemeral network should be left vegetated (see Figure 2). This would reduce the area of buffering required.*

Identifying 'critical transfer zones' provides an objective, topographically guided, basis for identifying locations for reducing runoff from farm. This type of analysis can be readily automated and applied at scale. Land and Water Science Ltd have generated a number of such analysis for catchments across New Zealand.

Sincerely,

Clint Rissmann, PhD

Director Land and Water Science
90 Layard St, Invercargill, 9810
Adjunct Senior Fellow
Waterways Centre
Lincoln University/University of Canterbury

P: 021 678112
W: www.landwatersci.net

Reference

Couldrey, M., Pearson, L., Rissmann, C., and Newe, H. (2018). Peak runoff control for farm contaminant retention in the Waituna Catchment. Land and Water Science Report 2018/12. 53p.

Appendix 3

Section 32 Report on Physiographic Zones

Winter Grazing and Dairy Farming

The following memo seeks to describe the susceptibility of particular parts of Southland to dairy grazing and winter grazing practices.

1. **Dairy Grazing**

Dairy cows grazing pasture excrete between 60-90% of the nitrogen they consume in urine and faeces, and over 70% of the nitrogen excreted is in urine (Haynes & Williams, 1993). This urinary nitrogen is deposited unevenly across the pasture, resulting in small, localised areas that contain a large amount of nitrogen known as urine patches. N losses to the environment occur primarily as leaching below the root zone to groundwater as NO_3^- or as losses to the atmosphere as either N_2O or N_2 gas via denitrification or as NH_3 gas via volatilisation of NH_4^+. N lost to shallow groundwater often ends up in streams during summer low flow recharge and can result in detrimental eutrophication effects. The majority of NO_3^- leaching occurs under a urine patch due to a difference in the loading rate of N from urine (~ 1000 kg $N.ha^{-1}$) (Di & Cameron, 2002; Haynes & Williams, 1993) and the capacity for plants to uptake this N (~ 300 – 700 kg $N.ha^{-1}$) (Moir et al, 2010 & refs within) resulting in an excess of N. In the Southland Region, nitrogen losses from dairy farms are approximately 60% greater than those from intensive sheep/beef/deer pasture farm systems (Ledgard 2014 and refs. within). Phosphorus losses from dairy farms are approximately 25% greater than those from intensive sheep/beef/deer pasture farm systems (Ledgard, 2014 and refs. within). However, phosphorus losses vary considerably with land type and form.

2. **Winter Grazing**

In-situ grazing of forage crops over the months of May – August has been shown to make a disproportionately large contribution to nutrient losses from the total farm system (De Klein et al. 2010; Monaghan et al. 2013; McDowell & Monaghan 2015; McDowell & Stevens, 2008; McDowell & Houlbrooke, 2008; Shepherd et al. 2012; Smith et al. 2012). Proportions of N and P lost and the mechanism of loss is dependent on the land form and type.

3. **Susceptibility across Southland**

Nutrient losses from these practices are exacerbated when they occur on parts of the landscape that are susceptible to either nitrogen or phosphorus loss. For example, dairy grazing on shallow stony soils that have no/very little ability to remove nitrogen or store water, resulting in transport of any excess or unused nitrogen below the root zone with drainage. In another example, organic soils, especially newly developed soils are susceptible to phosphorus loss because of the inherent low anion storage capacity of the soil meaning any excess water soluble phosphorus is transported with drainage and lost from the system.

The Physiographic Units provide a mechanism for identifying these areas of high susceptibility. Each of the Physiographic Units that are most susceptible to nutrient loss under dairy grazing and winter grazing are presented below with an explanation of the reasons for this. Particular regard is given not only to the contamination of the direct receiving environment but also to down gradient affects. For example a contaminated aquifer feeding a stream during baseflow may cause the stream to exceed a particular water quality threshold.

- **Old Mataura Physiographic Unit**

The Old Mataura Unit is characterised by highly weathered alluvial gravels of the Luggate and Shotover Formations (Turnbull & Allibone, 2003, Rissmann et al., 2015). The unit is exclusive to the Mataura Catchment and where overlain by well drained shallow stony soils or fragic pallic soils (i.e., Old Mataura Unit) there is little capacity to attenuate N loss. The predominance of well drained shallow stony soils that have little ability to denitrify or hold water (Topoclimate, 2001) means the area is highly susceptible to nitrate leaching to groundwater. The highly weathered nature of the gravels that make up the aquifer results in little/no ability to remove nitrogen and low transmissivity rates, meaning the water moves very slowly and nitrogen concentrations can build to high levels. Commonly these levels exceed the maximum allowable value (MAV) for drinking water (NZDWS, 2008; Rissmann, 2012; Rissmann et al., 2015). Great unsaturated zone lag times (3 – 9 years) (Chanut et al., 2014) also equate to a longer delay in peak nitrate delivery than in equivalent areas (i.e. Oxidised Physiographic Unit). Where ever there is this combination of the Luggate and Shotover formations overlain by well drained shallow stony soils or fragic pallic soils we see elevated groundwater nitrate (Rissmann 2012; Rissmann et al., 2015). Because the unit is dominated by land surface recharge (LSR) there is no flushing of the aquifers by alpine derived water (Rissmann et al., 2015).The median groundwater nitrate-N concentration within the unit is 10.0 mg/L, the highest of any Physiographic Unit (Physiographic User Guide, 2015). Also important to consider with the Old Mataura Unit is its contribution of groundwater to streams during baseflow in the summer months (Liquid Earth, 2010). It is hypothesised that contaminated groundwater from the Balfour area (within Old Mataura) increases the nitrate concentrations in the Waimea Stream considerably under baseflow and that this is contributing to the declining water quality in the Waimea Stream (Moreau and Hodson, 2015; Hodson, 2015) and the overall nitrogen load in the system. The Waimea Stream at Mandeville is one location in Southland that exceeds the national bottom line for periphyton (Hodson, 2015) and is showing increasing trends in surface water nitrate (Moreau and Hodson, 2015).

Summary

- Soils and aquifers do not remove nitrogen
- Due to low aquifer transmissivities nitrate concentrations can build to very high (toxic) levels
- Nitrogen can be rapidly transported below the root zone
- Nitrate concentrations exceed the MAV in many places
- Contribution of contaminated groundwater to surface water during baseflow degrades surface waters. The Waimea Stream is showing significant degradation and is getting worse.
- Lag times are slightly longer than in other equivalent areas (Oxidising Physiographic Unit)
- No/little riverine flushing due to almost exclusive LSR

- **Oxidising Physiographic Unit**

The Oxidising Unit is characterised by areas of soils with an oxic redox state (show little capacity to remove nitrate) underlain by aquifers that also show no little capacity to remove nitrate. Like the Old Mataura Unit these areas are susceptible to nitrate leaching through the soil profile to groundwater and nitrate concentrations become elevated in the underlying aquifers. As with the Old Mataura Unit the Oxidising Unit is dominated by land surface recharge (LSR) and hence receives no flushing by alpine water. The main difference in these units is that the aquifers are younger and less weathered meaning groundwater flows more quickly in these systems and that for equivalent nitrate loadings nitrate concentrations may not reach the same levels those seen in the Old Mataura Unit. Groundwater nitrate hotspots are common under the Oxidising Unit and in some places nitrate concentrations exceed the MAV (Hodson, 2015; NZDWS, 2008; Liquid Earth, 2010; Rissmann 2012; Rissmann et al., 2015). The median groundwater nitrate-N concentration within the unit is 5.7 mg/L, the third highest of any Physiographic Unit (Physiographic User Guide, 2015). In a similar manner to the Old Mataura Unit, aquifers within the Oxidising Unit contribute to baseflow in adjacent streams potentially increasing nitrate concentrations in-stream and overall nitrogen load in the system. The median surface water nitrate-N concentration within the unit is 2.1 mg/L, the second highest of any Physiographic Unit (Physiographic User Guide, 2015).

Summary

- Soils and aquifers do not have ability to remove nitrate
- Groundwater nitrate concentrations are the third highest of any unit and exceeds the MAV for drinking water in some areas.
- Contribution of contaminated groundwater to surface water during baseflow contributes to degradation of surface waters.
- No/little riverine flushing due to almost exclusive LSR

- **Peat Wetlands Physiographic Unit**

The Peat Wetlands Unit is characterised by areas of organic or intergrade soils underlain by peat. Peat areas are particularly prone to phosphorus loss especially is the land has been recently developed (Rissmann et al., 2012; McDowell & Monaghan, 2015). Organic soils have a low anion storage capacity and therefore do not retain phosphorus in the soil profile as well as soils with a higher mineral content (Rissmann et al., 2012; McDowell & Monaghan, 2015). For similar reasons, peats soils are also poor at retaining K and SO_4 and other agronomically applied chemicals including Ca and Mg. Peat wetlands also show elevated *E.coli* presumably due to high void space and consequently less effective filtering/retention of microbes.

Several streams within or hydraulically connected to the Peat Wetlands Unit within the Waituna catchment are showing increasing trends for dissolved reactive phosphorus (DRP). Median groundwater phosphorus concentrations for areas of peat wetland across the southern portion of the Waituna catchment are 50 times higher than those of the northern half of the catchment (Rissmann et al., 2012).

Summary

- Organic soils are poor at retaining phosphorus and other agronomically applied chemicals.
- Peat soils are poor at filtering out microbes equating to high instream *E.Coli* counts.
- Several streams within or that drain the unit are getting worse with regards to DRP.
- Development of land within the Peat Unit for dairy or wintering should be avoided due to the high risk of P and *E.coli* loss.

- **Central Plains Physiographic Unit (Particularly susceptible to losses under dairy grazing)**

The Central Plains Unit is categorised by aquifers that have little or no ability to remove nitrogen overlain by fine textured soils that have a high proportion of mafic derived clay content. Whilst the soils in this Unit have the ability to remove nitrogen the clay content causes them to crack in the dry summer months allowing drainage water carrying nitrogen to be flushed directly into the aquifers (Rissmann et al., 2015). During the winter these soils then expand and the cracks close forcing water to flow through the soil, through the artificial drain network or overland. This means the Central Plains Unit is highly susceptible to nitrate accumulation in groundwater during late summer and autumn when nitrogen that has accumulated in the soil zone over summer is flushed through the system in the first drainage event. Over winter the Unit acts no differently to the Gleyed Physiographic Unit (Rissmann et al., 2015). Ground and surface waters within the Central Plains Unit are showing significant deterioration. The median groundwater nitrate-N concentration within the unit is 6.1 mg/L, this is second only to the Old Mataura Unit (10.0 mg/L) (Physiographic User Guide, 2015). Some samples of groundwater within the Central Plains Unit exceed the MAV for drinking water (NZDWS, 2008; Rissmann 2012; Rissmann et al., 2015). The Central Plains Unit is dominated by land surface recharge so receives little/no flushing by alpine water (Rissmann et al., 2015). The median surface water nitrate-N concentration within the unit is 5.5 mg/L, this is the highest of any Physiographic Unit (Physiographic User Guide, 2015) and is currently showing an increasing trend (Moreau and Hodson, 2015; Hodson, 2015).

Summary

- Aquifers susceptible to nitrate accumulation.
- Soils allow direct transport of nitrate to aquifers in late summer – autumn.
- Groundwater contributes to streams at baseflow, the Waimatuku in particular is showing significant degradation and water quality is getting worse.
- No/little riverine flushing due to almost exclusive LSR.

- **Riverine Physiographic Unit**

The Riverine Physiographic Unit is categorised by recent and fluvial soils overlying oxidised aquifers. These soils are classed as having a severe nutrient leaching risk. Soils and aquifers within the Riverine Unit have no/little ability to remove nitrogen. Nitrogen losses in these areas under wintering can be large (Smith et al., 2012). The Riverine unit is differentiated from the Old Mataura and Oxidised units by a high degree of flushing by river waters, primarily alpine but also bedrock river recharge. Flushing by alpine and bedrock river water provides an ecosystem service by diluting and transporting nutrients in the groundwater. The high degree of river water flushing regulates the concentration of nitrate to values far below the NZ Drinking Water Standard, with nitrate nitrogen concentrations that are below the national bottom line of 6.9 mg/L.

Losses of nitrogen from these areas contribute to the overall load within the catchment. Due to the potentially large magnitude of losses per hectare these areas may contribute a disproportionate amount of nitrogen to the system. In the Oreti, Aparima, Waiau and Mataura the ultimate

freshwater receiving environments are the estuaries. Of these the Jacobs River (Aparima) and New River (Oreti) estuaries are showing signs of degradation and decreasing trends in water quality/state of eutrophication (Stevens & Robertson 2012; Stevens & Robertson 2013; Townsend and Lohrer, 2015).

There are significant unknowns around the fate of nitrogen derived from dairy and winter grazing on the Riverine Unit:

- Whether the majority or a significant proportion of the nitrogen lost is flushed through the estuaries to the sea in winter high flow events.
- Whether some/any of this nitrogen is taken up by macrophyte/periphyton growth in the River and in this then a problem in the estuary at a later time?
- Are N losses from dairying and winter grazing on the Riverine Unit a significant contributor to the degradation of the estuaries?
- Nitrogen lost from these areas during drainage events not associated with high flows may be a significant contributor to adverse effects in the downstream ecosystem.

Due to the majority of soils within the Riverine unit being classified as having severe N leaching loss dairying and winter grazing activities on the Riverine Unit will contribute to the load of nitrogen in the catchment. In regards to the catchment, this contribution is likely to be disproportionate to the land area (Smith et al., 2012; Ledgard, 2013. Whether this nitrogen load from winter and dairy grazing on Riverine is having direct significant impacts on the downstream ecosystems is unclear.

Conclusions

The Old Mataura, Oxidising and Peat Wetlands Physiographic Units have been identified as the most susceptible to nutrient loss and water quality degradation resulting from dairy and winter grazing. The Central Plains unit has been identified as being highly susceptible to dairy farming specifically. It should be noted that the Riverine Physiographic Unit is also susceptible to nitrogen loss but due to flushing by alpine water nitrogen does not accumulate in this environment. Nitrogen is transported down catchment and likely contributes a significant load to the downstream ecosystem. The inclusion of this as a unit of high susceptibility can be considered based on the outline provided above.

References

Chanut, P., Ledgard, G., Rissmann, C., Wilson, S., (2014). Estimating Time Lags for Nitrate Response in Shallow Southland Groundwater, Technical Report. Environment Southland publication No 2014-13, Invercargill. 51p.

De Klein, C. A. M., Monaghan, R. M., Ledgard, S. F., & Shepherd, M. (2010). A system's perspective on the effectiveness of measures to mitigate the environmental impacts of nitrogen losses from pastoral dairy farming. In Proceedings of the Australasian Dairy Science Symposium (Vol. 4, pp. 14-28).

Di, H.J.; Cameron, K.C. (2002). The use of a nitrification inhibitor, dicyandiamide (DCD) to decrease nitrate leaching and nitrous oxide emissions in a simulated grazed and irrigated a grassland. Soil use and management. 18, 395-403.

Haynes R, Williams P. (1993) Nutrient cycling and soil fertility in the grazed pasture ecosystem. Advances in Agronomy 49: 119-199

Hodson R. (2015) Water Quality in Southland – Fact Sheet. Environment Southland.

Ledgard, G. (2014). An inventory of nitrogen and phosphorous losses from rural land uses in the Southland region. Nutrient management for the farm, catchment and community. Occasional Report, (27).

Liquid Earth (2010). State of the Environment: Groundwater Quality Technical Report. Prepared for Environment Southland, 2010.

