Taranaki Regional Council

AGENDA
Policy & Planning

Tuesday 18 March 2025 10.30am

Policy and Planning Committee

18 March 2025 10:30 AM

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.

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Earthquake

If there is an earthquake - drop, cover and hold where possible. Please remain where you are until further instruction is given.

Date: 18 March 2024

Subject: **Policy and Planning Committee Minutes – 4 February 2025**

Author: M Jones, Governance Administrator

Approved by: A D McLay, Director - Resource Management

Document: TRCID-1492626864-461

Recommendations

That Taranaki Regional Council:

a) takes as read and confirms the minutes of the Policy and Planning Committee meeting of the Taranaki Regional Council held in the Taranaki Regional Council chambers, 47 Cloten Road, Stratford on Tuesday 4 February 2025

b) notes the recommendations therein were adopted by the Taranaki Regional Council on Tuesday 18 February 2025

Appendices/Attachments

TRCID-1492626864-248: Policy and Planning Committee Minutes – 4 February 2025

Date: 4 February 2025

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

Document: TRCID-1492626864-248

Present:

C S Williamson	Chairperson
S W Hughes	
B J Bigham	zoom
D M Cram	
C L Littlewood	ex officio
N W Walker	ex officio
D H McIntyre	
A L Jamieson	
M Ritai	Iwi Representative
E Bailey	Iwi Representative (zoom)
P Moeahu	Iwi Representative
G Boyde	Stratford District Council
L Gibbs	Federated Framers

Attending:

S J Ruru	Chief Executive
A D McLay	Director – Resource Management
M J Nield	Director – Corporate Services
A J Matthews	Director – Environment Quality
F Kiddle	Strategy lead
L Hawkins	Policy Manager
V McKay	Manager – Environmental Assurance
T McElroy	Manager- Science and Technology
C Pickford	Team Leader – Environmental Data
S Tamarapa	Pou Takawaenga – Relationship Facilitator
C Woollin	Communications Advisor
N Chadwick	Governance Administrator
M Jones	Governance Administrator

Three members of the public were in attendance.

The meeting opened at 10.30am.

Apologies: Were received and sustained from Councillor Filbee – South Taranaki District Council, and Councillor Haque – New Plymouth District Council.

McIntyre/Boyde

1. Confirmation of Minutes Policy and Planning 15 October 2024

Resolved

That the Taranaki Regional Council:

a) took as read and confirmed the minutes of the Policy and Planning Committee of the Taranaki Regional Council held at 10.45 on 15 October 2024 at Taranaki Regional Council 47 Cloten Road Stratford

b) noted the recommendations therein were adopted by the Taranaki Regional Council on Tuesday 29 October 2024.

McIntyre/Boyde

2. Government Submission Omnibus

2.1 P Moeahu moved a motion that Council will not lodge anymore submissions on Government legislation.

Moeahu/Ritai

10:46am L Gibbs joined the meeting

2.2 Following discussion, the motion was withdrawn by P Moeahu/M Ritai with the agreement of the Committee.

2.3 F Kiddle provided an overview of the two submissions relating to the proposed Government bills, seeking endorsement of these draft submissions, along with two submissions made by other bodies.

Councillor Bigham noted an interest with the Local Government (Water Services) Bill due to her role with Taumata Arowai.

Resolved

That the Taranaki Regional Council:

a) received the memorandum titled Government submissions omnibus

b) endorsed the submission in Attachment 1 on the Resource Management (Consenting and Other System Changes) Amendment Bill

c) endorsed the submission in Attachment 2 on the Local Government (Water Services) Bill

d) noted the submission in Attachment 5 from the Taranaki Mayoral Forum on the Offshore Renewable Energy Bill

e) noted that if Council has additional matters it wishes to raise on the Offshore Renewable Energy Bill not canvased in the Taranaki Mayoral Forum submission, there is a short window to lodge a separate submission ahead of submissions closing on 6 February

f) noted the submission in Attachment 7 from Te Uru Kahika on the Regulatory Standards Bill discussion document

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

h) determined 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.

Hughes/Walker

3. Freshwater Implementation February Update

3.1 L Hawkins provided a freshwater Implementation update for February 2025.

Resolved

That the Taranaki Regional Council:

a) received the February 2025 update on the Freshwater Implementation Programme.

Williamson/Cram

4. Request to Commence Coastal Plan Change

4.1 L Hawkins provided an update on an issue with the drafting of Policy 43 in the Coastal Plan for Taranaki 2023 (the Coastal Plan) seeking endorsement to commence with a plan change under Schedule 1 of the Resource Management Act 1991.

Resolved

That the Taranaki Regional Council:

a) received this memorandum entitled Proposed Plan Change to the Coastal Plan for Taranaki

b) noted that the wording of Policy 43 likely applies to the West Coast North Island Sanctuary likely precluding many appropriate use and development activities that disturb the seabed in the CMA

c) agreed to commence a plan change to Policy 43, and other consequential amendments, to address the issue

d) directed staff to engage closely with iwi throughout the plan change process

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

f) determined 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, determined that it does not require further information, further assessment of options or further analysis of costs and benefits, or advantages and disadvantages prior to making a decision on this matter.

Cram/Hughes

5. Lake Rotorangi State of the Environment Monitoring Report 2021-2024

5.1 T McElroy provided an overview of the Lake Rotorangi State of the Environment Monitoring Report 2021-2024.

Resolved

That the Taranaki Regional Council:

a) received the Lake Rotorangi State of the Environment Monitoring Report 2021-2024

b) noted the recommendations therein.

Jamieson/Boyde

6. Awatuna Constructed Wetland

6.1 C Pickford provided an overview of an investigation into the use of constructed wetlands. This investigation included the Awatuna Constructed Wetland.

Resolved

That the Taranaki Regional Council:

a) received the report titled Awatuna Constructed Wetland, and accompanying documentation

b) noted the findings of this investigation.

Littlewood/Williamson

P Moeahu spoke to the Committee on behalf of the Iwi Representatives expressing their view on who should be appointed Chair and Deputy Chair of the Taranaki Regional Council.

There being no further business the Committee Chairperson, C S Williamson, declared the meeting of the Policy and Planning Committee closed at 12:13pm.

Policy and Planning

Committee Chairperson: _____

C S Williamson

Date: 18 March 2025

Subject: **Mana Whenua Engagement Strategic Priorities**

Author: F Kiddle, Strategy Lead

Approved by: A D McLay, Director - Resource Management

Document: TRCID-1492626864-302

Purpose

1. The purpose of this memorandum is to set out the landscape for mana whenua engagement over 2025 and agree key strategic priorities for Taranaki Regional Council.

Executive summary

2. Taranaki Regional Council (Council) has extensive obligations to provide for mana whenua participation in Council decision-making. This is primarily under the Local Government Act 2002, Resource Management Act 1991 (RMA), Treaty settlement legislation, and the new Maunga Redress Act.
3. Council already has a number of initiatives underway that give effect to our current obligations. This is evident in the Māori ward and iwi representation on key committees. It is also shown in our freshwater workstreams. Particularly the funding with funding a pou taiao position within Te Kotahitanga o Te Atiawa to support the capacity of mana whenua to engage in freshwater policy development, and the establishment of the Wai Steering Group to discuss key issues regarding the development of the new Land and Freshwater Plan.
4. There is a clear programme of work ahead to deepen our relationship with mana whenua and deliver on other commitments. Adoption of a joint management agreement (JMA) with Ngāti Maru, establishment of the Waitara River Committee, and adoption of a relationship agreement with Maniapoto are all significant pieces of work that will have impacts across Council. Giving effect to the recently passed Maunga Redress Act will also require consideration, but more importantly, it is an opportunity to build a unique value proposition for Taranaki. Finally, the replacement of the RMA will require adjusting existing Treaty settlement arrangements and finding a governance framework that works for Taranaki.
5. Council is presented with a unique opportunity to fundamentally deepen our relationship, build competency within Council and capacity within iwi and hapū, and improve the levels of service we provide to the community. This will require a strategic approach and significant lift in engagement at the governance level, different levels of shared decision-making, operational level partnerships with iwi and hapū, and designated resource.

Recommendations

That the Taranaki Regional Council:

a) receives the memorandum titled *Mana whenua engagement strategic priorities*
b) notes the extensive obligations on Council to provide for mana whenua participation in Council decision-making
c) notes that the confluence of the Maunga Redress Act, Ngāti Maru JMA, Waitara River Committee, Maniapoto relationship agreement and RMA replacement presents a key strategic opportunity to deepen our partnership with mana whenua and deliver better services for the communities of Taranaki
d) approves the following strategic priorities for mana whenua engagement over the 2025 calendar year:
    a. advancing the Ngāti Maru joint management agreement
    b. advancing the establishment of the Waitara River Committee
    c. advancing the Maniapoto relationship agreement
    d. engaging with Te Tōpuni Kōkōrangi and Te Tōpuni Ngārahu to operationalise provisions in the Maunga Redress Act and explore broader opportunities
    e. engaging with iwi and the three district councils to explore governance arrangements for the RMA replacement and development of a potential combined plan that gives effect to existing Treaty settlements
    f. continuing to work closely with iwi in the development of the Land and Freshwater Plan and the future of our freshwater science and policy work
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

6. The Council has extensive legal responsibilities to support the participation of Māori in local government decision making that it is currently discharging in different ways. Many of these responsibilities are set by legislation that all local authorities need to implement, while others are specific to Taranaki. This section canvases the legislative requirements on Council and summarises the current initiatives in place.

Local Government Act

7. The Local Government Act 2002 (LGA) imparts broad responsibilities on Council to provide opportunities for Māori to contribute to decision-making processes. Council must specifically establish and maintain a process for Māori to contribute to decision making, consider ways to foster the development of Māori capacity to contribute, and provide relevant information to facilitate that contribution and development. The steps Council will take to foster Māori capacity to participate must be set out in the long-term plan.

8. The mechanisms a council may use to discharge these LGA responsibilities are variable and flexible. For example, a council could:
    a. establish a Māori ward or wards under the Local Electoral Act 2001
    b. appoint iwi representatives to relevant council committees
    c. enter into relationship agreements or memorandums of understanding with specific iwi authorities codifying how participation and engagement will occur across council functions
    d. provide iwi authorities with funding to build their capacity and engage with council processes or
    e. set up internship programmes for mana whenua to gain experience working for local government

9. Council has established both a Māori ward and has iwi representation on key committees (refer paragraphs 19 and 20 below). The Māori ward will be subject to a referendum at the local body elections later this year. Council is also currently funding one pou taiao position within Te Kotahitanga o Te Atiawa to support the capacity of mana whenua to engage in freshwater policy development under the Resource Management Act 1991 (RMA).

Resource Management Act

10. The RMA also imparts significant obligations regarding mana whenua engagement. At the highest level, under Part 2 of the RMA Council must:

    a. recognise and provide for the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, wāhi tapu, and other taonga as a matter of national importance
    b. have particular regard to kaitiakitanga
    c. take into account the principles of the Treaty of Waitangi.

11. In relation to the Treaty principles, those of partnership, participation and protection are particularly important. Partnership requires that parties act reasonably and in good faith. Participation, requires that opportunities are provided for mana whenua to engage with decision making processes at all levels. And protection, that the active protection of Māori interests, rights, taonga and rangatiratanga must be a priority.

12. The RMA also sets out a range of specific obligations for engagement with mana whenua in various RMA processes. These include that Council must:

    a. take into account relevant planning documents recognised by an iwi authority in any plan making process
    b. detail the resource management issues of significance to iwi authorities in the region in its regional policy statement
    c. consult with relevant iwi authorities throughout the drafting of a new plan, provide them a full copy of the draft plan for comment prior to formal notification and give particular regard to their comments
    d. serve notice of any publicly notified resource consent application on the relevant iwi authorities
    e. have regard to any relevant statutory acknowledgment in determining if a person is an affected person for a resource consent application.

13. Council also has the ability to enter formal shared decision-making arrangements and collaboration arrangements with iwi and hapū under the RMA. Joint management agreements (JMA) are the most powerful. These set up formal joint decision making between Council and iwi or hapū where a decision made under the JMA has legal weight as a decision of the local authority.

14. Either iwi or a local authority can also initiate the development of mana whakahono a rohe (iwi participation agreements). These arrangements specify the ways in which tangata whenua participate in decision-making under the RMA. Compared to a JMA, a mana whakahono a rohe is more akin to a relationship agreement. They set out in detail how participation will occur and existing obligations will be discharged, but final decision-making power remains with the local authority.

15. Beyond the pou taiao position already mentioned, Council also has a specific work stream for mana whenua engagement in freshwater policy development. Key to this was the establishment of the Wai Steering Group. This group is comprised of four representatives elected by the eight Taranaki iwi, the Council Chief Executive, and other Council staff as required. It is a forum for discussing key issues in the development of a new Land and Freshwater Plan for Taranaki. Throughout the plan development process, Council officers are also regularly engaging with iwi pou taiao on a range of matters. Finally, through the 2024-27 long-term plan, Council agreed to establish a long-term freshwater programme

with mana whenua. The intent of this programme is to look beyond the notification of a new Land and Freshwater Plan and explore different initiatives to deliver better freshwater outcomes.

16. In resource consenting, Council has a policy of providing all consent applications within a given rohe to the relevant iwi for comment. First and foremost, these comments are used to aid officers in determining if the iwi is an affected party for the notification assessment. Only if officers assess the activity as having minor or more than minor adverse effects on the iwi can the council progress down the pathway of notification. If the activity is not notified, officers will still take iwi comments within scope of the application into account when drafting consent conditions.
17. In considering iwi comments on consent applications Council is limited by the provisions of our operative plans. Often, we are not able to take some iwi comments into account due to these provisions. This most common where the comments relate to matters that are either already permitted under an existing permitted activity rule or relate to matters not captured by the specific matters of control for a controlled activity. An example of this would be a comment seeking cultural monitoring of excavation related to earthworks (a land-use consent matter), where we are only consenting the discharge of sediment from the earthworks (a discharge consent matter).
18. The detail of how the Government's planned replacement to the RMA will affect iwi engagement remains to be seen. But from the announced high-level policy to date, the shift to one regulatory plan for a region, integration of spatial planning, and shift in focus away from consenting towards more compliance and monitoring of permitted activities will all impact iwi engagement and how it occurs.

Iwi committee representatives

19. The longest standing Taranaki specific requirement for formal mana whenua participation in Council decision-making are the iwi representatives on the Policy and Planning and Operations and Regulatory committees. These positions are established through the 2016 settlement acts for Te Atiawa, Taranaki Iwi and Ngāruahine.
20. The iwi representatives have the same status as members appointed to the committee under the LGA. Council is able to adopt a different committee structure, including disestablishing a committee. It must, however, consult with the iwi of Taranaki and ensure that the Iwi representation is maintained in the new structure on the relevant committee that has responsibility for regulatory and policy matters. Hence, Council cannot diminish the nature of representation in the settlement acts.

Waitara Lands Act

21. The New Plymouth District Council (Waitara Lands) Act 2018 (Waitara Lands Act) imparts important obligations on Council. First, we are required to hold income from the Waitara Endowment Land that is to go towards betterment of the Waitara catchment and community. This money originates from the sale of Waitara leasehold lands and is termed the TRC income reserve. As of December 2024, there was $23.7 million, including accrued interest, in the Council's account. 70% of the funding is to go towards the restoration, protection, and enhancement of the environmental, cultural, and spiritual health and well-being of the Waitara River and the Waitara River catchment. 30% of the reserve can go towards any matter in Waitara or in the lower catchment of the Waitara River.
22. Second, Council is required to establish and administer the Waitara River Committee. The key purpose of the Committee is to determine the amounts and purposes of what the TRC income reserve will be spent on. Its decisions in this regard are final. It can also determine to accumulate funding in the reserve for allocation in future years.
23. Membership of the Committee must be comprised of 5 members nominated by Council, 4 by the Waitara River Authorities, and 1 by Te Kōwhatu Tū Moana Trust. A Waitara River Authority is an iwi

organisation that exercises historical and continuing mana whenua within the Waitara catchment. Discussions to date have been with Te Atiawa, Ngāti Maru, Ngāti Mutunga, Ngāti Tama and Te Kowhatu Tu Moana. Maniapoto and Ngati Ruanui have indicated that they do not wish to be involved in the process at this stage. The Waitara Lands Act does, however, provide for them to enter the process at a later date should they wish.

24. The Waitara River Committee is itself required to establish a subcommittee comprised of 4 members of Te Kōwhatu Tū Moana Trust. The purpose of this subcommittee is to provide advice to the Committee on how to spend the 30% of the TRC income reserve that can go towards any matter in Waitara or the lower catchment.

25. A draft partnering agreement to establish the Waitara River Committee has been progressed to an advanced stage by Council and iwi authorities. It is currently awaiting the finalisation of the joint management agreement required under Ngāti Maru's settlement, as this has significant implications for the work of the Waitara River Committee and Council resource management processes.

Ngāti Maru Settlement Act

26. Under the Ngāti Maru (Taranaki) Claims Settlement Act 2022 (the Ngāti Maru Settlement Act) Council is required to establish a JMA with Te Kāhui Maru Trust: Te Iwi o Maruwharanui.

27. The Act sets out the JMA must cover monitoring, resource consenting, compliance and plan development activities within the Waitara River Catchment. Depending on the specific provisions, these can apply variably to the Waitara River Committee, the Waitara River Authorities, or Te Kāhui Maru Trust. Attachment One contains a more detailed overview of the what the JMA is required to contain. Attachment Two contains a map of the catchment.

28. The final text of the JMA will likely provide for different levels of shared decision making depending on the provisions. Example types of provision include where the JMA:

    a. provides for the parties to explicitly make a decision, whereupon that decision has the same legal weight as a decision of Council
    b. provides for the parties to discuss and issue and make a recommendation up to Council for consideration and final decision
    c. provides for the parties to discuss an issue or approach but without a set decision or recommendation being made
    d. set out the procedures that will be followed to provide mana whenua opportunities to provide input into RMA decision making (e.g. resource consent decisions) and what Council will do with that information.

29. Council has recently received a draft JMA from Ngāti Maru as a starting point for negotiations.

Maniapoto Settlement Act

30. In addition to the JMA with Ngāti Maru, Council is also required to establish a relationship agreement with Te Nehenehenui, the Post Settlement Governance Entity (PSGE) for Maniapoto.

31. While the recognition by the Crown that Maniapoto's rohe extends into Taranaki has proved controversial, Council is bound by the provisions in the Maniapoto Claims Settlement Act (2022) (Maniapoto Settlement Act). This relationship agreement covers the area in Attachment Three. It must provide for Council and the trustees to work together under the RMA on matters relevant to Ngā Wai o Maniapoto in relation to monitoring and enforcement, plan changes, resource consents, identification of customary activities, and non-regulatory initiatives. The full matters it must cover are contained in Attachment One.

32. Council received draft text from Te Nehenehenui late in 2024. Officers have provided initial feedback and are awaiting further discussions.

The Maunga Settlement

33. The Te Ture Whakatupua mō Te Kāhui Tupua 2025/Taranaki Maunga Collective Redress Act 2025 (the Maunga Redress Act) came into force on 2 February 2025.

34. The cornerstone of this act is the recognition of Te Kāhui Tupua as a legal person, with the corresponding rights, powers, duties and liabilities. Te Kāhui Tupua encompasses Taranaki and the other Tūpuna Maunga, including Pouākai and Kaitake, from their peaks down to and including all of the surrounding lands, and incorporating all of their physical and metaphysical elements. This definition does not have a set boundary, but does go beyond the present limit of the national park of Te Papa-Kura-o-Taranaki.

35. Te Tōpuni Kōkōrangi is the human face and voice of Te Kāhui Tupua and is to perform functions in relation to Te Papa-Kura-o-Taranaki. It is comprised of 8 members, four appointed by the Minister of Conservation and four appointed by the trustees of Te Tōpuni Ngārahu – a trust comprised of one representative from each of the eight Iwi.

36. In addition to promoting the health and well-being of Te Kāhui Tupua, Te Tōpuni Kōkōrangi will also carry out conservation related functions for the national park, including preparing He Kawa Ora (the national park management plan) and jointly, alongside the Minister of Conservation, deciding whether to grant or decline applications for concessions or authorisations regarding interests in land (e.g. leases).

37. The Act contains provisions specifically relevant to Council's functions. As Te Kāhui Tupua is a legal person, Council will need to assess if it is an affected person under resource consent processes. Both Te Tōpuni Kōkōrangi and the trustees of Te Tōpuni Ngārahu are also entitled to lodge submissions and speak at a hearing on matters that impact Te Kāhui Tupua. Te Tōpuni Ngārahu must be treated as an iwi authority for the purposes of the RMA and a public body for the purposes of the LGA.

38. Finally, the Act changes the legal names of a number of geographic features. These are contained in Attachment four. Council is currently updating its maps, website, and internal guidance to reflect these changes.

Issues

39. The Waitara Lands Act, Ngāti Maru Settlement Act, Maniapoto Settlement Act, Maunga Redress Act and RMA replacement will require changes at the operational, managerial and governance levels of the Council. They also present important opportunities to improve the levels of service to our communities.

Discussion

Opportunities

40. The Maunga Redress Act provides a potential catalyst for deeper relationships across the Crown, councils and iwi. This is particularly so for building on the conservation and predator control work that is occurring in the region. In this space, the Maunga Redress Act could build a unique investment proposition to attract new funding and better utilise existing resources.

41. Beyond conservation, the Maunga Redress Act could support wider ambitions for Taranaki. For example, Te Kāhui Tupua has the potential to become a unifying entity for resource management planning across Taranaki. This is especially so because the Act already incudes specific Maunga values.

Such as that Te Kāhui Tupua is a source of spiritual, cultural and physical well-being for the people, lands, waters, flora, fauna of Taranaki. Strong relationships between the four councils and both Te Tōpuni Ngārahu and Te Tōpuni Kōkōrangi could also become important channels for regional resource management decision-making and collaboration.

42. At the very least, Council will need to engage early with Te Tōpuni Ngārahu and Te Tōpuni Kōkōrangi on how to operationalise the RMA provisions of the Maunga Redress Act. A key outstanding question to be addressed is when assessment by Council officers is required to determine if Te Kāhui Tupua is an affected person beyond the bounds of the national park. There will also be a number of operational decisions to be made, such as when we engage with Te Tōpuni Ngārahu vs Te Te Tōpuni Kōkōrangi and expectations on how that engagement occurs.

43. Turning to Council specific matters, the Waitara Lands Act presents an opportunity to develop and deliver a joint Council-mana whenua strategy for catchment improvement work. This is then supported by a ringfenced source of funding in the TRC income reserve. Together, a dedicated strategy and funding could deliver a real shift in the Waitara catchment, which could provide learnings that can be applied elsewhere. Success will require strong kanohi te kanohi relationships at the governance level and operational partnerships between council, iwi and hapū to deliver on the strategy.

44. The Ngāti Maru JMA and Maniapoto relationship agreement will then require another layer of partnership across Council. It is likely that both agreements will include provision for regular governance level forums between councillors and PSGE trustees to discuss how the agreements are working. The JMA requires co-governance regarding monitoring matters in the catchment, and this can be extended to other areas with the agreement of the parties. These documents are an opportunity to develop better systems for iwi participation, explore ways to build reciprocal capacity, strengthen person-to-person links, and better discharge our part 2 obligations under the RMA (refer paragraph 10).

45. Finally, the shift to a single combined plan under the RMA replacement is an opportunity to front-foot a preferred governance system for Taranaki that gives effect to Treaty settlements. A requirement to create a combined plan across the four councils will likely require a joint decision-making body. Accordingly, the policy provisions in the Ngāti Maru JMA will need to link to this body. And the iwi representation provisions in the Te Atiawa, Taranaki Iwi and Ngāruahine settlements will need updating. Finally, there would be an opportunity to explore the potential for Te Kāhui Tupua to be more formally involved in the plan making process as well.

Next steps

46. Taking all the changes together, Council is presented with a unique opportunity to fundamentally deepen our relationship, build competency within Council and capacity within iwi and hapū, and improve the levels of service we provide to the community. The successful delivery of these required initiatives will require a strategic approach and significant lift in engagement at the governance level, different levels of shared decision-making, operational level partnerships with iwi and hapū, and designated resource.

47. Council officers will continue to work with relevant PSGEs to progress the Ngāti Maru JMA, Waitara River Committee Partnering Agreement, and Maniapoto relationship agreement. When operational, these agreements will be useful for testing approaches that could be expanded to other iwi and other catchments in the future.

48. The most pressing priority is the Ngāti Maru JMA. Council officers are currently considering the draft provided by Ngāti Maru and will discuss next steps with Ngāti Maru and the other Waitara River Authorities.

49. In addition, Council officers will prioritise engagement with both Te Tōpuni Ngārahu and Te Te Tōpuni Kōkōrangi when they are established. This is to operationalise the RMA provisions in the Maunga Redress Act and explore broader opportunities. Ideally, this engagement would occur in partnership with the three other councils and at both the senior leadership and governance levels.
50. When details of the RMA replacement emerge over the course of this year, discussions will be needed with ngā iwi o Taranaki and the three district councils. This is to explore governance options for a combined plan that will give effect to existing settlement obligations and exploring opportunities for better integrating Te Kāhui Tupua into RMA plan making. These discussions can build on the spatial planning investigations that were initiated under the now repealed Spatial Planning Act.
51. Council officers will also continue to engage closely with iwi on the development of the new Land and Freshwater Plan. As agreed in the 2024-34 Long-Term Plan, this also includes the development of a long-term freshwater work programme with iwi and hapū looking beyond the notification of the current plan.

Options

52. It is recommended Council specifically approve the following as key strategic priorities for the 2025 calendar year:
    a. advancing the Ngāti Maru joint management agreement
    b. advancing the establishment of the Waitara River Committee
    c. advancing the Maniapoto relationship agreement
    d. engaging with Te Te Tōpuni Kōkōrangi and Te Tōpuni Ngārahu to operationalise provisions in the Maunga Redress Act and explore broader opportunities
    e. engaging with iwi and the three district councils to explore governance arrangements for the RMA replacement and development of a combined plan that gives effect to existing Treaty settlements
    f. continuing to work closely with iwi in the development of the Land and Freshwater Plan, including developing a long-term work programme looking beyond notification of the current plan.
53. Council has the option of not approving any given item in the above list or adding others. The above list is recommended for adoption as it reflects those actions that relate specifically to key legal obligations Council needs to discharge and work that supports the strategically significant freshwater policy programme.
54. Delivering the proposed strategic priorities will already require significant resourcing on behalf of Council. If Council elects to add additional priorities, care must be taken to ensure that these are able to be appropriately resourced without impacting other work programmes.

Significance

55. This decision is assessed as not significant with regards to the Significance and Engagement Policy. It will not have a significant impact on levels of service, incur more than $10,000,000 budgeted or $5,000,000 of unbudgeted expenditure, or involve the transfer of ownership or control of a strategic asset.
56. More broadly, the proposed strategic priorities reflect either matters already consulted on in the 2024-34 long term plan, or giving effect to known legislative obligations.

Financial considerations—LTP/Annual Plan

57. 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

58. 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*.

Climate change considerations

59. There are no climate change impacts to consider in relation to this item.

Iwi considerations

60. 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.

61. The Councils relationship with mana whenua in Taranaki, strengthened through the proposed strategic priorities, is crucial for the management of natural resources and the wider development of Taranaki. Council cannot discharge our environmental management obligations under part 2 of the RMA without the participation of mana whenua. The Māori economy in Taranaki is also both diverse and innovative, providing opportunities to help Council achieve its mission of a thriving and prosperous Taranaki.

Community considerations

62. 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

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

Appendices/Attachments

TRCID-2119408846-8: Analysis of iwi participation provisions across relevant acts

TRCID-2119408846-11: Waitara river catchment map

TRCID-249537064-122: Maniapoto relationship agreement area

TRCID-249537064-127: Maunga Redress Act name changes

	Ngāti Maru Settlement Act JMA provisions	Maniapoto Settlement Act Relationship Agreement provisions	Mana Whakahono ā Rohe under the Resource Management Act 1991
Scope	• No other subject matter than matters relating to the Waitara River and activities within its catchment affecting the Waitara River.	• Only apply within Area N on the map on page 21 here. • Focused on matters relating to Ngā Wai o Maniapoto.	• The area of interest of the initiating iwi, being what they identify as their traditional rohe. • For any additional iwi who join, it is likely that the geographic scope would extend to their full area of interest as well.
Participants	• Ngāti Maru and Council. • Provisions relating to the Waitara River Committee impact all Waitara River Authorities, but there is no obligation to include other authorities in the creation of the JMA.	• Maniapoto, Manawatū-Whanganui Regional Council, Taranaki Regional Council, Ruapehu District Council.	• One or more iwi authorities invite one or more relevant local authorities to enter into a Mana Whakahono a Rohe. • Other relevant iwi authorities can then join the process if they want or not. • Relevant local and iwi authorities are those whose areas of interest overlaps with, or is adjacent to, the area of interest of the initiating iwi authority.
Legal Framework	• Sections 36B to 36E of the Resource Management Act 1991 do not apply to the joint management agreement. • The performance or exercise of a duty, function, or power under the joint management agreement has the same legal effect as if it were performed or exercised by Taranaki Regional Council. • Taranaki Regional Council must not use the special consultative procedure under section 83 of the Local Government Act 2002 in relation to the joint management agreement. • The joint management agreement is enforceable between the parties to it. • Neither party has the right to terminate the joint management agreement.	• With the written agreement of the parties to a relationship agreement, the agreement may be treated as, or as part of, a Mana Whakahono a Rohe under section 58O(7) of the Resource Management Act 1991. • May combine into a single relationship agreement to deal with all three councils. • Does not provide for joint decision making between councils and iwi that has legal effect like a JMA does.	• Provision within the Resource Management Act. • Sets out how iwi will participate in decision-making processes. • Any matters pertain to joint management or delegation of powers is an optional extra. These must still meet the appropriate legal requirements in the RMA and potentially the special consultative procedure in the Local Government Act.