Moir, J. L., Cameron, K. C., Di, H. J., & Fertsak, U. (2011). The spatial coverage of dairy cattle urine patches in an intensively grazed pasture system. The Journal of Agricultural Science, 149(04), 473-485.

Monaghan R.M., Smith L.C., C.A.M. De Klein. (2013). The effectiveness of the nitrification inhibitor dicyandiamide (DCD) in reducing nitrate leaching and nitrous oxide emissions from a grazed winter forage crop in southern New Zealand. Agriculture, Ecosystems and Environment 175 (2013) 29– 38

McDowell, R. W., & Monaghan, R. M. (2015). Extreme phosphorus losses in drainage from grazed dairy pastures on marginal land. Journal of environmental quality, 44(2), 545-551.

McDowell, R. W., & Stevens, D. R. (2008). Potential waterway contamination associated with wintering deer on pastures and forage crops.

McDowell R.W., Houlbrooke D.J. (2008). Phosphorus, nitrogen and sediment losses from irrigated cropland and pasture grazed by cattle and sheep. Proceedings of the New Zealand Grassland Association 70, 77-83.

Moreau, M. and Hodson, R. (2015). Trends in Southland's water quality: a comparison between regional and national sites for groundwater and rivers. GNS Science Consultancy Report 2014/61.

NZDWS, (2008): New Zealand Drinking-Water Standards. Ministry of Health. Publication WA 675 NEW 2008. New Zealand 2005 (revised 2008).

Physiographic User Guide. (2015 in press). User guide to the physiographic technical sheets. Environment Southland report, November 2015.

Rissmann, C. (2012). The Extent of Nitrate in Southland Groundwaters Regional 5 Year Median (2007-2012 (June)) Technical Report. Environment Southland publication No 2012-09, Invercargill. 24p.

Rissmann C., Rodway E., Hughes B., Wilson K. (2015 in press). Physiographics of Southland Part 2: Application to Understanding Water Quality Outcomes. Environment Southland report.

Shepherd, M., Wyatt, J., & Welten, B. (2012). Effect of soil type and rainfall on dicyandiamide concentrations in drainage from lysimeters. Soil Research, 50(1), 67-75.

Smith, L. C., Orchiston, T., & Monaghan, R. M. (2012). The effectiveness of the nitrification inhibitor dicyandiamide (DCD) for mitigating nitrogen leaching losses from a winter grazed forage crop on a free draining soil in northern Southland. In Proceedings of the New Zealand Grassland Association (Vol. 74, pp. 39-44).

Stevens, L.M., Robertson, B.M. (2012) *New River Estuary 20012. Broad scale Habitat Mapping and Sedimentation Rate.* Report prepared by Wriggle Coastal Management for Environment Southland: 29.

Stevens, L.M., Robertson, B.M. (2013) *Jacobs River Estuary: Broad scale Habitat Mapping 2012/13.* Report prepared by Wriggle Coastal Management for Environment Southland. 26p.

Townsend, M and Lohrer, D. (2015). A review of the ecological health and water quality in four Southland estuaries. Prepared for Environment Southland and Dairy NZ, April 2015.

Topoclimate South, (2001). Topoclimate South Soil Mapping Project. Electronic files held by Environment Southland

Turnbull, I.M., Allibone, A.H. (compilers) (2003). Geology of the Murihiku area: scale 1:250,000. Lower Hutt: Institute of Geological & Nuclear Sciences Limited. Institute of Geological & Nuclear Sciences 1:250,000 geological map 20. 74 p. + 1 folded map

Environment Southland
Corner Price St & North Rd, Private Bag 90116, Invercargill 9840
Phone: (03) 211 5115 / 0800 76 88 45
Email: www.es.govt.nz

Date 27 April 2021

Subject: **SEM Periphyton Monitoring Programme Report for 2018-2020**

Approved by: G K Bedford, Director - Environment Quality

S J Ruru, Chief Executive

Document: 2750295

Purpose

1. The purpose of this memorandum is present to the Committee the latest report on the ecological health and state of streams and rivers in the Taranaki region, as measured by assessing periphyton during the 2018-2020 years. The programme is reported in *Freshwater Periphyton Monitoring Programme (Periphyton monitoring in relation to amenity values) State of Environment Monitoring Report 2018-2020.*
2. The Executive Summary and recommendations from the report are attached to this memorandum.

Executive summary

3. Section 35 of the Resource Management Act requires local authorities to undertake monitoring of the region's environment, including land, air, and fresh and marine water quality. The freshwater periphyton programme has been designed to monitor the presence, distribution, and characteristics of algae in Taranaki streams and rivers, especially if this reaches levels, which may affect the instream values of these streams i.e. aesthetic values (contact recreation and amenity values) and biodiversity values. Periphyton provide much of the energy (food) for aquatic ecosystems, but given the wrong combination of conditions, periphyton can proliferate to a degree that degrades the system, forming large nuisance growths (either thick mats or long filamentous strands). The New Zealand Periphyton Guidelines provide a reference for the point at which growths of periphyton exceed the recreational guideline. Periphyton cover is deemed to have become unacceptably prolific when at least 30% of the bed is covered by strands of filamentous algae, and/or at least 60% of the bed is covered by thick mats of algae.
4. The report notes that water, like all other natural resources, is considered by Maori to be a taonga to be valued, used with respect and passed on to future generations in as good or better condition than at present. In a physical sense, water is valued by hapu and whanau for the provision of sustenance through mahinga kai, or food resources eg, tuna (eel), piharau (lamprey), kahawai, inanga and other whitebait species. These cultural,

spiritual, and life-supporting values would be adversely affected by excessive periphyton growth.

5. The Taranaki Regional Council initiated a periphyton monitoring programme within its suite of the State of the Environment Monitoring (SEM) programmes for Taranaki, in the 2002-2003 monitoring year. The latest reports on the state of stream health and quality as measured by periphyton indicators is being presented today, covering the 2018-2020 period. It describes the results of the programme for the two monitoring years, and in addition provides an overall assessment (based on eighteen years of data) and identifies trends in the extent of periphyton cover at each site where present.
6. Twenty sites in nine representative catchments around the Taranaki region were selected for surveyed on four occasions during the two year period, generally in each spring and summer, according to consistent protocols including a minimum period after flow conditions that could scour and flush periphyton. In other words, sampling is conducted under 'worst case' conditions that allow nuisance periphyton to proliferate, prior to sampling.
7. Sites have been chosen to be representative of different catchment types found in the region, such as high conservation, riparian establishment, and major abstraction. Most of the rivers/streams in the programme have one upper site (ie less potential effect from human activities), and one or two lower sites (with various degrees of potential effect or influence). The results were interpreted to both provide a periphyton index score (PI) and to record exceedances of the recreational and aesthetic guidelines. For the PI, a higher value represents better in-stream conditions. The numerical index score is expressed in equivalent descriptive terms, ranging from 'very poor' through 'poor', 'moderate', and 'good' to 'very good' (the highest grading).
8. Chlorophyll *a* (the green pigment in algae) was used as a proxy for the amount of live periphyton biomass during the two summers. Guidelines for chlorophyll *a* have established by the Ministry for the Environment (Biggs, 2000). The National Objectives Framework (NOF) (MfE, 2014 and 2020) also uses chlorophyll *a* to assign rivers and streams into bands of stream health categories. There is a Government-imposed requirement to ensure streams and rivers are above the 'D' band (chlorophyll *a* to be less than 200 mg/m^2) from 2025 onwards. The Council's long-established chlorophyll *a* sampling protocol differs from that established more recently for the NOF guideline, and therefore results cannot be directly translated to NOF bands.
9. Surveillance monitoring was also undertaken for the presence of didymo (an invasive alien species of periphyton) and for cyanobacteria (some forms of which can become toxic).
10. In the **2018-2020** period, out of 160 individual site surveys conducted (80 for each of thick mats and for filamentous algae), 147 complied with the MfE guidelines- a compliance rate of 92% (93% in 2016-2018). Twelve of the 20 sites never had any breach during this period, while three sites had more than a single breach (out of the 8 surveys at each site): one site each on the Manganui (two breaches of the long filament guideline), the Patea (likewise), and the Waiongana (at one site, one breach each of the long filaments and the thick mat guidelines, and at the other site, 3 breaches of the long filaments)). None of these sites had had more than one breach in the previous two-year period; conversely, none of the sites that had had more than one breach previously showed the same pattern in the latest period. In terms of seasonality, there were two breaches found during spring surveys and the remainder in summer surveys. All these results were very much in line with those of the previous two years.

11. Of the 20 individual sites, 10 had a median Periphyton Index score of 'very good' in the 2018-2020 period, 8 had a median score of 'good', and 2 a score of 'moderate'. No sites received a lower median grading. During the same period, out of 80 individual ratings of state that could be assigned, 3 fell into the 'poor' and 1 into the 'very poor' categories; that is, 95% of surveys found at least 'moderate' condition.
12. Long term periphyton trend analysis revealed the status of periphyton was not changing at the majority of sites. After testing for statistically significant trends after FDR adjustment was applied (a rigorous test for statistical confidence), 4 sites had significantly increasing thick mats and two had significantly decreasing thick mats; long filaments are significantly decreasing at one site with no other significant trends in long filaments apparent anywhere else.
13. Periphyton biomass levels as assessed by chlorophyll *a* showed significant variation among sites, with a range from 1 to 621 mg/m^2 over the reported period. Three sites had values above the NOF guideline value (200 mg/m^2)- all during the 2020 summer. No site exceeded the NOF limit in both surveys. Exceedance of the numerical limit in a single survey does not constitute a breach of the NOF standard as prescribed. Nine sites had values above the guideline to protect benthic biodiversity (50 mg/m^2) in one or other of the two summer surveys- a significant reduction from the 13 sites which had been found to exceed this guideline within the 2016-2018 period. A majority of sites in each survey had values below the guideline.
14. No didymo has been found at any time at any site.
15. True upstream sites with little agriculture in their catchment generally have a low biomass and stable periphyton canopy throughout the year. Catchments with a proportion of their catchment used for agriculture are more likely to have periphyton growths at sites lower in the catchment during an average summer (not necessarily to a nuisance degree). The report notes that there has been generally an increase in riparian exclusion and planting implemented throughout the Taranaki region in the time since periphyton monitoring first began; this will generally lead to reduction in nuisance growths, but with occasional fluctuations depending on climatic conditions (eg sustained high stream temperatures noted during summer 2020).
16. The report includes recommendations for the continuation of the programme.

Recommendations

That the Taranaki Regional Council:

a) receives this memorandum on the results of the Council's SEM programme monitoring periphyton, and the accompanying report Freshwater Periphyton Monitoring Programme (Periphyton monitoring in relation to amenity values) State of Environment Monitoring Report 2018-2020 Technical Report 2020-24.

b) adopts the specific report recommendations contained therein.

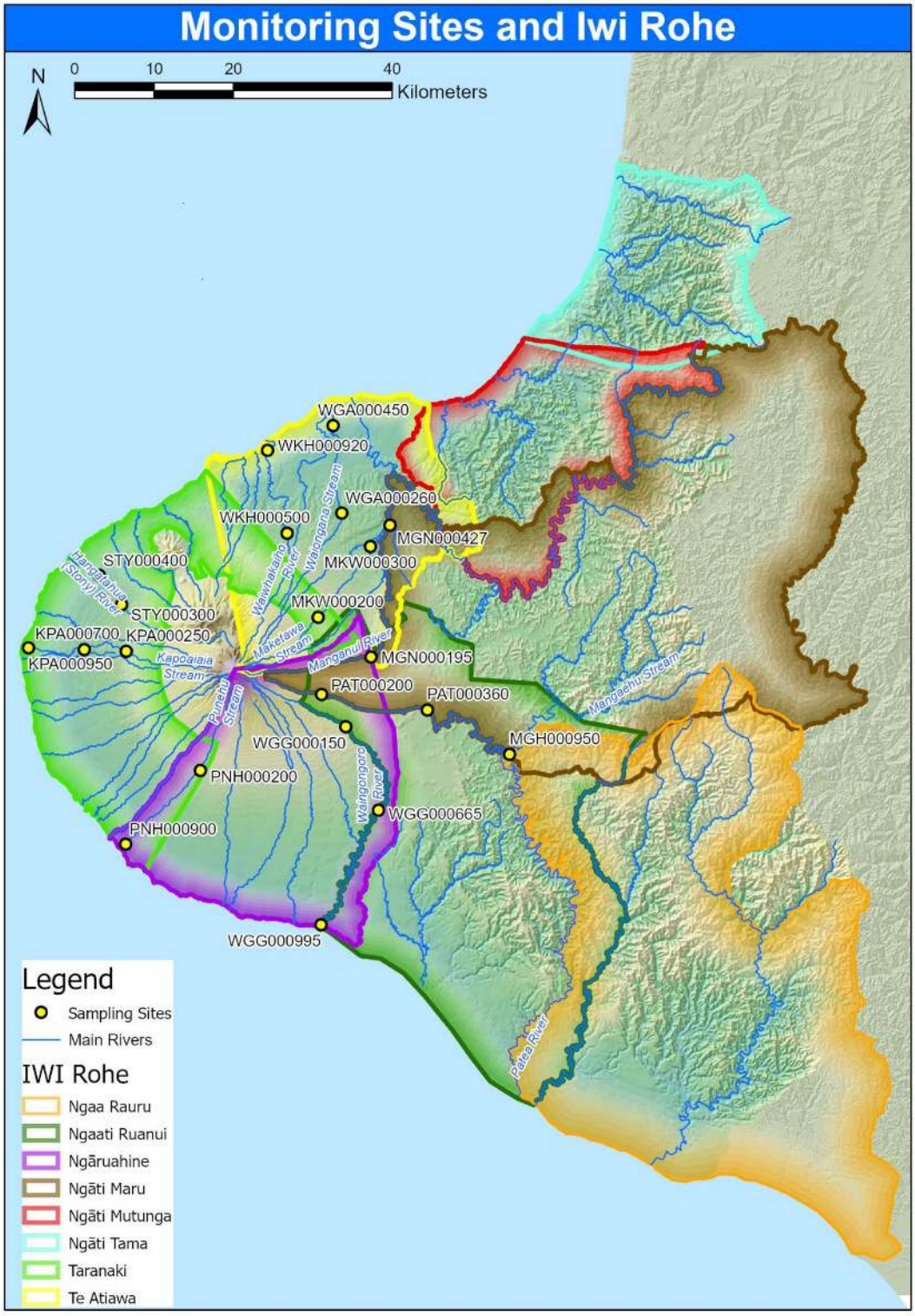


Figure 1: Periphyton sampling site locations (current programme)

Background

17. The Council's *Regional* Fresh *Water Plan for Taranaki (2001*) includes the following objectives:

    Obj 3.1.2 *To maintain and enhance the natural, ecological and amenity values of rivers and streams of value in the region…*

    Obj 3.1.4 *To safeguard the life-supporting capacity of water and aquatic ecosystems from the adverse effects of the use and development of fresh water*

    Obj 3.1.5 *To maintain and enhance amenity values and the quality of the environment of Taranaki's rivers…*

18. The Council's Annual Plan for 2018-2019 contained a target for managing the algal state of the region's streams, as follows: '*Improvements in…algal cover, against a baseline of 1995 water quality, as applicable at 11 representative sites*'.

19. Section 35 of the Resource Management Act requires local authorities to undertake monitoring of the region's environment, including land, air, and fresh and marine water quality.