Guiding Principles for Development and Implementation	• Must promote the purpose of restoring and maintaining the quality and integrity of the waters that flow into and form part of the Waitara River for present and future generations.
	• Must respect the mana of Ngāti Maru.
	• Must recognise the intrinsic value of the Waitara River as a taonga:
	• Must reflect a shared commitment to:
	  ○ working together in good faith and a spirit of co-operation;
	  ○ being open, honest, and transparent in their communications; and
	  ○ use best endeavours to ensure that the purpose of the joint management agreement is achieved in an enduring manner.
	• Must recognise that the joint management agreement operates within statutory frameworks and that complying with those statutory frameworks, meeting statutory timeframes, and minimising delays and costs are important.
		• Promote the overarching purpose of the Raumairoa (natural resources redress), which is:
		  ○ to care for and protect Ngā Wai o Maniapoto; and
		  ○ to restore and maintain, for present and future generations, the quality and integrity of the waters that flow into, and form part of, Ngā Wai o Maniapoto.
		• Respect the mana of Maniapoto.
		• Jointly committing to:
		  ○ work together in good faith and a spirit of co-operation;
		  ○ communicate in an open and honest way;
		  ○ use their best endeavours to ensure that the purpose of the relationship agreement is achieved in an enduring way; and
		  ○ recognise that the relationship agreement operates within a statutory framework which must be complied with.
			• Achieve the purpose of the Mana Whakahono a Rohe in an enduring manner.
			• Enhance the opportunities for collaboration amongst the participating authorities, including by promoting:
			  ○ the use of integrated processes; and
			  ○ co-ordination of the resources required to undertake the obligations and responsibilities of the parties to the Mana Whakahono a Rohe.
			• In determining whether to proceed to negotiate a joint or multi-party Mana Whakahono a Rohe, achieve the most effective and efficient means of meeting the statutory obligations of the participating authorities.
			• Work together in good faith and in a spirit of co-operation.
			• Communicate with each other in an open, transparent, and honest manner.
			• Recognise and acknowledge the benefit of working together by sharing their respective vision and expertise.
			• Commit to meeting statutory time frames and minimise delays and costs associated with the statutory processes.
			• Recongise that a Mana Whakahono a Rohe under this subpart does not limit the requirements of any relevant iwi participation legislation or the agreements associated with that legislation.

Monitoring and Enforcement Provisions	The part of the joint management agreement on monitoring and enforcement must provide for the Waitara River Committee to— • Meet no less than twice each year to—	The Agreement must provide for the councils and the trustees to work together under the Resource Management Act 1991 in relation to: • Monitoring and enforcement.	A Mana Whakahono a Rohe must: • record the agreement of the participating authorities about—

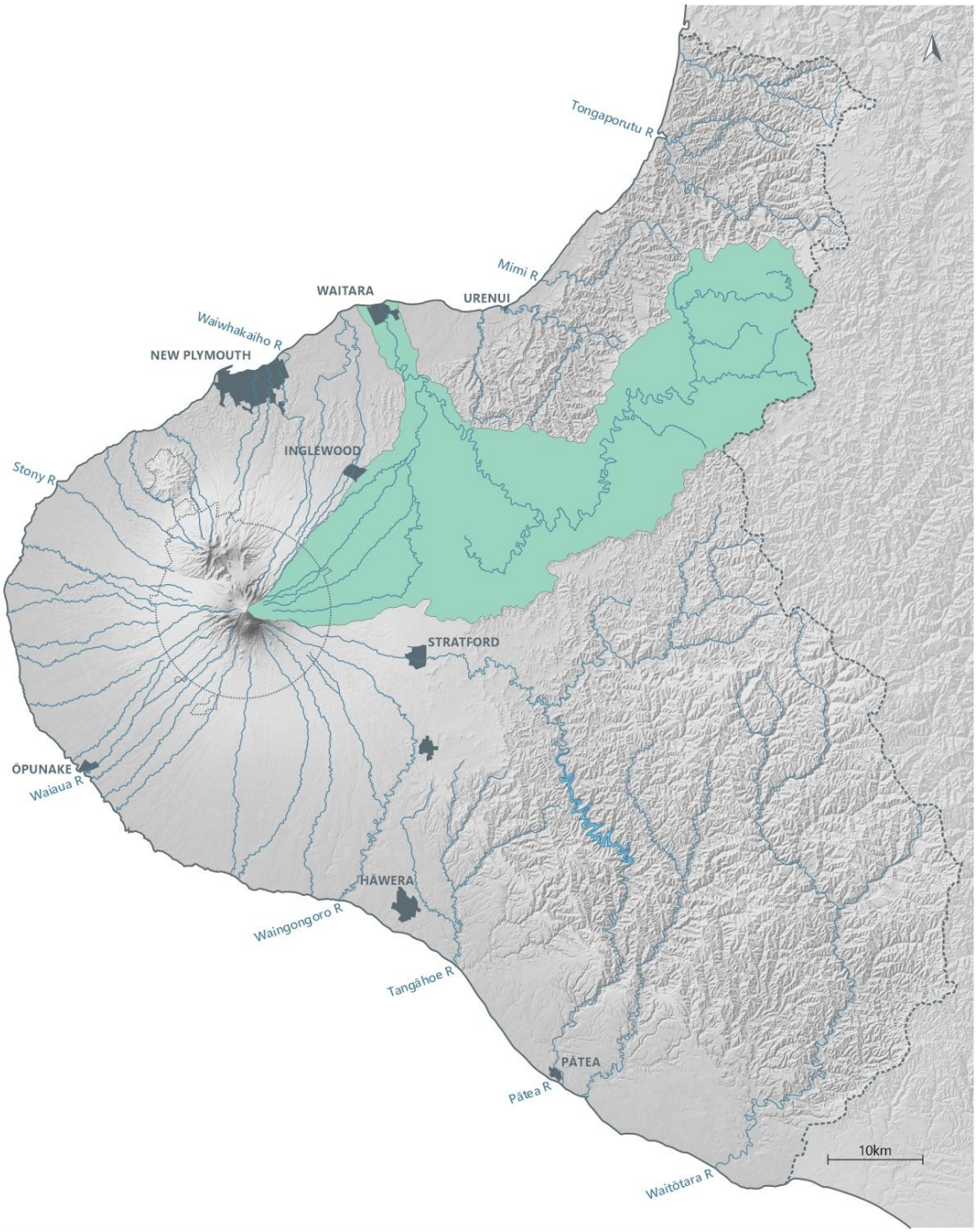
	○ discuss and agree the priorities for the monitoring of those matters set out in section 35(2)(a) to (e) of the Resource Management Act 1991; ○ discuss and agree the methods for and extent of the monitoring of those matters set out in section 35(2)(a) to (e) of the Resource Management Act 1991; and ○ discuss the opportunities for the Waitara River Authorities to participate in the monitoring of those matters set out in section 35(2)(a) to (e) of the Resource Management Act 1991. • Meet no less than twice each year to discuss appropriate responses to address the outcomes of the monitoring of those matters set out in section 35(2)(a) to (e) of the Resource Management Act 1991, including— ○ the potential for review of Resource Management Act 1991 planning documents; and ○ enforcement under the Resource Management Act 1991, including criteria for the commencement of prosecutions, applications for enforcement orders, the service of abatement notices, and the service of infringement notices. • Agree appropriate procedures for reporting back to the Waitara River Committee on the enforcement action taken by Taranaki Regional Council. • Discuss and agree the role of the Waitara River Authorities in the 5-yearly review provided for in section 35(2A) of the Resource Management Act 1991. • Discuss the opportunities for persons nominated by the Waitara River Authorities to participate in enforcement action under the Resource Management Act 1991. The cost of carrying out the matters provided for in this section must be paid out of the TRC income reserve.		○ how the participating authorities will work together to develop and agree on methods for monitoring under the RMA.
Resource Consent Processes	Requirements apply to a resource consent to: • dam, divert, take, or use water from or in the Waitara River; • discharge a contaminant or water into the Waitara River; • discharge a contaminant onto or into land in circumstances that will result in the contaminant entering the Waitara River; • alter, demolish, erect, extend, place, reconstruct, remove, or use a structure or part of a structure in, on, under, or over the bed or banks of the Waitara River; • drill, excavate, tunnel, or otherwise disturb the bed or banks of the Waitara River; • introduce or plant a plant or part of a plant, whether exotic or indigenous, in, on, or under the bed or banks of the Waitara River; • deposit a substance in, on, or under the bed or banks of the Waitara River; • reclaim or drain the bed of the Waitara River; • enter onto or pass across the bed of the Waitara River; • damage, destroy, disturb, or remove a plant or part of a plant, whether exotic or indigenous, in, on, or under the bed or banks of the Waitara River;	The Agreement must provide for the councils and the trustees to work together under the Resource Management Act 1991 in relation to: • The functions, powers, and duties under Part 6 of that Act in relation to applications for resource consents. • Identification of customary activities for which a resource consent should not be required under that Act. A relationship agreement must also provide that the trustees are to be given a summary of resource consent applications that are relevant to Ngā Wai o Maniapoto; the summary must be similar to that given under the limited notification process under the Resource Management Act 1991.	A Mana Whakahono a Rohe may specify: • How a local authority is to consult or notify an iwi authority on resource consent matters, where the Act provides for consultation or notification. • The circumstances in which an iwi authority may be given limited notification as an affected party.

	• damage, destroy, disturb, or remove the habitats of plants or parts of plants, whether exotic or indigenous, in, on, or under the bed or banks of the Waitara River; and • damage, destroy, disturb, or remove the habitats of animals or aquatic life in, on, or under the bed or banks of the Waitara River. The part of the joint management agreement on the resource consent process must provide that: • Council must provide the Waitara River Authorities with information on the applications for resource consents that the Council receives; • The information must be provided as soon as is reasonably practicable after the application is received and before a determination is made under sections 95A to 95C of the Resource Management Act 1991 and be: o the same as would be given to affected persons through limited notification under section 95B of the Resource Management Act 1991; or o the information that Taranaki Regional Council and the Waitara River Authorities agree on: • Council and the Waitara River Authorities must jointly develop and agree criteria to assist the Council's decision-making under the following processes or sections of the Resource Management Act 1991: o best practice for pre-application processes; o section 87D (request that an application be determined by the Environment Court rather than the consent authority); o section 88(3) (incomplete application for resource consent); o section 91 (deferral pending additional consents); o section 92 (requests for further information); o sections 95 to 95F (notification of applications for resource consent); and o sections 127 and 128 (change, cancellation, or review of consent conditions). • Council must actively encourage applicants to consult early with the Waitara River Authorities before lodging an application, including facilitating participation in pre-lodgement hui with iwi. • Council must give appropriate weight to any comments received from the Waitara River Authorities within agreed timeframes in making decisions on applications, in light of the requirement under section 6(e) of the Resource Management Act 1991 to recognise and provide for the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, wāhi tapu, and other taonga. • Council may use the Waitara River Committee as the forum to undertake any of the actions under this section. The criteria developed and agreed regarding Council decision-making: • Are additional to, and must not derogate from, the criteria that the Council must apply under the Resource Management Act 1991. • Do not impose a requirement on the Council to change, cancel, or review consent conditions.		

	Council and the Waitara River Authorities each bears their own costs of complying with this section.		
Plan review process etc.	This section applies to preparing, reviewing, changing, or varying a Resource Management Act 1991 planning document to the extent to which those processes relate to the Waitara River. The part of the joint management agreement on preparing, reviewing, changing, or varying a Resource Management Act 1991 planning document must record— • How a Waitara River Authority may participate in the preparation or change of a policy statement or plan, including the use of any of the pre-notification, collaborative, or streamlined planning processes under Schedule 1 of the Resource Management Act 1991. • How Taranaki Regional Council will undertake consultation requirements, including the requirements of section 34A(1A) and clause 4A of Schedule 1 of the Resource Management Act 1991.	The Agreement must provide for the councils and the trustees to work together under the Resource Management Act 1991 in relation to: • The preparation, review, or change of a planning document.	A Mana Whakahono a Rohe must record the agreement of the participating authorities about: • How an iwi authority may participate in the preparation or change of a policy statement or plan, including the use of any of the pre-notification or streamlined planning processes under Schedule 1. • How the participating authorities will undertake consultation requirements, including the requirements of section 34A(1A) and clause 4A of Schedule 1.
Conflict resolution in agreeing agreement	• If Council and trustees cannot agree in required timelines and do not agree to extend that period, they must notify the Minister there are issues in disputes. • Unless otherwise agreed between the Minister and the trustees, the Minister and trustees, in consultation with TRC, then have 2 months to try reach agreement. • If not agreed after that, the Minister must make a determination on the issue in dispute and the agreement must be finalised. • At any point, the Minister may appoint a facilitator or take any other action considered appropriate to promote the resolution of an issue in dispute.	• No conflict resolution procedures.	• If an iwi initiates, the agreement must be finalised within 18 months of when the invitation is received or any other period agreed. • If disputes arise in negotiations, the participants may agree a binding a dispute resolution process. • Failing that, they must undertake a non-binding process. • If that does not work, they may individually or jointly seek the assistance of the Minister. • The Minister may appoint a Crown facilitator and direct authorities to use a particular alternative dispute resolution process. • There are no power for the Minister to force an agreement, but they could direct parties to undertake binding dispute resolution.

Other matters	• The joint management agreement must include a commitment from the Council to:
	  ○ Provide timely notice to the trustees of any environmental issues with abandoned petroleum wells within the rohe of Ngāti Maru which may come to the Council's attention.
	  ○ Acknowledge Ngāti Maru as an affected party regarding mining activities within the rohe of Ngāti Maru and provide timely notice to the trustees of receipt of any applications for consents relating to mining activities within the rohe and a summary of any application for such a consent.
	• The commitment regarding abandoned petroleum wells is limited to the extent that Taranaki Regional Council has a statutory role in relation to abandoned petroleum wells or mining activities, as the case may be.
	• May to extend the joint management agreement to cover any other duties, functions, or powers.
		• May cover additional matters, including functions, powers, and duties agreed by the parties, and matters relating to capacity and capability building for the parties, to better provide for the aspirations for the relationship agreement to be realised.
		• The Agreement must provide for the councils and the trustees to work together under the Resource Management Act 1991 in relation to the provision of opportunities for the parties to work together on non-regulatory initiatives relating to Ngā Wai o Maniapoto and activities within their catchments that affect Ngā Wai o Maniapoto.
			• A Mana Whakahono a Rohe must record the agreement of the participating authorities about:
			  ○ how the participating authorities will give effect to the requirements of any relevant iwi participation legislation, or of any agreements associated with, or entered into under, that legislation; and
			  ○ A process for identifying and managing conflicts of interest.
			• A Mana Whakahono a Rohe may specify:
			  ○ any arrangement relating to other functions, duties, or powers under the RMA;
			  ○ if there are 2 or more iwi authorities participating in a Mana Whakahono a Rohe, how those iwi authorities will work collectively together to participate with local authorities; and
			  ○ whether a participating iwi authority has delegated to a person or group of persons (including hapū) a role to participate in particular processes under the RMA.

Waitara River Catchment



Maniapoto relationship agreement area (area N)

Maunga Redress Act name changes

Existing Name	New Name	Geographic Feature Type
Egmont National Park	Te Papa-Kura-o-Taranaki	National park
Ahukawakawa (sphagnum moss swamp)	Ahukawakawa	Wetland
Bells Falls	Te Rere-o-Tahurangi Falls	Waterfall
Fanthams Peak	Panitahi	Hill
Kaitake Peak	Kaitake	Hill
Kaitake Range	Kaitake Range	Range
Karaka Tonga Stream	Karakatonga Stream	Stream
Kokowai Stream	Kōkōwai Stream	Stream
Lake Dive	Mangōraukawa / Lake Dive	Lake
Mount Taranaki or Mount Egmont	Taranaki Maunga	Hill
Oakura River	Ōākuramatapū River	River
Patuha	Patuhā	Hill
Patuha Pa	Patuhā Pā	Pā site
Pouakai	Pouākai	Hill
Pouakai Range	Pouākai Range	Range
Stony River (Hangatahua)	Hangatahua River	River
Te Henui Stream	Te Hēnui Stream	Stream
The Dome	Te Umu-o-Taomanawa	Hill
Warea River (Teikaparua)	Te Ikapārua River	River
Warwick Castle	Te Tāhuna-o-Tūtawa	Hill

Date: 18 March 2025

Subject: **Government Reform Strategic Priorities**

Author: F Kiddle, Strategy Lead

Approved by: A D McLay, Director - Resource Management

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Purpose

1. The purpose of this memorandum is to set out the landscape of Government reform over 2025 and agree key strategic priorities for Taranaki Regional Council.

Executive summary

2. The Government is advancing its ambitious programme of reform, with a number of proposals set to have a significant impact on areas of Taranaki Regional Council (Council) responsibility. These include:
3. A large programme of national direction review and creation under the Resource Management Act 1991 (RMA), including a strong freshwater component:
    a. replacing the RMA with two new acts.
4. A number of targeted reforms to local government, including the overall purpose of local government, performance benchmarking and potential rates capping;
    a. climate change adaption legislation to codify roles and responsibilities, set out data and information requirements, and specify cost-sharing arrangements.
5. A number of other reforms related to biosecurity, land transport, the emission trading scheme, emergency management, regulatory standards, and Treaty principle clauses in legislation.
6. Council does not have the resources to effectively engage in all reform proposals. Accordingly, prioritisation is needed to maximise our impact while not detracting from business-as-usual activities. It is noted, however, that other sector groups including Te Uru Kahika, Taituarā and Local Government NZ will likely be lodging submissions on behalf of their members.
7. Of the proposed reforms, those relating to RMA national direction, RMA replacement, local government reform, and climate change adaptation are the largest priorities. National direction changes will shape the development of our Land and Freshwater Plan and immediately impact consenting and compliance. The replacement of the RMA will fundamentally change how resource management is done in Taranaki. Changes to local government's purpose, performance management and rates capping, are likely to prove particularly contentious. And climate change adaptation legislation will shape how we deliver climate related services to our communities.
8. The above priorities do not mean other reform work is not important. We will continue to engage with other work streams as resources allow. We will also maintain a watching brief on the Regulatory Standards Bill and any consultation regarding reviewing Treaty principle clauses in legislation.

Recommendations

That the Taranaki Regional Council:

a) receives the memorandum titled *Government reform strategic priorities*

b) notes that prioritisation of Council engagement with Government on reform proposals is needed to ensure our limited resources are focused on those proposals that will have the largest impact on Council operations and Taranaki communities

c) approves the following strategic priorities for Government reform engagement over the 2025 calendar year:

   a. national direction proposals under the Resource Management Act 1991, giving priority to freshwater related matters

   b. the proposed replacement of the Resource Management Act 1991

   c. local government reforms

   d. climate change adaptation legislation.

d) directs Council officers to engage with Te Uru Kahika and the three Taranaki territorial authorities to coordinate engagement on the strategic priorities identified above

e) notes Council officers will maintain a watching brief on the proposed Regulatory Standards Bill and any legislation to give effect to the NZ First coalition agreement to review references to the principles of the Treaty of Waitangi in legislation

f) notes Council will continue to engage on other reform proposals as resources allow and that other groups such as Te Uru Kahika, Taituara and Local Government NZ will likely develop and lodge submissions on behalf of their members

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

h) 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

9. The Government is continuing with its ambitious programme of reform, with a number of significant proposals moving forward in 2025. The below section outlines the scope of these work streams.

National direction

10. The Government has work underway to amend 14 existing national direction instruments and develop seven new ones. National direction is issued under the Resource Management Act 1991 (RMA) and mainly takes the form of either national policy statements (NPS) or national environmental standards (NES). The former prescribe objectives and policies local government must implement. The latter provide technical standards, methods or requirements councils directly implement (e.g. in resource consenting). Three broad consultation packages covering the 21 instruments are proposed. The below table sets out what these will cover.

Package	Instruments and objective of changes
Primary sector	• NPS Freshwater Management (NPS-FM): Better reflect the interests of all water users, rebalance Te Mana o te Wai and allow more flexibility to councils. • NES Freshwater (NES-F): Same objective as NPS-FM changes. • Stock exclusion regulations: Make rules more responsive to local conditions. • NES Drinking Water: Simplify implementation of source water protection for regional councils and take a risk-based approach. • NPS Indigenous Biodiversity: Make more enabling for quarrying and mining and review operation of significant natural areas (SNAs). • NES Commercial Forestry: Reduce council discretion for afforestation, review slash settings, and limit ability to be more stringent in local plans for the purposes of giving effect to the NPS-FM. • NES Marine Aquaculture: Increase flexibility to innovate and improve existing farms.
Housing and urban development	• NPS Highly Productive Land: Objective yet to be publicly released. • NPS Urban Development: Remove barriers to urban development and delivering housing. • Enabling granny flats instrument: Allow them to be built more easily. • Papakāinga instrument: Require each district plan includes provisions to enable papakāinga housing. • Heritage instrument: Objective yet to be publicly released. • National hazards national direction: Provide a comprehensive, national consistent planning framework for addressing the risks form hazards under the RMA.
Infrastructure and Energy	• NES Telco Facilities: Update to reflect new technology and give telecommunication providers investment certainty. • NPS Infrastructure: New NPS to Ensure decisions sufficiently and more consistently enable infrastructure, while managing effects. • NPS Renewable Electricity Generation and NPs Electricity Transmission: Better enable these activities to support climate transition and resilience. • New Zealand Coastal Policy Statement: Objective yet to be publicly released.

11. The Government is also reviewing the Resource Management (Freshwater Farm Plans) Regulations 2023. The purpose of this review is to make the system simpler to implement and reduce costs to participants. This includes exploring how the system can integrate with existing industry environmental programmes and amending certification and auditing requirements.
12. The Government intends to consult on these three packages of national direction around March 2025. It intends to pass the packages into law by mid-2025.

RMA replacement

13. While the Government is amending national direction, it is also working on replacing the RMA entirely. Cabinet has agreed ten core design features for this new system. These are:

a. Narrow the scope of the resource management system to focus on managing actual effects on the environment
b. Establish two acts with clear and distinct purposes – one to manage environmental effects arising from activities, and another to enable urban development and infrastructure
c. Strengthen and clarify the role of environmental limits and how they are to be developed.

14. Provide for greater use of national standards to reduce the need for resource consents and simplify council plans. This would mean that an activity which complies with the standards cannot be subject to a consent requirement.
15. Shift the focus away from consenting before activities can get underway, and towards compliance, monitoring and enforcement of activities' compliance with national standards.
    a. Use spatial planning and a simplified designation process to lower the cost of future infrastructure.
16. Realise efficiencies by requiring one regulatory plan per region, jointly prepared by regional and district councils.
17. Provide for a rapid, low-cost resolution of disputes between neighbours and between property owners and councils, with the potential for a new Planning Tribunal (or equivalent).
    a. Uphold Treaty of Waitangi settlements and the Crown's obligations
    b. Provide faster and cheaper processes with less reliance on litigation, contained within shorter and simpler legislation that is more accessible.
18. An Expert Advisory Group was established last year to work alongside Government officials and report to Cabinet on the core details of the new system. This report has been provided to Cabinet but is yet to be publicly released.
19. The Government intends to introduce legislation to the house in the second half of this year, and have it passed before the election in 2026.

Local government reform

20. The Local Government System Improvements programme aims to ensure councils are focused on their core functions, spend within their means and are subject to appropriate scrutiny. It proposed changes across four different themes, which are outlined below.

Theme	**Proposed change**
Decision-making	• Remove reference to the four well-beings in the Local Government Act 2002 (LGA). • Amending the purpose of local government to read along the lines of "to meet the current and future needs of communities for good-quality local infrastructure, public services, and performance of regulatory functions in a way that is most cost-effective for households and businesses, therefore supporting local economic growth and development." • Amend consultation and decision-making requirements to allow councils to adapt to change quicker and save money while balancing democratic principles. • Provide a range of regulatory relief to councils that reflects case law and provides operating efficiencies.
Systems and processes	• Establish a council performance measurement framework, new council reporting requirements and the ability to set benchmarking requirements through regulations.

	• Review the bylaw system to provide councils modern tools and consider giving councils greater ability to set infringement fees. • Consider exploration of shared services to provide efficiencies (mainly done through three waters, RMA and building consent reforms).
Funding and financing	• Establish a system to limit council expenditure on nice-to-haves, with principles for such a system going to Cabinet in early 2025. • Removing legal constraints on cost recovery and potentially requiring councils to demonstrate how they are using cost recovery for certain activities. • Improve risk management practices and support a collective approach to insurance. • Increasing borrowing limits for high-growth councils and improve the range of funding tools beyond rates available to councils.
Transparency and accountability	• Review access to information for elected members, codes of conduct and conflict of interest procedures. • Consider options to balance freedom of expression with the orderly conduct of council business. • Ensure chief executives are aware of other commitments that elected members have when considering council business and scheduling meetings.

21. The Government intend to have a bill covering the above matters introduced in June 2025 and passed by late 2025.

Climate change adaptation legislation

22. After an investigation by parliament's Finance and Expenditure Committee into climate adaptation, the Government is now considering options for formal climate adaptation legislation. Four key workstreams have been identified that will shape future legislation. These are below:
    a. Risk and response information sharing: Examining how hazard risk and response information can be better shared so parties can make more informed decisions about their appetite for, and management of, risk
    b. Roles and responsibilities: Looking at how principles need to be implemented and decisions made. This includes evaluating roles and responsibilities under the full range of relevant existing legislation
    c. Principles for investment in risk reduction: Supporting consideration of investments across the full spectrum of risk reduction options, including local and central government. This is to ensure communities and businesses know where investment will happen in their area
    d. Principles for cost-sharing pre- and post-event: Setting out the Government's approach to the sharing of costs from future natural hazard risk, particularly addressing uncertainty of what will be available to assist property owners with recovery from an event or to take action before an action occurs.
23. The Government intends to introduce the above to the House in 2025. It has not provided a timeline for when it intends this to pass into law.

Other matters

24. There are also other multiple other reform work programmes that will impact on Council. These include the following work streams that could result in a bill introduced in 2025 or regulations released for consultation:
25. Review of the Biosecurity Act. Consultation on a range of discussion documents was undertaken at the end of 2024, with a fulsome submission prepared by Te Uru Kahika. The next step will be for the Government to introduce a bill to the House.
26. Regulatory Standards Bill. With consultation on the discussion document now closed, a bill can be expected as the next step. The ACT coalition agreement specified that the bill will be passed into law as soon as practicable.
27. The commitment on the NZ First coalition agreement to "[c]onduct a comprehensive review of all legislation (except where it is related to, or substantive to, existing full and final Treaty settlements) that includes 'The Principles of the Treaty of Waitangi' and replace all such references with specific words relating to the relevance and application of the Treaty, or repeal the references."
28. Emergency Management Bill. Changes to emergency management in response to the range of reviews into the response to Cyclone Gabrielle. This includes giving effect to a whole-of-society approach to emergency management, enabling local government to provide a consistent minimum standard of emergency management, professionalising the work force, enabling the parts of the system to work better together, and drive a strategic focus on implementation.
29. Changes to the Land Transport Management Act to move to a ten-year funding cycle rather than three years and unbundle continuous from project funding. There is also a Land Transport Management (Time of Use Charging) Amendment Bill that allows for implementation of time of use charging.
    a. Emissions trading scheme reform: Amendments to limit the conversion of productive land to commercial exotic forestry.
30. Urban Development and Infrastructure Bill. This Bill is expected to enable urban development and infrastructure development to align with the Government Going for Growth Plan. It will be relevant to spatial planning and the Future Development Strategy, which is required for New Plymouth.
31. Public Works Act Amendment Bill to give effect to recommendations from an expert panel.

Issues

32. Engaging to a meaningful level on Government reform proposals is highly resource intensive for Council. Prioritisation is needed to maximise our impact while not detracting from business-as-usual activities.