20. The Taranaki Regional Council initiated the periphyton monitoring programme within the Council's suite of the State of the Environment Monitoring (SEM) programmes for Taranaki in the 2002-2003 monitoring year. The freshwater periphyton programme has been designed to monitor the presence, nature, and distribution of algae in Taranaki streams and rivers with particular regard to the extent of proliferation which may affect the instream values of these streams i.e., aesthetic values (contact recreation and landscape values), biodiversity values, and those values linked to Maori culture and tradition. The programme is a continuing programme so as to test the effectiveness of regional water resources management policies. The most obvious of these is the progressive development of riparian planting in Taranaki, as shading of a stream may serve to limit periphyton growth and riparian planting may also filter runoff that is high in nutrients and sediment, which in turn may help reduce conditions conducive to the establishment of nuisance growths. Reductions in contaminant concentrations and mass loadings in point source discharges (whether agricultural or industrial) within a catchment may consequently improve water quality and limit the nutrients which allow nuisance periphyton to proliferate.

21. When managing rivers and streams for instream values, it is important to consider periphyton for two reasons:

    (a) Periphyton provides much of the energy (food) for the ecosystem.
    (b) Given the wrong conditions, periphyton can proliferate, forming large nuisance growths. Such growths interfere with human uses and degrade the habitat for other organisms.

22. The New Zealand Periphyton Guidelines provide a reference at which point growths of periphyton exceed the recreational guideline. This point is exceeded when at least 30% of the bed is covered by filamentous algae and/or at least 60% of the bed is covered by thick mats of algae. Additional guidelines or standards are now in place for chlorophyll *a* (the green pigment in algae). The *New Zealand Periphyton Guidelines* (2000) recommended a maximum value of 50 mg/m^3 (monitored on the basis of scheduled rather than worst-case sampling) for the protection of benthic diversity, or 200 mg/m^3 to protect trout fisheries. The National Policy Statement for Freshwater Management 2014 (amended 2017 and again 2020) sets a bottom line of 200 mg/m^3 (monitored on the basis

of scheduled monthly rather than targeted worst-case sampling, and with one or two exceedances allowed for in each year).

Discussion

23. This report summarises the results of the programme for the monitoring period 2018-2020, and follows on from earlier reports covering up to the end of the 2018 monitoring period. Twenty-one sites have been surveyed each year in ten catchments around the Taranaki region. However, due to safety concerns for one site, it has been deleted from the programme. Sites were chosen to be representative of different catchment types such as high conservation, riparian and major abstraction. In most cases, each river/stream has one upper site (where there is less potential effect from human activities), and one or two lower sites (with various degrees of potential effect). Sampling was undertaken generally twice each year, in spring (between September and December) and summer to late summer (between January and April), in accordance with protocols that required a minimum period since preceding freshes that may have served to reduce pre-existing periphyton growths. In other words, sampling is undertaken under the conditions that serve to promote a proliferation of periphyton- that is, a worst case circumstance. In some cases surveys had to be omitted because of the absence of suitable (low flow) conditions for the time being.

24. At each site, ten random assessments were made across the stream using a periphyton viewer. Periphyton cover on the stream bed within each square were estimated visually as a percentage cover on the substrate, as being of one of three types-thin film, mats, and/or filaments. The colour of the growth (brown, black, or green) was also recorded, as this provides information on the type and desirability of growths. Additionally, during the summer period periphyton samples were collected from ten rocks randomly selected at each site and levels of chlorophyll a pigment were analysed in a laboratory to determine viable periphyton biomass.

25. Information on the extent of coverage and the characteristics of the algae present is used to establish a periphyton index score (PI) as well as to determine whether the site exceeded the national recreational and aesthetic guidelines. The PI index is based on more information that just the percentage cover or whether the guidelines are exceeded.

26. While a periphyton index has been presented within national stream habitat assessment protocols (the 'SHMAK' PI), this has been found to not be suitable for characterising sites where periphyton communities are frequently affected either by scouring in floods, or by proliferation during low flow stable conditions, such as occurs in Taranaki. Therefore the Council has modified this PI methodology to generate its own index (the 'TRC PI'). In simple terms, a site clear of any algae will have a score of 10 (the maximum), and a site completely covered in filamentous green algae will have a score of 1 (the lowest possible score). While a site that has an exceedence of the periphyton guidelines could conceivably still have a reasonable PI score, even up to 8.2 (depending on the nature of the periphyton present, rather than its extent), a low TRC PI (somewhat at or below 6.0) will generally indicate undesirable growths are present to a significant, even if not at excessive levels. In descriptive terms, the categories are as follows:

Category ratings for TRC PI scores

Rating	TRC PI score
Very good	8-10
Good	6-8

Moderate	4-6
Poor	2-4
Very poor	0-2

27. An approximate scale for interpreting PI values is as follows:-

Score: 0 to 1.9
There are mainly long filamentous green algae at the site indicating that there is high to moderate enrichment. Such enrichment could be from enriched seepage/discharge, or could occur naturally in streams that have a high proportion of recent volcanic rocks (central North Island) in their catchments.
Score: 2 to 3.9
These communities suggest a moderate level of enrichment.
Score: 4 to 5.9
These communities suggest slight enrichment. Clean stones can result from recent abrasion by flood flows or intense grazing by invertebrates/insects that live in the gravels.
Score: 6 to 7.9
These communities are generally composed of species that are able to grow under moderate to low nutrient conditions. These communities also usually grow back first after a flood has removed previous growths, but may be out-grown by filamentous algae if nutrient levels are sufficiently high.
Score: 8 to 10
These communities usually signify low concentrations of nutrients and/or intensive grazing by invertebrates/insects that live among the gravels, or recent scouring.

28. In the **2018-2020** period, out of 160 individual site surveys conducted (80 for each of thick mats and for filamentous algae), 147 complied with the MfE guidelines- a compliance rate of 92% (93% in 2016-2018). Twelve of the 20 sites never had any breach during this period, while three sites had more than a single breach (out of the 8 surveys at each site): one site each on the Manganui (two breaches of the long filament guideline), the Patea (likewise), and the Waiongana (at one site, one breach each of the long filaments and the thick mat guidelines, and at the other site, 3 breaches of the long filaments). None of these sites had had more than one breach in the previous two-year period; conversely, none of the sites that had had more than one breach previously showed the same pattern in the latest period. In terms of seasonality, there were two breaches found during spring surveys and the remainder in summer surveys. Staff have noted that there were prolonged periods of elevated temperatures in streams across the region in the 2020 summer season. All these results were very much in line with those of the previous two years.

29. For the TRC Periphyton Index, the median values for the 2018-2020 surveys were that ten sites (50%) recorded a 'very good' rating, eight sites (25%) recorded a 'good' rating, and two sites (10%) recorded a overall 'moderate' rating (individual survey scores varied from 'poor' to 'very good' in one of these cases, and from 'poor' to 'very good' in the other). All individual surveys received a rating of at least 'moderate' for the TRC periphyton index score, except for three 'poor' scores and one 'very poor' score recorded out of a total of 80 surveys. That is, 95% of surveys found at least a 'moderate' periphyton condition.

Indicative and significant 18-year trends to summer 2020

30. After testing for statistically significant trends after FDR adjustment was applied (a rigorous test for statistical confidence), 4 sites had significantly increasing thick mats and two had significantly decreasing thick mats; long filaments are significantly decreasing at one site with no other significant trends in long filaments apparent anywhere else. The lower Patea River site had previously shown a significantly decreasing level of long filamentous algae. It is noted that the lower Patea River site is just below the discharge point from the Stratford wastewater treatment plant, where recent design and operational improvements have been delivered. In these latest surveys, no trends were apparent at this site.

Patterns in periphyton cover

31. In general, the sites with higher levels of nuisance periphyton were located at the lower ends of their catchment. All sites located within 10 km of the National Park boundary had low or no nuisance periphyton. A number of factors are likely to contribute to this situation, including nutrient levels, hydrology, shading, temperature, substrate composition and invertebrate grazing pressure.

32. Most of the surveyed streams and rivers flow through intensive agricultural areas, and as a result, at some of the lower catchment sites nutrient levels are high enough to cause excessive periphyton growths. Other factors that may contribute to increased levels of nuisance periphyton at lower catchment sites include a lack of shading. This either can be due to limited riparian vegetation along the river (as is more common at lowland sites on the Taranaki ringplain) or due to the riverbed being wider and more open than further upstream.

33. Differences in invertebrate grazer abundances among sites would also affect periphyton biomass. Finally, downstream sites have higher water temperatures than their upstream matched sites, a factor which promotes faster periphyton growth.

    Summer surveys usually have higher levels of nuisance periphyton than the spring surveys. This can be attributed to three main factors: higher water temperatures, which enables faster periphyton growth; longer daylight hours, which promote photosynthesis; and longer periods without freshes or floods to scour away periphyton.

Chlorophyll-a concentration measurements

34. The National Policy Statement for Fresh Water (2014, revised in 2017 and 2020) establishes attribute states (criteria) for the allowable concentration of chlorophyll-a, the pigment in periphyton. The attribute states and their associated numerical descriptions are: 'A' less than 50 mg chl-a/m^2; 'B' 50-120 mg chl-a/m^2; 'C' 120-200 mg chl-a/m^2 ; and 'D' (ie below the bottom line) more than 200 mg chl-a/m^2. Compliance is determined on the basis of samples collected monthly under 'random systematic' conditions ie on the same day of each month regardless of weather and flow conditions. Compliance is defined as having 1 or less samples each year containing more than 200 mg chl-a/m^2.

35. The Council's long-running SEM programme measures chlorophyll only once per year (summer), under worst case conditions ie when periphyton proliferation is at its most productive, rather than on a random basis. Therefore there can be no direct comparison made with the NOF criteria. However, a review of available chlorophyll-a data is still informative. The Council has initiated a separate periphyton survey following the NOF protocols.

36. No site gave one than one result above 200 mg chl-a/m^2 when sampled under worst case conditions in the two summers. Eleven sites (approximately half of all sites) had no results above 50 mg chl-a/m^2, and are effectively in the 'A' band. Six sites had no result above 120 mg chl-a/m^2, and are therefore effectively equivalent to the 'B' band. The three remaining sites (two sites in the Waiongana at mid and lower catchment points, and one in the mid Patea) each had one result above 200 chl-a/m^2. As noted above, this does not necessarily mean that the sites or the waterways they represent would be deemed to be in the 'D' attribute state.

Conclusions

37. Overall, sites located upstream in catchments had low levels of periphyton, while sites further downstream had higher levels of periphyton, which on infrequent occasions (assessed under conditions when proliferation was most likely to occur and to be at its greatest extent) breached various guidelines. Correlation analysis has previously been carried out to attempt to ascertain which environmental factors might be most closely associated with proliferation of periphyton. Results of this were inconclusive. Distance downstream from the National Park, or time since the last fresh, were both factors that were evident to some degree. While some strong correlations emerged for some surveys at some sites, these were not consistent across all sites or all surveys when higher levels of proliferation were found. It should also be borne in mind that correlation does not establish causation.
38. Due to the number of variables involved (e.g. nutrients, light level, temperature, shading, substrate type, time since last fresh, water clarity, level of invertebrate grazing etc), and interaction effects between variables, it can be difficult to ascertain the main factors driving periphyton biomass.
39. The cumulative effects of agricultural discharges via point source or diffuse pollution, together with wider, less shaded stream widths and slower flow velocities, were probably the main cause of algae proliferation in 'downstream' catchment sites.
40. In summary, the weight of evidence from annual monitoring and trend analysis of worst-case conditions suggests that the state of the region's streams, as measured by periphyton biomass, is predominantly 'good' to 'very good'. It is noted that comparison with the NPS-FM attribute for periphyton will be undertaken in a separate programme.
41. The report notes that there has been generally an increase in riparian exclusion and planting implemented throughout the Taranaki region in the time since periphyton monitoring first began.
42. The Council and regional community are committed to meeting the various LTP targets, and over the long term additional measures for maintaining and enhancing water quality, such as completion of the riparian programme and exclusion of direct discharges of treated farm effluent to water, should see further and more robust gains in in-stream ecological health across the region.

Decision-making considerations

43. Part 6 (Planning, decision-making and accountability) of the *Local Government Act 2002* has been considered and documented in the preparation of this agenda item. The recommendations made in this item comply with the decision-making obligations of the *Act*.

Financial considerations—LTP/Annual Plan

44. 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

45. 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

46. 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. A focus in state of the environment monitoring programmes on stream health and well-being, and subsequent reporting to the Council, recognises iwi desires for the protection of wai ora.

Community considerations

47. 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

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

Appendices

Document 2484139 (excerpts): Freshwater Periphyton Monitoring Programme (Periphyton monitoring in relation to amenity values) State of Environment Monitoring Report 2018-2020 Technical Report 2020-24.

Executive summary

Section 35 of the Resource Management Act requires local authorities to undertake monitoring of the region's environment, including land, air, and fresh and marine water quality. The Taranaki Regional Council began monitoring for nuisance periphyton in the 2002-2003 monitoring year. Monitoring is timed for when river conditions are at their most conducive for promoting excessive periphyton growth. That is, by design the programme seeks to quantify 'worst-case' periphyton in the region's rivers. This report summarises the results of the State of the Environment periphyton programme for the monitoring period 2018-2020.

Periphyton is the layer of slime that can form on stream beds and on submerged objects. It consists of a mixture of algae and cyanobacteria that naturally occurs in rivers and streams. It plays a fundamental role in a stream's ecosystem, functioning by utilising sunlight via photosynthesis to absorb nutrients and organic compounds for growth. The periphyton subsequently becomes a food source for invertebrates, which in turn provide food for other organisms such as fish and birds. Nuisance periphyton in the form of prolific thick mats, pervasive long filaments or cyanobacteria can cause a range of issues such as streams becoming un-inviting for recreational users, anglers having difficulty fishing, streams closures due to cyanobacteria toxins, and adverse impacts on stream ecology.

This freshwater periphyton programme has been designed to monitor for the presence and biomass of 'nuisance' algae in Taranaki streams and rivers at levels which may affect instream values i.e., aesthetic values (contact recreation and landscape values), biodiversity values, and those values linked to Maori culture and tradition. To Maori, water is life, is linked to conception, and sustains the growth of crops, animals and people. Rivers represent the tipuna (ancestor) of the Tangata Whenua. Water and every river (awa) therefore has its own mana. Water also has its own mauri (life force) and wairua (spirituality). If the mauri or wairua of a waterbody is interfered with by way of pollution or desecration, then the spirit of the tipuna are affected and the waterbody will lose its vitality, its fruitfulness and its mana. Water, like all other natural resources, is considered by Maori to be a taonga to be valued, used with respect and passed on to future generations in as good or better condition than at present. In a physical sense, water is valued by hapu and whanau for the provision of sustenance through mahinga kai, or food resources e.g., tuna (eel), piharau (lamprey), kahawai, inanga and other whitebait species. These values would be adversely affected by excessive periphyton growth.

Twenty sites are surveyed in nine rivers/streams around the Taranaki Region. Sites have been chosen in order to be representative of different catchment types, such as high conservation, agriculture, riparian and major abstraction. Rivers or streams have one upper (mostly un-impacted) site, and one or two lower sites (with various degrees of land use impact).

Periphyton surveys are scheduled for two times per year; spring (15 September to 31 December) and summer (1 January to 15 April). Sampling is always carried out after an extended period of low flow of at least ten days since a fresh of 3x median flow (i.e. after sufficient time for excessive growths to establish). At each site, ten random assessments are made across the stream using a periphyton viewer. Types of periphyton cover on the stream bed within each square are estimated visually as percentage coverage on the substrate. Periphyton types considered are thin, medium and thick films of mats and short and long filaments. The colour of the growth (brown, black, or green) is also recorded. Additionally, during the summer period periphyton samples are collected from ten rocks randomly

selected at each site, and levels of chlorophyll *a* pigment are analysed in a laboratory to determine periphyton biomass.