Discussion

33. Council does not have the resources to engage on all the reform underway to the depth needed to impact Government policy. To maximise our impact, we need to prioritise what reform proposals we engage in, be selective of what aspects of proposals we comment on, and make use of our wider local government networks.
34. The national direction package, especially as it relates to freshwater, is a key priority. Changes to the NPS-FM will need to be reflected in our policy programme for the creation of a new Land and Freshwater Plan. While any changes to the NES-F or the high-level policies in the NPS-FM will likely have an immediate impact on resource consenting and compliance functions. Freshwater management broadly is also a key strategic priority of Council, recognised as a specific matter for consultation in the current Long-Term Plan.
35. The replacement of the RMA will also have wide-ranging implications for Council and engagement needs to be a priority. For example, the shift to a single combined plan for the region may require a

restructuring of both operational and governance arrangements for the four Taranaki councils regarding resource management policy. Or a shift towards requiring more permitted activities, could cause a drop in resource consenting loads but a corresponding increase in compliance monitoring activities. More broadly, successful resource management reform has the potential to greatly improve the quality of regulation in Taranaki, helping promote growth while managing environmental effects.

36. Proposals regarding local government reform are still high-level, but changes to council funding and any potential rates capping will be particularly important. Local government has been calling for more flexible funding options for years, and changes in this area will likely be welcomed. But rates capping has proved controversial overseas and could significantly impact any successful non-regulatory functions of regional councils.
37. Finally, climate change adaptation is an emerging area of priority for all regional councils. In light of Cyclone Gabrielle, there is growing concern around how regional councils support their communities to adapt to climate change. Particularly, around infrastructure provision, potential relocation and the provision of robust data. Council liability for damages due to the failure of flood protection infrastructure is also of high priority, with some high-profile court cases now underway.
38. The above recommended priorities are not to say the other reforms occurring are not important for Council. Simply that we cannot do everything to a standard where we may achieve positive change. We will continue to engage on other proposals as resources allow.
39. It will also be important to maintain a watching brief on the Regulatory Standards Bill and review of Treaty principles clauses in existing legislation. Both could significantly impact how we work with mana whenua to achieve positive environmental outcomes in Taranaki. But it remains to be seen how feedback on the Regulatory Standards Bill consultation document will be incorporated. And there has been no detail on the review of Treaty principles clauses. Until we see further information, it is difficult to determine how engaged Council should be in these processes.
40. Finally, when engaging on all reform work-streams, it is important for Council to maximise key relationships across local government. This will allow us to achieve greater impact by providing a stronger voice. It will also reduce resourcing pressure, as we will be able to draw on the insights of other parties. A key relationship is with the three Taranaki territorial authorities, where we are already working closely with them on resource management and climate change matters. Te Uru Kahika, the umbrella organisation for regional councils, is also crucial. We have contributed to clear and effective advocacy from Te Uru Kahika on a range of matters. This includes resource management reform, climate change adaptation and biosecurity changes.

Options

41. It is recommended Council approve the following strategic priorities for Government reform engagement:
    a. national direction proposals under the Resource Management Act 1991, giving priority to freshwater related matters
    b. the proposed replacement of the Resource Management Act 1991
    c. local government reforms
    d. climate change adaptation legislation.
42. Council could alternatively elect to add other reform work-streams to the priorities, remove some, or have no set priorities. These options are not recommended as the identified priorities will have the biggest impact on areas of Council responsibility and alone represent a significant amount of work to engage on them robustly.

Significance

43. This decision is assessed as not significant with regards to the Significance and Engagement Policy. It will not have a significant impact on levels of service, incur more than $10,000,000 budgeted or $5,000,000 of unbudgeted expenditure, or involve the transfer of ownership or control of a strategic asset.

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. The report is not proposing any changes to existing funding or objectives set in the Long Term Plan.

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*.

Climate change considerations

46. There are climate change impacts to consider in relation to this item. Resource management reform is likely to directly impact Councils ability to regulate for matters regarding to climate change mitigation and adaption. Reforms to local government around purpose and funding will shape how councils are able to engage with the community on non-regulatory climate change initiatives and fund large-scale programmes. And the climate change adaptation legislation will fundamentally shape the role of regional councils in this space, particularly as it relates to data, infrastructure provision and cost-sharing.

Iwi considerations

47. 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. Council will continue to engage with iwi to discuss reform proposals.

Community considerations

48. 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

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

Date: 18 March 2025

Subject: **Freshwater Implementation March Update 2025**

Author: L Hawkins, Policy Manager

Approved by: A D McLay, Director - Resource Management

Document: TRCID-149262864-433

Purpose

1. The purpose of this memorandum is to provide a Freshwater Implementation project update.

Executive summary

2. Set out in this memorandum is an update on the progress of the freshwater package from central government. The memorandum focusses on the key tasks undertaken since the previous Committee meeting, and identifies risk associated with the project and achievement of the project timeframes.
3. The attached report focusses on the key streams of work associated with the freshwater package. This being policy development, implementation of Freshwater Farm Plans, and the communications and engagement timeline.

Recommendation

That the Taranaki Regional Council:

a) receives the March 2025 update of Freshwater Implementation Programme.

Background

4. This memorandum updates on progress in implementing the Freshwater Package. An implementation programme was previously presented to and approved by the Committee. This report provides an overview on the progress of the work programme, specifically focusing on the previous 6 weeks and those ahead. It provides an opportunity for discussions relating to progress and risks identified.

Discussion

5. The attached report (attachment 1) provides a high level overview of the progress made since the last Committee meeting in February 2025, and identifies those tasks to be undertaken in the coming 6 weeks. It also identifies risks associated with the programme, and a copy of the high level engagement strategy.
6. Key discussion points are included in the covering memorandum to draw attention to key areas of work.

Government direction

7. Since the previous meeting the government has released proposed wastewater standards for consultation – *Wastewater Environmental Performance Standards*. A discussion document is attached to this report (attachment 2) for information for the Committee.
8. The need for widescale upgrades of wastewater infrastructure in New Zealand has driven the government to progress a framework that will aim to reduce complexity, time and cost of the consenting process for wastewater treatment infrastructure.
9. The proposed standards cover the more common wastewater management activities and establish consistent levels of common contaminants allowed in treated wastewater. The standards will only apply to public networks. The standards cover areas where resource consents are commonly sought for wastewater treatment plants, specifically:
    a. Discharges to water for the range of parameters and receiving environments, alongside a tailored standard for small wastewater treatment plants
    b. Discharges to land
    c. Beneficial reuse of biosolids
    d. Arrangements for wastewater network overflows and bypasses of wastewater treatment plants.
10. Within each of the components in the paragraph above, the standards are further broken down to address different requirements and sensitivity of receiving environments – for example in discharges to water the standards propose tailored treatment requirements for seven categories of waterbody – lakes, river or stream with high sensitivity, river or stream with moderate sensitivity, river or stream with low sensitivity, estuaries, in-shore coastal waters and open oceans.
11. Not all contaminants associated with wastewater treatment are covered by the standard. Regional councils will remain the regulator for catchments, including wastewater treatment plants, networks and their discharges and will have a role in implementing and ensuring compliance consistent with the standards through consents conditions. A regional council will not be able to introduce conditions that require either higher or lower levels of treatment, and if a matter is not dealt with in wastewater standards, the relevant regional council will continue to set consent requirements and conditions. Consents will be required to be issued for 35 years, with the driver for this being providing certainty to long-term wastewater management and investment planning.
12. The government is seeking comments on the proposed wastewater standards, with the consultation option for 2 months from 25 February to 24 April 2025. Staff are currently reviewing the standards and the implications for Taranaki both in terms of environmental outcomes being sought for freshwater, but also in terms of process alignment with regional councils other responsibilities.
13. As the committee meeting schedule does not align with the submission deadlines, a draft response will be circulated to the committee for their input in the coming weeks to enable a submission to be submitted in time. A retrospective approval will then be sought at the next Policy and Planning Committee meeting in April. Staff will also participate in the discussions on this matter that are had within Te Uru Kahika.

Ongoing policy drafting and engagement with groups and tangata whenua

14. Progress has been made in continuing to draft sections of the draft Land and Freshwater Plan, in particular topics such as animal effluent and earthworks have been further refined from previous discussions with working groups and will be revisited with groups in the coming weeks for further input.
15. Staff have also been working closely with and seeking input and guidance from the Ngā iwi o Taranaki Freshwater Pou Taiao position on the drafting and general approach on a number of topics including source water protection areas, ecologically significant wetlands, earthworks and water over allocation. The next step for these topics will be to discuss more widely with iwi pou taiao and hāpu.

Freshwater Farm Plans

16. Since the last meeting of the Committee no further updates to direction on Freshwater Farm Plans have been received from the government.

Appendices/Attachments

TRCID–1492626864-439: Freshwater Implementation Progress Report March 2025

TRCID-1492626864-464: Proposed national wastewater environmental performance standard - discussion document

Freshwater Implementation Project Report to Policy & Planning Committee

March 2025

	Progress in the last six weeks	Key tasks in the coming six weeks	Risks

National Policy Statement for Freshwater Management	○ Developing draft policy and objectives ready for refinement against expected new NPS-FM direction.
	○ Meetings with iwi Pou Taiao re key policy directions – topics including Source water risk management areas, earthworks, regionally significant wetlands, managing over allocation.
	○ Progress Science programme:
	  ○ Continue existing attribute work
		• Developing draft policy and objectives ready for refinement against expected new NPS-FM direction.
		• Expecting national direction to land in the next 6 weeks – will work on reviewing and responding.
		• Respond to the Wastewater Environmental Performance Standards – consultation closes 24 April 2025
		• Meetings with Nga iwi o Taranaki Pou Taiao re key policy directions – topics including Source water risk management areas, earthworks, regionally significant wetlands, managing over allocation.
		• Meetings with iwi Pou Taiao re key policy directions – topics including Source water risk management areas, regionally significant wetlands
		• Ongoing discussion Meetings with key stakeholder groups to refine policy direction.
		  ○ Effluent management framework
		  ○ Earthworks
		• Progress Science programme:
		  ○ Continue existing attribute work
			• Medium risk – Partnership with iwi. Risk that the timeframes, complexity of issues and the need to be working in an agile manner to develop the policy framework will impact on the partnership approach being fostered. Amendments to the Pou Taiao Agreement including the setting up of a steering committee to mitigate this risk. Opportunity to consider amendment to programme to providing more time and opportunity to work through policy drafting. Continue to present progress to the Wai Steering Committee. *Also note that the next 6 weeks will likely be focused on central govt direction will also be relevant for iwi*.
			• Medium risk – participation in the community engagement is low. Mitigated through continued promotion of process, community meetings switched to being held at various locations, targeted engagement with industry groups to lessen the load on individuals.
			• High risk –change to direction of the NPSFM with the new government. We can mitigate against this risk by maintaining momentum on policy development, keeping abreast of policy announcements from the government, and taking pause when necessary to confirm approach as policy guidance from the government develops.

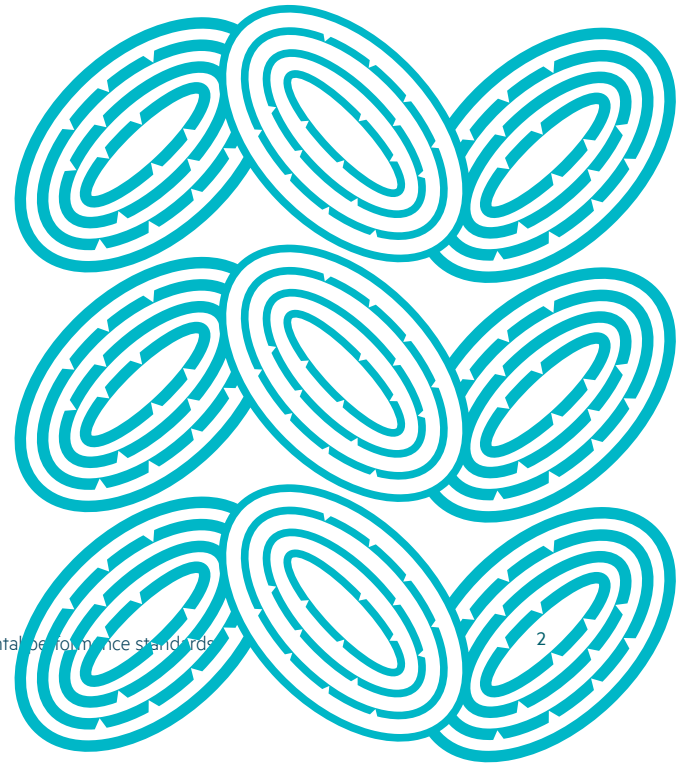
Freshwater Farm Plans	• Status quo – as we await further direction from the Government on likely changes to the Regulations etc.	• Status quo – as we await further direction from the Government on likely changes to the Regulations etc.	• Low risk – potential change to direction of FWFP regulations with the new government. The government has signalled the continuation of the FWFP process and Councils should expect an order in council, as such this is a low risk. The continuation of the programme will mitigate against any pressure to respond to an OIC when released.

Water Services Authority
Taumata Arowai

Consultation on proposed wastewater environmental performance standards

Discussion document

Table of contents



1. How to make a submission

The Water Services Authority – Taumata Arowai (**the Authority**), on behalf of the Minister of Local Government, is consulting on a set of proposed wastewater environmental performance standards ('wastewater standards') under section 138 of the Water Services Act 2021. We welcome feedback on the proposals to inform the first set of national wastewater standards and how they are implemented.

This discussion paper includes some questions (set out in boxes) you may like to respond to in your submission. **Appendix Three** contains the full list of questions. You are invited to answer any or all the questions included. Where possible, please include evidence to support your views (for example, references to facts and figures, or relevant examples).

Timeframes

The consultation is open for 2 months from 25 February 2025. It closes at **5.00pm on 24 April 2025**. You can make a submission via:

- our online survey form, or
- sending your responses to kōrero@taumataarowai.govt.nz or mailed to Level 2, 10 Brandon Street, PO Box 628, Wellington 6140, New Zealand.

Please include your name, or the name of your organisation and contact details in your submission.

You will find all the information on this consultation at: korero.taumataarowai.govt.nz/regulatory/wastewater-standards

Please direct any questions you may have in relation to the submission process to: kōrero@taumataarowai.govt.nz.

Your feedback will inform the final wastewater standards and how they are implemented

The Authority welcomes feedback on the proposals in this document. This consultation document outlines the first set of proposed wastewater standards. Once submissions have been received, a final proposal will be developed for the Minister of Local Government's consideration. The final wastewater standards will be set in regulations made by the Governor-General by Order in Council, on the advice of the Minister.

The wastewater standards are expected to be set in mid- to late-2025. This will follow enactment of the Local Government (Water Services) Bill.

2. Executive summary

New Zealand's publicly-owned wastewater infrastructure is facing a significant challenge. A significant proportion was built around 30-40 years ago, and upgrades or renewals are required for many wastewater treatment plants and networks. Population growth and urban development is driving the need for infrastructure renewals, with larger communities and housing areas requiring treatment plants and networks with significantly greater capacity than they currently have.

In the next decade, 57 percent of public wastewater network plant infrastructure will require reconsenting, and of this number, approximately 20 percent of plants are currently operating on expired resource consents. The resource management system can be challenging for network owners and communities. Across the country, resource consents are developed, assessed and monitored largely on a case-by-case basis. This means the consenting process can be lengthy, uncertain and information intensive. Upgrading wastewater infrastructure is resource intensive and a significant investment for councils, particularly with many facing affordability challenges and competing demands on how rates should be spent. This directly affects communities throughout New Zealand in terms of higher rates, increased public health risks and the impact on the environment.

National or state-level wastewater environmental performance standards ('**wastewater standards**') combined with transparent public reporting, are a common feature in many jurisdictions that New Zealand commonly compares itself to, such as the United Kingdom, the European Union, Australia and Canada.

This discussion document proposes New Zealand's first set of wastewater standards. These standards will set nationally consistent requirements for all wastewater networks and operators through resource consents as these are renewed or issued for new wastewater infrastructure. Wastewater standards will:

- support environmental outcomes,
- drive cost and time efficiencies,
- support owners of networks to better plan for the cost of infrastructure, and
- save time for territorial authorities as owners of the public infrastructure, and regional councils as regulators.

The proposed wastewater standards are expected to deliver significant cost-efficiencies that may include reduced consenting costs of up to 40 percent based on case study examples. This includes reductions in costs associated with the consenting process such as staff time, technical assessments, feasibility assessments, legal costs and consultation and engagement costs.

Reductions to capital upgrade costs and ongoing operating costs such as staff training and maintenance can also be expected. The costs savings on an individual plant will depend on specific circumstances, such as the type or size of the plant, treatment processes, and options for where the plant discharges. However, over time, further costs savings are expected as materials are standardised, and modular plant options are available that comply with wastewater standards.

Wastewater standards will provide increased certainty to territorial authorities as owners of networks so they can better plan for the cost of infrastructure, and leverage cost efficiencies in designing, procuring and operating wastewater treatment plants. This will support territorial authorities in developing long-term plans in future.

The Local Government (Water Services) Bill proposes 'infrastructure design solutions' that will be used as part of the second implementation phase for wastewater standards. These instruments will support network operators to meet wastewater standards and provide design and operating requirements for modular wastewater treatment plants.

Infrastructure design solutions will result in faster consenting processes and potentially significant cost savings, and over time will enable network operators to standardise the design and procurement of infrastructure, and enable modular, off-the-shelf solutions to be installed.

What does this package of wastewater standards cover?

The initial package of proposed standards covers areas where resource consents are commonly sought for wastewater treatment plants, specifically:

- discharges to water for a range of parameters and receiving environments, alongside a tailored standard for small wastewater treatment plants,
- discharges to land,
- beneficial reuse of biosolids, and
- arrangements for wastewater network overflows and bypasses of wastewater treatment plants.

The proposed standards do not cover the following matters:

- discharges to air from wastewater treatment plants,
- recycled treated wastewater for non-potable use,
- contaminants of emerging concern such as endocrine disruptors, PFAS (per- and polyfluoroalkyl substances) and heavy metals, and

- arrangements for onsite wastewater treatment systems (such as septic tanks) or community owned and operated schemes.

These areas will continue to be regulated through the existing resource consenting process, pending future wastewater standards that address them. To ensure standards remain fit-for-purpose, the Authority will establish an ongoing work programme to evaluate how standards have been implemented and to consider where additional standards may be appropriate or whether amendments are necessary.

How will wastewater standards be implemented?

Wastewater standards will primarily be implemented through future resource consents for public wastewater treatment plants and networks as they come up for renewal. Wastewater standards must be implemented as part of any new resource consent for existing plants and networks, as well as consents for new wastewater infrastructure. The certainty generated by wastewater standards will streamline these consent processes and decisions. Any matters not covered by wastewater standards will continue to be set through the existing resource consent process as they are now.

Regional councils remain the regulator for catchments, including wastewater treatment plants, networks and their discharges, and will have a critical role in implementing and ensuring compliance with wastewater standards through resource consents. Consistent with this role, regional councils will implement the wastewater standards through consent conditions. The Authority will collect information through regular network environmental performance reporting and summarise it annually in a public-facing report, to provide a further layer of transparency about plant and network environmental performance.

Decisions about wastewater arrangements, such as where plants are located and discharge to, will continue to sit with territorial authorities and their communities. Territorial authorities will, for example, continue to consult with their communities about their preferences under local government legislation, and apply to regional councils for new consents for wastewater treatment plants or networks in a way that reflects community preferences.

Relationship with Local Water Done Well

Wastewater standards are a core aspect of Local Water Done Well, the Government's approach to address long-standing water infrastructure challenges. Wastewater standards are intended to reduce the regulatory burden relating to consenting, and lead to greater standardisation in plant design, performance and operation, while providing councils with greater certainty of costs for their wastewater network investments.

The Local Government (Water Services) Bill (**the Bill**), which is currently before a Parliamentary select committee, proposes changes that impact how wastewater standards are made and implemented. These amendments are designed to ensure regional councils must implement any requirements imposed as part of a wastewater standard in a new consent, and cannot include any conditions in a consent which are any more or less restrictive. The Bill also proposes that, where the infrastructure proposed in a new consent meets the relevant wastewater standard, a 35-year consent must be issued, to maximise the benefit of public investment in the wastewater treatment infrastructure. The Bill also proposes changes to the consultation that applies when wastewater standards are made.

Many councils have wastewater treatment plants with resource consents that will expire in the first two years following the implementation of wastewater standards. The Bill proposes an automatic extension of these consents, so they expire two years following the commencement of the Bill.

Appendix Two outlines the proposals in the Bill that, if enacted, will impact how wastewater standards are created and implemented. The proposals in this discussion document are based on the new arrangements set out in this Bill. The Government proposes to make the first set of wastewater standards once this Bill is enacted later this year.

You can find more information about the Local Government (Water Services) Bill here.

Proposal *on-a-page*

The Water Services Authority—Taumata Arowai (the Authority), on behalf of the Minister of Local Government, is consulting on a set of proposed national wastewater environmental performance standards ('wastewater standards') under section 138 of the Water Services Act 2021.

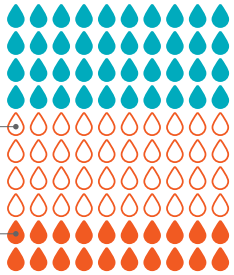
A What is the rationale for change?

A significant proportion of Council and Crown-owned wastewater infrastructure was built 30-40 years ago. These now require upgrades or renewals.

Population growth and urban development also drive the need for infrastructure renewals, with larger communities and housing areas requiring treatment plants and networks with much greater capacity than they currently have.

Around 60% of public wastewater infrastructure will require reconsenting in the next decade.

Of this number, 20% of plants are currently operating on expired resource consents.



KEY:
- Valid
- Due to expire
- Expired

The resource management system can be challenging for network owners and communities across the country.

Resource consents are developed, assessed, and monitored largely on a case-by-case basis. The current process can be lengthy, uncertain, and information intensive as a result.

B What does this package of wastewater standards cover?

The Water Services Act 2021 (the Act) (section 138) enables the Authority to make wastewater standards following public consultation.

Standards only apply to Council and Crown-owned infrastructure, and may include requirements, limits, conditions, or prohibitions related to activities associated with wastewater treatment plants and networks, including:

- **Discharges to land, air or water**
- **Biosolids** and other **by-products** from wastewater
- **Energy use**
- **Waste** introduced by a third party into a wastewater network (such as trade waste).

The initial package of proposed standards covers areas where resource consents are commonly sought for wastewater treatment plants and networks, specifically:

Discharges to water

THIS STANDARD PROPOSES:

- Treatment requirements for the main contaminants discharged from a treatment plant, varying by the risk and sensitivity of the receiving environment.

Discharges to land

THIS STANDARD PROPOSES:

- A framework for identifying suitable land for discharge application, based on a site-specific risk assessment.
- Treatment requirements for nutrients and pathogens discharged to land.

Beneficial reuse of biosolids

THIS STANDARD PROPOSES:

- A grading system for processing biosolids from wastewater treatment plants, with corresponding activity status for how and when biosolids can be reused based on Water NZ guidelines.

Wastewater network overflow and bypass arrangements

THIS STANDARD PROPOSES:

- Risk-based planning, monitoring and reporting requirements for overflows from networks and bypasses of plants.
- All existing overflow points must be consented.

- Monitoring and reporting requirements will apply across all the standards.

Small plant standard (SPS)

The discharge to water standard will impose different treatment requirements for wastewater treatment plants that service very small communities. These plants are significantly different to those that service larger towns and cities. They are usually oxidation ponds that rely on passive treatment arrangements that require little operation, at isolated sites and often without access to electricity. These small plants often have a minimal impact on the receiving environment because of their small size, particularly in comparison to contaminants like nutrients from surrounding land. Due to this, no nutrient treatment is proposed as part of the small plant standard, and other treatment requirements are tailored to suit infrastructure of this nature.

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C How will territorial authorities (TAs) and regional councils (RCs) use the standards?

Territorial authorities (TAs) who have wastewater treatment plants due for upgrade or renewal will consult with their communities under the Local Government Act 2002 to determine the best arrangement for their circumstances.

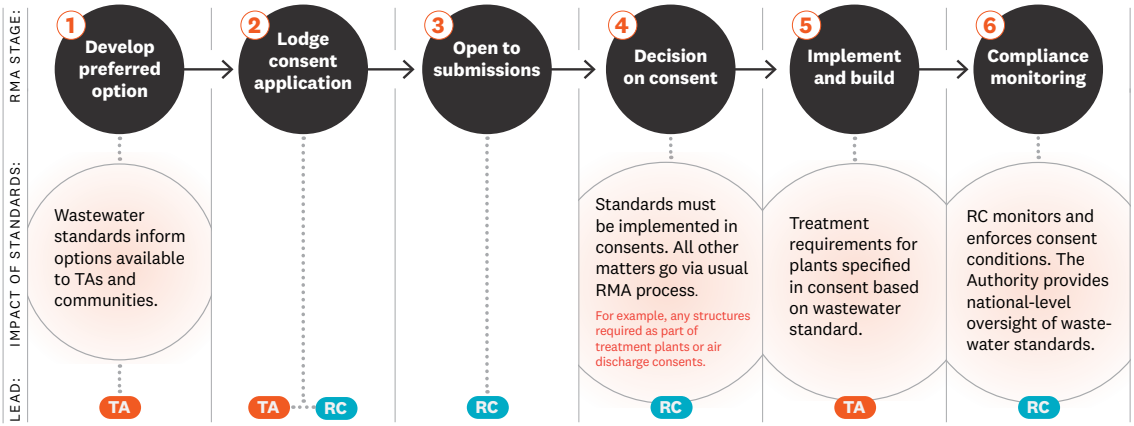
The standards will set treatment requirements based on the type of water body or land the plant discharges to.

These standards will guide councils and communities in making decisions, and in the design, planning, and funding once a decision is made.

Examples of what this might look like:

Communities and TAs may choose to either:

- Decommission and replace an old plant with one that discharges to land in the summer, and water in the winter, or
- Upgrade an existing plant or combine multiple plants into one centralised arrangement.



D What are the expected benefits of the proposed standards?

Wastewater standards will:

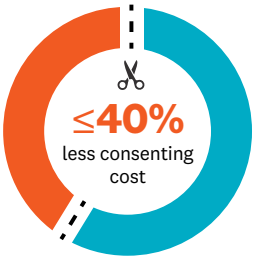
- Support environmental outcomes.
- Drive cost and time efficiencies.
- Support owners of networks to better plan and fund infrastructure.
- Provide clear expectations about treatment quality to communities.

Expected cost efficiencies:

Based on case studies, we expect up to 40% reduction in consenting costs.

This includes cost reductions in staff time, technical and feasibility assessments, legal costs, and consultation/engagement expenses.

Over time, further savings will come from standardising infrastructure and operations to comply with the proposed wastewater standards.



The standards will provide certainty to TAs, helping them to better:

- Plan
- Design
- Engage with communities
- Fund infrastructure upgrades
- Develop long-term plans

E What was the process to develop the standards?

The Authority developed these proposals using evidence, technical advice, testing.

Review of a range of previous work relating to the area.

Commissioning technical reports into potential areas where standards could be made.

Commissioning case studies of wastewater arrangements to understand the perspectives of iwi/Māori, TAs, and RCs.

Commissioning detailed technical advice into the discharge to water and land standards.

A Technical Review Group made up of TAs, RCs, peak industry bodies, and leading industry professionals.

The goal is to create credible standards that balance:

The proposed standards do not cover the following matters:

- ✗ Discharges to air from wastewater treatment plants.
- ✗ Recycled treated wastewater for non-potable use.
- ✗ Other contaminants from treatment plants (such as endocrine disruptors, heavy metals, and PFAS).
- ✗ Arrangements for private networks or onsite wastewater treatment systems (such as septic tanks).

Version: 21 Feb 2025

3. What is covered by the proposed wastewater standards?

Relevant provisions in the Water Services Act 2021

The Water Services Act 2021 (**the Act**) (section 138) enables the Authority to make wastewater standards. The Local Government (Water Services) Bill proposes to change this so that standards are set through regulations made by Order in Council, on the advice of the responsible Minister.

Standards may include (but are not limited to) requirements, limits, conditions, or prohibitions related to activities associated with wastewater networks, including:

- discharges to land, air or water,
- biosolids and any other byproducts from wastewater,
- energy use, and
- waste that is introduced by a third party into a wastewater network (for example, trade waste).

The Local Government (Water Services) Bill also expands and clarifies how standards affect processes and decisions under the Resource Management Act 1991.

The Act enables the Authority to exercise several functions that are relevant to the proposed wastewater environmental standards. These include:

- **Network Environmental Performance Measures:** network operators are required to monitor and report on the environmental performance of their drinking water, wastewater and stormwater networks. Robust data collection and reporting is critical to providing a clear picture about how networks are performing, to minimise potential impacts on the environment and public health over time.
- **Wastewater Network Risk Management Plans:** these plans can be required under section 139 of the Water Services Act (once a timeframe is set by notice in the Gazette) and must meet any relevant wastewater measures, standards or targets.[1] Once made they must be reviewed every 5 years.
- **Wastewater Environmental Performance Targets:** The Authority may also create targets that apply to wastewater network and their operators. These will be introduced at a later date, once there is a clearer picture of how wastewater networks are performing and where targets may be appropriate.