The New Zealand Periphyton Guidelines, established by the Ministry for the Environment (Biggs, 2000), provide a reference at which point growths of periphyton exceed the recreational guideline. This point is exceeded when more than 30% of the bed is covered by filamentous algae and/or more than 60% of the bed is covered by thick mats of algae. A TRC specific periphyton index score derived from the standard periphyton index score (Biggs et al., 1998) is also calculated from the periphyton cover data, and scores converted into one of five grades.

Chlorophyll *a* is used to estimate the amount of live periphyton biomass over two summers. Guidelines for chlorophyll *a* were established by the Ministry for the Environment (Biggs, 2000). The National Objectives Framework (NOF) (MfE, 2020) also uses chlorophyll *a* to assign bands to rivers and streams. There is a Government-imposed requirement to ensure streams and rivers are above the D band (chlorophyll *a* 200 mg/m^2) from 2025 onwards. The Council's long-established chlorophyll *a* sampling protocol differs from that established more recently for the NOF guideline and therefore results cannot be directly translated to NOF bands. The Council is now also conducting a NOF-aligned periphyton monitoring programme.

Long-term trends in periphyton cover have been analysed using a combination of the Mann-Kendall technique, a 5% significance level, and a Benjamini-Hochberg False Discovery Rate (FDR) analysis. A LOWESS curve is also fitted to the time series of cover data for each site, allowing a visual inspection of both short and long term trends.

The results for the SEM nuisance periphyton programme during the 2018-2019 monitoring year showed that on two occasions, at two sites, there was a breach of the thick mat guideline, and that on six occasions across four separate sites there was a breach of the long filaments guideline. For the 2019-2020 monitoring year there were no breaches of the thick mat guideline and five occasions, at five separate sites, where there was a breach of the long filaments guideline (Table 1).

For the TRC Periphyton Index, the median index value for 2018-2020 monitoring showed that ten sites (50%) recorded a 'very good' rating, eight sites (25%) recorded a 'good' rating, and two sites (10%) recorded a 'moderate' rating. All surveys received a rating of at least 'moderate' for the TRC periphyton index score except for three 'poor' scores and one 'very poor' score recorded out of a total of 80 surveys. That is, 95% of surveys found at least a 'moderate' periphyton condition.

Periphyton biomass did not exceed the NOF standard (200 mg/m^2) for the summer 2019 surveys but did exceed the NOF standard at three sites for the summer 2020 survey (but see further on the interpretation of NOF compliance below). Periphyton biomass exceeded the guideline to protect benthic biodiversity (50 mg/m^2) at six sites for the summer 2019 survey, and eight sites for the summer 2020 surveys.

Periphyton biomass results generally reflected nuisance periphyton percentage cover levels, and to a lesser extent TRC PI scores. There were three sites with chlorophyll *a* levels in exceedance of the NOF bottom line criterion, however for each of these three sites only one of the two surveys was in exceedance. As noted above, these results do not mean that a 'D' NOF classification can be applied, as three years of systematically scheduled monthly data is required to produce a NOF rating. These sites can therefore not be said to be compliant or non-compliant. Furthermore, the NOF protocol allows sites to have one sample per year (out of 12 surveys if the NOF procedure was used) for non-productive waterbodies above the 200 mg/m^2 standard without deeming the site's quality to be in non-compliance.

Table 1: Summary of SEM periphyton results for 2018-2020 monitoring period

River/Stream	Site	Distance from Nat Park (km)	Median TRC Periphyton Index	Long-Term Trend		Periphyton cover - compliance with national guideline		Periphyton biomass (chlorophyll a mg/m^2)	
				Thick mats	Long filaments	Thick mats	Long filaments	2019	2020
Hangatahua (Stony)	Mangatete Road	7.3	Very good	Indeterminate	Indeterminate	4/4	4/4	0	1
	SH45	12.5	Very good	Indeterminate	Indeterminate	4/4	4/4	1	4
Kapoaiaia	Wiremu Road	5.7	Very good	Indeterminate	Decreasing*	4/4	4/4	10	81
	Wataroa Road	13.5	Good	Indeterminate	Indeterminate	4/4	3/4$^+$	17	42
	Cape Egmont	25.2	Good	Indeterminate	Indeterminate	4/4	3/4$^+$	36	66
Maketawa	Derby Rd	2.3	Very good	Indeterminate	Indeterminate	4/4	4/4	1	1
	Tarata Road	15.5	Very good	Indeterminate	Indeterminate	4/4	4/4	23	9
Manganui	SH3	8.7	Very good	Decreasing*	Indeterminate	4/4	4/4	2	2
	Bristol Road	37.9	Good	Indeterminate	Indeterminate	4/4	2/4$^+$	88	48
Patea	Barclay Road	1.9	Very good	Indeterminate	Indeterminate	4/4	4/4	3	3
	Skinner Road	19.2	Moderate	Indeterminate	Indeterminate	4/4	2/4$^+$	142	621^n
Punehu	Wiremu Road	4.4	Very good	Increasing*	Indeterminate	4/4	4/4	3	2
	SH45	20.9	Good	Indeterminate	Indeterminate	4/4	4/4	13	16
Waingongoro	Opunake Road	7.2	Very good	Decreasing*	Indeterminate	4/4	4/4	44	64
	Stuart Road	29.6	Very good	Indeterminate	Indeterminate	4/4	4/4	75	92
	Ohawe Beach	66.6	Good	Increasing*	Indeterminate	4/4	4/4	55	67
Waiongana	SH3a	16.1	Good	Indeterminate	Indeterminate	3/4$^+$	3/4$^+$	69	242^n
	Devon Road	31.2	Moderate	Indeterminate	Indeterminate	4/4	1/4$^+$	122	283^n
Waiwhakaiho	SH3 (Egmont Village)	10.6	Good	Increasing*	Indeterminate	4/4	3/4$^+$	14	42
	Constance St, NP	26.6	Good	Increasing*	Indeterminate	3/4$^+$	4/4	41	22

* Significant trend at $p<0.05$ after FDR adjustment, ^{n} above NOF standard, $^+$ exceeds Biggs, 2000 guideline

Long term periphyton trend analysis revealed that for the majority of sites neither thick mats nor long filamentous algae levels showed significant improvement or degredation.

The data used for nuisance periphyton guidelines (thick algal mats and long filaments) overlaps with the TRC periphyton index score but was potentially distinct from the periphyton biomass data. This is due to the rocks viewed for periphyton cover not necessarily, and probably unlikely, being the same ones as used to collect periphyton biomass. Therefore, even though ten replicates are used, results can potentially differ significantly between the two methods. Furthermore, periphyton coverage examines both live and dead periphyton while periphyton biomass uses chlorophyll *a* which is contained within live material only.

Generally, ringplain streams and rivers closer to the Te Papakura o Taranaki boundary had less periphyton than those further downstream. The majority of lowland sites, except for those on the Hangatahua, Punehu, and Maketawa Rivers had at least one survey with moderate to high levels of periphyton.

The difference between spring and summer surveys was typical, with average thick mat and long filamentous algae levels higher in summer by between 8-12 percent compared with spring. Furthermore, the majority of guideline breaches occurred during summer surveys (11 summer breaches vs two spring breaches) and the only notional breaches of the NOF guideline were all in a summer survey.

No *Didymosphenia geminata* was found for the monitoring period under review. Didymo, or 'rock snot', is a highly prolific and invasive diatom algae that forms blooms resembling dirty cotton wool. It has spread to nuisance proportions in a number of South Island high country streams and rivers.

Overall, the following conclusions can be made:

1. Generally, the monitored sites complied with nuisance periphyton guidelines, with 97% and 86% of surveys complying with the periphyton guideline for thick mats and long filaments respectively, and 84% of sites being compliant with nuisance periphyton guidelines at all times.
2. 'Upstream sites' with little agriculture in their catchment had typically lower levels of periphyton compared with sites located further down the catchment, which had nuisance periphyton levels which occasionally breached guideline limits.
3. Due to the number of variables involved (e.g. nutrients, light level, temperature, shading, substrate type, time since last fresh, water clarity, level of invertebrate grazing etc), and interaction affects between variables, it can be difficult to ascertain the main factors driving periphyton biomass.
4. The cumulative effects of agricultural discharges via point source or diffuse pollution, together with wider, less shaded stream widths and slower flow velocities, were probably the main cause of algae proliferation in 'downstream' catchment sites.
5. High flows can cause a reduction in periphyton growth but the degree of this effect is not consistent between streams.

From these conclusions, a number of recommendations are made. Monitoring of the streams should continue as previously performed. The Council has also initiated a separate periphyton/chlorophyll *a* programme as per the NOF protocols, at sites considered representative of Freshwater Management Units

In response to the invasion of *Didymosphenia geminata* in the South Island, it is also recommended that samples continue to be taken by the Council at selected sites for expert analysis.

Recommendations

1. THAT monitoring of the periphyton communities in the Hangatahua, Maketawa, Manganui, Patea, Waiwhakaiho, Waingongoro, Punehu, Kapoaiaia, and Waiongana Rivers is continued.
2. THAT in the 2020-2022 monitoring period, the Waiwhakaiho, Manganui, Patea, Waingongoro, Hangatahua and Kaupokonui Rivers and Kapuni and Mangaoraka Streams are monitored for the invasive diatom Didymosphenia geminata.

3. THAT the periphyton survey results are included in the next SEM 5 yearly state of environment report.
4. THAT programmes designed to limit nutrient input into Taranaki streams and rivers continue to be implemented; such as riparian planting/fencing and the disposal of dairy shed effluent to land, in order to reduce periphyton levels in lowland streams and rivers in agriculturally dominated catchments.

Date 27 April 2021

Subject: **Regional Freshwater Recreational Bathing Water Quality Report for 2019-2020**

Approved by: G K Bedford, Director - Environment Quality

S J Ruru, Chief Executive

Document: 2750551

Purpose

1. The purpose of this memorandum is to update the Committee on the 2019-2020 bathing season results from the 'state of the environment' programme that monitors freshwater contact recreational water quality. The full report (*Freshwater contact recreational water quality at selected Taranaki sites State of the Environment Monitoring Report 2019-2020, Technical Report 2020-01*, April 2021) is available upon request, and will be published on the Council's website following this meeting. This memorandum summarises the report's data and results, and the Executive Summary and recommendations from the report are attached as an appendix.
2. A companion report at today's meeting provides the equivalent data for the coastal bathing beaches programme for the same period.

Executive summary

3. The Council's *Regional Freshwater Plan for Taranaki* recognises point source and diffuse source discharges of contaminants to surface freshwater as a significant resource management issue. The Council seeks to manage the quality and effects of such discharges through consents (for point sources) and programmes such as riparian exclusion and plantings (for diffuse sources). Progressive improvement in in-stream water quality is being achieved as consent conditions are made more rigorous, and as land managers undertake new fencing and planting.
4. The Council's State of the Environment monitoring programmes include a programme to monitor the state and any changes in the state of the recreational quality of the region's lakes and rivers at sites that are used by the community for recreation.
5. The latest seasonal report (for summer 2019-2020) is available upon request, and the Executive Summary of the report is attached to this memorandum as an appendix, for Members' information. Sixteen sites were monitored for bacteriological quality. Nine of these sites are also monitored for benthic cyanobacteria ('slime') as well. Three lake sites were monitored for both bacteriological quality and planktonic cyanobacteria (floating algal 'blooms')- lake Rotomanu, Lake Opunake, and Lake Ratapiko, while Lake Rotokare

was monitored solely for planktonic cyanobacteria. In the year under review, there were further investigations conducted at the Waimoku Stream (Oakura), to ascertain its impact upon the water quality of Oakura Beach. The Waimoku Stream carries extremely high levels of bacteria, due to dense birdlife.

6. Sampling frequency is increased to weekly at the region's most popular sites, including within the Christmas-New Year holiday period, with the additional sampling being undertaken regardless of weather. The core scheduling is referred to as 'SEM' sampling and the additional sampling as 'MfE' sampling. The scheduled 2019-2020 sampling regime was cut short by the covid-related lockdown. It is noted that there was the expectation that there would be no community use of recreational bathing sites during the lockdown in any case.
7. There was little difference between the SEM and the MfE datasets in the year under review.
8. Bacterial levels were similar to long-term patterns in the season under review, and improved over the previous year. Excluding the Waimoku Stream results from comparisons, 15% of samples were in the 'Action' category. Three-quarters of the 'Action' level samples arose at just two sites- lower Waiwhakaiho and lower Te Henui. These exceedances were due to resident wild fowl populations in the vicinity, and bacterial contamination at these two sites has remained high for the last 15 years. At most of the other Taranaki freshwater contact recreational sites, it is almost always an isolated event rather than continuing poor baseline quality that gives rise to any exceedances of guidelines. Notably, there were no exceedances of the 'Action' level in the Waiwhakaiho River at Merrilands Domain, while at the site at its mouth, 8 of 11 samples exceeded this guideline.
9. Eight of the 16 sites remained below the Ministry for the Environment's 'Action' level at all times during the season (cf 5 in the previous season), the same number as in the 2017-2018 season. Another 4 sites had only one non-compliance during the season (cf 2 in the previous season). In terms of guideline attainment, the top sites for water quality in the 2019-2020 season were:

    1 Patea River at boat ramp, Patea
    1= Urenui River at estuary
    1= Lake Ratapiko
    1= Lake Opunake at boat ramp
    1= Waiwhakaiho at Merrilands Domain
    1= Manganui River at Everett Park

10. The Council's 2012-2022 Long-Term Plan (LTP) has as a target for microbiological quality in inland waters, the maintenance or increase in the number of sites compliant with the 2003 Ministry of Health contact recreational guidelines[1] (with 2003-2004 as the baseline year). Out of the 11 inland bathing sites that have been monitored in both seasons, 6 were fully compliant in 2003-2004, and 5 in 2019-2020 (cf 3 in 2018-2019). In 2003-2003, 3 of the 11 had one 'Action' exceedance, and in 2019-2020 5 of the 11 had one exceedance.

[1] Note that the NPS-FM 2020 uses slightly different criteria, to define the overall status of a water body (as distinct from its suitability for use on any particular occasion) as a regulatory instrument, but the NPS-FM criteria essentially align with the MoH/MfE 2003 guidelines. See paragraph 14 of this memo.

11. Cyanobacteria blooms were recorded at lower levels than usual, other than at Lake Opunake which had levels higher than usual and exceeding the 'Action' threshold for the first time, in late February. Benthic (streambed) cyanobacteria were found occasionally in most of the nine rivers and streams monitored. Warning signs were posted at the mouth of the Kaupokonui River when the 'Action' level for exposed mats of cyanobacteria was exceeded once, in February, to avoid potential risk to children or dogs (who seem drawn to the odour of exposed mats but are then adversely affected by toxins if present within the cyanobacteria). Several sites exceeded 'Alert' levels on occasion.
12. While the regional riparian programme and diversion of farm dairy effluent to land will have significant benefits for reducing bacteriological contamination of waterways in the long term, through reducing faecal deposition directly into waterways or on stream banks and through increasing the interception and attenuation of runoff, the significant variations in results in the last decade point also to more immediate meteorological and hydrological as well as longer term land management and farming practice influences showing through.
13. Over the long term, there are clear indications of deteriorations in the Te Henui Stream and the lower Waiwhakaiho River (and the Waimoku Stream). In each case waterfowl have been conclusively identified as the source of microbial pollution. No other sites have shown statistically significant trends (either positive or negative) in seasonal median *E. coli* counts.
14. The Ministry for the Environment released a report in 2013 ('*Suitability for swimming'* July 2013 INFO 690), which focused solely on the grading system used by MfE and the Ministry of Health to indicate the presence of risk factors at swimming spots. The Council has repeatedly expressed its disappointment that this system, which does not take into account the state of water as revealed by day to day monitoring, has from time to time been given so much emphasis, as also its mis-interpretation (e.g. '60% of NZ's waters unsafe to swim in') by the media. However, it is also acknowledged that in this publication at least, MfE noted that the suitability for recreation grading protocols and ratings:
    - do not represent an accurate picture of water quality in the catchment;
    - reflect a precautionary approach to managing health risk;
    - are not designed to represent health risks on a particular day;
    - tend to reflect the poorest water quality measured at a site rather than the average water quality;
    - a site may be graded as poor but still be suitable for swimming much of the time; and
    - do not replace the site-specific information available on council websites.[2]
15. Governments of the day have continually amended the recreational criteria for freshwater. The latest iteration is set out in the National Policy Statement for Freshwater Management 2020 (NPS-FM). It defines four attribute states for primary contact, which are based on the 95th%ile result for samples collected during the bathing season at recognised bathing sites (that is, the attribute state is defined by the highest result in any collection of results, once the highest 5% of results are discarded).