Wastewater standards apply to public wastewater networks

The Act provides that wastewater standards may only apply to public networks (i.e., owned by a territorial authority or its service delivery organisation such as Watercare, or certain Central Government organisations), as defined in the Act:

> ***wastewater network*** means the infrastructure and processes that—
>
> (a) are used to collect, store, transmit through reticulation, treat, or discharge wastewater; and
>
> (b) are operated by, for, or on behalf of one of the following:
>
> *(i) a local authority, council-controlled organisation, or subsidiary of a council-controlled organisation:*
>
> *(ii) a department:*
>
> *(iii) the New Zealand Defence Force*

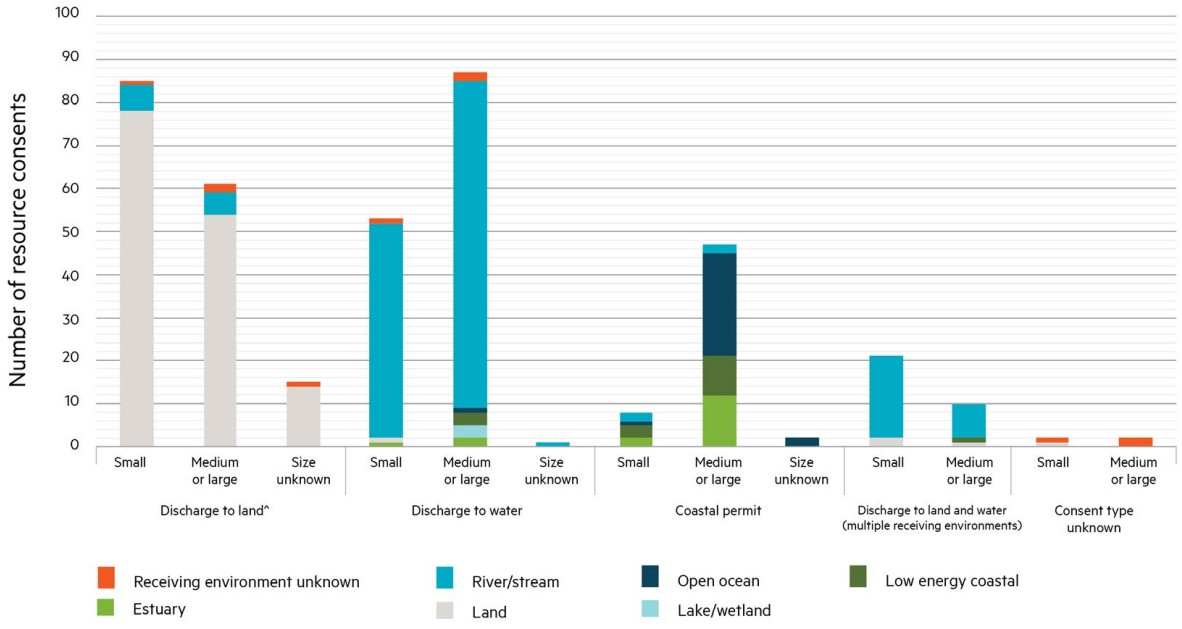
The standards do not apply to privately owned networks, septic tanks or onsite systems for treating wastewater (those captured by AS/NZS 1547:2012). This includes onsite systems with primary, secondary and disinfection wastewater systems – for example, wastewater from campground ablution blocks and amenity public toilets – as well as septic tanks. In these situations, wastewater is generally from one or multiple buildings but within one land area or site. Treatment is typically minimal (compared to a treatment plant with multiple levels of treatment) as is the environmental impact.

What are the proposed wastewater standards in this discussion document?

This document proposes an initial set of wastewater standards for discharges to land and water, and arrangements for applying biosolids to land and managing overflows and bypasses. This initial set of standards targets areas where performance improvements will be most effective for this essential infrastructure and cover the majority of consents for wastewater treatment plants as set out in the graph below.

1 To date, the Water Services Authority hasn't published any requirements or guidance on Wastewater Network Risk Management Plans should cover.

Wastewater discharge consents by consent type, size and receiving environment*



Based on 353 primary discharge consents from Water Services Authority Wastewater Discharge Consents Database
^ Includes discharges to land that may enter water

Discharge to water standard

The proposed standard for discharges to water includes:

- treatment limits for the main contaminants or 'parameters' that are discharged by wastewater treatment plants, and which commonly are subject to limits or monitoring arrangements in resource consents,
- different classes of receiving environment, in relation to which the treatment limits vary,
- 'end of pipe' monitoring and reporting requirements for the treatment limits, and
- sets separate treatment requirements that are tailored to small wastewater treatment plants that service very small populations and have a minimal impact on the receiving environment.

Discharge to land standard

The proposed standard for discharges to land is based on a site-specific risk assessment and includes:

- a framework for identifying areas of land appropriate for land application and classifying its risk,
- treatment requirements for wastewater that is discharged to land, and
- monitoring and reporting requirements, including for soil and water at and around the discharge site.

Beneficial reuse of biosolids standard

The proposed standard for beneficial reuse of biosolids includes:

- a grading system for processing biosolids, with corresponding activity status under the Resource Management Act 1991 for how and where biosolids can be reused,
- additional treatment requirements and mitigation measures where biosolids have a lower grade, and
- monitoring and reporting requirements, which correspond with the grade of biosolids.

Arrangements for wastewater network overflows and bypasses of wastewater treatment plants

The proposed standard for wastewater network overflows and bypasses includes:

- requirements for network operators to develop wastewater risk management plans, to identify where overflows and bypasses are a risk, and how they should be managed,
- monitoring and reporting requirements for overflows and bypasses from wastewater networks, and
- classification of overflows and bypasses as controlled activities under the Resource Management Act 1991.

We would like your feedback on the following questions:

- Do you agree with the areas the first set of standards are proposed to cover?
- What areas should we prioritise to introduce wastewater standards in future?

How will wastewater standards be implemented?

Regional councils remain the regulator for wastewater and stormwater networks and are responsible for land-use planning, resource consent processes, and monitoring, reporting and compliance and enforcement under the Resource Management Act 1991. The proposed standards will be implemented through new resource consents, which for discharges to water and land will be granted for 35-year timeframes.

We are developing guidance to support network owners and operators, as well as consenting authorities, to implement wastewater standards.

We would like your feedback on the following questions:

- What topics should we cover in the guidance material to support implementation of the standards?
- Are there particular groups we should work with to develop guidance and if so, who?
- How should factors such as climate change, population growth, or consumer complaints be addressed when considering a 35-year consent term?

Discharges to land and water

The proposed wastewater standards will determine some of the conditions imposed on discharge consents under the Resource Management Act 1991. For the specific parameters (and corresponding limits) included in the standard, regional councils will not be able to introduce conditions that require either higher or lower levels of treatment. Monitoring and reporting requirements will also be set through consent conditions.

If a matter is not dealt with in wastewater standards – for example, air or odour discharges – the relevant regional council will continue to set consent conditions. Outside of matters covered in the standards, regional councils (and, where relevant, city or district councils) will still need to consider other consenting aspects of wastewater infrastructure and discharges, such as the location and whether any structures for the plant are required. The proposed standards do not remove the requirement for applicants to engage with communities as part of the infrastructure planning and consenting process.

Wastewater overflows and bypasses

This discussion document proposes that risk-based monitoring and reporting arrangements be implemented for wastewater overflows, including for both overflows from networks and bypasses of wastewater treatment plants. It also proposes that overflows and bypasses must have an associated consent (that is, they are a 'controlled activity' under the Resource Management Act 1991).

Regional councils will continue to control how adverse effects of overflows and bypasses on the environment are managed. The specific monitoring and reporting requirements in the proposed standard will be included in the wastewater standard and set through consent conditions.

Beneficial reuse of biosolids

This discussion document proposes a framework for grading biosolids to reflect the level of treatment they have received and the residual levels of contaminants that they contain. The grading framework will also set the consent requirements for different grades of biosolids, with the highest grade not requiring a resource consent to be applied to land (that is, a 'permitted activity' under the Resource Management Act 1991).

This proposal is based on Water New Zealand's draft Beneficial Use of Biosolids and other Organic Materials of Land (Good Practice Guide). This guide has been developed with the sector, and is based on existing guidelines that have been in place since 2002 that have been implemented in some regional plans and consents.

Second phase of wastewater standards: Infrastructure Design Solutions

The Local Government (Water Services) Bill provides for 'infrastructure design solutions' that will be developed as part of the second implementation phase for wastewater standards, with a new provision inserted into the Water Services Act 2021. These voluntary solutions will set out standardised design and operating requirements for modular wastewater treatment plants or components of wastewater treatment plants that are deemed to meet the wastewater standards. This is intended to support network operators to meet wastewater standards in a cost-effective way.

The infrastructure design solutions are initially likely to focus on treatment plants in smaller communities. They are not in scope for this consultation on proposed wastewater standards. They will be developed and publicly consulted on once enabled through legislation as part of the implementation of the standards.

4. Our wastewater environment

By the numbers: Wastewater treatment plants[2]

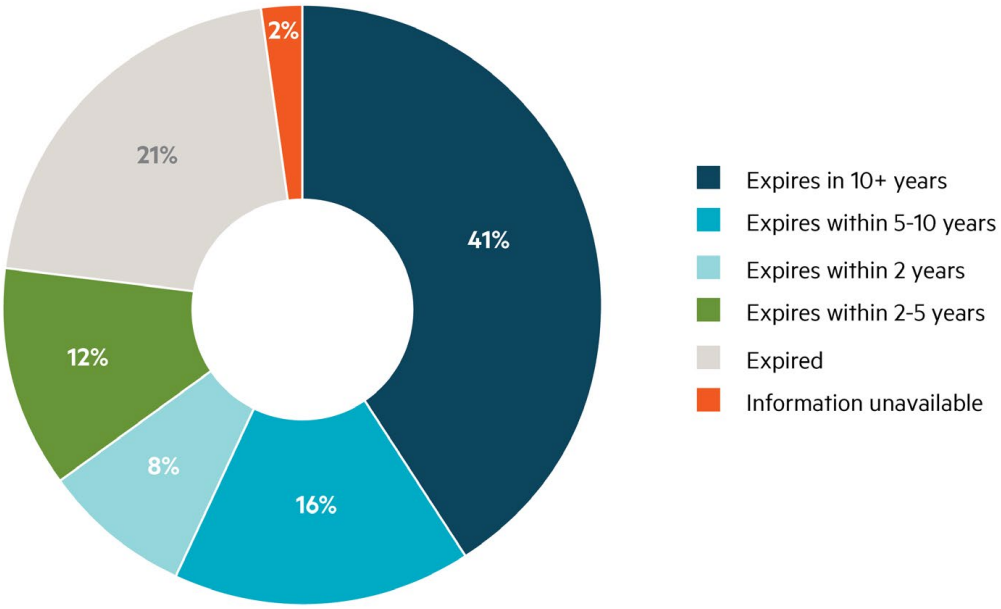
- There are 334 publicly owned wastewater treatment plants across New Zealand, which are owned and/or operated by councils, their council-controlled organisations, or by Crown agencies like the Department of Conservation and the New Zealand Defence Force.
- All 67 local councils operate one or more wastewater treatment plants.
- Approximately 50 percent of wastewater treatment plants serve communities of less than one thousand people.

What are the main challenges?

Over the next 10 years, at least 57 percent of consents for wastewater treatment plants will come up for renewal.[3]

Already, expired consents make up 21 percent of wastewater treatment plant consents.

Wastewater discharge consent expiry timeframes*



Based on 353 primary discharge consents from Water Services Authority Wastewater Discharge Consents Database

2 These figures are based on the Water Services Authority Database of Wastewater Resource Consents.

3 The percentage of consents coming up for renewal is based on a Water Services Authority Database of Wastewater Resource Consents. This database was compiled in late-2024 and differs from previously shared numbers of consents coming up for renewal and those that are already expired.

This will place a large consenting burden on councils as well as communities that engage with the consenting process (often on a voluntary basis). There is an opportunity to streamline part of the consenting process, through the introduction of a standardised approach to how wastewater discharges and other wastewater network activities are managed.

The upgrades required to New Zealand's wastewater treatment plants and the associated networks represent a significant infrastructure challenge for councils. A large portion of New Zealand's wastewater plant infrastructure was built around 30-40 years ago, with network infrastructure typically older and in unknown condition. In many cases, significant upgrades are now needed.

Many networks have limited capacity to accommodate population growth, which increases the rate and frequency of overflows and means wastewater treatment plants need to be upgraded to manage increasing demands due to urban development and housing growth. In Auckland, for example, there are current wastewater network constraints limiting development, in areas such as the Hibiscus Coast and Warkworth.

The realities for smaller plants

Approximately 50 percent of wastewater treatment plants serve communities of fewer than one thousand people. The technology used in these small plants tends to be relatively simple (e.g., mostly oxidation pond-based systems).

Oxidation pond-based systems often cannot perform to the same standard as more technologically sophisticated plants. Affordability challenges are particularly felt in smaller communities, with the cost of consenting and upgrading treatment plants falling on limited or declining ratepayer bases in areas such as Southland. Geographic constraints often mean amalgamating smaller treatment plants is not feasible.

Source: The Southland Economic Project (2018)

The effects-based consenting process is complex, costly and varies across the country

Under the Resource Management Act 1991, wastewater treatment plants require several resource consents, including for discharges of treated wastewater to water or land, discharges to air (including odour), certain activities associated with beneficial reuse of biosolids, land use for the treatment plant, and in some regions, overflows.

The resource consenting process follows an effects-based approach, which means managing the effects of activities on the environment, rather than the activities themselves. This approach has led to three main issues:

- there are significant costs in investigating and agreeing on the effects of a proposed activity to inform a consent,
- there is significant variation in wastewater treatment requirements (both across the country and within regions), and this impacts the overall system and its performance in multiple ways, and
- there is a lack of transparency about how the wastewater system is performing.

There is significant variation in wastewater treatment requirements across the country

The existing resource management system is based on the consenting arrangements for wastewater treatment plants and networks being set "at place" based on a particular plant, the associated receiving environment and the specific effects on it, and any community preferences about the arrangements. This approach has led to significant variation in treatment limits, monitoring and reporting requirements from plant to plant, with no consistency based on common areas such the age of a plant, its treatment processes or infrastructure, or impacts on the receiving environment. The approach has also resulted in significant design, operating and consenting costs for plants, long consent processing times and treatment arrangements determined without any clear baseline or expectations for what "good" treatment should be. The bespoke process limits potential efficiencies and cost savings, for example, from standardising how treatment plants are designed, constructed and operated.

Compliance with consents can be particularly challenging due to the varying treatment limits and inconsistencies in consent conditions. Many contaminants have no limits placed on them, or alternatively are articulated in ways that make compliance and enforcement difficult or impossible. Regional councils may experience challenges in taking timely and consistent enforcement action due to a lack of reliable information.

There are significant costs in investigating and determining the effects of a proposed activity for a consent

The consenting process for infrastructure such as wastewater is complex, time-consuming and expensive. Costs are often incurred through:

- engaging technical specialists to assess environmental effects and required plant upgrades,
- consultation with communities and other potentially affected parties,
- peer review by the consenting authority, and
- at times, Environment (or High) Court appeals.

Resource consenting for wastewater has also had to occur in parallel with implementing freshwater policy changes, for example, under the National Policy Statement for Freshwater Management. This has required considerable time and effort from councils and their communities.

The variable cost of wastewater consents

A 2021 report prepared by the New Zealand Infrastructure Commission – Te Waihanga looked at the cost of consenting infrastructure projects in New Zealand. The report found the cost of consenting to be considerably higher in the waste and water sectors (compared to other infrastructure sectors).

This was largely driven by the amount of expert advice and intensive engagement required. The report also found that the most significant indirect costs are those associated with delay. Funding set aside for infrastructure upgrades may be unable to be used due to significant consenting delays. The cost of construction and availability of resources (labour and materials) may change during the consenting processes.

A national stocktake of wastewater treatment plants, undertaken in 2019, found a range of reasons for why treatment plants are operating on expired consents. These reasons include the capacity and capability of small councils to manage the consenting process, lengthy and/or difficult consultation processes, and affordability constraints to meet community expectations.

Source: National stocktake of municipal wastewater treatment plants (2019)

Source: The cost of consenting infrastructure projects in New Zealand (2021)

There is a lack of transparency about wastewater system performance

The general age and condition of wastewater infrastructure has implications for communities, including for public health and environment quality. When wastewater systems are not properly managed, including the collection, treatment, and disposal processes, it can lead to various health issues and risks. A badly maintained wastewater system can expose communities to disease-causing pathogens; and in disaster situations, such as floods, the risk of water-borne diseases travelling through a community can increase.

The impacts of deferred maintenance include an increase in overflows from the broader network. In an overflow, untreated wastewater escapes from a network into environments including streams, rivers, harbours and coastlines. This impacts community members using these environments to swim or gather food, as well as the plants and animals living there.

Despite these impacts on communities, public information about the performance of wastewater networks is hard to find. The lack of transparency and consistent public reporting makes it difficult to understand how environmental and public health risks are being managed. There is an opportunity for the Authority to improve national consistency through its monitoring and reporting functions, which will increase transparency about how wastewater networks are performing. Wastewater standards can also support this work.

Opportunity and benefits of national wastewater standards

To drive cost efficiencies, save time for both those seeking and issuing consents, and make infrastructure design and procurement more efficient, there is an opportunity to put wastewater standards in place ahead of the large number of consents coming up for renewal.

Wastewater standards will drive cost efficiencies in plant design, procurement and operations

The proposed wastewater standards are expected to deliver significant cost-efficiencies relating to consenting costs. The interim regulatory impact statement published with this discussion document (which can be found here) includes case studies that estimate, for example that up to 40 percent of costs on consenting may be saved through application of the proposed standards. This includes reductions in costs associated with the consenting process including staff time, technical assessments, feasibility assessments, legal costs and consultation and engagement costs.

In some cases, there may also be reductions to capital upgrade costs and ongoing operating costs such as staff training and maintenance. The costs savings on an individual plant will depend on specific circumstances, such as the type or size of the plant, treatment processes, and options for where the plant discharges. However, over time, further costs savings are expected as materials are standardised, and modular options that comply with wastewater standards become available.

Wastewater standards will provide certainty to network owners and operators, so they can better plan for the cost of infrastructure – and leverage cost efficiencies in designing, procuring and operating wastewater treatment plants. This will support territorial authorities in developing future long-term plans (including 30-year infrastructure strategies).

The consistency created by national wastewater standards will enable benchmarking of performance and incentivise transparent and consistent compliance and enforcement.

The Authority publishes system-level information about the environmental performance of wastewater networks annually. Nevertheless, public information about individual wastewater network performance can be hard to find. At the same time, community expectations about how wastewater discharges are managed and reported are increasing.

Establishing nationally consistent wastewater standards will help to:

- ensure communities have access to better information, which will enable clearer expectations about the quality and service of wastewater treatment,
- streamline consent processes (design and engagement) to save applicants time and reduce the cost of consultants,
- provide certainty to local councils as network owners, so that they can plan for the cost of upgrading and maintaining wastewater infrastructure,
- provide opportunities for economies of scale in plant design, procurement and operator capability building / training,
- ensure that overflows from networks are better understood by network owners, ensuring that the pipe infrastructure is appropriately managed and maintained, and public health and environmental risks are reported to affected communities,
- make compliance and enforcement for regional councils easier by standardising the main contaminant limits and monitoring and reporting requirements in wastewater discharge consents,
- enable benchmarking of performance, to drive improved efficiencies over time, and
- improve public health and environmental outcomes over time.

Learning from international practices

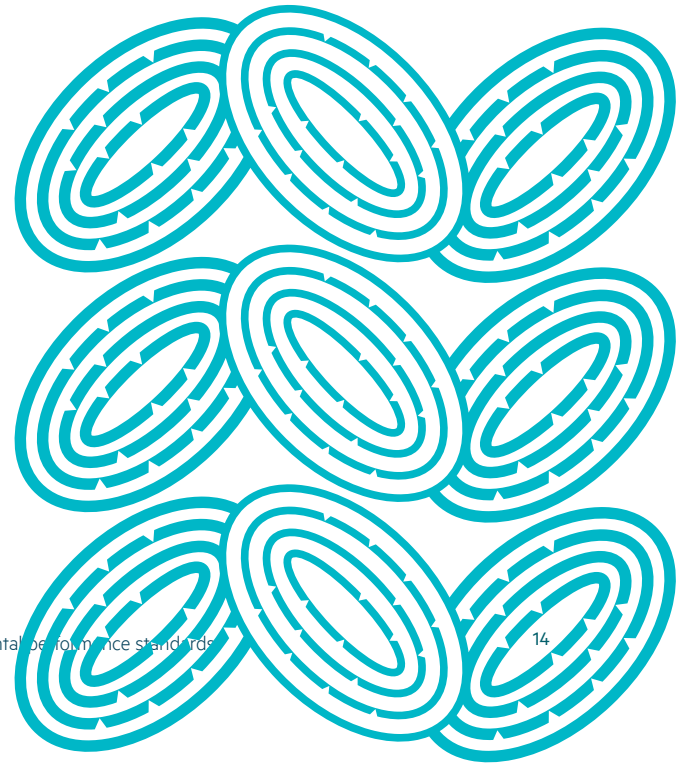
National or state-level wastewater standards have been in place for decades in many of the jurisdictions that New Zealand commonly compares itself to, including the European Union (EU), United Kingdom, Australia and Canada.

Internationally, the protection of public health is broadly considered the key driver for setting wastewater discharge regulations, closely followed by environmental protection. Phased introduction of standards is a common approach taken overseas to support the manageability, fiscal impacts and prioritisation of certain upgrades: the EU has applied standards to different sizes of treatment plants over different timeframes as an example.

In many jurisdictions there is a population (or population equivalent) or flow (volume) component for setting standards, dependent on discharge type. While there are different approaches to setting, implementing and enforcing standards, there is widespread use of central parameters.

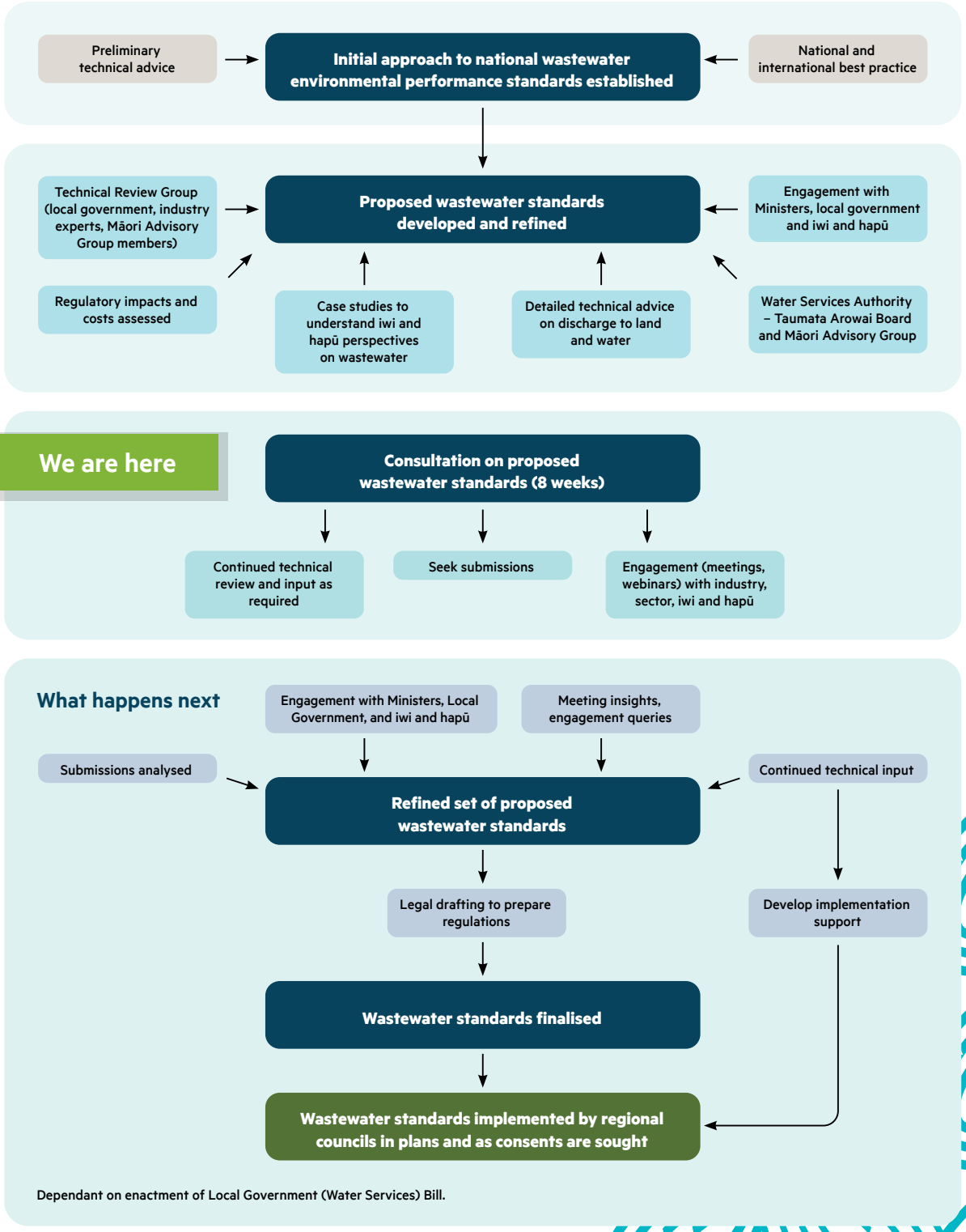
There are well-established monitoring and reporting requirements for overflows in many international jurisdictions that provide detailed information on overflow events – for example, the number, location and volume of overflows. The data collected is used to:

- identify where there are issues (primarily the scale and type of overflows),
- benchmark performance and identify areas for improvement,
- inform the public and community groups,
- prioritise what and where infrastructure improvement is needed,
- develop standards, and
- make investment decisions based on reliable data.



5. How were the proposals in this discussion document developed?

Developing the first set of wastewater standards



The Authority has developed these proposals through a policy process that has drawn on a range of evidence, technical advice and testing with councils and industry experts. This has included:

- reviewing a range of previous work in this area, including the New Zealand Wastewater Sector report (2021), commissioned by the Ministry for the Environment, and a suite of reports commissioned by the Department of Internal Affairs[4]
- commissioning technical reports into potential areas where standards could be made
- commissioning case studies that detail iwi and hapū involvement in wastewater treatment arrangements to better understand Māori values and perspectives, and how existing wastewater treatment arrangements can meet iwi and hapū aspirations
- commissioning detailed technical advice into the discharge to water and land standards

Copies of these documents can be found here.

The Authority convened a Technical Review Group to provide advice on proposals relating to wastewater standards. This group was comprised of individuals with leading expertise across sectors involved with wastewater management, including representatives from regional councils, territorial authorities, industry professionals, and Water New Zealand. Members of the Authority's Board and Māori Advisory Group also participated in the Technical Review Group.

Regulatory impact statement

An interim regulatory impact statement has been prepared to comply with Cabinet requirements for proposals that will have regulatory impact – this can be found here. This provides a summary of the problem being addressed, the options considered, their associated costs and benefits, the consultation undertaken, and the proposed arrangements for implementation and review. The regulatory impact statement will be updated following consultation and will be considered by the Minister of Local Government and Cabinet as part of the process for the setting of standards.

Iwi and hapū perspectives on wastewater treatment arrangements

To inform the development of the standards, the Authority engaged with a number of iwi and hapū to understand perspectives on wastewater treatment arrangements. The Authority commissioned a series of case studies to understand how mana whenua views have been incorporated into areas like resource consents, what processes work well, and where there is room for improvement. For each case study, the Authority also engaged with the relevant territorial authority and regional council.

Some of the themes from this engagement include:

- there is a strong preference for ongoing 'at-place' decision-making to ensure that iwi and hapū are involved in decisions affecting them and can actively participate in all phases of wastewater treatment processes. This extends from design arrangements through to monitoring and reporting of the infrastructure once built and its effect on the environment.
- iwi and hapū consider human waste to be tapu (prohibited) due to its impact on the health of people and the environment. This means that human waste must undergo a process of whakanoa (cleansing) before it can be safely integrated back into the environment. There are various ways that wastewater infrastructure has responded to this, including arrangements to allow waste to have contact with land before it is discharged to water.
- the preference is for the highest standard of treatment possible for both water and land-based approaches at the point of discharge. Where wastewater is discharged to water, at minimum it should not have a detrimental impact on the health and quality of the taiao (receiving environment) or the people that use the environment.
- while iwi and hapū strongly prefer discharge to land, there are several examples where this option has not proved feasible. This has primarily been because nearby land is not suitable (e.g., too porous), because the land is highly productive and therefore too expensive, or because the wastewater treatment plant is too large meaning the quantity of land required is not a practical alternative.

4 This includes the national stocktake of municipal wastewater treatment plants, and cost estimates for upgrading wastewater treatment plants that discharge to the ocean.