Attribute state and description	Numeric attribute state

[2] *Suitability for swimming: Indicator update July 2013: INFO 690*, Ministry for the Environment

	(expressed as *E coli* per 100 ml)
Excellent	<130
Good	130-260
Fair	260-540
Poor (below national bottom line)	>540

16. It should be noted that these criteria were published after the completion of the 2019-2020 programme, and are not referenced in the report.
17. The Committee can also note for its information that there are also four separate 'swimmability' criteria within the NPS-FM 2020, that are to be applied other than at recreational sites, and on a year-round basis regardless of whether river and weather conditions are suitable for recreational use at any time and location. The Council's separate year-round SEM water quality programme provides data that is assessed by the Council to determine regional 'swimmability' as defined by the latter criteria.
18. In terms of promoting a 'one-stop shop' in public awareness of available guidance on water quality and suitability for recreational use, the Council now promotes the regional councils' LAWA website as the preferred source of national data on water quality and other environmental metrics. Data from the Council is uploaded automatically to the LAWA website as soon as it is available.
19. In terms of responsibility for advising the public on public health aspects of water quality, during 2016 the Council discussed with the district councils and the Medical Officer of Health the messaging that each agency should be providing to the public. As a result, it was agreed that the TRC website would direct all web enquiries around 'Can I swim here?' to the websites of the Taranaki District Health Board (TDHB) and district councils, where public health-based interpretation of water quality data would be provided and any advisory notification posted.
20. The Council's intentions re the completion of the regional riparian management programme and the diversion of the remaining dairy effluent treatment system discharges from streams to land will serve to reduce bacterial loadings on our streams. The finding of the 2018 study by NIWA[3] into the outcomes of the riparian programme, that there has been a meaningful reduction in bacterial loadings in the waterways of the ringplain correlated with the progressive implementation of the programme, is noted.
21. The report proposes the continuation of the existing programme. This recommendation reiterates the Council's undertakings already set out in the Annual Plan for 2020-2021.

Recommendations

22. That the Taranaki Regional Council:

3 Analysis of stream responses to riparian management on the Taranaki ring plain, NIWA client report 2018051HN, prepared for Taranaki Regional Council, March 2018

a) receives the memorandum noting the preparation of the report *Freshwater Contact Recreational Water Quality at selected Taranaki sites SEM Monitoring Report 2019-2020, Technical Report 2020-01*; and

b) adopts the specific recommendations presented in Technical Report 2020-01.

Background

23. Section 35 of the Resource Management Act requires local authorities to undertake monitoring of the region's environment, including land, soil, air, and fresh and marine water quality. Monitoring is undertaken to identify pressures upon the regional resources, their state, changes in their state (i.e. trends), and the effectiveness of the policies and actions undertaken to maintain and enhance the environment.

24. The Regional Fresh Water Plan for Taranaki contains objectives to manage the state of the region's surface freshwater. Objective 6.2.1 requires the Council and region '*to maintain and enhance the quality of the surface water resources of Taranaki by avoiding, remedying or mitigating the adverse effects of contaminants discharged to land and water from point sources*', while Objective 6.3.1 is an equivalent objective for diffuse sources of contaminants.

25. In Section 10.3 of the Plan, the Council commits to continued monitoring, research and investigations related to fresh water quality, to provide information on the state of fresh water in the region and the effectiveness of the Plan.

26. Section 4 of the RFWP recognises that iwi seek the recognition of the values of water and protection of the mana, mauri, and wairua of waterways against contamination; maintenance of the quality of water for its ability to provide mahinga kai; and respect for wāhi tapu and other areas or resources that have special significance.

27. The Council's 2018-2028 LTP has, under the 'Levels of service' specified for resource management, a commitment to '*maintain and enhance overall water quality in our rivers and lakes, groundwater and coastal waters*'. The measure for this activity is: '*parameters that characterise the physical, bacteriological, biological and chemical quality of surface water*'.

28. The Taranaki Regional Council initiated freshwater contact recreational water quality monitoring at a number of designated sites as part of Council's state of the environment monitoring (SEM) in 1996. The on-going programme is designed to annually monitor the bacteriological quality of lakes, rivers and streams at popular contact recreational sites. This work is undertaken principally for state of the environment purposes, measuring the current condition of the sites and looking for any trends as indicators of pressures, but the results are also compared with various contact recreational guidelines as a means of providing perspective on the significance of the results.

29. Monitoring is scheduled to be carried out from early November to the end of March (ie the bathing season), but can extend to April, depending on weather conditions.

30. Freshwater contact recreational water quality monitoring measures the number of bacteria in the sampled water. The designated indicator bacterium is *E.coli*. Sampling is undertaken according to documented Council procedures, which includes avoidance of elevated river flow conditions.

31. The programme proposed for each year is workshopped with staff of the three district councils and the TDHB - Health Protection Unit prior to the start of each season, results are reported as soon as available on the Council's website throughout the season, and a

full report on all results and findings presented to and discussed with each of the other agencies at the completion of the season.

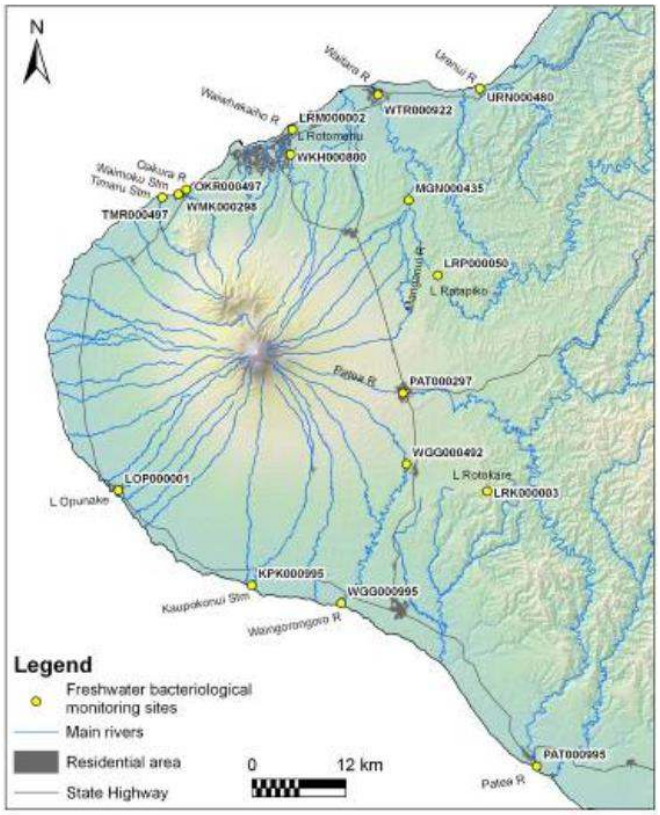


Figure 1 Location of freshwater contact recreation survey sites in 2020-2021

Discussion

Programme description

32. This report examines the bacteriological quality of 16 popular freshwater recreational locations in the region for the 2019-2020 bathing season. It was the twenty-fourth such annual survey. Some of the sites have been added during the programme's lifetime, in response to concerns over cyanobacteria and as changes in access have meant new sites have become more popular. Sampling began in early November and was curtailed in mid March, due to the covid pandemic lockdown. This meant that only 11 of the 13 scheduled SEM surveys could be completed. There was an increased frequency at popular sites from mid December until the lockdown, in recognition of greater usage during this period especially during public holidays.

33. Sample test results were compared with the Ministry for the Environment's (MfE) *Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Areas* (2003). These guidelines are developed to apply to high-contact uses of water used intensively for recreational purposes, but are applied by the Council to each of the freshwater recreational sites without differentiation as to risk e.g. sites where there is paddling or kayaking or children playing in or near the water are treated the same as sites where there is repeated full immersion of swimmers' heads through activities such as diving or body-surfing rapids. The guidelines note a potential health hazard '*when the water is used*

for recreational activities such as swimming and other high-contact water sports. In these activities there is a reasonable risk that water will be swallowed, inhaled (Harrington et al 1993), or come in contact with ears, nasal passages, mucous membranes or cuts in the skin, allowing pathogens to enter the body'.

34. The sites have also been graded for recreational suitability according to MfE, 2003 guidelines, based upon the immediately preceding five seasons of monitoring data (where such data existed). In addition, the Council assesses sites using the Ministry's 'Suitability for recreation' (SFRG) criteria that base grades on surrounding land use. In doing so, it emerges that although most of the sites' SFRGs suggest possible high risks associated with contact recreational usage, those SFRG gradings have been dictated by the agricultural nature of all catchments (meaning the sites are inevitably rated poorly regardless of proven quality). SFRG gradings for the 5 years to 2020 are given in the report and discussed below.

35. Governments of the day have continually amended the recreational criteria for freshwater. The latest iteration is set out in the *National Policy Statement for Freshwater Management 2020* (NPS-FM). It defines four attribute states for primary contact, which are based on the 95th%ile result for samples collected during the bathing season at recognised bathing sites (that is, the attribute state is defined by the highest result in any collection of results, once the highest 5% of results are discarded).

Attribute state and description	Numeric attribute state (expressed as *E coli* per 100 ml)
Excellent Estimated risk of Campylobacter infection is <0.1%, 95% of the time	<130
Good Estimated risk of Campylobacter infection is 0.1-1.0%, 95% of the time	130-260
Fair Estimated risk of Campylobacter infection is 1-5%, 95% of the time	260-540
Poor (below national bottom line) Estimated risk of Campylobacter infection is >5%, at least 95% of the time	>540

36. The Committee can note for its information that there are also four separate 'swimmability' criteria within the NPS-FM 2020, that are to be applied other than at recreational sites, and on a year-round basis regardless of whether river and weather conditions are suitable for recreational use at any time and location. The Council's separate year-round SEM water quality programme provides data that is assessed by the Council to determine regional 'swimmability' as defined by the latter criteria.

37. In general, these approaches indicate shortcomings in the grading systems that are based upon landuse/perceived impacts, or a precautionary interpretation of monitoring data other than actual exceedances, rather than basing gradings upon actual monitoring data

measured throughout the bathing seasons. The results of the Council's contact recreational water quality programmes confirm that gradings do not reflect the recreational water quality experienced by recreational users and therefore it is suggested by Council officers that they are not appropriate to be used or relied upon to provide any statement about how safe water actually is for recreational purposes. They show only susceptibility, and predominantly reflect perceptions and suppositions about how some land uses might influence quality, as designated 'risk factors'. It is the view of the Council that when there is regular and systematic testing of the actual quality, those results reflect actual levels and are far more informative and meaningful to recreational water users. The Council emphasises the importance of results of systematic and timely on-going testing and reporting of actual contact recreational water quality.

38. It is noted that the Ministry for the Environment acknowledges that the SFRG '*reflects a precautionary approach to managing public health risks and does not represent an accurate picture of water quality in the catchment. … The grades reflect a precautionary approach to managing health risk and are not designed to represent health risks on a particular day. They tend to reflect the poorest water quality measured at a site rather than the average water quality. A site may be graded as poor but still be suitable for swimming much of the time….The indicator does not replace the site-specific information available on council websites*.'[4]

39. In terms of access to a 'one-stop shop' for public awareness of available guidance on water quality and suitability for recreational use, the Council has in the last few years promoted the LAWA website as the preferred source of national data on water quality and other environmental metrics. The LAWA website has been set up and is supported by all regional councils across New Zealand, as a 'one stop shop' for the public to use to access environmental data. Data from the Council is uploaded automatically to the LAWA website as soon as it is available.

40. In terms of responsibility for advising the public on public health aspects of water quality, during 2016 the Council discussed with the district councils and the Medical Officer of Health the messaging that each agency should be providing to the public. As a result, it was agreed that the TRC website would direct all web enquiries around the question of 'can I swim here?' to the websites of the TDHB and district councils, where public health-based interpretation of water quality data would be provided and any advisory notification posted. This protocol was followed during the season under review.

Results

Microbiological quality

41. The Council's 2012-2022 Long-Term Plan (LTP) has as a target for microbiological quality in inland waters, the maintenance or increase in the number of sites compliant with the 2003 Ministry of Health contact recreational guidelines. Out of the 11 inland bathing sites that have been monitored in both seasons, 6 were fully compliant in 2003-2004, and 5 in 2019-2020 (cf 3 in 2018-2019). In 2003-2003, 3 of the 11 had one 'Action' exceedance, and in 2019-2020, 5 of the 11 had 1 exceedance. There is no overall pattern of change at any of the sites in question, with individual sites showing considerable variability year by year.

[4] *Suitability for swimming: Indicator update July 2013: INFO 690*, Ministry for the Environment

42. In general terms, *E. coli* bacteriological water quality was somewhat better than the previous period but similar to the long term patterns, as marked by the overall number of samples entering the 'Alert' level and seasonal median counts. As usual there was a high degree of variability between individual sites. Variability in quality between bathing seasons at each site may be related to a variety of reasons including changing hydrological and meteorological conditions, stock access, wildlife presence, and dairy farm wastes disposal practices in particular.
43. Excluding the Waimoku Stream results from regional analysis, 15% of samples were in the 'Action' category, down from 21% the previous season. Three-quarters of the 'Action' level samples arose at just two sites- lower Waiwhakaiho and lower Te Henui. These exceedances were due to resident wild fowl populations in the vicinity, and there is increasing bacterial contamination at these two sites. At most of the other Taranaki freshwater contact recreational sites, it is almost always an isolated event rather than general baseline seasonal quality that gives rise to any exceedances of guidelines. Notably, there were no exceedances of the 'Action' level in the Waiwhakaiho River at Merrilands Domain, while at the site at its mouth, 8 of 11 samples exceeded this guideline.
44. Eight of the 16 sites remained below the Ministry for the Environment's 'Action' level at all times during the season (cf 5 in the previous season). Another 4 sites had only one non-compliance during the season (cf 2 in the previous season).
45. In relation to the guidelines, two bathing sites (the mouth of the Te Henui Stream and the Waiwhakaiho River site adjacent to Lake Rotomanu), failed almost invariably to meet the *E. coli* 'Action' guideline for contact recreation. Both sites have high numbers of resident birds, and DNA analysis has shown that these populations are the cause of the high bacterial counts. It can be noted that the Waiwhakaiho River at Merrilands Domain i.e., below the agricultural catchment and within the urban area, consistently has very high quality. Notably, there were no exceedances of the 'Action' level in the Waiwhakaiho River at Merrilands Domain in the year under review, and only 3 exceedances in the last 7 years (a 97% compliance rate), while at the site below the urban reach, 8 of 11 samples exceeded this guideline, and 65 samples in the last 7 years (a 25% compliance rate).
46. Six sites maintained counts below the 'Alert' mode at all times throughout the season (compared with 4 in the previous season), while a total of 8 sites maintained counts below the 'Action' mode at all times (5 last season). In terms of all samples at bathing sites during the monitoring season, there were 26 'Action' samples (43 in the previous season). Nineteen of these samples were at just two sites, as noted above. Sixty-nine percent of all samples were in the 'surveillance' mode, an extra 8% above the previous season. Fourteen of the 16 sites monitored in 2019-2020 each had at least 80% of all samples below the 'Action' threshold.
47. In terms of median E coli bacterial numbers, the 5 bathing sites with the best water quality in 2019-2020 were:

    1= Urenui River

    1= Patea River at boatramp, Patea

    3 Lake Ratapiko

    4 Lake Opunake at boatramp

    5 Waiwhakaiho River at Merrilands Domain.

Lake Opunake comes into this list, and Lake Rotomanu drops out of this list down to 6th, from 2018-2019.