- resource consenting processes are often protracted and experiences of working with councils tended to be highly variable, often due to a lack of early engagement and changes in council staff as the key contact point. Iwi and hapū input is often done on a voluntary or in-kind basis and limited (for example, due to competing demands), which makes it difficult to engage consistently. There is therefore a preference for resourcing or funding to enable good engagement in these processes.
- the case studies, together with information from other sources, demonstrated that comprehensive engagement processes involving iwi led to better outcomes from the iwi and hapū perspective.

You can read through the case studies here.

Treaty settlement obligations and other arrangements between councils, iwi and hapū

There are several legislative and regulatory mechanisms that provide for iwi and hapū engagement and involvement in wastewater management processes. This includes legal obligations between councils and iwi and hapū, as well as the statutory obligations imposed on the Authority to engage early and meaningfully with Māori.

Treaty settlement obligations impose a duty on territorial authorities, regional councils, and decision-makers under the Water Services Act (including the Authority) to have regard to Treaty settlement arrangements that exist and cover the Waikato, Waipā, and Whanganui River catchments.

To inform development of the standards, the Authority is engaging with iwi in these catchments where there are specific settlement obligations to uphold. Broader engagement is also underway with iwi and hapū who have agreements or arrangements with Councils that impact on wastewater arrangements, such as regional participation arrangements under the Resource Management Act 1991, customary marine title holders under the Marine and Coastal Area (Takutai Moana) Act 2011, freshwater obligations under Treaty of Waitangi and parties to joint management arrangement.

This engagement will inform the advice to the Minister of Local Government on how the standards could apply where there are settlement or other relevant obligations.

6. A discharge to water environmental performance standard

The **proposed approach** is to establish a discharge to water environmental performance standard that:

- Sets treatment limits for specified contaminants or 'parameters' that will vary depending on different types of receiving environments.
- Imposes monitoring and reporting arrangements for treatment requirements.
- Provides that, where a consent applicant can demonstrate they will meet treatment requirements imposed by the standard, the consent authority must issue a discharge consent with a 35-year timeframe.
- Sets separate treatment requirements that are tailored to small wastewater treatment plants (oxidation ponds) that service very small populations and have a minimal impact on the receiving environment.

What is a 'discharge to water' from a wastewater treatment plant?

Many wastewater treatment plants discharge treated wastewater to a water body (for example, the ocean or a river). Resource consent conditions set requirements relating to the quality and volume of the discharge, and specify any treatment requirements relating to particular contaminants that are potentially harmful to the environment or create risks to public health.

A resource consent will include monitoring and reporting requirements to track compliance with consent conditions, and require reporting on performance (and any non-compliance) to the relevant regional council.

If the operator of the plant does not comply with these requirements or conditions, they will be in breach of their resource consent. Regional councils are responsible for compliance and enforcement where this occurs – actions can include requiring the operator to remedy the non-compliance, issuing a fine, or commencing court action.

In this context, 'discharge to water' from a wastewater treatment plant does not refer to overflows from the broader pipe network, or where partially treated wastewater bypasses the wastewater treatment plant. These areas are dealt with in the overflows section of this discussion document (covered in section nine of this document).

Given the impacts of poorly managed pathogens in coastal and freshwater environments (for example, to swimming and shellfish collection), these contaminants are routinely considered for discharge to water consents. For many waterbodies, there are also a range of other activities that impact water quality – for example, recreational boating or activities on nearby farmland. Regional councils manage the cumulative impacts of these activities on water bodies through planning, consenting and enforcement.

Current arrangements for discharges to water

Based on the Authority's Public Register of Wastewater Networks and a stocktake of resource consents, There are 202 resource consents for wastewater discharges to water.

The management of wastewater discharges to water varies significantly throughout New Zealand and within regions. Variations apply to contaminants and the corresponding limits in consents, as well as their monitoring and reporting requirements.

There are currently 50 wastewater treatment plants discharging to water with expired consents; a situation authorised under section 124 of the Resource Management Act 1991. Of these 50 plants, the average time a plant has been operating on an expired consent is 5 years – the longest is 24 years.

Receiving environments for discharges to water range from large open ocean environments to more static estuarine or lake environments. Generally, due to the significant amount of dilution and dispersion, open ocean environments are less sensitive to discharges than lakes, rivers and streams.

Relevant documents and processes

Consenting authorities consider a range of documents when managing discharges to water, including:

- The National Policy Statement for Freshwater Management (NPS-FM) and associated National Objectives Framework, which identifies values for freshwater through engagement with mana whenua and communities[5]
- The New Zealand Coastal Policy Statement 2010, which requires consenting authorities to have particular regard to the sensitivity and capacity of receiving environments, nature of contaminants, and avoiding adverse impacts on ecosystems and habitats

5 The NPS-FM is under review and is scheduled to be replaced in 2027.

- Quantitative Microbial Risk Assessments (QRMA), which are increasingly used by consenting authorities to assess the public health risk associated with coastal marine wastewater discharges
- The Australian and New Zealand Guidelines for Fresh and Marine Water Quality (revised in 2018), which provide guidance to assess, manage and monitor the water quality of aquatic systems in Australia and New Zealand.

How will wastewater standards help to manage discharges to water?

Improving consistency in how discharges to water are managed, and the treatment limits for specific receiving environments will make it easier for network operators to plan, design and operate wastewater infrastructure. It will reduce the complexity of resource consenting and setting conditions.

National standards provide an opportunity to apply consistent limits to a core set of contaminants (such as total nitrogen, total phosphorous, sediment and pathogens) that are discharged from wastewater treatment plants and can impact waterbodies, and the aquatic life and recreational activities in and around these areas. The proposed standards would also set consistent requirements for parameters that indicate there are public health risks, such as *E.coli* or enterococci.

Standards will introduce consistent monitoring and reporting requirements for the core set of contaminants, which will build a clear and comparable picture of how wastewater treatment plants are performing. In future, this information may be used to introduce measures to lift the performance of wastewater networks.

Proposed approach: discharge to water environmental performance standard for wastewater treatment plants

Discharge to water environmental performance standard will specify receiving environment types

It is proposed that treatment requirements will vary depending on the type of receiving environment. This approach is proposed because:

- treatment requirements are generally less stringent where the discharge is to a water body with higher levels of dilution – for example, to the open ocean or a large river;
- conversely, where the discharge is to a water body that has lower levels of dilution or is sensitive in nature, treatment requirements should be higher – for example, a lake or estuary; and
- treatment requirements should differ depending on whether the discharge is to a saline / marine environment or to a freshwater environment.

The proposal is to specify seven categories of receiving environment in the standard, based on dilution and type of receiving environment. A dilution approach is proposed because it is simple, is understood by regulators and operators, and removes the need for more complex (and costly) dispersion modelling. This is reflected in its frequent use in other jurisdictions (including Canada, USA, Switzerland, European Union). It is intended to be a proxy for mixing, as well as the assimilative capacity in the receiving environment and the relative scale of the discharge in relation to the volume of the waterbody.

$$\text{Dilution ratio} = \frac{\textbf{Volume + Flow}}{\textbf{Volume}}$$

Volume: the largest predicted annual median for discharge volume, across the duration of a consent (m³/day)

Flow: the average of the lowest 7 days average flow across a year (m³/day)

The following categories of receiving environment are proposed:

Category of receiving environment	Definition
Lakes and natural ponds with dilution ratio >50	Body of standing freshwater, which is entirely or nearly surrounded by land. It includes lakes and natural ponds but excludes any artificial ponds. Typically, low energy depositional environment in which dispersion/dilution is limited by an absence of strong water currents.
River or stream with dilution ratio >10 and <50 (low)	A continually flowing body of fresh water, including streams and modified watercourses, but excludes any artificial watercourse (including an irrigation canal, water supply race, canal for the supply of water for electricity power generation, and farm drainage canal). Rivers or streams or streams with very low dilution (dilution ratio <10) are excluded from the standards due to their lower ability to assimilate wastewater discharges.
River or stream with dilution ratio >50 and <250 (moderate)	
River or stream with dilution ratio >250 (high)	
Estuaries with dilution ratio >50	A partially enclosed coastal body of water that is either permanently or periodically open to the sea in which the aquatic ecosystem is affected by the physical and chemical characteristics of both runoff from the land and inflow from the sea. It includes features variously named on the NZMS 1:50,000 topographic maps as estuary, creek, firth, inlet, gulf, cove, river mouth, bay, lagoon, harbour, stream, fjord, sound, haven, and basin.[6]
Low energy coastal with dilution ratio >100	Area that is sheltered from large waves and long period waves. Occur in gulfs and behind islands and reefs on the open coast and includes recessed harbours and embayments.
Open ocean with dilution ratio >1000	Water that is remote from estuaries, fiords, inlets, harbours, and embayments, typically >500m from a shoreline and high energy environment.

Seasonality

Assessing the seasonal implications of wastewater discharges is complex because changes occur both at the treatment plant and in the receiving environment.

Flow varies in the receiving environment and is typically low in summer and higher in winter. Sensitivity of the receiving environment – to nutrients in particular – varies seasonally usually with a greater probability of eutrophication effects in warmer temperatures. In summer months, the discharged nutrient loads pose a greater risk to the receiving environment because the waterbodies are in a low flow state. Over the year, flows in and out of some treatment plants may increase due to significant increased visitor numbers relative to the usual population. Wastewater treatment plants should be designed in a way that accommodates changes in flow.

The risk of seasonal fluctuations in flow is addressed using:

- the 7 Day Median Annual Low Flow to establish the proposed dilution categories.
- the Median Design Flow and proposed numeric limits manage loading to the environment and forms the basis for the discharge volume that will be consented.
- the annual median statistical basis in the proposed standard allows for some flexibility over the course of the year.

These features of the proposed approach provide flexibility to allow for seasonal variation while maintaining an appropriate level of protection for freshwater environments under low flow conditions. This approach will mean that treatment plants are effectively designed to meet the proposed standard across all seasons.

6 A list of estuaries in New Zealand can be found here: Assessment of the eutrophication susceptibility of New Zealand's estuaries | Ministry for the Environment

Parameters and numeric limits for discharges to water

The proposed discharge to water standard sets limits on the contaminants most commonly found in treated wastewater discharges. In the case of *E. coli* and enterococci, they are faecal bacteria indicators that, if present in sufficient quantities, indicate that other harmful pathogens may be present that can cause illness.

Some effects are not covered by the proposed standard as they are influenced by site-specific factors and will therefore continue to be addressed by regional councils during the consenting process. These include:

- The volume of discharge: this relates to site-specific effects such as scour, as well as the scale of the discharge relative to the receiving water body.
- Cumulative effects of the nutrient load of the discharge, which may impact downstream water bodies.
- Toxicity of metals and other contaminants, such as pesticides, drugs, antibacterial agents and PFAS.
- The presence of artificial chemicals, such as microplastics.
- Bioaccumulation of contaminants in organisms in the receiving water body, such as mercury. (note, the standards address the risk of bioaccumulation on human health after eating affected organisms, particularly filter feeders such as mussels).
- Other effects, such as odour, noise and the location of the discharge structures and bypasses.

Contaminants and parameters not covered by the proposed discharge to water standard

Where contaminants are not covered by the standard (for example, heavy metals), the usual resource consenting process would apply. This would mean regional councils may set an appropriate limit on these contaminants if this is considered necessary. We anticipate these limits would likely draw on the Australian and New Zealand Guidelines for Fresh and Marine Water Quality, or other factors that a regional council considers appropriate.

Some of the parameters covered by the standard will regulate the levels of other contaminants not covered by the standards. For example, limits proposed for Total Nitrogen will also regulate levels of heavy metals in a treated discharge.

When there are multiple metrics for a parameter the standard is intended to cover all types of that parameter. For example, parameters are proposed for Total Nitrogen and Total Phosphorous and this is intended to cover all forms of nitrogen and phosphorous. This means that a consent may not include different treatment limits for types of nitrogen or phosphorous.

Wastewater standards may be expanded in future to include additional contaminants where there is a clear body of evidence and there would be benefit in having a nationally consistent approach.

Treatment requirements for discharges to open ocean

Discharges to open ocean are typically subject to a higher rate of mixing and dispersion, subject to stronger tidal and wind currents, and tend to have less frequent public access to the discharge point.

To reflect the assimilative capacity of the open ocean, discharges are only required to treat for enterococci and ammoniacal-nitrogen. This is on the assumption that discharges to ocean and coastal receiving waters will be milli screened to remove solids, as is common in wastewater treatment plants in New Zealand. Trade Waste bylaws also typically control and manage the effects of the discharges of highly coloured waste streams to ocean and coastal receiving waters, as well as known toxic compounds.

Pathogen limits for discharges to water

As an alternative to the default limits in the standard and to protect shellfish health, we are proposing that a Quantitative Risk Management Assessment (QRMA) could be completed to determine what numeric parameters apply for pathogens (enterococci and *E. coli*) in situations where:

- shellfish is routinely collected, and these areas could be impacted by a new outfall discharge, or
- regular monitoring of an existing discharge has indicated some microbial contamination of shellfish.

The outcome of the QRMA would be used to determine whether the consent holder could meet a higher or lower limit from the proposed standard. We have commissioned additional technical advice about what these limits should be.

We would like your feedback on the following question:

- How should we consider checks and balances to protect against situations where the degree of microbial contamination may change throughout the duration of a consent?

Exceptions to the proposed standard

The proposed standard will not apply in all situations. For discharge to water arrangements that aren't captured by the proposed standard, the wastewater standards would not apply, and any treatment requirements would be set in resource consent conditions by the relevant regional council.

The proposed standard will not apply in the following situations:

- discharges to a waterbody that meets the requirements of Attribute Band A for all attributes contained in Appendix 2A and Appendix 2B of the NPS-FM. This will only be a very small proportion of New Zealand's water bodies that are in a natural, undegraded state.
- discharges to rivers or streams with very low dilution (with a dilution ratio of <10).
- discharges from a wastewater treatment plant directly to an aquifer (commonly known as deep well injection). This is relatively new technology and there are currently no treatment arrangements of this nature in New Zealand.
- discharges to natural wetlands (i.e., those which are not part of the treatment process for the wastewater discharge).
- discharges within the following proximities:
  - 1,000m upstream or 100m downstream of human drinking water abstraction points in rivers
  - 500m radius from human drinking water intakes in lakes
    - 1,000m upstream of any tributaries that discharge to lakes within the 500m radius from intakes
- discharges to a waterbody that has naturally high levels of a particular parameter. This is not intended to capture waterbodies that have existing high levels of a particular parameter due to diffuse discharges that occur through land use such as farming.

We would like your feedback on the following questions:

- Are the areas for exceptions appropriate to manage the impacts of discharges and do you anticipate implementation challenges?
- How should the exceptions be further defined to ensure there are no unintended consequences?

Parameters covered by the discharge to water standard (including the rationale, measurement unit and numeric limits)

Parameter, rationale and statistic		Lakes and natural ponds	Rivers and streams (low dilution)	Rivers and streams (moderate dilution)	Rivers and streams (high dilution)	Estuaries	Low energy coastal	Open ocean
Carbonaceous Biochemical Oxygen Demand ($cBOD_5$) **Rationale:** $cBOD_5$ can indicate the effectiveness of wastewater treatment processes. High levels of $cBOD_5$ can deplete dissolved oxygen and harm aquatic life. **Statistic:** Annual median		15 mg/L	10 mg/L	15 mg/L	20 mg/L	20 mg/L	50 mg/L	Not applicable
Total Suspended Solids (TSS) **Rational:** Total Suspended Solids an important visible indicator of water quality. Suspended solids absorb light, which can increase water temperature and decrease oxygen levels in waterbodies. **Statistic:** Annual median		15 mg/L	10 mg/L	15 mg/L	30 mg/L	25 mg/L	50 mg/L	Not applicable
Nutrients (Total Nitrogen and Total Phosphorous) **Rationale:** Nutrients can affect ecosystem health through eutrophication, increases in plant growth (e.g., algal blooms) and reduced water clarity. The proposed discharge to water standards sets limits on total nitrogen and total phosphorous. For each of the subcategories, limits for nutrients reflect flow and loading.	**Total Nitrogen –** **Statistic:** Annual median	10 mgN/L	5 mgN/L	10 mgN/L	35 mgN/L	10 mgN/L	10 mgN/L	Not applicable
	Total Phosphorus – **Statistic:** Annual median	3 mgP/L	1 mgP/L	3 mgP/L	10 mgP/L	10 mgP/L	10 mgP/L	Not applicable
Ammoniacal-nitrogen (ammonia) **Rationale:** Ammonia can deplete oxygen levels in water, resulting in reduced biodiversity and declining fish populations. **Statistic:** Annual 90%ile		3 mgN/L	1 mgN/L	3 mgN/L	25 mgN/L	15 mgN/L	20 mgN/L	50 mgN/L
E. coli **Rationale:** As with enterococci, *E. coli* indicates the presence of pathogens and faecal pollution in freshwater. **Statistic:** Annual 90%ile		6,500 cfu/100mL	1,300 cfu/100mL	6,500 cfu/100mL	32,500 cfu/100mL	Not applicable	Not applicable	Not applicable
Enterococci **Rationale:** Enterococci and *E. Coli* indicate the presence of disease-causing bacteria, viruses or protozoa. Enterococci is the most suitable bacteria to test for in marine waters. **Statistic:** Annual 90%ile		Not applicable	Not applicable	Not applicable	Not applicable	2,000 cfu/100mL	4,000 cfu/100mL	40,000 cfu/100mL

Compliance, monitoring and reporting requirements

Compliance, monitoring and reporting requirements are proposed as part of the discharge to water standard. These will be included in the consent relating to the wastewater treatment plant, and the consent holder will be required to comply with the monitoring and reporting requirements as a condition of the consent.

Compliance, monitoring and reporting requirements are a standard feature of consent conditions. However the detail of these arrangements varies widely from consent to consent and region to region, and this results in poor outcomes including:

- Some compliance conditions in consents are not articulated in a way that makes breach of a condition or limit enforceable – this compromises enforcement action and can impact on environmental outcomes.
- Differences in monitoring and reporting from plant to plant is, in some cases, an unjustifiable regulatory burden to both operators and regional councils when the plant arrangements are broadly similar.
- There is currently a lack of transparency (and public accountability) for compliance of plants with conditions of a consent.
- It is currently not possible to benchmark performance from plant to plant or operator to operator, which is a standard feature of many other jurisdictions.

Operators will be required to monitor compliance with each of the parameters covered by the standards. The following requirements will apply to all wastewater treatment plants:

- Monitoring the discharge directly from the discharge point ('end of pipe' monitoring) will be required for all contaminants covered in the proposed standard.
- The standard will not require receiving environment monitoring.
- Monitoring requirements are set out in the table of parameters and are based on either the 90th percentile or annual median.

The frequency of monitoring will vary according to the size and complexity of a wastewater treatment plant increases, so does the frequency of the monitoring required:

- Continuous monitoring will be required for wastewater treatment plants serving populations greater than 10,000 – this is already often the case in resource consents for plants of this size.
- Fortnightly monitoring is required for plants serving populations between 1,000 and 10,000 people.
- Monthly reporting is required for small-scale plants serving 1000 people or less.

The following proposed reporting requirements would apply to all parameters:

- Any breach of a parameter must be reported by an operator to the relevant regional council as soon as reasonably possible after the breach is detected.
- An operator must publish compliance against parameters in applicable standards on a monthly basis, on a publicly available website maintained by the operator, and provide the report to the relevant regional council.
- Annual reporting is required of compliance against parameters in applicable standards to regional council and the Water Services Authority.

To provide confidence in how the standards are implemented, network operators will be required to engage a third party, on an annual basis, to audit compliance with matters covered by the standard, including monitoring and reporting requirements. Costs associated with third party auditing will be covered by network operators, rather than consenting authorities.

We would like your feedback on the following questions:

- Are the treatment limits, and monitoring and reporting requirements proportionate to the potential impacts of the different discharge scenarios?
- What benefits and challenges do you anticipate in implementing the proposed approach? Are there particular matters that could be addressed through guidance material?

Periphyton

Periphyton is the slime and algae that grows on primarily hard-bottomed waterbodies such as beds of streams and rivers and requires certain environmental conditions to grow. While it is essential for healthy ecosystems, periphyton can have significant environmental impacts when it proliferates – it can degrade swimming and fishing spots and clog irrigation and water supply intakes. Periphyton is increasingly being used as an indicator of waterbody health, for example, in the Waikato River Authority's River Health and Wellbeing Report.

The Authority proposes that, where a wastewater treatment plant discharges to a hard bottomed or rocky stream or river, the nitrogen and phosphorous limits in the standard would not apply, and the treatment requirements will be set on the basis of a site-specific risk assessment. This represents a best practice approach and is commonly undertaken in existing consents. Based on the outcome of assessment, the infrastructure owner would develop an approach that would be incorporated in the discharge consent.

We would like your feedback on the following questions:

- What feedback do you have for managing periphyton in hard bottomed or rocky streams or rivers?
- What detail should be covered in guidance to support implementing this approach for managing periphyton?

A discharge to water standard for small wastewater treatment plants

The wastewater standard for discharges to water will set different treatment requirements for small plants that service very small communities given how many are in this category and their shared characteristics. These plants are significantly different to those that service larger towns and cities. Most of these plants are oxidation ponds that rely on passive treatment processes that require little operation and less frequent monitoring, at sites that are isolated and often do not have access to electricity.

These plants generally have a low impact on the receiving environment, particularly in relation to nutrients, compared to other sources in the surrounding catchment. Different standards are therefore proposed for small plants that are proportionate to their scale and operating requirements.

The criteria for small plants would be based on the influent $cBOD_5$ load entering the treatment plant.

- If an existing plant receives a mean annual influent $cBOD_5$ load of 85kg / day or less, it will qualify for the small plant standard.
- The small plant standard would only apply to existing plants with a mean annual influent load of this volume or less.

We have defined small plants using the average $cBOD_5$ rather than population served to account for situations where a plant may service only a small population but also receive waste from significant industrial or trade-waste sources.

New treatment plants, including those that meet the definition of small plants, will need to be designed and operated to meet the default standards.

Where the influent $cBOD_5$ load increased so that it no longer qualified for the small plant standard, it would need to be upgraded to meet the general standard. This would be specified as a condition of the consent.

The discussion document identifies potential specific characteristics for the small plant standard including:

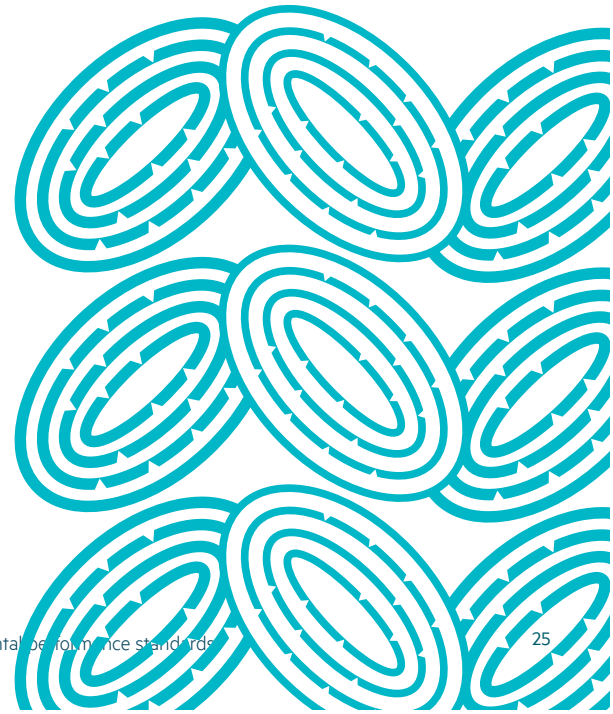
- removal of treatment requirements for total nitrogen (TN) and total phosphorous (TP) – an ammoniacal nitrogen standard would continue to apply because of its toxicity

Feedback is sought on less stringent treatment requirements for other parameters:

- *E. coli* / enterococci could be made less stringent, particularly where limited human contact with receiving waters occurs
- a standard for dissolved $cBOD_5$ rather than $cBOD_5$, and TSS limit could be reduced recognising that solids discharged from a well operated wastewater treatment are likely to be algae solids
- operational requirements such as regular desludging of oxidation ponds – these would be included in the consent for the plant.

We would like your feedback on the following question:

- How should we define small plants and what changes to the default standards should apply to them?



7. A discharge to land environmental performance standard

The **proposed approach** is to establish a discharge to land environmental performance standard that:

- Sets out a risk-based framework, to determine what types of land treated wastewater may (or may not) be discharged to.
- Sets out treatment requirements, to reflect each risk category, for wastewater that is discharged to land.
- Imposes monitoring and reporting arrangements.
- Provides that, where a consent applicant is able to demonstrate that they will meet treatment requirements imposed by the standard, the consent authority must issue a discharge consent with a 35-year timeframe.

What is a 'discharge to land' from a wastewater treatment plant?

In this discussion document, discharges to land refer to discharges of treated wastewater from wastewater treatment plants only, rather than discharges from onsite arrangements such as septic tanks.

While the majority of treated wastewater is discharged to water (freshwater or coastal), approximately 35 percent of wastewater treatment plants discharge treated wastewater to land. Some treatment arrangements are seasonal, with wastewater being discharged to water during conditions when rainfall means wastewater levels are higher and conditions are less suitable for discharge to land. It is more common for small wastewater treatment plants to discharge to land. Discharging treated wastewater to land is often used to provide an additional layer of treatment – for example, through physical filtering.

Treated wastewater can be discharged to land using a variety of methods, to influence how quickly it is released and what method is used. The characteristics of the land will also impact how treated wastewater can be applied. Broadly, land application falls into the following categories:

- **Discharging to rapid infiltration basins:** where treated wastewater is applied to areas that are highly permeable. Compared to other methods, this requires a much smaller area of land but requires deep and highly porous soils, and typically require relatively high-level wastewater treatment beforehand.
- **Slow rate irrigation systems:** where treated wastewater is applied to the surface of a site with plants, crops or pasture.
- **Discharging to sub-soil:** where treated wastewater is applied through buried distribution lines, typically using drainage fields.
- **Discharge to wetlands:** where wetlands are unsealed and unlined, some or all of the discharge will infiltrate through the base of the wetland. This is typically considered a discharge to land. Some wetlands constructed for the purpose of wastewater treatment may collect the discharge at the end of the wetland and pump this to a land application site, this would also be considered a discharge to land.
- **Discharging to land where there is human contact (for example, parks or golf courses):** this is typically done using slow-rate surface irrigation, usually with a much slower flow rate.
- **Mixed wastewater discharge systems:** in some situations, depending on factors such as weather, treated wastewater is only discharged to land for part of the year. Heavy rainfall compromises the ability of the land to absorb discharges.

Discharging to land is technically more complex than discharging to water, for several reasons:

- The topography of the land used will impact the degree of soil erosion and runoff, what plants are suitable and which wastewater disposal system should be used.
- Climate conditions impact how feasible land discharges are.
- Some soils do not have capacity to absorb wastewater or may become oversaturated over time.
- Land-based discharges can lead to potential contamination of water – particularly through nitrogen leaching.
- As the distance between land disposal sites and wastewater treatment plants increases, so do the capital and operating costs.

Rapid infiltration basins are not covered by the Standard

At this stage, the proposed standard is limited to low-rate infiltration arrangements. This is because there are some fundamental differences in design and operation compared to slow-rate irrigation systems. As a result, it is anticipated that the design and application of limits on nutrients and pathogen loads for rapid infiltration systems will require detailed, site-specific assessments. Given the complex nature of land discharge and the need for further technical work, rapid infiltration systems will be addressed in a subsequent standard.

Current arrangements for discharges to land

Resource consents set requirements relating to matters such as the quality and volume of the discharge, and include treatment requirements relating to particular contaminants that are potentially harmful. Currently, there are no standardised consent conditions for wastewater discharged to lands. This creates variation in what contaminants are covered in consents and what limits apply. This has impacts on network operators – in their ability to plan, design and operate wastewater infrastructure.

Some regional plans include policies that promote land-based disposal of wastewater, for example:

- The proposed regional plan for Northland states that an application for a consent to discharge to water resource consent will generally not be granted unless discharge to land has been considered and found not to be environmentally, economically or practically viable (D.4.2 of Proposed Regional Plan, 2024).
- The Greater Wellington Regional Council Operative Natural Resources Plan indicates a preference for land-based discharge of wastewater. New discharges of treated wastewater to coastal water are discouraged and new wastewater discharges to freshwater are to be avoided unless discharge to land is not practicable.

The New Zealand Land Treatment Collective has developed the *New Zealand Guidelines for Utilisation of Sewage Effluent (2000)*. These guidelines have been designed to support network operators and consenting authorities to consider relevant factors for planning, design, consenting, management, and monitoring of a land treatment system.

Relationship with recycling treated wastewater for non-potable reuse

Some jurisdictions have treatment standards for reuse of treated water for non-potable use – for example, to irrigate sports fields, parks, or horticulture, or for dust suppression. There are broader conversations happening in New Zealand about how to reuse treated wastewater for non-potable purposes. While this is out of scope for the first set of wastewater standards, it may be picked up in future – particularly with increasing demand to consider alternative water sources with population growth and pressure from climate change.

Opportunity

A national environmental standard for discharges to land informs site selection and evaluation, provides certainty for what limits need to be met through consents, and confirms what monitoring and reporting requirements apply.

While the standard doesn't determine how wastewater should be managed, it will support councils to have discussions with communities about where treated wastewater should be discharged and help them evaluate the trade-offs and costs of different options.

Proposed approach: discharge to land environmental performance standard for wastewater treatment plants

Risk management assessment for specific types of land

The proposal is for a risk management assessment of the site and its suitability, which can be applied to specific land scenarios. This approach is a common way to consider whether a potential site is appropriate to discharge to, ahead of incurring significant expense through technical assessments.

The feasibility of potential sites is assessed using a baseline assessment, which will allow a network owner to assess the suitability of land and the treatment requirements early in the process. This assessment also allows risks to be identified, managed and mitigated in a way that will allow land discharge to be a viable alternative to discharge to water, especially for smaller wastewater treatment plants.

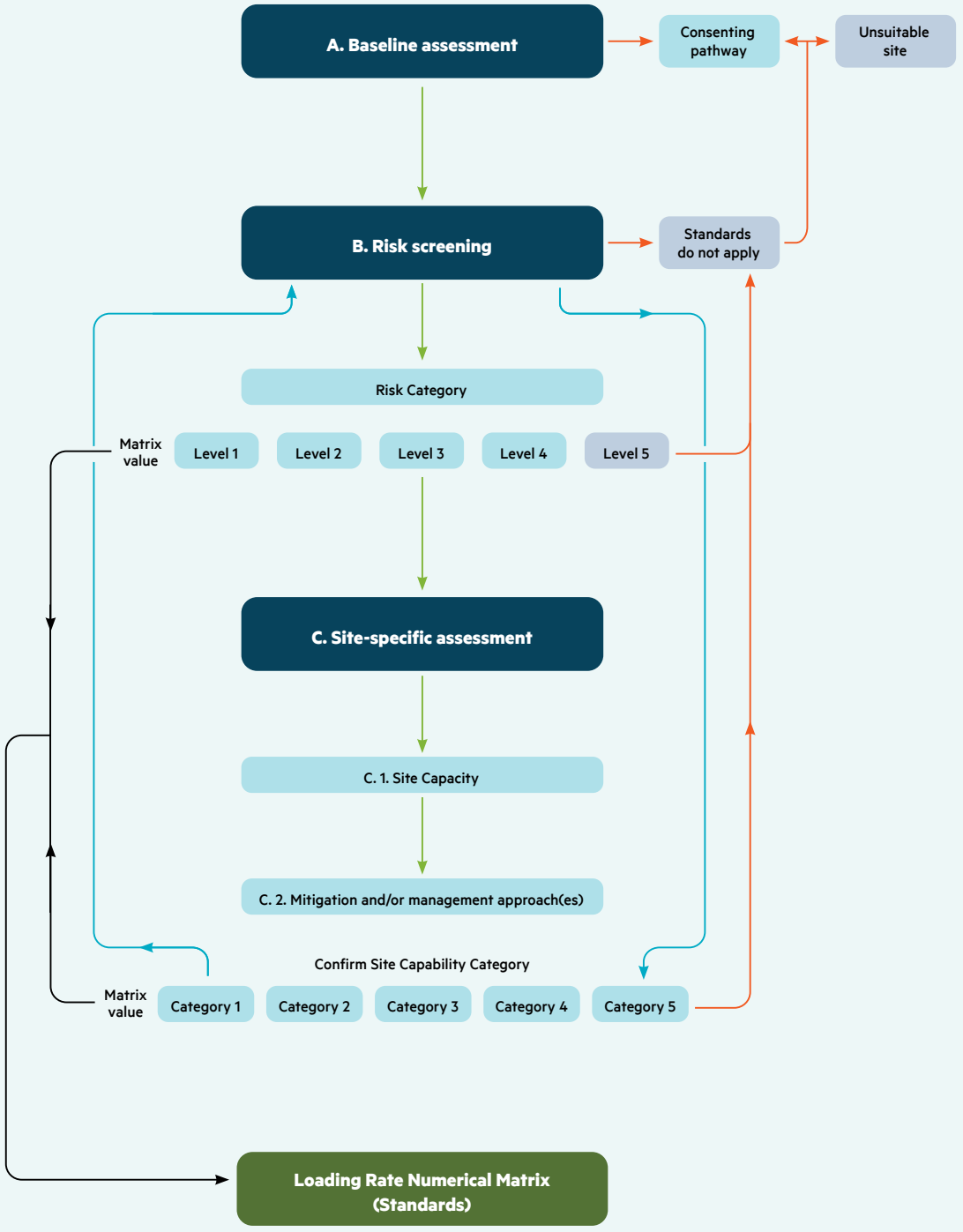
To encourage standardisation, while accounting for variables that influence site suitability, we have developed a risk-based framework that ensures all relevant factors are considered. The risk-based approach will consider a range of variables to determine a risk class for the land which will then set treatment requirements and application limits that apply. Detail about this approach and how it will apply is set out in **Appendix Four**.

The risk-based approach is comprised of three components:

- a desktop feasibility assessment of prospective land (to consider factors such as climate and underlying geology);
- a risk screening assessment which generates a score that to indicate the risk category; and
- a site-specific assessment, which determines the capability of the site and identifies necessary mitigation measures and management approaches.

A diagram outlining the risk assessment process is set out below:

Preliminary assessment



A baseline assessment will confirm whether a site is suitable to apply to standards to. This assessment will consider items such as underlying geology and groundwater, physical attributes of the site such as topography and size, and current or proposed land uses.

In situations where potential sites are deemed unsuitable for discharging treated wastewater, this is generally intended to prevent risks of:

- adversely impacting public health.
- run-off, erosion and reduced infiltration efficiency (for example, where discharged at surface or above surface irrigation on slopes greater than 10 degrees).
- infrastructure failure, groundwater contamination, surface runoff and environmental degradation (for example, where sites are geologically unstable).
- leaching and groundwater contamination in situations where soils are inappropriate for land application (for example, heavy clay and peat soils).
- compromising cultural heritage, traditional land use practices, and respect the values of local communities. This captures areas which are wāhi tapu, tūpuna, and other sites on Rarangi korero / New Zealand Heritage List.

Sites will also be deemed unsuitable where it is necessary to protect public health, preserve soil health and prevent contamination of crops (for example, irrigation to human food crops). Situations where a customised design approach is needed, for example, for partial land discharge arrangements such as riparian strip wetlands and mix-and-match schemes, are also considered unsuitable.

Suitable sites will move through to more detailed risk screening and site-specific assessments.

Risk screening involves applying a qualitative risk assessment tool, to identify pathways for contaminants (Total nitrogen, Total phosphorous and *E. coli*) to reach a receptor as a result of the discharge. This will consider environmental, public health, and social risks. A risk category between 1 – 4 will be assigned.

A site-specific assessment will involve a detailed check of key factors to understand the capability of the site to receive and manage a discharge. This will consider the proposed application method, detailed groundwater and soil assessments, and possible options for mitigating the effects of a discharge. A site capability category between 1 – 4 will be assigned.

		Site Capability Category			
		Site has decreasing ability to manage discharges →			
		1	2	3	4
Risk Category: Greater pathways for contamination ↓	1	Class 1	Class 1	Class 2	Class 3
	2	Class 1	Class 2	Class 2	Class 3
	3	Class 2	Class 2	Class 2	Class 3
	4	Class 2	Class 2	Class 3	Standards don't apply (Category 5)

Combining the risk and site capability categories will then determine the overall Class for the site, and the subsequent loading rates and numeric limits that apply for parameters covered by the standard. The table below sets out which parameters are covered by this standard and the rationale for each parameter.

Parameter	Rationale
Total Phosphorus	The proposed discharge to land standard uses total nitrogen and phosphorus as they represent the sum of all forms of these nutrients present in wastewater. Managing these nutrients is important to avoid run-off to waterbodies causing eutrophication.
Total Nitrogen	
E. coli	The proposed discharge to land standard includes *E. coli* as it indicates the presence of pathogens and faecal pollution in soil.

The Class determines what numeric limits need to be met for parameters covered by the standard. Where no limit applies for *E. coli*, this assumes the pathway/receptor connection can be adequately removed. The loading rates and concentration with each class account for total load from a site, including from the discharge itself, the land on which it is applied and how it is managed.

Class	Total Nitrogen (kg/ha/year)	Total Phosphorous (kg/ha/year)	*E. coli* (public health) (cfu/100mL)
1	500	75	No limit
2	250	50	< 2,000
3	150	20	< 1,000

The hydraulic loading rate for discharges to land shall not exceed 5 mm/hour or 15 mm/application event. This application rate reflects the capacity of many soil types and is designed to avoid significant ponding or surface run-off.

Contaminants and parameters not covered by the proposed discharge to land standard

Some parameters, such as total suspended solids and heavy metals, are not directly covered by the proposed standard. These will need to be considered when designing and maintaining the land discharge system, to avoid operational risks such as blockages and surface run-off. Where contaminants are not covered by the standard, the usual resource consenting process would apply, and regional councils would set an appropriate limit.

We may expand the standards in future to include additional contaminants where there is a clear body of evidence and there would be benefit in having a nationally consistent approach.

We would like your feedback on the following questions:

- Are the proposed parameters appropriate to manage the impact of wastewater discharges to land?
- What benefits and challenges do you anticipate in implementing the proposed approach? Are there other particular matters that could be addressed through guidance material?

Management and Operation Plans

All consents that involve the discharge to wastewater to land will be required to be the subject of a Management and Operation Plan. These plans should include detail about:

- site restrictions
- site inspection requirements (general site operation)
- management requirements and recommendations
- maintenance and contingency requirements, and environmental monitoring
- environmental monitoring and reporting requirements.

Guidance will be developed by the Water Services Authority to support implementation of the standards. This will provide detail about the form and content of Management and Operation Plans, to support network operators.

Monitoring and reporting requirements

It is proposed that the following requirements will apply to all discharge to land arrangements:

- Groundwater monitoring will be required for all arrangements to assess the potential impact of the discharge.
  - All arrangements will have to monitor for pH, electrical conductivity, Total ammoniacal nitrogen, Total nitrogen, Nitrate nitrogen, dissolved reactive phosphorous, *E. coli* and Chloride.
  - Water quality monitoring must be undertaken every 3 months.
  - The number of monitoring wells differs depending on whether the bore is up gradient (minimum 1 well), down gradient (minimum 2 wells) or up gradient of sensitive receptors (site-specific).
- Soil monitoring will be required for all arrangements. While additional monitoring may be required through individual Management and Operation Plans, the following requirements apply as a starting point:
  - Frequency: soil monitoring must be undertaken as part of the baseline and site-specific assessments, and every 5 years thereafter.
  - Number of samples: soil samples are to be collected at a per hectare rate, determined by a Suitably Qualified Experienced Practitioner considering the treatment level, plant size and soil capability.
  - Parameters:
    - Cation exchange capacity
    - Exchangeable Cations (all measured by me/100g and base saturation %): Sodium, Potassium, Calcium, Magnesium.
    - Sodium absorption ratio
    - Soil pH
    - Total phosphorous
    - Olsen phosphorous

The following proposed reporting requirements would apply to all discharge to land arrangements:

- Any breach of a parameter must be reported by an operator to the relevant regional council as soon as reasonably possible after the breach is detected.
- An operator must publish compliance against parameters in applicable standards on a monthly basis, on a publicly available website maintained by the operator, and provide the report to the relevant regional council. Water quality monitoring and groundwater monitoring results should also be published and shared with the relevant regional council.
- Annual reporting is required of compliance against parameters in applicable standards to regional council and the Water Services Authority.

To provide confidence in how the standards are implemented, network operators will be required to engage a third party, on an annual basis, to audit compliance with matters covered by the standard, including monitoring and reporting requirements. Costs associated with third party auditing will be covered by network operators, rather than consenting authorities.

We would like your feedback on the following question:

- Are the monitoring and reporting requirements proportionate to the potential impacts of the different discharge scenarios?

8. A beneficial reuse of biosolids environmental performance standard

The **proposed approach** will establish an environmental performance standard for beneficial reuse of biosolids, including:

- setting out a grading system for processing biosolids, with corresponding activity status under the Resource Management Act 1991 for how and where biosolids can be reused.
- imposing additional requirements where biosolids have a lower grade.
- imposing monitoring and reporting requirements to reflect the grade of biosolids.

What are biosolids?

In the 2024 Network Environmental Performance Measures Guide, biosolids are defined as:

> *solids or semi-solids (sludge) from the wastewater treatment process, which have been physically and/or chemically treated to produce a semi-solid, nutrient-rich product.*

Biosolids are a nutrient and energy-rich by-product of the wastewater treatment process and are predominantly a mix of water and organic materials. During the treatment process, microorganisms digest wastewater and break down the organic solids. This separates into two streams – a liquid stream (wastewater) and a solids component (sewage sludge). The water content of the solids is further reduced through additional treatment processes (for example, centrifuges or solar drying), to produce biosolids. The quality and composition of biosolids depends on the profile of wastewater entering the treatment plant. Biosolids normally contain between 15 and 95 percent solids, which often contain:

- Macronutrients, including nitrogen, phosphorus, potassium and sulphur.
- Micronutrients, including copper, zinc, calcium, magnesium, iron, boron, molybdenum and manganese.

Biosolids usually contain other substances. These can include synthetic chemical compounds such as pharmaceuticals, microplastics, per- and poly-fluoroalkyl substances (PFAS), or heavy metals.

When managed and treated appropriately, biosolids can be used to improve soil conditions and provide nutrition for plants and forestry, rehabilitate land such as mines or landfills, and improve the microbiology and the water holding capacity of soils. Energy and gases can be extracted from biosolids, to generate heat energy, biogas and biofuel. Internationally, biosolids have also been used in construction (for example, biosolids bricks) and to produce protein- and fat-rich biomass.

The biosolids covered by this standard follow the above definition, and do not include untreated raw sewage sludge, septic tank sludge or sludge from industrial processes.

To realise the beneficial reuse of biosolids, the risks need to be carefully managed to protect environmental, cultural and public health. Typical risks from biosolids involve exposure from concentrated contaminants finding their way into waterbodies, or via uptake into crops, fish, birds, livestock and people. Some contaminants in biosolids can accumulate in the soil they are applied to, which can mean the land becomes contaminated and unsuitable for particular uses.

Current arrangements for managing biosolids

The Australian and New Zealand Biosolids Partnership has carried out regular surveys of wastewater treatment plants since 2010. Key findings from the 2023 survey indicates that Biosolids production has increased year on year in New Zealand[7] – the increase is not uniform across plants or regions.

Some examples of management of biosolids in New Zealand include:

- **Incineration:** the Tahuna wastewater treatment plant (owned and operated by Dunedin City Council) operates the only biosolids incinerator in Australasia.

7 Trends in the New Zealand Biosolids Industry: The Australia and New Zealand Biosolids Partnerships Survey (2024), Marcus Richardson (Stantec), Catherine Vero (Ekistica), Rob Tinholt (Australia New Zealand Biosolids Partnership).

- **Land rehabilitation:** this amounts to about 43 percent of biosolids. About 330 tonnes of treated biosolids a day from the Mangere wastewater treatment plant is being used to rehabilitate a retired quarry on neighbouring Puketutu Island.
- **Sludge minimisation facilities:** Wellington City Council is building a facility to reduce the volume of sludge generated by the Karori and Moa Point wastewater treatment plants. The facility will produce a dry, odourless product that can be more easily transported, and used as a soil conditioner and as fuel for industrial heat.
- **Storage:** it's estimated that 15 percent of wastewater treatment plants are storing biosolids. Geo-bags are sometimes used as part of the biosolids production process. Central Hawke's Bay Council used a series of geobags at its Waipawa and Waipukurau wastewater treatment plants to store and stabilise biosolids, prior to removing these from their respective sites.
- **Compost:** The MyNoke worm farm in Taupō produces compost from organic waste (including biosolids), which is purchased by the council and used as fertiliser in parks and reserves.
- **Landfill:** approximately 40 percent of biosolids[8] are disposed of at landfills.

Compared to other jurisdictions, such as Australia and those in the European Union, the rate of reuse of biosolids in New Zealand is low. The relatively high proportion of disposal of biosolids to landfill is an outlier in the international context. Landfills are reaching limits about how much biosolids they receive and the cost of disposing of them is increasing. As not all landfills accept biosolids, some councils truck biosolids for disposal outside their region, often at considerable expense.

Many small-scale wastewater treatment plants with oxidation ponds are not desludged regularly, despite expected operating and maintenance arrangements. This affects the operation of the ponds and increases the concentrations of contaminants, heavy metals and odour. The high number of small oxidation ponds in New Zealand means this is likely to be a significant national problem.

Planning and consenting arrangements

Regulatory settings for managing biosolids in New Zealand are quite different to other countries. Many other jurisdictions have national frameworks that provide for the beneficial reuse of biosolids, in ways that incentivise options other than disposal at landfill. Some regional plans (for example, the Auckland Unitary Plan) allow application of biosolids to land as a permitted activity, if the biosolids have met processing requirements around pathogens and contaminants such as heavy metals. Most regional plans do not have specific provision for biosolids, which means that application of biosolids to land may require a resource consent. This is likely to be a regulatory disincentive to the reuse of biosolids.

Guidelines for the Safe Application of Biosolids to Land in New Zealand

The *Guidelines for the Safe Application of Biosolids to Land in New Zealand* (the Guidelines) have been in place since 2003. The Guidelines were reviewed in 2017, and a subsequent comprehensive review of the guidelines is underway, coordinated by Water New Zealand. The draft *Beneficial Use of Biosolids and other Organic Materials on Land (Good Practice Guide)* was tested with the sector in late-2024 and is due to be published in mid-2025.

The guidelines aim to implement best practice arrangements for beneficial reuse of biosolids, including links through to planning controls to allow significantly broader reuse of biosolids in New Zealand than currently occurs. The Guidelines are known and understood by the sector, and have already been implemented in some plans and consents.

Proposed approach: environmental performance standard for beneficial reuse of biosolids

The Authority proposes a standard for beneficial reuse of biosolids that is based on the Guidelines. The current comprehensive revision of these guidelines has been subject to extensive technical review, together with engagement with sector experts.

8 As above.

The core elements of the proposed standard are as follows:

- Set out a grading system for processing of biosolids. The grade will reflect the extent to which the pathogen content and vector attraction has been controlled, as well as the level of metals and organic chemical contaminants in the product.
- Application of biosolids that have been processed to the highest grade to land will be treated as a permitted activity. Biosolids that have been processed to lower grades will be a controlled or restricted discretionary activity.
- Exclusion periods will apply where biosolids have a lower pathogen grade depending on the land use – for example, where there is public access, or for permitted types of horticulture or agriculture.
- The nitrogen application rate for biosolids must not exceed, at maximum, an average of 200kg total nitrogen per hectare per year.

Grading system

The Guidelines contain detailed procedures for the monitoring and sampling of biosolids to ensure that end-products are appropriately categorised, and subsequently managed in their reuse. Biosolid producers will need to develop a detailed process and product monitoring programme in accordance with the Guidelines.

The proposed grading system is designed to differentiate between organic products that are of low risk and those that contain pathogens and/or contaminants that may pose a risk to the receptors. Using this system, biosolids are to be categorised by two grades, as follows:

- **Stabilisation grade, A or B.** This is determined by the pathogen content of the product and whether or not an approved pathogen reduction procedure and an approved vector attraction reduction method have been implemented.
  - A product is considered Grade A if:
    - It has a documented quality assurance system
    - It has undergone at least one of the listed pathogen reduction processes
    - It has undergone at least one of the listed vector attraction reduction methods
    - It meets all listed product pathogen standards after processing but prior to application
  - A product is considered Grade B if:
    - It has a documented quality assurance system
    - It has undergone at least one of the accepted vector attraction reduction methods
  - If a product does not attain Grade B stabilisation, it is not classified
- **Contaminant grade, 1 or 2.** This is determined by the levels of metals and organic contaminants in the product.
  - Grade 1 is a product that has compliant levels for every contaminant
  - Grade 2 is not compliant for at least one of the contaminants.

Confirmation of pathogen and contaminant grades will require two sets of sampling:

- Verification sampling demonstrates whether a treatment process is producing a final product of consistent quality and is typified by a high-frequency sampling regime.
- Routine sampling is required to demonstrate continued compliance with the product standards.

The following table sets out the proposed approach for grading beneficial reuse of biosolids:

	Contaminant grade 1	Contaminant grade 2
Stabilisation Grade A	Permitted activity (provided all activity standards are met)	Restricted discretionary activity (provided all activity standards are met)
Stabilisation Grade B	Controlled activity (provided all activity standards are met)	

Consenting approach

The Authority proposes to establish Permitted, Controlled, and Restricted Discretionary consenting pathways for the reuse of biosolids, depending on their categorisation grade. Verified monitoring and sampling of the biosolid products will be a condition of the reuse as either a Permitted, or Restricted Discretionary Activity.

In situations where the proposed reuse of a Grade A1 or B1 biosolid does not meet the applicable activity standards, the proposal would be considered a restricted discretionary activity. Should a biosolid not receive a grade under the framework – for example, where a vector attraction reduction method has not been completed – reusing the biosolids would be assessed by the relevant regional council through the consenting process. When the biosolids standard is made, it will be applied through applications for resource consents.

We are seeking feedback on appropriate Permitted, Controlled, and Restricted Discretionary activity standards and subsequent matters of control and restricted discretion. Common examples of such provisions from rules around the country are provided below.

Examples of qualifying criteria for the reuse of biosolids

(1) Biosolid application must be to land only and must avoid groundwater or surface water contamination

(2) Biosolids may not be applied to certain areas or land types such as:

  (a) wāhi tapu or sites of cultural significance

  (b) water supply protection zones

  (c) sites with geographical, geological or hydrological constraints

(3) Buffer requirements from:

  (a) property boundary;

  (b) surface water body and the coastal marine area;

(4) Restrictions on supplementary land uses such as land used for food production or residential areas.

(5) Verification requirements for grades of bio-solids.

(6) Restrictions on the production of offensive or objectionable odour or dust.

(7) Specific requirements for record keeping and reporting such as:

  (a) the nature of the biosolids including dry solids content, application, volume, location and frequency; and

  (b) the total nitrogen mass-load applied per hectare per annum.

(8) Baseline soil testing, or testing where biosolids have been applied to land continuously for more than 5 years

We would like your feedback on the following questions:

- What matters of control or restricted discretion should sit with consenting authorities to manage the reuse of biosolids?
- What should the permitted activity standards include?

Approach for managing contaminants of emerging concern in biosolids

Global research continues into the significance of contaminants of emerging concern and the implications for beneficial reuse of biosolids. At this stage, some contaminants of emerging concern are not included in the proposed standard (for example, PFAS). Instead, the Authority proposes keeping the matter under active review and may update the standard as new developments occur.

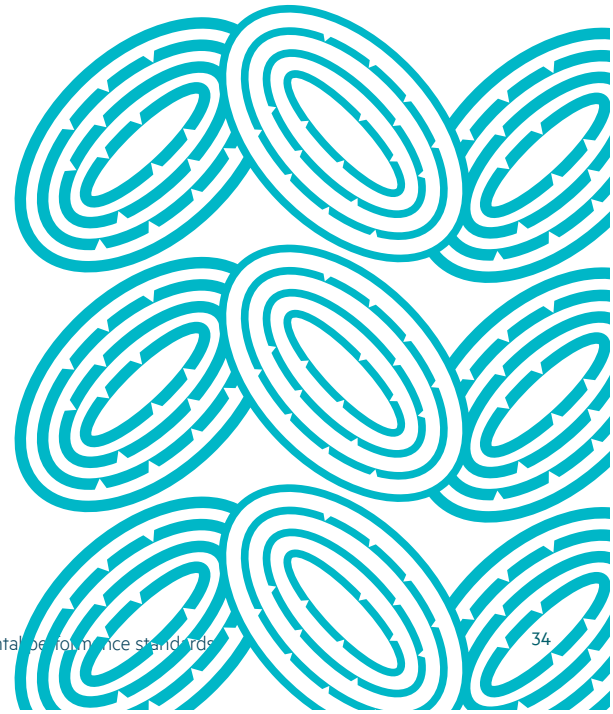
This will mean we are well-positioned to leverage research by other international regulators, as well as agencies such as New Zealand's Environmental Protection Authority (EPA). The profile of biosolids in New Zealand is likely to mean international limits cannot be applied directly, and work would be required, alongside the Ministry of Health and the EPA, to determine what controls are appropriate. Taking a watching brief approach also means we can observe longer-term trends, such as whether and how contaminants of emerging concern accumulate over time.

We would like feedback on two proposed options about how PFAS, as a contaminant of emerging concern, should be addressed in the short-term:

- **Option One:** Provide guidance to support implementation of the standards that could include advice on contaminants of potential concern – such as organic contaminants like microplastics or PFAS. These areas could be brought into the standard over time, as research continues and there is greater capacity in the New Zealand market to test for contaminants of emerging concern.
- **Option Two:** This option would build on guidance issued as part of Option One. Alongside guidance, risk analysis could be undertaken to determine which wastewater treatment plants should test for contaminants of emerging concern. This would provide a local baseline for quantities of these contaminants that might trigger stricter regulation.

We would like your feedback on the following question:

- How should contaminants of emerging concern in biosolids be addressed in the short-term?



9. Management of overflows and bypasses

The **proposed approach** will establish risk-based planning, monitoring and reporting arrangements for wastewater network overflows and bypasses from wastewater treatment plants, including:

- Requiring network operators to use wastewater risk management plans to identify where risks of overflows are, and how they should be managed, controlled, monitored and eliminated.
- Imposing monitoring and reporting requirements for overflows from wastewater networks.
- Making all overflows a controlled activity under the Resource Management Act 1991, consistent with proposed changes through the Local Government (Water Services) Bill.

What are overflows and bypasses?

Overflows occur where untreated or partially treated wastewater escapes from a wastewater network into the environment. Overflows of untreated wastewater are a public health risk that impacts communities, compromising areas used for swimming, recreational activities and mahinga kai (food collection). Overflows are inevitable. In the 2021/2022 financial year, the Water New Zealand National Performance Review reported a total of 3,121 overflows across New Zealand and this number doesn't include instances where overflows are not reported.

Overflows are caused by a range of factors:

- Constrained capacity to accommodate population growth, which increases the rate and frequency of overflows due to demand on the network.
- Blockages such as build-up of fat and oil, tree roots or incorrectly marketed products (e.g., flushable wipes).
- Plant failures or equipment damage such as broken pipes or pump breakdown.
- Flows that exceed system capacity, either caused by significant inflow or infiltration[9].

Wastewater networks are particularly vulnerable to impacts of climate change, with increasing severe weather events likely to exacerbate the frequency and impact of overflows.[10]

Almost all wastewater networks are designed to overflow when the amount of water coming into the pipe network exceeds the capacity of the network and/or treatment plant. Some networks are designed so wastewater overflows into the stormwater network when the capacity of the wastewater network is exceeded – for example, during heavy rainfall. Similarly, some older (combined) networks collect both wastewater and stormwater, which means stormwater is also received by the wastewater treatment plant.

Engineered overflow points are used to manage when and where overflows occur. Most networks are designed so wastewater overflows caused by constrained capacity go into the stormwater network through constructed (engineered) overflow points. Even with engineered overflow points, uncontrolled overflows still occur at network points that aren't designed to overflow (such as manholes or gully traps). Uncontrolled overflows are typically caused by blockages or faults in a network, rather than high flows.

Bypasses occur where partially treated wastewater is diverted to protect a treatment plant

A bypass occurs where partially treated wastewater is diverted past the normal treatment plant route and discharged to the environment. Plants are designed to do this to prevent issues with equipment and systems within the treatment plant, that can occur during periods of high rainfall and inflow.

Current arrangements for monitoring, reporting and managing network overflows

The approach to managing overflows varies significantly across New Zealand. While wastewater treatment plant discharges are consented, many overflows from wastewater networks remain unconsented or partially consented. Some networks have a comprehensive consent that covers overflows from the entire network, while others have consents for specific overflow points.

9 Inflow is generally where stormwater gets into the wastewater network from illegal roof connections, low gully traps or cross-connected stormwater systems. Infiltration occurs when water from saturated surrounding soil enters the wastewater network through defects in pipe joints, damaged pipes, private laterals in poor condition and/or offset manhole risers.

10 'Impacts and implications of climate change on wastewater systems: A New Zealand Perspective' (2021), James Hughes, Katherine Cowper-Heays, Erica Olesson, Rob Bell and Adolf Stroombergen.

From a stocktake of regional plans, around half of regional councils prohibit network overflows, or consider them emergency discharges under section 330 of the Resource Management Act 1991. This approach means that overflows often remain unconsented, and therefore subject to limited or no monitoring or reporting, or requirements for network operators to remove the cause or mitigate any adverse effects from the overflow. As overflows are inevitable, this approach results in the problem being hidden and is not a long-term solution.