48. Based upon the number of samples that have been within the 'surveillance' mode (ie the category of sites that are most frequently in the highest category of quality) over the entire record since 1996, the following ranking of sites (in descending water quality) may be used to rank bathing sites in Taranaki:

    1 Patea River at boat ramp, Patea
    2 Urenui River at estuary
    3 Lake Ratapiko
    4 Waiwhakaiho River at Merrilands Domain
    5 Lake Rotomanu
    6 Waingongoro River at Ohawe Beach
    7 Manganui River at Everett Park
    8 Oakura River at SH45
    9 Kaupokonui River at beach domain
    10 Lake Opunake
    11 Waingongoro River at Eltham Camp
    12 Waitara River at town wharf, Waitara
    13 Patea River at King Edward Park, Stratford
    14 Timaru Stream at Weld Road
    15 Waiwhakaiho River adjacent to Lake Rotomanu
    16 Te Henui Stream at mouth, East End.

49. Temporal trends over the 1996-2020 period have been evaluated for the sites that have ten years or more data (and will continue to be assessed annually). Two sites, the Waiwhakaiho River adjacent to Lake Rotomanu and the Te Henui Stream, show statistically significant increasing trends. Previously the site at the Eltham camp site on the Waingongoro River also showed statistically significant deterioration, but with the most recent results this trend is no longer as definite. There are indications of increasing trends in median *E. coli* counts at another twelve bathing sites, and of reductions at three bathing sites.

50. Permanent health warning signage have been erected by the New Plymouth District Council (on the direction of Taranaki District Health Board) following past exceedances of 'Action' levels at Oakura [for past Waimoku Stream issues], Waitara township, the lower Waiwhakaiho River, and Te Henui Stream. Vandalism of the warning signs at Waitara has been an on-going issue.

Microbiological quality and SFRG

51. The sites have also been re-graded for recreational suitability according to MfE, 2003 guidelines, based upon the immediately preceding five seasons of monitoring data (where such data exists). In addition, the Council assesses sites using the Ministry's 'Suitability for recreation' (SFRG) criteria that base grades on surrounding land use. In doing so, it emerges that although most of the sites' SFRGs imply possible high risks associated with contact recreational usage, those SFRG gradings have been dictated by the agricultural nature of all catchments (meaning the sites are inevitably rated poorly regardless of proven quality).

52. The 5-year microbiological data to 2020 indicate 10 of 16 sites achieving compliance on 90% or more of occasions, and 4 more on at least 80% of occasions. Yet the only

freshwater bathing site in Taranaki graded either 'good' or 'very good' according to MfE criteria is Lake Rotokare. Further, the Urenui River estuary site, the Patea River estuary site, the Manganui River site at Everett Park, the Waiwhakaiho River at Merrilands Domain, and the Lake Ratapiko site, have either never reached or else have had a maximum of 3 results in the 'Action' mode at any time during the last five seasons (i.e. have attained at least a 95% compliance rate), under the sampling protocols of the SEM programme, and yet according to the Ministry for the Environment, all these sites should be deemed 'poor' sites for bathing.

Microbiological quality: NOF 'swimmability' criteria

53. In February 2017, MfE released proposals to further amend the NOF 'swimmability' criteria. These proposals were put into effect later that year[5]. While data gathered within the Council's bathing season monitoring programmes is not collected as per the 2017 NOF specifications (which are for a year-round monitoring programme regardless of flow and weather conditions), this year's report does again assess the state of Taranaki's freshwater bathing sites against the proposals, as a matter of information[6]. The monitoring data from Taranaki's freshwater bathing sites for the past five seasons have been analysed against the 2017 MfE criteria for 'swimmability'. The NOF criteria do not include any minimum ('bottom line') requirements, but the government of the day announced its intention that 90% of the nation's rivers should be in the top three categories by 2040.
54. The Ministry stipulated that across all criteria, a single failure (i.e. any result falling into either of the bottom two categories) in even one of the four distinct criteria is sufficient to constitute an overall 'unsuitable for swimming' grading. Of the 17 recognised freshwater recreational sites in Taranaki, for samples collected over the last five years under conditions suitable for recreation, 4 sites satisfy all criteria, and another 3 fail only one of the four criteria.
55. What becomes apparent is that gradings denoting degrees of suitability for swimming vary immensely according to the particular criterion. This lack of rationalisation between criteria is not helpful for sensibly conveying 'swimmability' to the public.

Cyanobacteria

56. The presence of cyanobacteria can trigger health warnings in any of 4 ways- excessive coverage of the stream bed, exposure of algal mats on rocks at the water's edge, excessive quantities of detached mats floating in the water column, or 'blooms' of planktonic cyanobacteria. There are national guidelines for unacceptable levels of stream bed coverage or the concentration of planktonic cyanobacteria in blooms. In addition, the Council has chosen to also adopt an approach of assessing suitability for recreational use when exposed or detaching mats are detected. To date there have been no reported incidences of humans or animals in the Taranaki region having been harmed by toxins produced by benthic cyanobacteria though there may well have been unreported incidences. Microscopic analysis of benthic cyanobacteria reveals that toxin-producing bacteria are generally present.

---

[5] In August 2020, after the close of the bathing season under review, MfE promulgated separate criteria specifically for the purpose of evaluating suitability for bathing at designated bathing sites during the bathing season.

[6] For the most recent classification of Taranaki's waterways sampled and assessed according to the NOF 'swimmability' regulations, see *Freshwater Physicochemical Programme State of the Environment Monitoring Annual Report 2018-2019,Technical Report 2019-98*, Taranaki Regional Council October 2020

57. For planktonic (floating) cyanobacteria, of the four designated lake monitoring sites, only one had biovolumes exceeding contact recreational guidelines at some time during the 2019-2020 season. Warning signs were erected at Lake Opunake for 9 days in February. This was the first occasion when signs have been needed at the lake; this may be linked to an altered flushing regime. Planktonic cyanobacteria were detected in Lake Rotomanu and Lake Rotokare at lower than usual levels on occasion throughout the season, and never at Lake Ratapiko.
58. Benthic (streambed) cyanobacteria was monitored at nine locations throughout the season, and, while detected occasionally, reached public health warning levels in respect of streambed coverage only at Kaupokonui River at its mouth, triggering the erection of warning signs for the time being. Action level was never reached for either exposed or detaching mats, at any site at any time during the season.

Other matters

59. Microbial source determination testing has previously been conducted at a number of recreational sites, using environmental forensic DNA testing techniques. DNA marker tracking investigations in the Patea River at Stratford, the Waingongoro River at Eltham and the Timaru Stream have found that the principal faecal contributions were sourced from wildfowl and from ruminants. No human markers were found. The Council continues to use the technique for investigative puposes.

Conclusions

60. The report includes recommendations for the 2020-2021 bathing season that pertain to the scope of the sampling programme and integration with the dairy treatment pond compliance monitoring programme so that any adverse effects and sources can be efficiently identified and appropriate action taken. The recommendations are reproduced as an appendix to this memorandum, for the information of Members.
61. There is variability in quality between bathing seasons at each site, which is related to a variety of reasons including hydrological conditions, stock access, the presence of wildlife (particularly wildfowl), and dairy farm wastes disposal practices in particular. Similar results have been recorded elsewhere for sites in the middle and lower reaches of other streams and rivers in New Zealand (Deely et al, 1997 and MfE, 2008). The Ministry for the Environment identifies dense bird and wildlife populations, agricultural runoff, and storm water or sewerage discharges as potential sources of contamination. These factors continue to be the major sources of adverse impacts on recreational water quality for the Council to address.
62. The Council's intentions re the completion of the regional riparian management programme and the diversion of the remaining dairy effluent treatment system discharges from streams to land will serve to reduce bacterial loadings on our streams. The finding of the 2018 study by NIWA[7] into the outcomes of the riparian programme, that there has been a meaningful reduction in bacterial loadings in the waterways of the ringplain correlated with the progressive implementation of the programme, is noted.

---

7 Analysis of stream responses to riparian management on the Taranaki ring plain, NIWA client report 2018051HN, prepared for Taranaki Regional Council, March 2018

Decision-making considerations

63. Part 6 (Planning, decision-making and accountability) of the Local Government Act 2002 has been considered and documented in the preparation of this agenda item. The recommendations made in this item comply with the decision-making obligations of the Act.

Financial considerations—LTP/Annual plan

64. 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

65. 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 Biosecurity Act 1993.

Iwi considerations

66. 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. In particular, iwi participated in the preparation of the Regional Freshwater Plan for Taranaki and submitted on the Council's LTP, and the SEM programme described above aligns with those considerations. This memorandum is to be considered by the Policy and Planning Committee which includes iwi representation.

Community considerations

67. This memorandum and the associated recommendations have considered the views of the community, interested and affected parties, as expressed within LTP and policy development processes, and those views have been recognised in the preparation of this memorandum.

Legal considerations

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

Appendices

Document: 2627289 (exerpts): Executive summary and recommendations from '*Freshwater contact recreational water quality at selected Taranaki sites State of the Environment Monitoring Report 2019-2020, Technical Report 2020-01*, April 2021.

14

Executive summary

*(*from *'Freshwater contact recreational water quality at selected Taranaki sites State of the Environment Monitoring Report 2019-2020, Technical Report 2020-01')*

This survey of sixteen recognised freshwater contact recreational sites in the Taranaki region was the twenty-fourth of an on-going programme designed to annually monitor the bacteriological quality of lakes, rivers and streams at popular contact recreational sites during each bathing season. It forms a component of the State of the Environment bathing beaches trend monitoring programme, which commenced in the 1995-1996 summer period. Two sites (at Lakes Ratapiko and Opunake) were monitored in this programme during this 2019-2020 period for the fourteenth time, partly as a component of the more recently instituted cyanobacteria programme (covering four lakes) instigated after consultation with Taranaki District Health Board. A site in the lower Waitara River was added in the 2010-2011 period at the joint request of Taranaki Healthcare and NPDC, and two additional sites in the lower reaches of the Waiwhakaiho River and Te Henui Stream (both adjacent to the New Plymouth walkway) were included in the programme in the 2012-2013 period. The sixteen sites have been graded for recreational suitability (SFRG) according to MfE, 2003 guidelines, in part based upon the immediately preceding five seasons of monitoring data (where such data existed) although short-comings of this grading methodology are acknowledged. A re-assessed SFRG also has been provided by inclusion of the current season's data for comparative purposes and this showed minimal change of the microbiological water quality gradings over this latest five year period.

The Waimoku Stream site is sampled on a three-yearly frequency and it was monitored during the period under review. This stream is known to carry extremely high levels of bacterial contamination due to its resident waterfowl population (pukeko, ducks), and a warning sign advising against recreational use of the stream is permanently in place. It is now monitored primarily for its potential impact on Oakura beach's water quality (refer *Bathing Beach Water Quality State of the Environment Monitoring Report Summer 2019-2020*, technical report 2020-82).

A further site (Lake Rotokare) has been monitored since 2007, principally for planktonic cyanobacteria. Additional comprehensive flowing water benthic cyanobacteria monitoring (at nine river/stream sites) was undertaken in the current period for the seventh time in this state of the environment programme.

Changes were made in 2016-2017 to follow protocols for reporting on the Land and Water Aotearoa (LAWA) website: sampling frequency at four of the most popular sites (Lake Rotomanu, Waiwhakaiho River at Merrilands Domain, and Kaupokonui and Waingongoro river mouths) was increased to weekly, mainly in dry weather, from December to February inclusive, and extended to March in 2017-2018.

The 2019-2020 monitoring period was cut short in March 2020 by the advent of the Covid-19 pandemic, resulting in two fewer (eleven) sampling runs than in previous seasons for trend monitoring.

The results of the 2019-2020 survey have continued to illustrate variability in bacteriological water quality, with the highest quality achieved at the Urenui River estuary and lower Patea River sites where marked seawater intrusion is the norm (under high tide conditions), and Lake Ratapiko. Impacts on bacteriological water quality at some sites, particularly the lower reaches of the Waiwhakaiho River and Te Henui Stream, were due principally to resident

wild fowl populations in the vicinity of recreational usage sites (as confirmed previously by inspections and DNA marker surveys).

In terms of *E. coli*, bacteriological water quality in the latest survey period was similar in comparison with historical surveys. The total number of samples falling within the "Alert" or "Action" categories (31% of samples, or 35% if the samples of the Waimoku are included) across the 16 recognised bathing sites was slightly higher than the recorded long-term average. However, it should be noted that the "Action" category is the only category for which swimming is not recommended. In the 2019-2020 season, 85% of all samples (Ie, excluding the Waimoku) met the national bathing guideline. Of the 15% of samples that exceeded the guideline, 11% arose from just two sites - the two New Plymouth urban sites. Bird life was mainly responsible for the exceedances at these sites.

Two sites recorded all single samples in either the 'Alert' or the 'Action' mode of the MfE, 2003 guidelines (Te Henui Stream near East End beach and Waimoku Stream at Oakura), while one site (Waiwhakaiho River opposite Lake Rotomanu) recorded nine of eleven samples in those modes. Nine other sites from time to time exhibited single sample entries, mainly into the 'Alert' mode of the 2003 guidelines, at some time during the season. Seven of these sites had counts which entered the 'Action' mode, a slight increase the number and frequency of guideline exceedances in comparison with many previous seasons' results.

To a certain extent these exceedances were probably a feature common to the mid and lower reaches of rivers and streams draining developed (particularly agricultural) catchments throughout New Zealand.

Notably, no exceedance of the MfE 'Action' guideline was found in the Waiwhakaiho River at Merrilands Domain (mid urban New Plymouth and downstream of agricultural land), whereas 8 of 11 samples exceeded this guideline further downstream near this river's mouth.

At most sites, minimal follow-up sampling was performed when deemed necessary following exceedances of the 'Action' limit, as in most cases bacteriological quality was found to have returned to typical levels within short time frames or the causes were well established from historical data. Permanent health warning signage had been erected by New Plymouth District Council (on the direction of Taranaki District Health Board) following past exceedances of 'Action' levels at the lower Waiwhakaiho River, Waimoku Stream and Te Henui Stream sites, and of 'Alert' levels at Waitara. Temporary signage was required at the Lake Rotomanu, Timaru Stream and upper Patea, mid and lower Waingongoro and Waitara Rivers sites following single sample 'Action' levels, but single sample 'Alert' level exceedances at other sites were not necessarily signposted.

Temporal trends over the 1996-2020 period have been evaluated on the basis of seasonal median *E. coli* count for the seventeen sites that have ten years or more data (and will continue to be assessed annually). Three sites (Te Henui and Waimoku Streams and lower Waiwhakaiho River) have shown a statistically significant increasing trend. No other sites have shown statistically significant trends (positive or negative) in seasonal median *E. coli* counts.