Similarly, there is no shared definition or approach to monitoring and reporting of overflows resulting in high variability across New Zealand. Some councils only record overflows that are reported by a member of the public. Others have taken a risk management approach, with telemetric monitoring and public reporting of high-risk overflows. As there isn't a common definition of what constitutes an overflow, councils may have different methods for counting and classifying them. This variability means it is difficult to build a clear picture of what causes overflows, and where and how frequently they occur.

In 2019, the Regional best practice guide for the management of wastewater overflows was developed[11] to provide a standardised framework and key performance targets for the response, monitoring and reporting of wastewater overflows across the Bay of Plenty region. In 2022, Water New Zealand published a Good Practice Guide for Addressing Wet Weather Wastewater Network Overflow Performance. While the guide provides a common framework for wastewater network service providers to implement, it appears uptake has been minimal.

What information about overflows is publicly available?

Despite the impact on public health and water-based recreation, it is often difficult for the public to find reliable, real-time information about overflows when they occur. Due to poor information about where and when overflows occur, even network owners can't properly manage their networks to reduce the frequency of overflows to improve public health and environmental outcomes.

Nevertheless, some tools provide publicly available information on water pollution risk and swim safety, including where water quality has been impacted by overflows. These include:

- Land, Air, Water Aotearoa (LAWA) presents national environmental data (collected by regional councils and unitary authorities) and information about river, lake and recreational water quality, alongside a range of other environmental health topics
- The SafeSwim programme in Auckland and Northland provides transparent real-time information about the risk of swimming at specific locations. SafeSwim draws on a range of inputs, including real-time monitoring of wastewater and stormwater networks (and consequently, overflows), alongside predictive models.

Network Environmental Performance Measures

As part of mandatory requirements set by the Authority, network operators are now required to monitor and report on the environmental performance of wastewater networks. From mid-2024, network operators were required to start recording wastewater overflow information for reporting to the Authority by 30 September 2025. This requires operators to record overflows against consistent definitions and causes. This information will be summarised in an annual network environmental performance report and published on the Authority's website.

Improving monitoring and reporting arrangements for overflows

Given the public health and environmental impacts and variability in how overflows are monitored, reported and managed, the wastewater standards present an opportunity to set out a risk-based monitoring and reporting regime that:

- Creates greater consistency in how overflows are categorised, managed and reported.
- Supports network operators to prioritise, manage and reduce wastewater overflows.
- Ensures there is greater transparency of public information about overflows affecting areas where people might swim or gather shellfish, and how operators are trying to reduce them.
- Supports regional councils to monitor compliance with wastewater overflow consents and to take proportionate enforcement action where required.

Proposed approach for managing overflows

The Authority is proposing a risk-based approach, that gives network operators the tools to prioritise addressing overflows based on the risk, impact and likelihood of overflows, within their means. The proposed requirements would apply to all wastewater network overflows, including those from combined wastewater and stormwater networks.

11 This document was developed by the Bay of Plenty Regional Wastewater Management Group. This group includes representatives from the Bay of Plenty Regional Council, relevant territorial authorities and the Toi Te Ora Public Health Service.

Consistent with the Authority's approach to mandatory network environmental performance reporting, the Authority proposes defining overflows as:

> *Instances where untreated or partially treated wastewater (or stormwater contaminated with wastewater) spills, surcharges, discharges or otherwise escapes from a wastewater network to the external environment. This may be due to different causes and may be released via either constructed (engineered) or unconstructed overflow points. Engineered overflow points are designed and intended to act as an emergency relief valve during instances of capacity overload in the network, whereas unconstructed overflow points are not (but inadvertently perform this function).*[12]

The Authority proposes defining bypasses as:

> *Bypasses are discharges where the wastewater is not fully treated due to inlet flow rates exceeding the design capacity of a wastewater treatment plant, and then discharged into a receiving environment.*

We would like your feedback on the following questions:

- Is the current definition of overflow fit-for-purpose, and if not, what changes do you suggest?
- Does the proposed definition of bypasses adequately cover these situations, and if not, what changes do you suggest?

Wastewater Network Risk Management Plans

The Authority proposes that wastewater network risk management plans will be required for all wastewater networks, to ensure network operators identify how risks and hazards from both the network and treatment plants, including overflows, will be managed.

The Authority will issue requirements under section 138 of the Water Services Act 2021 about what should be covered in the overflow section of wastewater network risk management plans. In the first instance, plans should include:

(a) a map of controlled and uncontrolled overflow points across a network: understanding where these points are in a network is critical to developing approaches to manage overflows. It will also form the basis of monitoring and reporting arrangements.

(b) a list of all overflow points in the network, that are categorised based on a risk framework: the risk framework looks at the likelihood and potential impact of an overflow and allocates a corresponding level of priority.

(c) the arrangements relating to any bypass overflows for a wastewater treatment plant, with a risk assessment of these arrangements;

(d) a summary of approaches taken by the network operator to manage, control, monitor or eliminate risks: approaches for managing overflows are likely to differ depending on the size, scale and complexity of the wastewater network, as well as the resourcing and funding available to the network operator.

In developing wastewater network risk management plans, network operators will be expected to engage with communities, including mana whenua, to understand where risks of overflows are, and how they should be managed, controlled, monitored or eliminated. The plans should demonstrate this engagement has happened and how it has influenced approaches to manage, control, monitor or eliminate risks.

There are existing examples of overflow management plans throughout the country, for example those developed by WaterCare or required by Greater Wellington Regional Council. Once finalised, the plans will need to be shared on a publicly available website and provided to regional councils and other interested parties, such as iwi and hapū.

We would like your feedback on the following questions:

- How should Wastewater Risk Management Plans relate to existing risk management planning tools, and if the Local Government (Water Services) Bill proceeds, stormwater risk management plans?
- What should be covered in guidance to support developing wastewater risk management plans?
- We understand wastewater risk management plans are already required in some regions – what approaches have worked well and where is there room for improvement?
- How should Wastewater Risk Management Plans interact with the proposed consenting pathways for overflows and bypasses?

Making wastewater network overflows and bypasses a controlled activity

The Local Government (Water Services) Bill proposes to amend the Water Services Act and Resource Management Act to allow the Authority to set resource consent activity status, for activities performance in accordance with the standards. Subject to enactment, the Authority is proposing to make all overflows from wastewater networks, together with bypasses from a wastewater plant, a controlled activity as part of this wastewater standard. Making overflows a controlled activity means that all wastewater overflows and bypasses will need to be consented.

12 Network Environmental Performance Measures and Guide 2024.

This is a significant change from the current approach to consenting wastewater network overflows for some regions. A consistently applied controlled activity creates a standard consenting pathway to ensure overflows are recorded and reported, which will increase visibility over time and improve our understanding of network performance. Specific approaches to reducing the impact and frequency of overflows can then also be set by consenting authorities through consent conditions.

An example of a controlled activity rule for network overflows from the Auckland Unitary Plan is provided below.

Example of controlled activity for network overflows from the Auckland Unitary Plan:

The discharge of untreated wastewater overflows onto or into land and/or into water from an existing separated wastewater network servicing existing urban areas (excluding wastewater treatment plants) is a Controlled Activity.

Controlled Activity Standards

(1) A programme must be in place to reduce network overflows to an average of no more than two events per discharge location per annum by 2040.

(2) Emergency overflow points must be designed and located so that any discharges minimise nuisance, damage, public health risk, and ecological effects and do not cause scouring and erosion at the point of discharge.

(3) A wastewater network operations plan must be prepared, and implemented, which provides all of the following:

- (a) a description of the wastewater network;
- (b) maintenance procedures and levels of service for key elements of the network;
- (c) operational procedures including response to system failures, incidents and significant overflow events; and
- (d) monitoring and reporting procedures.

(4) All pump stations must be continuously monitored by telemetry so that the wastewater network operator is immediately informed of any pump station failure or fault that may result in an overflow.

(5) The wastewater network must be operated to prevent dry weather overflows during normal operation of the network, and the network operator must have an operational and maintenance programme in place that minimises unforeseen dry weather overflows to the environment.

Matters of Control

(1) for the discharge of untreated wastewater overflows onto or into land and/or into water from an existing separated wastewater network servicing existing urban areas (excluding wastewater treatment plants):

- (a) the implementation of the overflow reduction programme;
- (b) the mitigation of any adverse effects associated with the discharges, including effects on potable water supplies and public health;
- (c) the implementation of the wastewater network operations plan and the operations and maintenance programme;
- (d) associated monitoring and reporting; and
- (e) the duration of the consent and the timing and nature of reviews of consent conditions.

Assessment Criteria

(1) for the discharge of untreated wastewater overflows onto or into land and/or into water from an existing separated wastewater network servicing existing urban areas (excluding wastewater treatment plants):

- (a) the extent to which the overflow reduction programme, the network operations plan and operational and maintenance programme:
  - (i) set out the best practicable option for preventing or minimising adverse effects;
  - (ii) adequately address wastewater discharges generated as a result of potential urban growth, urban redevelopment, and land use intensification within the wastewater catchment, taking into account the growth and intensification provisions of the Plan; and
  - (iii) prevent or minimise adverse effects of wastewater overflows on public health, potable water supplies, freshwater and coastal waters.

We would like your feedback on the following questions:

- Do you support setting all wastewater network overflows as controlled activity?
- What matters of control should remain with consenting authorities to reduce the impact and frequency of overflows and bypasses?
- Are there examples of existing approaches to managing overflows that would work well as matters of control?
- What other factors need to be considered when making overflows and bypasses a controlled activity? What matters would be helpful to address through guidance?
- What transition arrangements should apply for scenarios where Regional Councils already have consenting pathways for overflows?

Monitoring and reporting requirements

The Authority is also proposing to create a wastewater standard, under section 138 of the Water Services Act 2021, that will set out what monitoring and reporting requirements apply for overflows from wastewater networks.

Monitoring

Monitoring arrangements depend on the type of overflow point. As a minimum, operators would be required to have telemetric monitoring for:

- all engineered overflow points or discharge points that are classified as high risk in wastewater risk management plans;
- all new constructed overflow points and pump stations; and
- all uncontrolled discharge points (using manhole sensors) where there are high frequency overflows.

While installing telemetry at all overflow points is best practice, this may not be immediately feasible from a financial and practical perspective. To reflect this, the Authority proposes staggering the telemetry installation requirements, with high-risk overflows requiring monitoring to be installed sooner.

Reporting requirements are also influenced by the risk assessment of overflows. Public reporting – particularly following overflow events – is critical to improving public transparency through having readily accessible information about overflows and the impacts on recreation and food gathering. Longer-term, after-the-fact reporting supports regional councils, alongside the Authority, to understand where overflows occur and what causes them. In the longer term, this information may be used to set targets, to compel network operators to reduce overflows over time.

Reporting

Reporting is separated into first response and follow-up reporting.

First response reporting refers to the information that is important for the public health of the community immediately affected by the overflow. This includes information about the time and extent of the overflow, alongside any public health warnings. To ensure the information is available to the affected community at the time they need it, this information should be shared on a publicly accessible website such as the council's website or an online platform such as SafeSwim. This information should be accompanied by public health information (for example, signage) at the site of the overflow, as well as engaging with the local Medical Officer of Health. The following timeframes apply for first response reporting:

- For overflows categorised as high risk: within 2 hours of the event.
- For overflows categorised as medium risk: within 24 hours of the event.
- For overflows categorised as low risk: within 48 hours of the event.

Follow-up reporting is intended to demonstrate how the overflow was managed. This also includes an assessment of the public health and environmental impact of the overflow. As with first response reporting, this should be shared on a publicly accessible website. It should also be provided directly to the relevant regional council, alongside mana whenua and any community groups with a direct interest. This reporting must be completed within two weeks of the overflow event being resolved. If an overflow event lasts more than two weeks, then updates are required to be provided every two weeks following the approach outlined under the first response reporting.

We would like your feedback on the following questions:

- What matters should be covered in guidance material to support monitoring and reporting requirements?
- Do you support establishing a framework that determines how overflows are managed based on risk?

10. Arrangements for wastewater treatment plants operating on expired consents under section 124 of the Resource Management Act 1991

Approximately 20 percent of wastewater treatment plants are operating under expired consents. Treatment plants can do so for an undefined period under section 124 of the Resource Management Act 1991 (RMA), provided an application to renew their consent was lodged within a specified timeframe.

Plants currently operate on an expired consent for an average of five years, with one operating on an expired consent for 24 years.

The Local Government (Water Services) Bill includes changes to the RMA which, if enacted, would allow a time limit to be placed on the period that a wastewater treatment plant may operate on an expired consent under section 124. This is because once wastewater standards are set, the treatment requirements for a plant will be certain and the network operator will be able to engage with its community about the options, plan for, and fund any necessary upgrades.

The Authority proposes that a wastewater treatment plant may only operate on an expired consent under section 124 for a maximum of 2 years. The standards would specify that this arrangement will not commence for 5 years, to give those territorial authorities with plants on expired consents time to plan for and fund the necessary upgrades.

We would like your feedback on the following questions:

- How long should wastewater treatment plants be able to operate under section 124 of the RMA once wastewater standards have been set?

Appendix One: Glossary

Term	Definition and Source
Application Method	The specific technique or approach used to apply a substance, treatment, or technology to a wastewater system. This includes the methods, equipment, and procedures employed to achieve the desired treatment or effect, ensuring efficiency, effectiveness, and compliance with relevant Standards. Application methodologies may vary depending on the treatment type, such as chemical addition, filtration, or biological processes, and are designed to optimize the removal or reduction of pollutants. Source: United States Environmental Protection Agency
Assimilative Capacity	The maximum loading rate of a particular pollutant that can be tolerated or processed by the receiving environment without causing significant degradation to the quality of the ecosystem and hence the community values it supports. Source: Australian and New Zealand Guidelines for Fresh and Marine Water Quality
Baseline Assessment	An initial evaluation or desktop exercise conducted to identify and assess potential sites suitable for the application of treated wastewater. This assessment typically involves reviewing high level existing environmental, geological, and land use information to determine the suitability of land parcel for wastewater discharge, without the need for immediate site-specific assessment that would require fieldwork i.e. a first qualitative base for a proposed/potential site. Source: Discharge to Land Technical Report (2025)
Biosolids	Solids or semi-solids (sludge) from the wastewater treatment process, which have been physically and/or chemically treated to produce a semi-solid, nutrient-rich product. Source: Network Environmental Performance Measures and Guide 2024
Bypass	**Proposed definition** An intentional diversion of partially treated wastewater from a portion of the treatment facility. A bypass may also occur in a controlled way if operators need to release to shut down equipment for repairs, and there is no way to reroute the wastewater. Consents may provide specific timings, frequencies, circumstances and reporting requirements.
Contaminant	Any substance (including heavy metals, organic compounds and micro-organisms) that, either by itself or in combination with other substances, when discharged onto or into land or water, changes or is likely to change the physical, chemical or biological condition of that land or water. Source: Resource Management Act 1991
Controlled Activity	Activities described by section 87A(2) of the RMA which require a resource consent from the Regional Council. Source: Resource Management Act 1991
Discharge	Volume of treated wastewater that is released from a wastewater treatment plant into the receiving environment. Source: Discharge to Land Technical Report
Dilution Ratio	Ratio of receiving environment flowrate/volume to wastewater discharge flowrate/volume. A measure of extent of dilution that takes place within the receiving environment. Source: Discharge to Water Technical Report

Overflows	**Proposed definition** Instances where untreated or partially treated wastewater (or stormwater contaminated with wastewater) spills, surcharges, discharges or otherwise escapes from a wastewater network to the external environment. This may be due to different causes and may be released via either constructed (engineered) or unconstructed overflow points. Engineered overflow points are designed and intended to act as an emergency relief valve during instances of capacity overload in the network, whereas unconstructed overflow points are not (but inadvertently performs this function. Source: Network Environmental Performance Measures and Guide 2024
Pathogens	Disease-causing micro-organisms such as certain bacteria, viruses and parasites. Source: Discharge to Water Technical Report
Periphyton	A group of organisms in aquatic environments specialised to live on and exploit much larger (usually inert) surfaces. Groups of organisms include fungi, bacteria, protozoa, and algae. The most conspicuous group is the algae and this group is usually the focus of most studies of periphyton. Source: New Zealand Periphyton Guideline 2000
Primary treatment	The separation of suspended material from wastewater in septic tanks, primary settling chambers, or other structures, before effluent discharge to either a secondary treatment process, or to a land application system. Source: AS/NZS 1547:2012
Quantitative Microbial Risk Assessment	A quantitative way of estimating the health risk to people who are swimming in and consuming raw shellfish harvested from waters which are near sources of microbial contamination such as river plumes and wastewater outfalls. Source: NIWA Microbial Monitoring factsheet
Receiving Environment	Any waterbody receiving discharge from a wastewater treatment plant. Source: Adapted from the National Policy Statement on Freshwater Management
Secondary treatment	Aerobic biological processing and settling or filtering of effluent received from a primary treatment unit. Source: AS/NZS 1547:2012
Wāhi tapu	Sacred place, sacred site – a place subject to long-term ritual restrictions on access or use, i.e. a burial ground, a battle site or a place where tapu objects were placed Source: Te Aka Māori dictionary

Appendix Two: Relationship with Local Water Done Well and Local Government (Water Services) Bill

As part of its Local Water Done Well policy programme, the Government has introduced the Local Government (Water Services) Bill (the Bill) into Parliament to propose changes to how water services are delivered in New Zealand. You can find more detail about the Bill here.

This Bill includes proposals to change the legislative arrangements that apply to wastewater standards in both the Water Services Act 2021 and the Resource Management Act 1991. The main proposed areas of change that relate to this discussion document are:

Area of Change	Description
A single national standard to be applied in resource consents (with a limited set of exceptions)	Changes are proposed to the Resource Management Act 1991 providing that, where a wastewater environmental performance standard is made, a consent authority (regional council) may not grant a resource consent contrary to the standard and must include conditions that are *no more or less restrictive* than is necessary to give effect to the standard unless an "exception" applies. This establishes an absolute standard, for the matters that the standard covers. Regional councils will continue to be responsible for wastewater discharge consenting but will be required to apply the wastewater standards through consent conditions and be responsible for enforcing consent compliance.
Exceptions regime	While wastewater standards are intended to create certainty and national consistency, there will be cases where a national standard may be inappropriate. Exceptions (for example, the discharge to water standard not applying for discharges to natural wetlands) will be a component of a standard and developed and enacted through the same process as wastewater standards. In situations where an exception applies, the existing resource consent process is reverted to. This means regional councils determine consent conditions, as well as monitoring and reporting requirements, alongside consultation with the community.
Minimum consent duration	Shorter consent timeframes create uncertainty and can compromise the ability to take an affordable long-term investment approach. Where wastewater infrastructure has been renewed or upgraded to meet the new wastewater standards, it is proposed that a 35-year consent duration will apply.
Periodic review of standards	Wastewater standards will require periodic review to enable risks to receiving environments or people to be managed, and to take advantage of new technology. Changes to standards will apply at the start of the new consenting cycle. The Bill proposes changes to section 128 of the Resource Management Act 1991, so that the making or amendment of a wastewater environmental performance standard is a potential trigger for a review of resource consent conditions.
Standards may include activity status	Wastewater standards will be able to set the consenting status of an activity – for example, that aspects of wastewater management are a discretionary or controlled activity. This is intended to create a consistent approach to how consenting authorities consider certain activities or discharges from wastewater networks.
Standards will take precedence over national directions and plans	Where there is any inconsistency between a wastewater standard and a national direction or plan made under the RMA, the wastewater environmental performance standard will prevail.
Standards will be made by Order in Council	Wastewater standards will be enacted through regulations made by Order in Council on the recommendation of the Minister of Local Government. A Regulatory Impact Statement is prepared and considered alongside proposed wastewater standards, to ensure the costs and benefits are clearly understood.

Change in approach to Te Mana o te Wai	Existing requirements in the Act for decision-makers to give effect to Te Mana o te Wai will be replaced with a requirement to take account of the National Policy Statement for Freshwater Management and other relevant national directions and regional plans that relate to freshwater when exercising their functions.
Infrastructure design solutions	The Authority will be able to set infrastructure and operating requirements for wastewater treatment plants that, if met, will result in faster consenting processes (for example, via controlled activity status). An infrastructure design solution would specify most of the consent requirements for the infrastructure, and function as a design solution. Over time, this will enable network operators to standardise the design and procurement of infrastructure, and enable modular, off-the-shelf solutions to be installed. Proposed law changes will enable the Authority to develop infrastructure design solutions as part of the implementation of wastewater standards. These are initially likely to focus on small treatment plants. Proposals for infrastructure design solutions will be publicly consulted on.

The Bill was introduced in December 2024 to implement the proposed changes and is progressing through the select committee process. On current timing, the Bill is expected to be enacted in mid-2025. Feedback that relates to the proposed changes to legislation governing wastewater standards should be separately directed through the select committee process, which is led by the Department of Internal Affairs.

Arrangements for resource consents expiring in the short-term

Many territorial authorities will have wastewater treatment plants with resource consents that will expire in the period following enactment of wastewater standards. The Bill includes arrangements to extend existing resource consents, to expire two years following the commencement of the Bill. This will give councils time to plan for how standards will affect reconsenting decisions for wastewater infrastructure, alongside any required upgrades or renewals.

The detail about transition arrangements for wastewater standards is outlined in the Bill and complementary documents.

Appendix Three: Consultation questions

We would like your feedback on the following questions:

General

- Do you agree with the areas the first set of standards are proposed to cover?
- What areas should we prioritise to introduce wastewater standards in future?
- What topics should we cover in the guidance material to support implementation of the standards?
- Are there particular groups we should work with to develop guidance and if so, who?
- How should factors such as climate change, population growth, or consumer complaints be addressed when considering a 35-year consent term?

Discharge to Water

- How should we consider checks and balances to protect against situations where the degree of microbial contamination may change throughout the duration of a consent.
- Are the areas for exceptions appropriate to manage the impacts of discharges and do you anticipate implementation challenges?
- How should the exceptions be further defined to ensure there are no unintended consequences?
- Are the treatment limits, and monitoring and reporting requirements proportionate to the potential impacts of the different discharge scenarios?
- What benefits and challenges do you anticipate in implementing the proposed approach? Are there particular matters that could be addressed through guidance material?
- How should we define small plants and what changes to the default standards should apply to them?
- What feedback do you have for managing periphyton in hard bottomed or rocky streams or rivers?
- What detail should be covered in guidance to support implementing this approach for managing periphyton?

Discharge to Land

- Are the proposed parameters appropriate to manage the impact of wastewater discharges to land?
- What benefits and challenges do you anticipate in implementing the proposed approach? Are there other particular matters that could be addressed through guidance material?
- Are the monitoring and reporting requirements proportionate to the potential impacts of the different discharge scenarios?

Beneficial Reuse of Biosolids

- What matters of control or restricted discretion should sit with consenting authorities to manage the reuse of biosolids?
- What should the permitted activity standards include?
- How should contaminants of emerging concern in biosolids be addressed in the short-term?

Overflows and Bypasses

- Is the current definition of overflow fit-for-purpose, and if not, what changes do you suggest?
- Does the proposed definition of bypasses adequately cover these situations, and if not, what changes do you suggest?
- How should Wastewater Risk Management Plans relate to existing risk management planning tools, and if the Local Government (Water Services) Bill proceeds, stormwater risk management plans?
- What should be covered in guidance to support developing wastewater risk management plans?
- We understand wastewater risk management plans are already required in some regions – what approaches have worked well and where is there room for improvement?
- How should Wastewater Risk Management Plans interact with the proposed consenting pathways for overflows and bypasses?
- Do you support setting all wastewater network overflows as controlled activity?
- What matters of control should remain with consenting authorities to reduce the impact and frequency of overflows and bypasses?
- Are there examples of existing approaches to managing overflows that would work well as matters of control?
- What other factors need to be considered when making overflows and bypasses a controlled activity? What matters would be helpful to address through guidance?
- What transition arrangements should apply for scenarios where Regional Councils already have consenting pathways for overflows?
- What matters should be covered in guidance material to support monitoring and reporting requirements?
- Do you support establishing a framework that determines how overflows are managed based on risk?

Arrangements for wastewater treatment plants operating on section 124, Resource Management Act 1991

- How long should wastewater treatment plants be able to operate under section 124 of the RMA once wastewater standards have been set?

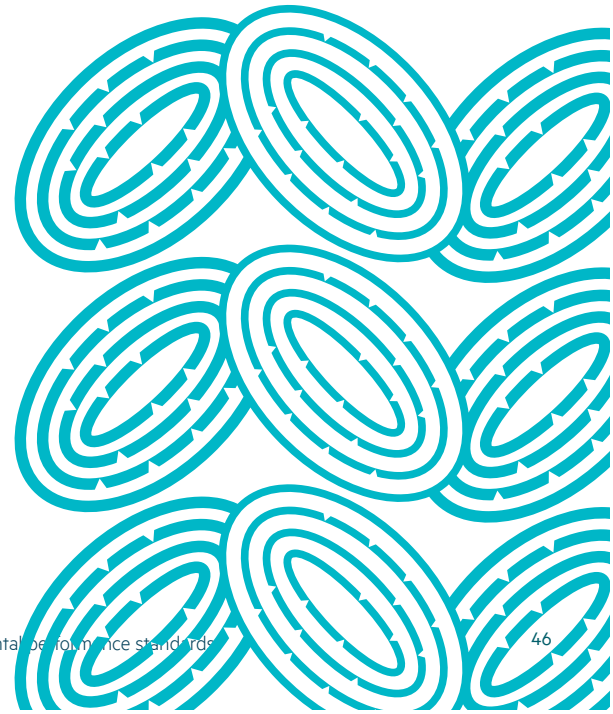
Appendix Four: Detail of the proposed approach for discharges to land

This section sets out detail of the proposed framework for discharging treated wastewater to land, including matters to be considered when determining whether to discharge to a proposed site and the numeric limits for the parameters covered by the proposed standard.

Further detail on how to implement the discharge to land standard will be set out in guidance material, to be released by the Water Services Authority once standards are enacted. Guidance will be tailored to support wastewater treatment plant operators as well as consenting authorities.

To determine whether treated wastewater can be discharged to land and what aspects of the discharge to land standard apply, the following process must be followed:

1. Baseline assessment: specific requirements will be set out in guidance to accompany the standards and are including but not limited to:
    a. Soil moisture assessment (e.g., to assess field capacity and seasonal variability)
    b. Existing desktop information:
        i. Site physical attributes (e.g., topography and whether a sufficient area of land is available)
        ii. Existing groundwater data and models (to understand depth, quality, flow direction, seasonal variation and sensitivity)
        iii. Available soil data (to understand soil type and drainage capacity)
        iv. Underlying geology
        v. Site contamination history
        vi. Current and proposed land use with the application area
        vii. Potential receptors, proximity and sensitivity (including environmental, social, cultural and to the built environment)
    c. Where insufficient information is available via desktop research, conduct a field-based investigation.
2. Risk screening, to assign a corresponding risk category: this involves applying a qualitative risk assessment tool, to identify pathways for contaminants (Total nitrogen, Total phosphorous and *E. coli*) to reach a receptor as a result of the discharge. Guidance accompanying the standards (to be published once the standards are enacted) will include a list of pathways for contamination to ensure the quality of risk assessments is consistent. This includes considering:
    a. Environmental risk: groundwater depth and its proximity from the site boundary, and the nature of receptors within 100m of a site boundary.
    b. Public health risk: whether the site is near –
        i. a primary contact recreation within immediate receiving water (surface water)
        ii. an area people can walk past an application area with sub-surface drip irrigation
        iii. a drinking water protection zone
        iv. a location of domestic private bores.
    c. Social risk: primarily, amenity values and cultural considerations.



3. Site-specific assessment: this involves a site-specific check of key factors, to understand the capability of the site and what mitigation measures are appropriate. This includes considering:
    a. the application method (for example, whether a sub-surface drip irrigator or low-pressure spray)
    b. the degree and type of vegetation cover
    c. a groundwater assessment: to confirm the flow direction, quality and depth of groundwater, and to install groundwater monitoring wells
    d. a soil assessment: undertaken by a suitably qualified and experienced person, to address the following –
        i. hydraulic conductivity
        ii. water holding capacity
        iii. high risk soils, or soils classified as Category 5 and 6 in AS/NZS1547:2012
        iv. Existing nutrient concentrations and potential cumulative effects including but not limited to: Total Phosphorus, Olsen P, Total nitrogen, TKN, ammonium-N, Nitrate-N, Exchangeable cations, pH.

The site-specific assessment should also involve considering what mitigation or management approaches are necessary to reduce risk, for example:

a. buffer zones and planting
b. monitoring discharge volumes and quality
c. irrigation scheduling
d. management of spray draft/odour
e. vegetation management and monitoring
f. public access requirements
g. irrigation system maintenance
h. contingency plans
i. receiving environment monitoring
j. periodic Operation and Maintenance Plan reviews
k. alternate potable well supply.

The table below outlines how factors are considered in the site-specific assessment and what risk category corresponds with. Where between categories, it is recommended the most conservative (highest) category is applied to the loading rate matrix.