Additional sampling (in accordance with the MfE, 2003 guidelines for datasets for grading purposes) at four principal usage sites (Lake Rotomanu and Waiwhakaiho, Kaupokonui and Waingongoro Rivers) occurred largely in dry weather and resulted in little change in the overall median bacteriological numbers.

Overall, the 2019-2020 monitoring year saw lower than usual levels of planktonic cyanobacteria, especially at Lake Rotokare, which typically has had high bio-volume levels during the summer months. However, Lake Opunake, unlike the other three lakes, had higher than usual levels, and recorded its first ever exceedance of

the Action level bio-volume. This necessitated warning notices to avoid contact recreation for 9 days from late February 2020.

Benthic cyanobacteria were found occasionally in most of the nine rivers and streams monitored. Monitoring frequency was increased from fortnightly to weekly in response to 'Alert' levels found on several occasions. The 'Action' mode trigger level was reached once, in February 2020, when bed coverage in Kaupokonui Stream at the beach domain led to the posting of warning notices to contact recreational users. Two sites (Waingongoro and Kaupokonui Rivers at mouth) exceeded the 'Alert' mode trigger level for bed coverage on a total of nine surveys. The 'Alert' mode trigger level for exposed mats was exceeded at five sites (Waingongoro River at Ohawe, Kaupokonui River at the mouth, Waiwhakaiho River at the last riffle and at Merrilands Domain, and Manganui River at Everett Park) on a total of seven individual site surveys, and for detaching or detached mats accumulating on the river's edge at the same sites (except the lower Waiwhakaiho site) on a total of 15 surveys. Levels of benthic cyanobacteria were higher than in the previous three seasons, and similar to the preceding two seasons, probably a reflection of the relative amounts of rainfall causing freshes that scour streambeds of periphyton.

Timely reporting of the results of bacteriological water quality and cyanobacteria numbers/cover was undertaken by use of the Taranaki Regional Council website (www.trc.govt.nz) and LAWA website (www.lawa.org.nz), as well as liaison with territorial local authorities and the Health Protection Unit of Taranaki District Health Board, throughout the survey season of 2019-2020.

For the fourth time, this report also discusses the monitoring results in the light of the criteria for primary recreational use of water bodies ('swimmability') set out in the National Objectives Framework that is attached to the *National Policy Statement for Freshwater Management 2014.*

It is recommended that annual bacteriological monitoring of selected freshwater sites be continued (in conjunction with the coastal bathing water programme) by use of a similar sampling format over a five month (November to March inclusive) contact recreational period to provide information for trend detection purposes and for assessment of suitability for contact recreational usage. Cyanobacteria monitoring at the four lakes sites and nine stream/river sites at a lesser frequency is also recommended to continue. A further recommendation involves appropriate scheduling of the annual round of dairy wastes disposal systems and advice provided in relation to stock access to watercourses to attempt to reduce the frequency of exceedances of recreational limits particularly in catchments where historical problems from this source have been located.

6. Recommendations

(from 'Freshwater contact recreational water quality at Taranaki sites State of the Environment Monitoring Report 2018-2019, Technical Report 2019-01')

As a result of the 2019-2020 summer freshwater contact recreation bacteriological survey it is recommended:

1. THAT the 2020-2021 survey be performed at sixteen regular sites continuing with the existing sampling protocols during the season extending from 1 November to 31 March (and into April, if necessary).
2. THAT the 2020-2021 survey includes additional samples collected at the four principal usage sites (Lake Rotomanu, Waiwhakaiho River at the Merrilands Domain, Waingongoro River at Ohawe and Kaupokonui River at the mouth) in accordance with MfE, 2003 guidelines.
3. THAT the 2020-2021 summer survey includes cyanobacteria monitoring at the three lake sites and an additional lake (Rotokare) site and benthic cyanobacteria monitoring at nine of the river and stream sites fortnightly on at least ten occasions.
4. THAT follow-up sampling (after guideline exceedances) be performed when deemed necessary by TRC staff.
5. THAT appropriate timing of the annual dairy farms inspection round be incorporated into the programme for catchments where issues relating to exceedances of contact recreational standards have been identified and advice and publicity be provided in relation to the prevention of stock access to natural water.
6. THAT reporting of results be performed as appropriate during the season, and in an Annual Report upon completion of the season's programme.
7. THAT the appropriate statistical trend detection procedures be applied to the data and reported in the Annual Report.

1

MEMORANDUM
Policy & Planning

Date 27 April 2021

Subject: **Bathing Beach Recreational Water Quality SEM Report 2019-2020**

Approved by: G K Bedford, Director - Environment Quality

S J Ruru, Chief Executive

Document: 2750471

Purpose

1. The purpose of this memorandum is to present to the Committee the report on the quality of coastal bathing waters in the Taranaki region during the 2019-2020 bathing season, as set out in the report *Bathing Beach Water Quality State of the Environment Monitoring Report Summer 2019-2020, Technical Report 2020-82*. The Executive summary and recommendations from the report are attached to this memorandum. The full report is available upon request, and will be published on the Council's website following this meeting.

Executive summary

2. The report provides an assessment of microbial water quality at 12 bathing beach sites in the Taranaki region, based on routine summer monitoring of faecal indicator bacteria (enterococci) in the 2019-2020 summer. A core group of 10 beaches is monitored every year, and another 10 are monitored over the course of a rotating 3-year cycle. Results are assessed for any evidence of trends, and for compliance with microbiological water quality guidelines for recreational use prepared by the Ministry for the Environment (MfE) and the Ministry of Health (MfE, 2003), and are released to the public via the Council's website.
3. Eleven samples were collected at every site under bathing conditions ('SEM samples'). This was fewer than usual, because of the COVID pandemic and associated lockdown restrictions (but noting consequent minimal recreational bathing activity). Eight of the sites had a further 8 samples collected at each, under all-weather and all-tide conditions ('MfE samples'), to provide an increased degree of timely reporting to the public during holiday periods.
4. During the 2019-2020 summer season, exceedances of guidelines for microbiological water quality across bathing beaches in the Taranaki region were only sporadic. Nine out of the ten samples that reached 'Alert' mode (which is still considered safe for swimming) were collected during three surveys that were carried out shortly after

rainfall. There were no 'Action' mode events during the year under review. No anomalous or persistent water quality issues were identified during the season.

5. Median enterococci counts recorded in the SEM programme were lower or equal to their respective historical medians at eight sites, and higher at the remaining four sites.
6. Out of the 196 samples collected for SEM purposes, 95% were in the highest water quality category (surveillance mode). In the previous summer, this figure was 92%.
7. In the 2019-2020 season, Fitzroy, Opunake, and Oakura (camping ground site) were once again the region's cleanest bathing beaches. It should be noted that even the beach with the highest median count across all samples, Onaero Beach, had a median count that was just 20% of the 'Alert' threshold and 10% of the 'Action' threshold. Relatively higher median counts at Ohawe, Onaero, Back Beach, and Oakura Beach in front of the surf club are strongly correlated with a riverine influence from meandering streams that discharge near the sampling points. At Back Beach, gulls and dogs were regularly observed near the monitoring point during sampling, and undoubtedly generate a localized source of contamination. Over the long term, Opunake, Oakura beach in front of the camping ground, and Fitzroy beaches are consistently amongst the region's cleanest.
8. There were two result patterns differing markedly from 2018-2019. In 2018-2019, Ngamotu Beach recorded three guideline exceedances (including two Action mode exceedances) and a median enterococci count of 20 cfu/100 ml. In 2019-2020, there was only one guideline exceedance ('Alert' level only) and the median enterococci count was 10 cfu/100 ml. This improvement reflects the resolution at the time of an issue of extremely high and widespread indicator bacteria, discovered in March 2019 and subsequently addressed successfully. (Subsequent investigations showed these counts were due to a source of naturalised rather than faecally-sourced colonies). At Ohawe Beach, there had been six guideline exceedances and a median enterococci count of 45 cfu/100 ml recorded in 2018-2019. In 2019-2020 there was just one guideline exceedance and a median count of 13 cfu/100 ml.
9. The Fitzroy Beach site continues to show a statistically significant improvement. No site is showing a statistically significant deterioration.
10. Waitara East beach shows an indicative but not statistically significant tendency towards improvement in recent years, with no indications of any change apparent at Waitara West beach.
11. Over the long term, 8 of the sites monitored during the season under review indicate a tendency towards improvement, and 2 an extremely slight tendency towards marginal deterioration. Two sites have insufficient data for any trend analysis.
12. Through the Council's Long Term Plan (LTP) and 2019-2020 Annual Plan, the Council's target in respect of the microbiological state of coastal bathing sites is that there is maintenance or increase in the number of sites from 2003 compliant with 2003 Ministry of Health contact recreational guidelines. In 2003, 7 of 9 coastal bathing sites were compliant with the guidelines ('Action' levels). In the season under review, all nine sites were compliant throughout the season.

Recommendations

That the Taranaki Regional Council:

a) receives the memorandum noting the preparation of the report *Bathing Beach Water Quality State of the Environment Monitoring Report Summer 2019-2020 Technical Report 2020-82;* and
b) adopts the specific recommendations presented in Technical Report 2020-82.

Background

13. Taranaki's coastal and inland fresh waters are widely used for a range of contact recreational activities such as swimming, sailing, surfing, wind surfing, and underwater diving. The sea is important as a source of kaimoana. Maintaining and protecting the quality of this recreational water is therefore an important resource management and public health issue.

14. The Council's notified Proposed Coastal Plan noted:-

> *The coastal environment is an important and valued part of Taranaki's environment and the quality of life offered by the region. The coastal marine area in particular is an extensive area of public space available for people to use and enjoy. It is where we play, gather food, undertake traditional practices, or relax. Many coastal resources and activities contribute to the economic, social and cultural well-being of communities..… Taranaki generally has high quality coastal water, mainly as a result of the region's exposed coastal environment and low development pressures. However, a deterioration of coastal water quality can sometimes occur in discrete areas, such as near river mouths and in close proximity to wastewater discharges.*
>
> *The resources of Tangaroa have provided for and nourished the iwi o Taranaki for generations. These resources were integral to the lives of the people who occupied the settlements that adjoined the coastline. Tangaroa provided for them materially, acted as a highway for travel, a source of rongoa (medicine), aided their well-being and provided for their spiritual sustenance….. Sustainable coastal management, through the exercise of kaitiakitanga and tikanga, is at the heart of the relationship between iwi o Taranaki and the coastal environment. This Plan has integrated iwi o Taranaki values throughout the Plan provisions.*

15. The draft policies set out in the Plan address the public use and enjoyment of the coastal environment, including enjoyment of its amenity and recreational values. Through its Annual Plan, the Council is committed to monitoring the microbiological state of coastal bathing sites.

16. It is recognised that the quality of coastal waters in New Zealand is variable. It can be compromised by contaminants from sources such as sewage and storm water outfalls, septic tanks, urban run-off, birdlife, sanitation discharges from boats, and dairy effluent discharges and contaminated run-off from agricultural land. The Ministry for the Environment has identified that at a national scale, intensifying land uses in rural areas and rapid urban development of coastal areas have the potential to put increasing pressure on the quality of the country's coastal recreational waters.

17. As one of the suite of State of the Environment (SEM) monitoring programmes that the Council has in place, bathing water quality around the region's coastline is assessed each summer. Ten primary beach sites are repeatedly sampled during the bathing season every year, and another ten beaches are sampled one year in three on a rotating basis. The SEM programme began in 1995-1996. There had also been a number of surveys prior to this time.

18. The bacteriological state of each site is compared with national guidelines[1].

19. Through the Council's LTP and 2019-2020 Annual Plan, the Council's target in respect of the microbiological state of coastal bathing sites is that there is *maintenance or increase in the number of sites from 2003 compliant with 2003 Ministry of Health contact recreational guidelines*. In 2003, 7 of 9 coastal bathing sites that are being monitored annually were compliant with the guidelines (i.e. went throughout the entire season without an 'Action' level event).

Discussion

20. The report presented to the Committee today summarises the results for the 2019-2020 bathing season, including beaches monitored in year two of the rotation.

21. Eleven samples were collected over the bathing season at each of the 12 sites designated for the season, as part of the Council's regular SEM monitoring programme, with an additional 8 or so samples collected at 8 of the primary beaches to fulfil Ministry for the Environment requirements for calculation of microbiological assessment categories (which go beyond the Council's long-established programme and are sampled under a different protocol, including sampling within all-weather and all-tide conditions). The additional samples also provide to the public a more immediate update on water conditions during statutory holiday periods. In addition, follow-up samples were collected in most cases whenever enterococci counts in scheduled sampling exceeded the threshold for 'Alert' status. Because of COVID lockdown restrictions, the Council could not complete its schedule of 13 SEM samples, which is the normal Council protocol.

22. The monitoring results have been assessed using the national microbiological guidelines for marine recreational areas (MfE, 2003). The indicator bacteria measured are enterococci. Levels of less than 140 enterococci per 100 ml are considered to be acceptable (i.e. water quality is suitable for bathing, and approximately weekly sampling is routinely undertaken for surveillance purposes). Should any routine samples contain greater than 140 enterococci per 100 ml, the 'Alert' mode is triggered – that is, water is deemed potentially unsuitable for bathing, and further sampling is often undertaken. This is a mode for elevated surveillance, and it is not considered that public health has yet been compromised if sample results are at this level.

23. Samples containing greater than 280 enterococci per 100 ml indicate water is highly likely to be contaminated. The guideline recommendation is that further sampling is to be undertaken again within 24 hours, to see if the elevated bacteriological counts are continuing. If the second result in this case is also above 280, then the 'Action' categorisation is designated. That is, it is when there are two consecutive samples above 280 enterococci per 100 ml in a specific sequence, that it is considered public health is potentially compromised. Any follow-up action is in the hands of the Taranaki District Health Board. High flows in streams and rivers following rainfall events may have a major but localised influence on the water quality of Taranaki beaches, and re-sampling is not always undertaken if a significant rainfall event in the immediate past is determined to be the likely cause of a sample exceeding 280 enterococci per 100 ml. The

[1] *Microbiological Water Quality Guidelines for Marine and Freshwater Recreational Areas*, Ministry for the Environment 2003

Council's website has a standing advisory that swimming is not recommended within 3 days of heavy rainfall.

24. Microbiological water quality in the 2019-2020 season was very good, by comparison with the previous season and even more so by comparison with 2017-2018 when quality had been adversely affected by higher than usual levels of summer rainfall, and also particularly by Cyclone Fehi at the beginning of February 2018 (coinciding with a king tide height). Exceedances of the 'Alert' threshold were only sporadic in this most recent season. During the 2019-2020 summer season, 94.9% of all samples remained below even the 'Alert' threshold, compared with 91.8% in 2018-2019 and 89% in 2017-2018.

25. Median enterococci counts recorded in the SEM programme were lower or equal to their respective historical medians at eight sites, and higher at the remaining four sites (in two of these cases, higher by just 1).

26. Based on median counts in the 2019-2020 season, Opunake, Fitzroy and Oakura beach in front of the camping ground were the region's cleanest bathing beaches. These results largely mirror those of past years. Opunake and the Oakura beach in front of the camping ground are consistently the best in the region, followed closely by Fitzroy, Patea, and Waverley beaches.

27. As has been the case in previous years, Back Beach and Onaero were comparatively the worst, while noting that their seasonal SEM survey medians of 26 and 20 were still only 10% of the 'Action' and 20% of the 'Alert' trigger levels. Further, neither site had any individual samples reaching the 'Action' threshold. The median count at Onaero in 2019-2020 was (relatively) somewhat above those in its long-term records.

28. Both of these sites show a particularly pronounced riverine influence from time to time. However, the gulls and/or dogs that observed near the Back Beach monitoring site on every sampling occasion may also be generating a localised source of contamination. A riverine influence is particularly evident at Onaero where the freshwater input can often be identified through low sample conductivity results. Three counts at this site were above the "Alert' threshold; all three had conductivity readings indicating the sample was primarily river water.

29. In the case of the two Waitara beaches, this has been the sixth season since the discharge of treated municipal sewage has been diverted to New Plymouth. Having noted that, the Waitara River rather than the outfall was considered to have had the greater effect on bacteriological quality on the beaches. Waitara East beach shows an indicative but not statistically significant tendency towards improvement in recent years, with no indications of any change apparent at Waitara West beach. Over 95% of all samples collected at these two beaches remained below even the 'Alert' level. On one occasion both beaches had indicator counts above the 'Action' threshold; at both sites the conductivity readings showed the samples were primarily river water, and followed rainfall events. The next sampling survey 4 days later showed extremely low counts. At Ohawe Beach on the same day, the same pattern and likely cause was evident. Of note, an earlier sample at Ohawe Beach also showed a predominantly freshwater content, but with a very low indicator bacteria count. The preceding weather on that occasion had been fine.

30. The site at Fitzroy Beach is showing a strong statistically significant improvement. This may be associated with improvements to stormwater control in the vicinity, undertaken by NPDC. Bacterial counts at most of the region's beaches are so low that it would be impossible to bring about a statistically significant improvement.

31. No site is showing a significant deterioration over the record of results. In terms of indicative (as distinct from statistically significant) trends, eight sites are showing signs of reductions in median enterococci, while two are showing an extremely slight tendency towards marginal deterioration in bacteriological quality. Two sites have insufficient data for any trend analysis.
32. In terms of the Council's target in respect of the microbiological state of coastal bathing sites as expressed in the Council's LTP and 2019-2020 Annual Plan, the target is that there is *maintenance or increase in the number of sites from 2003 compliant with 2003 Ministry of Health contact recreational guidelines*. In 2003, 7 of 9 coastal bathing sites that were monitored annually were compliant with the guidelines (ie remained throughout the season below the 'Action' level category). In the 2019-2020 season under review, all SEM sample results at the same 9 beaches were compliant with this guideline. The LTP target was therefore met.
33. Frequent and timely reporting of the results of bacteriological water quality was undertaken by use of the Taranaki Regional Council website (www.trc.govt.nz) as well as liaison with territorial local authorities, the Health Protection Unit of Taranaki District Health Board, and Ngāruahine throughout the summer bathing season of 2019-2020.
34. Continuation of the bathing beach SEM programme in the 2020-2021 bathing season is recommended.

Decision-making considerations

35. Part 6 (Planning, decision-making and accountability) of the *Local Government Act 2002* has been considered and documented in the preparation of this agenda item. The recommendations made in this item comply with the decision-making obligations of the *Act*.

Financial considerations—LTP/Annual Plan

36. 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

37. 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

38. 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. A focus in the state of the environment monitoring programmes on marine water quality, and subsequent reporting to the Council, recognises iwi desires for the protection of te moana. The SEM programme reported

herein also reflects iwi considerations expressed within the development of the Council's Coastal Plan for Taranaki.

Community considerations

39. 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

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

Appendices

Document 2605120 (excerpts): Bathing Beach Water Quality State of the Environment Monitoring Report Summer 2019-2020, Technical Report 2020-82 (executive summary and recommendations).

Executive summary

This report provides an assessment of microbial water quality at 12 coastal bathing beach sites in the Taranaki region, based on summer monitoring of faecal indicator bacteria conducted by the Council between November 2019 and March 2020. The report focusses on enterococci results, as this indicator is considered by health authorities to provide the closest correlation with risks of health effects in New Zealand coastal waters. Results have been assessed for compliance with microbiological water quality guidelines prepared by the Ministry for the Environment (MfE) and the Ministry of Health (MfE, 2003).

Eleven samples were collected at every monitored beach under dry weather conditions for State of the Environment Monitoring (SEM) purposes, except when it was unsafe to do so. This was two less than normal due to the COVID pandemic and associated lockdown restrictions. At eight of the ten coastal sites monitored every year, an extra eight samples were collected to satisfy MfE requirements for the number of seasonal samples to be used for grading purposes and to provide more timely results during the holiday periods. Follow up samples were often collected following instances where enterococci counts exceeded 140 cfu/100 ml.

Microbiological water quality results were regularly reported on the Taranaki Regional Council website (www.trc.govt.nz) and there was timely liaison with territorial local authorities and the Health Protection Unit of the Taranaki District Health Board throughout the summer bathing season of 2019-2020.

The normal mode of monitoring is deemed the 'Surveillance' mode. Additional monitoring is considered if a sample exceeds the 'Alert' mode (140 cfu/100 ml). The 'Action' mode guideline is reached when enterococci counts in two consecutive samples exceed 280 enterococci cfu/100 ml, and requires public notification by health authorities.

During the 2019-2020 summer season, 196 routine samples were collected across 12 sites; of which 94.9% remained within Surveillance mode (≤140 cfu/100 ml), and 5.1% (ten samples) reached Alert mode (>140 cfu/100 ml). Nine out of the ten samples that reached Alert mode were collected during three surveys that were carried out shortly after rainfall. There were no Action mode events during the year under review. No anomalous or persistent water quality issues were identified during the season.

Based on all routine sample results, Opunake Beach, Oakura Beach (at the camp ground) and Fitzroy Beach had the highest water quality (median enterococci counts ranging from 1 - 4 cfu/100 ml). Oakura Beach (at the surf club), Back Beach and Onaero Beach had the lowest water quality (median enterococci counts ranging from 18 – 28 cfu/100 ml). The key difference between these sites is their proximity to potential sources of faecal contamination such as rivers, streams and stormwater outlets. The stream and river mouths that occur near Oakura Beach (at the surf club), Back Beach and Onaero Beach can potentially have a significant influence on coastal water quality, particularly after heavy rainfall.

Mann-Kendall tests were performed on the SEM samples in order to assess long-term trends in microbiological water quality. One site, Fitzroy Beach, showed a significant decrease in median enterococci counts (improving quality) over the 25 years it has been monitored, indicating an overall improvement in microbiological water quality. Slight decreases in median enterococci counts were found at another seven sites, although these trends were not statistically significant. Similarly, trend analyses found slight increasing trends in median enterococci counts at two sites that were not statistically significant. Overall, based

on SEM samples, recreational water quality across the region was generally comparable with previous years.

Through the Council's Long Term Plan (LTP), the Council's target in respect of the microbiological state of coastal bathing sites is that there is maintenance or increase in the number of annual monitoring sites from the 2003-2004 summer that are compliant with the contact recreational guidelines (MfE, 2003). In the 2003-2004 summer, seven of the nine coastal bathing sites were compliant with the guidelines (Action levels). No sites exceeded this guideline In the season under review. The LTP target was therefore met.

Continuation of the Bathing Beach Recreational Water Quality Programme in the 2020-2021 year is recommended.

Recommendations

As a result of the 2019-2020 bathing beach recreational water quality survey it is recommended:

1. THAT the 2020-2021 summer survey be performed at 12 sites continuing with the existing sampling protocol (sites monitored annually, plus Year 3 sites).
2. THAT the 2020-2021 summer survey also includes weekly 'MfE samples' at eight sites (Onaero, Waitara West, Waitara East, Fitzroy, Ngamotu, Oakura Surf Club, Opunake and Ohawe) between December and February in accordance with MfE, 2003 guidelines to provide up to date public information on beach conditions throughout the holiday periods.
3. THAT follow-up sampling be performed as deemed necessary by Council staff.
4. THAT public reporting of results be performed as appropriate during the season, and in an annual report upon completion of the season's programme.

.

Date 27 April 2021

Subject: **Regional LiDAR PGF/LINZ project**

Approved by: D Harrison, Director - Operations

S J Ruru, Chief Executive

Document: 2752517

Purpose

1. The purpose of this memorandum is to inform the Committee of the progress of the Regional LiDAR capture project that is presently underway in Taranaki.

Executive summary

2. Taranaki Regional Council (the Council) has contracted AAM NZ Ltd (AAM) to carry out the LiDAR data collection.
3. Land Information New Zealand – Toitū te Whenua (LINZ) is administering Provincial Growth Funding on behalf of the Ministry of Business, Innovation, and Employment. A portion of this funding has been made available to the Council.
4. The Council sought and received significant co-funding commitment from each of the three Taranaki TAs (NPDC, SDC, & STDC) as well as a contribution from Auckland University.
5. In March 2021 the Council engaged AAM to supply LiDAR data for the whole Taranaki region as well as the portion of Stratford that is situated in Manawatū-Wanganui region.
6. This project will enable LiDAR data to be collected that will:
   6.1. significantly improve the ability to plan for natural disasters;
   6.2. ensure New Zealand has LiDAR data collected to LINZ standards (the LiDAR Base Specification1);
   6.3. enable better land management decisions through interpretation and analysis of the LiDAR data; and
   6.4. contribute to regional economic development.

---

1 "LiDAR Base Specification" means the PGF Version: New Zealand National Aerial LiDAR Base Specification (January 2020) found at the following website: https://www.linz.govt.nz/data/linz-data/elevation-data

Recommendations

That the Taranaki Regional Council:

a) receives this agenda memorandum *Regional LiDAR PGF/LINZ Project.*

Background

7. On 29 October 2018 the Regional Economic Development Minister, Shane Jones, and Land Information Minister, Eugenie Sage, announced that up to $19 million co-funding from the Provincial Growth Fund (PGF) was available to help regions obtain a baseline elevation dataset. It was expected that this will deliver significant practical value and multiple uses over the coming decades to councils and regional industries.
8. LINZ is managing this initiative on behalf of the Ministry of Business, Innovation and Employment's Provincial Development Unit.
9. The aim of the PGF LiDAR elevation data capture project is to develop a consistent elevation dataset across most of New Zealand. The standard open-data products are a 1m gridded bare earth Digital Elevation Model, a 1m gridded Digital Surface Model, and the source data point cloud.
10. The captured data will be hosted by LINZ and made publically available.
11. Regional councils were invited to apply for funding from the PGF through LINZ for LiDAR to be captured across their region. The cost of capturing the data was to be split approximately 50:50 between the Regional Council and the PGF. The Council sought and received significant co-funding commitment from each of the three Taranaki TAs (NPDC, SDC, & STDC) as well as a contribution from Auckland University.
12. During November 2020, a representative from TRC met with LINZ and MPI panel members to undertake a moderation exercise following the individual assessment and scoring of the LiDAR RFT proposals. Of the respondents, six offered good solutions in terms of the quality criteria that were assessed (these included matters such as their ability to meet the specific regional requirements and the LINZ LiDAR base specification). Overall AAM offered the best overall value proposition and were selected as the preferred supplier.

Discussion

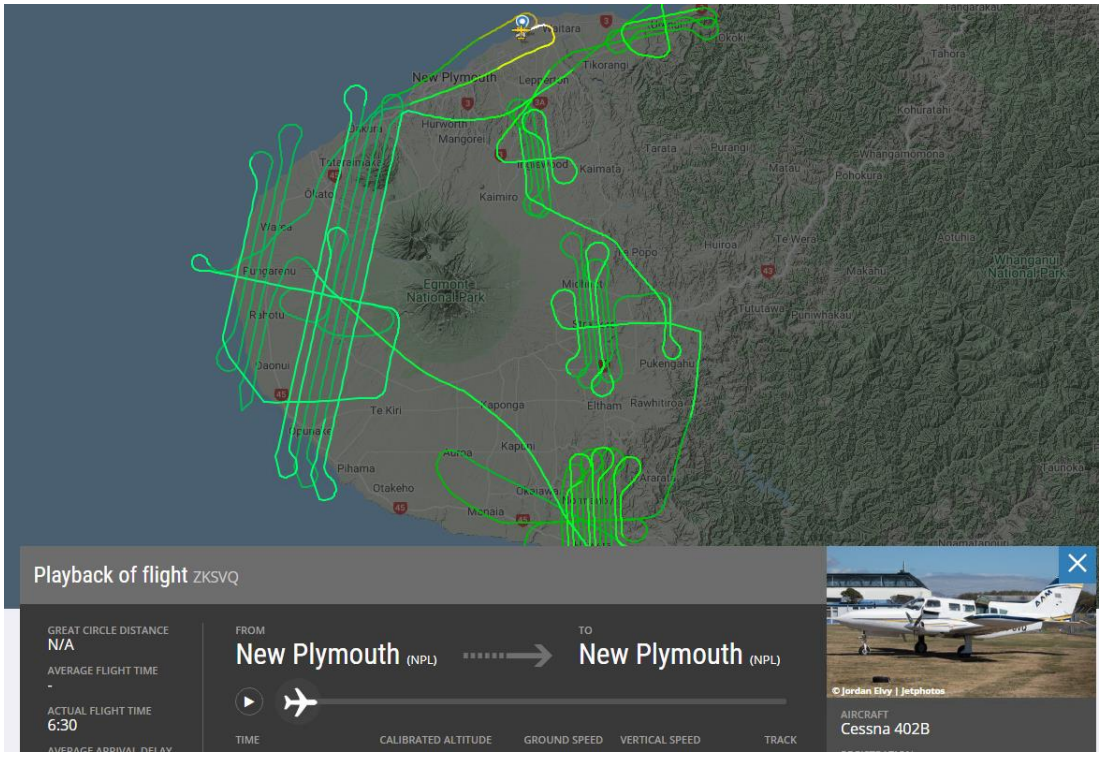
13. High-quality elevation data provides the opportunity to accurately map and digitally recreate the physical world, both built and natural. It is a foundational data asset essential to decisions involving the physical world, with the potential to help drive regional economic growth and spur new investment across the country.
14. Elevation data is captured through Light Detection and Ranging (LiDAR), a technology that uses aircraft-mounted laser instruments to measure distances to features on the ground. The result is a highly accurate dataset measuring ground terrain and above-ground features such as buildings and vegetation.
15. The Council has contracted AAM to carry out the LiDAR data collection of approximately 8,000 square kilometres across the Taranaki region plus the portion of Stratford that is situated in Manawatū-Wanganui region.
16. Total project costs were agreed between the supplier and TRC at $777,875 (this included most of the original RFT requirements and a number of additional requirements that

were agreed after the initial contract was agreed). Contributions were agreed between the funding partners as follows:

PGF Contribution	49%
NPDC Contribution	28%
STDC Contribution	9%
TRC Contribution	6%
SDC Contribution	5%
Auckland University Contribution	3%

17. Contracts and agreements have been signed between TRC and the supplier, LINZ and the Council's four funding partners. Collection of LiDAR over Taranaki commenced over the Easter weekend (the flight paths for the initial collection are shown in the image below). Aerial LiDAR collection should be completed by mid June 2021 with processing and final deliverables being received by the Council by the end of October 2021.

18. A public media statement has been released by the Council on 15 April. The statement was written to inform the public of the project and to also encourage the Taranaki community to consider the opportunities that are available to them to apply the resulting LiDAR data in Taranaki. This media statement can be found here https://www.trc.govt.nz/council/news-and-events/council-news/high-tech-survey-takes-taranaki-to-next-level-of-mapping/



Financial considerations—LTP/Annual Plan

19. 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

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.

Community considerations

22. 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

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

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 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	Let there be certainty
tina	Secure it!
Tina! Hui e! Taiki e!	Draw together! Affirm!