Factors considered in the site-specific assessment for potential discharges to land:

	Category 1	Category 2	Category 3	Category 4	Category 5
Hydraulic conductivity	Moderate	Moderate to rapid	Slow draining	Rapid draining	Poorly drained, saturated soil
Soil type and suitability	Sandy loam, loam, silt loam	Sand, loamy sand	Fine grained – clay loam, silty clay loam	Course granular soil	High risk soils, i.e., heavy clays, peat, soils classified as Category 5 and 6 in AS/NZS 1547:2012
Land use	Suitable for nutrient removal by cropping	Suitable for nutrient removal by cropping	Permanent ground cover	Permanent ground cover	Permanent ground cover
Topography	Low relief <10-degree slopes	Low relief <10-degree slopes	Slopes up to 17 degrees	Slopes up to 17 degrees	Slopes > 17 degrees
Depth to groundwater	>10m	>10m	Between 5 and 10 m below ground level	Between 1 and 5m below ground level at times	Shallow /at ground level, <1m below ground level
Natural hazards (e.g., flooding, land instability)	Negligible risk	Low risk	Medium risk	High risk	Very high

Date: 18 March 2025

Subject: **Land and Freshwater Plan Programme Review**

Author: L Hawkins, Policy Manager

Approved by: A D McLay, Director - Resource Management

Document: TRCID-1492626864-329

Purpose

1. The purpose of this memorandum is to provide the Committee with an update on the programme for development of the Land and Freshwater Plan.

Executive summary

2. Changes to the Resource Management Act (RMA) made in late 2024 prevent the Council from notifying a Freshwater Planning Instrument until such time that a new National Policy Statement (NPS-FM) is gazetted or the 31 December 2025, whichever is sooner. This has implications for the current programme of works in developing a new Land and Freshwater Plan.
3. The change in legislation has necessitated a review of the programme, and as such consideration of influencing factors has been undertaken in order to provide the Committee with an updated programme. Consideration has been given to the ongoing uncertainty relating to changes that might be made to the detail of national direction on freshwater, existing council resources and expertise, consultation inputs, local government elections and the desire to maintain momentum.
4. The review of these elements has resulted in three options for consideration by the Committee. These include an amended programme aiming for notification in September 2026; an amended programme aiming to be ready for Clause 3 consultation by March 2026; or a direction from Council for staff to continue with work but without setting a definitive programme to maximise flexibility in response to expected change from central government.
5. The review has also highlighted the need to ensure that the Committee is well informed and engaged throughout the policy development process, particularly in such a time of uncertainty relating to national direction. Staff have considered two options to provide for this, including undertaking workshops within the scheduled committee meetings or setting up a working group of Committee members that can provide input outside of formal Committee meetings.

Recommendations

That the Taranaki Regional Council:

a) receives the memorandum titled *Land and Freshwater Plan Programme review.*

b) notes that the existing programme endorsed by the Committee in March 2024 is no longer able to be achieved due to the changes in legislation made in October 2024, which prevents councils notifying a

freshwater planning instrument before either a new National Policy Statement Freshwater Management in place or 31 December 2025, whichever is sooner.

c) endorses the approach to pause work on identified National Objectives Framework attributes identified in this memorandum, and to revisit upon further government direction becoming available;

d) endorses one of the following options in relation to the programme timeline:

   (i) Option 1a – aim for notification of Land and Freshwater Plan and associated updates to the Regional Policy Statement in September 2026

   or

   (ii) Option 1b – continue the development of the Land and Freshwater Plan and associated updates to the Regional Policy Statement so that the programme is ready for Clause 3 consultation in March 2026

   or

   (iii) Option 1c – no specific programme timeline (but before end 2027) and directs staff to notify a new Land and Freshwater Plan and associated updates to the Regional Policy Statement as soon as possible.

e) directs staff to consider any updates provided by the government on the future National Policy Statement Freshwater Management and request appropriate reporting to the committee, including consideration of any necessary changes to the programme in accordance with resolution made above in c.

f) endorses one of the following options in relation to engagement with the Policy and Planning Committee and Council on the development of the Land and Freshwater Plan:

   (i) Option 2a – workshops are held within Committee and Council meetings and in doing so endorses the Land and Freshwater Plan Governing Style Protocol in Appendix 2 of this memorandum.

   or

   (ii) Option 2b – set up a freshwater working group and direct staff to develop a terms of reference and membership for the working group, for consideration at the 29 April 2025 Committee meeting.

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

h) 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 October 2024, the government amended the Resource Management Act (section 80A) to prohibit regional councils from publicly notifying a freshwater planning instrument before 31 December 2025 or the date on which a replacement NPS-FM is published, whichever date is sooner. However, the deadline for when a new plan must be notified remains as 31 December 2027. These government changes have necessitated a change in the programme for developing a new Land and Freshwater Plan.

7. In addition, updates from the government on proposed changes to the NPS-FM have not yet been released and there remains a level of uncertainty as to when it will be available. Whilst areas of the policy programme can continue, the timely delivery of new government direction is important for

being able to maintain momentum and have a clear understanding of the formal requirements. As a result, there remains a level of uncertainty that needs to be considered.

Issues

8. With the amendments to section 80A of the RMA, there is a need to bring back to Council an updated programme of work, noting that this is being developed within a state of uncertainty.

Discussion

9. A new programme timeline for the development of the draft Land and Freshwater Plan is necessary following the RMA amendments. However, there remains uncertainty on a number of fronts. These include awaiting new policy direction from the new NPS-FM. The draft timeline has been constructed taking consideration of the following factors.

National Policy Direction

10. At the time of writing this memorandum, updates from the government on the direction and content of the new NPS-FM had not been released. Uncertainty therefore remains on the detail that Council will need to give effect to in the draft Land and Freshwater Plan. Whilst staff have been able to progress a number of areas of the draft plan based on direction from community, industry and tangata whenua, along with scientific investigations, the finalisation and refinement of these policy options cannot be undertaken until the NSP-FM has been gazetted.
11. Staff understand the government is working towards a release of the new NPS-FM by the middle of 2025. The proposed options for the timeline set out in the memorandum assume that this direction will have landed by August 2025 at the latest, and that any changes can be readily reflected in the framework we have used to date. Staff will consider the implications of any changes and the overall timeline once the new national direction becomes available.

Desire to Maintain Momentum

12. In March 2024 the Committee endorsed a programme that aimed to notify a new plan by mid 2025, but with a pause and reflect approach when additional direction from government had been provided. The endorsed programme was based on a number of factors including responding to the environmental challenges facing Taranaki, the fact that change in national direction has been a constant since the introduction of the first NPS-FM in 2014, the age of the existing Regional Freshwater Plan, the need to take a long term approach to see water quality and quantity improvements, and the desire to maintain momentum with our community and tangata whenua.
13. Whilst the changing regulatory framework has necessitated a programme update, these factors all remain relevant. As such, the programme options retain a focus on maintaining momentum to notify a new land and freshwater plan as soon as practicably possible.

Staffing and resourcing, including technical work deliverables

14. There has been, and will continue to be, a significant demand on internal science support for policy development. The work that has been completed to date has been of a high quality and will be critical for developing defendable policy decisions. A number of investigations remain underway, but a review of national government direction and the impact on existing and future work has to be factored into the programme timeline. As with previous factors, an assumption has been made that work completed to date will remain relevant, and refinement to the technical work that underpins the science team's advice will be minimal upon release of the revised NPS-FM.
15. With regard to resourcing, technical work will rely on inputs from both external providers and the Council's science team. Changes to the timeline options may result if any deliverables from external providers are delayed. As has been previously noted the policy and science teams are relatively small comparative to other regional councils, and at the time of writing this memorandum the policy team

have three vacancies. The timeline options assume that we have sufficient external support and that these vacancies can be quickly filled and therefore have minimal impact on the programme.

16. There are also several areas in which staff have paused work due to changing government direction and because we do not currently have all of the information that would be needed to advance plan development. These attributes include:
    - Submerged plants (natives) Lakes
    - Submerged plants (invasive species) Lakes
    - Deposited fine sediment wadeable rivers
    - Dissolved oxygen rivers
    - Ecosystems metabolism rivers.
17. Should government direction on these elements change, these areas will need to be revisited and will have an impact on resourcing and timelines.

2025 Local government elections

18. The 2025 Local Government elections will be held in October. A number of factors have been considered in relation to this, including an approximate three-month break in being able to access elected member feedback and input across the election period. Consideration has also been given to providing time for the new elected and appointed members to familiarise themselves with the policy development process and content ahead of any key decisions needing to be made in 2026. In this regard it has been assumed the new Council will be able to consider commencing formal consultation under Schedule 1, clause 3 of the RMA in March 2026. This is a significant milestone in option 1A of the programme timeline.

Consultation

19. During 2024, extensive consultation was held with the community, industry and tangata whenua. Much of the consultation focused on the development of the National Objective Framework (NOF), which under the current NPS-FM (2020) has very directive consultation requirements. Any changes in Government requirements in this area will need to be reflected in the programme moving forward.
20. As the consultation to date has provided staff with valuable direction to continue policy development, the programme has assumed a more targeted approach to public consultation in future stages. This will take the form of small discussion groups with community and industry representatives based on topics. Although targeted consultation will be the focus, there is the opportunity for wider consultation to occur on selected topics late in 2025. This is set out in option 1A.
21. Wider regional consultation will occur as part of the Schedule 1 clause 3 statutory requirements. This approach has enabled a longer time being allocated to Clause 3 consultation (five weeks) than had been planned under the previous programme. This will provide the opportunity for all interested persons and parties to review and provide comments on a complete draft of the Land and Freshwater Plan.
22. Engagement with tangata whenua will continue to occur throughout policy development, with conversations focused on key topics. Joint work and engagement with the Ngā Iwi o Taranaki Freshwater Pou Taiao will continue, along with input sort from iwi pou taiao and kaimahi throughout the programme. There will also be the opportunity to work with tangata whenua to receive feedback during both Schedule1 clause 3 and clause 4a consultation. Both of these stages of consultation have been set down for a five-week period.

Engagement with Committee and Council

23. The only statutory decision that Council must make under the Resource Management Act 1991 (RMA) is to notify the draft Land and Freshwater Plan, which includes adopting the section 32 report. However, Council may wish to make policy and milestone decisions along the way, to guide staff on the preferred direction of travel and reduce contentious issues which could impact delivery.

24. Engagement with the Policy and Planning Committee (the Committee) is critical during the policy development and draft plan stages. Staff are working towards bringing policy packages through to the Committee across the remaining 2025 meeting. We are mindful, however, of the risk associated with any central government announcement on the new NPS-FM.
25. The Committee meeting schedule constrains the programme as to how this can be undertaken. With agenda lead times, finding a timely approach to align with programming can be challenging. The key milestones that need to be taken through to the Committee are set out below:
26. Draft policy packages including options
27. Round two of target attributes state development, and potential consultation approach (noting that this may be influenced by direction in the pending NPS-FM)
28. Draft plan for clause 3 consultation endorsement
29. Updates from clause 3 consultation, ahead of clause 4a consultation endorsement
    a. Draft plan for endorsement for notification.
30. The touch points around clause 3 and beyond can sometimes take more than one meeting round, this is dependent on the level of complexity and interest. At this stage staff have assumed one meeting round for each stage. It should be noted that additional Committee meetings may be required, and Ordinary Council meeting dates may also need to be utilised.
31. The current format of Committee meetings may not lend itself to the in-depth discussions needed to support the Committee's understanding of the draft policy approach, particularly for the discussions around draft policy packages. A series of land and freshwater options papers will be presented to the committee to facilitate these discussions. The process by which the Committee engages with policy development will have an impact on the programme timeline. There are two options for how the Committee may wish to engage, set out in the next section of the memorandum.

Options

32. To address the issues discussed above, there are a number of options available for consideration. Benefits and risks are outlined with each option. Noting there are programme timeline options for consideration, along with options for engagement with the Committee and Council.

Options on programme timeline

Option 1A – aim for a September 2026 notification

33. This option would continue to maintain momentum of the existing policy programme, but would enable time to respond to the new NPS_FM when it is gazetted. A programme setting out the key milestone of policy development is set out in Appendix 1 of this paper. The new programme aims to have the Land and Freshwater Plan notified in September 2026. This timeline is predicated on the other aspects of this memo being resolved in a timely manner and government direction being a new NPS-FM gazetted by August 2025.

Option 1A – September 2026 notification	
Advantages	Disadvantages
• Newly elected councillors will have time to develop an understanding of draft plan content • Gives some time to refine policy options and writing, and respond to government direction	• Limited opportunity for broader consultation • Direction on freshwater farm plans may still be in infancy

• Provides earlier certainty to the community and industry with clear commitment to a plan notification date. • Better aligns with Long-term and Annual Plan programmes for policy and science areas. • Modern plan in place earlier to guide consenting processes • Provides adequate time for clause 3 and 4a consultation, reflecting best practice, and potential broader consultation later in 2025.	• Limited opportunities for broader pre clause 3 public consultation. • Committed notification may change in response to national direction updates.

Option 1B – aim for Clause 3 consultation in March 2026

34. This option would see Council continue to work on developing the draft Land and Freshwater Plan (and associated updates to the RPS), so that the Council is ready to commence Clause 3 consultation in March 2026. The option does not include a commitment to a notification date, to enable greatest level of flexibility given the uncertainty surrounding national direction on freshwater.

Option 1B – aim for Clause 3 consultation in March 2026	
Advantages	Disadvantage
• Enables the greatest level of flexibility and additional time to respond to the government direction when updated ahead of notification of a plan • Allows for additional consultation that may take the form of region wide consultation beyond that planned in Clause 3 • Freshwater farm plans may be in place / or at least updated regulation settled to enable consideration ahead of notification. • Gives more time to refine policy options and writing post clause 3 and clause 4a consultation ahead of notification. • Newly elected councillors will have time to develop an understanding of draft plan content • Some alignment with Long-term and Annual Plan programmes for policy and science areas.	• Potential delays in providing certainty to the community and industry without a clear commitment to a notification date • Potential further delay on implementing a planning framework to improve Taranaki waterways • Potentially extends resourcing and budgeting across additional financial years out of line with the LTP, dependant on when notification can take place • A modern and streamlined plan may not be in place as quickly as possible prior to the large amount of resource consents expiring and requesting renewal in coming years • Potentially aligns with other Councils programmes around the country and could create pressure for hearing commissioners etc.

Option 1C – no specific programme timeline

35. This option would see council continue with work on developing the draft Land and Freshwater Plan, but would not set a specific notification date, noting that it must be notified by end December 2027. The committee would direct staff to notify as soon as possible.

Option 1C – no specific programme timeline (but before end 2027)	
Advantages	Disadvantages
• Enables flexibility and additional time to respond to the government direction when updated • Allows for additional consultation that may take the form of region wide consultation beyond that planned in Clause 3 • Freshwater farm plans may be in place / or at least updated regulation settled to enable good practice to be embedded across the plan development and the freshwater farm planning system. • Gives more time to refine policy options and writing • Newly elected councillors will have time to develop an understanding of draft plan content.	• Delays providing certainty to the community and industry • Further delay on implementing a planning framework to improve Taranaki waterways • Potentially extends resourcing and budgeting across additional financial years out of line with the LTP • A modern and streamlined plan is not in place as quickly as possible prior to the large amount of resource consents expiring and requesting renewal in coming years • Potentially aligns with other councils' programmes around the country and could create pressure for hearing commissioners etc • Loss of momentum – both internally and externally. This may risk motivation and resource of tangata whenua and the community being involved in an even longer programme • Risk of conflict with RMA reforms the longer notification is delayed • Possible low productivity period for policy staff by not providing a clear programme, can be mitigated by allocating to other non-freshwater policy programme work.

Recommended option

36. Whilst all three options present opportunities and risk, *option 1B – aim for Clause 3 consultation by March 2026* will provide council with time to respond to pending central government direction, expand clause 3 and 4a consultation from the existing programme, account for the local government elections, whilst also supporting the development of the Land and Freshwater Plan in a manner to avoid unnecessary delay for implementation and environmental improvement. This also enables flexibility in when the Council may commit to notification, providing opportunity to be agile to the uncertainty currently in place. There are risks to option 1B as, like option 1A, it is dependent on a number of variables set out in the discussion of this memorandum. Should these change it is likely the programme will slip and clause 3 consultation may not be achieved in March 2026. If this occurs the committee will be updated with a new revised approach.

Options for engagement with Policy and Planning Committee and Council

37. There are two options to guide how the engagement with the Policy and Planning Committee and Council occurs. Set out below is an overview and analysis of the pros and cons of each option.

Option 2A – workshops within Committee and Council meetings

38. To make the most of the existing committee meeting schedule, there is value in considering running workshops with standing orders put aside, facilitated by staff, in order to build a full and rich understanding of the topic areas requiring decisions during a committee process. Acknowledging the time required in such workshops may result in the Committee meeting being extended beyond that currently set down in the meeting schedule.
39. To meet the dual objectives of allowing for a more relaxed workshop style of briefing whilst also achieving the necessary level of resolution, it is proposed that the Committee ask Council to agree that:
    - Land and Freshwater Plan Issues and Options papers be considered as part of a separate section of the Policy and Planning Committee ordinary meeting agendas
    - Council Standing Orders (except for those prescribed in statute) should be suspended for the section of ordinary meeting agendas in which Land and Freshwater Plan Issues and Options papers are to be considered
    - The Committee and Council endorse the Governing Style Protocol attached (Appendix 2) that will be applied to the Land and Freshwater Plan Section of the meetings
    - The Committee Chair will have authority to guide and control the Land and Freshwater Plan section of the meetings in accordance with the attached protocol in a manner that they consider appropriate.

Option 2A – workshops within Committee and Council meetings	
Advantages	Disadvantages
• Transparent process for community and interested persons • All decision makers can engage in and be across all issues • Protocol can support a more informal structure to enable workshop style discussions • Resolutions and direction can easily be sought from the Committee • Continued partnership with tangata whenua through existing structure of the committee with Iwi representatives present.	• Limited by the existing schedule of meetings • Potential for time constraints when agendas are full with other business of the Committee and Council • Despite suspending standing orders, formal format may constraint discussion.

Option 2B – Land and Freshwater working group

40. An alternative approach is to set up a land and freshwater governance working group which could facilitate more regular touch points for staff to seek discussion and direction. Such a working group would be made up of representatives from the Policy and Planning Committee – both councillor and iwi representatives. The purpose of this group would be to:

41. Provide a regular platform for discussion around material presented in the Land and Freshwater Plan Issues and Options papers
42. Provide a mechanism for strengthened partnership with tangata whenua and for Taranaki iwi issues, and potential solutions to be discussed
43. Identify any matters that require escalation to the Policy and Planning Committee
    - Regular reporting to the policy and planning committee to support and seek resolution on relevant papers presented.
44. This would be a Council established working group, that reports to the Policy and Planning Committee. It would not have any delegated decision-making power but would rather act as an advisory body to Council and its Committees. The group wouldn't be mandated to draft the provisions of the draft land and freshwater plan, but it would be expected to discuss topics / issues of relevance at both the Policy and Planning Committee and Council to support the programme progressing.

Option 2B – Freshwater working group establishment	
Advantages	Disadvantages
• Provides a high level of flexibility with regard to frequency and timing of meetings • Less formal structure can support in-depth discussion and inquiry • Opportunity to further strengthen the partnership and relationship between the Council and tangata whenua.	• Potential for council and committee members to not fully understand complexity of issues when relying on briefings from staff and the working group • Potential for perceived lack of transparency for community and interested persons • The time required to set up such a working group does not align with the programme of works to facilitate discussions with Council on policy content as soon as possible.

Recommended option

45. Staff recommend option 2A. This option provides the best opportunity to align with recommended programme Option 1B. It provides a clear process to seek direction and resolution, whilst also providing for an opportunity to undertake inquiry into the policy options being presented. It provides a transparent process to the community.
46. Whilst there are a number of merits with option 2B, the potential risk to the timing of the programme is considered by staff to be a necessary consideration. However, this approach may be something which the Committee may wish to consider further if there are delays to the programme following government direction. It may also be something Council considers in the new triennium.

Significance

47. This decision is not considered significant in terms of the Significance and Engagement Policy. The requirement to develop a new Land and Freshwater Plan is a statutory responsibility of Council. Public and community interests will be considered through the consultation process of policy development, the options presented in the paper are administrative in nature.

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.
49. The change is programme is out of step with the policy programme in the LTP / Annual Plan, this however is out of the control of Council due to legislative change resulting in this change.

Policy considerations

50. 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*.
51. The committee made a decision in March 2024 to keep momentum with plan development within the environment of likely policy change from the government. This resolution included a review when additional direction had been provided by the government, this has now occurred with the relevant legislation change and an updated programme is now prepared for the Committees consideration.

Climate change considerations

52. This item is administrative in nature. There are *no* climate change issues to consider in relation to this item.

Iwi considerations

53. 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.
54. Staff undertook discussions with the Wai Steering group on 6 March in relation to the content of this memorandum. At the meeting feedback supported the content and indicated support for the recommendations made by staff.
55. The Wai Steering Group are supportive of the programme continuing and to working to a specific timeframe. They were also supportive of either option 2A and 2B, but emphasised that in both options the role, engagement and input from tangata whenua is of benefit to the process and needs to be supported.

Community considerations

56. 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.
57. There will be sections of the community that prefer the Council to delay notification until close to the 2027 deadline. There will also be parts of the community that will be dissatisfied with a muti-year delay for when the region will have a freshwater plan that can deliver better outcomes for Taranaki.

Legal considerations

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

Appendices/Attachments

Appendix One – draft programme of Option 1A and 1B

TRCID 1492626864-395: Committee protocol for land and freshwater workshops

APPENDIX One – draft programme of Option 1A and 1B

Milestone Name	Start	Finish	Notes
Initial options drafting of RPS (freshwater chapter) and Land and Freshwater Plan prepared, includes: • Focus group discussions • Internal TRC feedback • Scientific input • Discussions with tangata whenua	November 2024	Mid April 2025	
Review discussion document of NPSFM on drafting to date	March	Mid April	The date that the actual NPS-FM draft drops to us will impact on this
Refinement of initial drafting to produce first draft	Mid April	Early June	
Further testing of draft with tangata whenua and focus groups	End June	Mid July	
NPSFM gazetted	August 2025		This has not been confirmed by Government. The date this milestone occurs will impact on the programme and subsequent tasks
Review and refine drafting against NPSFM	August 2025	Early October 2025	
Formal legal review of drafting	October	October	
Opportunity for broader consultation on specific topics if needed	November	December	
P&P Committee approval of draft for Clause 3 consultation	Feb 2026		Note this assumes a late Feb meeting
Clause 3 consultation	March 2026	Early April	5 week period
Note tasks beyond this align with Option 1A			
Review clause 3 feedback and refine draft (including legal review)	Early April	Mid May	

Clause 4a Consultation with iwi	Mid May	Late June	5 week period
Review clause 4a feedback and refine draft (including legal review)	End June	Early August	
P&P approval to publicly notify	August		Note decision to be made at August meeting 2026
Draft Land and Freshwater Plan and updated Freshwater Chapter of the RPS to be publicly notified	September 2026		

Land and Freshwater Plan Governing Style Protocol

Background

The Policy and Planning committee will be considering a number of Issues and Options reports relating to development of a new Regional Land and Freshwater Plan.

A number of the topics/issues to be considered can be complex and as such there is an argument for these items to be considered in a 'workshop style' of meeting. This protocol sets out a framework within which the Land and Freshwater Plan Issues and Options papers will be considered.

Operating Protocol

During the Land and Freshwater Plan Issues and Options section of their meetings the Policy and Planning Committee will suspend the application of standing orders and operate with an emphasis on:

- Achievement of the Council's Mission
- Recognising and acting in accordance with the organisational values and code of conduct
- Recognising the legislative and national policy frameworks within which the Plan needs to be developed
- Encouraging the participation of all members to support consideration of a range of viewpoints that might be raised, acknowledging the need to balance the range of views that might exist in coming to a decision on a preferred approach
- Focusses on providing leadership and direction setting rather than administrative detail
- The future rather than the past or present
- Proactivity rather than reactivity
- Acting in the interests of the region as a whole rather than particular individuals or groups
- Allowing for a high level of participation from all Committee members and officers.

Chair Role

The Committee agrees that the Chair has authority to lead the Land and Freshwater section of the meetings in accordance with this protocol. The decision of the Chair on modus operandi matters is final.

Mission and Values

The Taranaki Regional Council Mission and values are:


Ko o mātou whāinga
MISSION
To work for a thriving and prosperous Taranaki by:
• Promoting the sustainable use, development and protection of Taranaki's natural and physical resources
• Safeguarding Taranaki's people and resources from natural and other hazards
• Promoting and providing for significant services, amenities and infrastructure
• Representing Taranaki's interests and contributions regionally, nationally and internationally.
We will do this by leading with responsibility, working co-operatively, encouraging community participation, and taking into account the Treaty of Waitangi.
Taranaki
Regional Council
Working with people | caring for our environment
He ngākau o mātou matapono
VALUES
He ngākau pono
Integrity
Ehara o mātou mahinga tika, i te hanga ngawari.
We do what is right, rather than what is easy.
He ngākau tuki tahi
Teamwork
He kapa mahi tahi, whāitake mātou, Te kaunihera o Taranaki.
We are one TRC team, working together with courage and purpose.
He ngākau aroha
Care and Respect
Ko to mātou manaakitanga ki a tatou, he whakairo pai ki ngā tāngata katoa.
We demonstrate care and respect for ourselves and others; we treat everyone with dignity.
He ngākau kakama
Agility
E whai ana mātou kia piki ake te kounga o te puna auaha.
We strive for excellence, embracing change as an opportunity for innovation.
Ko o mātou take
OUR PURPOSE
Our purpose, as defined in the Local Government Act 2002, is to:
• Enable democratic local decision-making and action by, and on behalf of, communities
• Promote the social, economic, environmental, and cultural well-being of communities in the present and for the future.
This purpose is further clarified, refined, and focused by the various other Acts affecting our functional responsibilities such as the Resource Management Act 1991 and the Biosecurity Act 1993. These Acts set the more precise scope of responsibility and powers described in this Plan.

Date: 18 March 2025

Subject: **Estimated Reference Condition of Taranaki Lakes**

Author: A Norhayati, Scientist - Freshwater

Approved by: AJ Matthews, Director - Environment Quality

Document: TRCID-1492626864-391

Purpose

1. The purpose of this memorandum is to provide the Committee with an overview of Cawthron Institute's report 'Estimated reference condition and paleolimnological analysis of Taranaki lakes'.

Recommendations

That the Taranaki Regional Council:

a) receives the report titled Estimated Reference Condition of Taranaki Lakes

b) notes the findings therein.

Background

2. The National Policy Statement for Freshwater Management 2020 (NPS-FM) requires councils to undertake monitoring, set targets and establish actions to maintain and improve outcomes for a range of freshwater environments, including the region's lakes.
3. To inform the development of Council's new Land and Freshwater Plan, a new state of the environment programme was established in 2023 to monitor water quality in six regionally representative lakes, in line with requirements set out in the NPS-FM. The lakes and their river catchments monitored include:
    - Lake Rotokawau (Tongapōrutu)
    - Rotokare/Barrett Lagoon (Huatoki)
    - Lake Rotokare (Tangahoe)
    - Lake Kaikura (Mangaroa)
    - Lake Herengawe (Wairoa)
    - Lake Waikare (Waitōtara)
4. While the monitoring record is still relatively short, preliminary results indicate that all six lakes fail to achieve the minimum standard (known as the national bottom-line) for at least one freshwater attribute; including measures such as total nitrogen, chlorophyll-a and dissolved oxygen concentrations (TRC, 2023). Furthermore, a regional modelling assessment found that nearly 80% of all lakes in Taranaki larger than one hectare likely fail to achieve the national bottom line of at least one freshwater attribute (Schallenberg et al. 2023).

5. Under the NPS-FM, if a lake or river fails to achieve these standards, action is required to improve that water body to above the national bottom line while meeting community-aspired targets, which may require lake restoration or revitalisation efforts. Each lake is unique and the drivers of lake health are often complex and interrelated. As a result, these efforts can require more comprehensive investigation and, ultimately, significant investment over a number of years.
6. Robust information about the natural, unimpacted state of lake ecosystems (i.e. the reference condition) is one of several pieces of information that can be used to inform realistic environmental targets and aid in developing restoration activities; essentially establishing an upper limit for the range of improvement that might be possible.
7. For most freshwater attributes in the NPS-FM, band A reflects pristine, unimpacted conditions; however, for some water bodies this standard may be unrealistic even in the absence of human-induced impacts. Regional differences in environmental characteristics and naturally occurring processes can result in lower grades for some freshwater attributes (for example, naturally elevated concentrations of dissolved reactive phosphorous in streams originating within Te Papakura o Taranaki which fail to achieve the national bottom line (TRC, 2024).
8. To assist the Council in estimating the reference condition of lakes in the region, Cawthron was commissioned to:
    - Provide advice on the reference condition of total phosphorus (TP), total nitrogen (TN) and chlorophyll-a (chl-a) concentrations, drawing on an existing nationwide assessment of lake reference conditions.
    - Collate the data generated by the Our Lakes' Health: Past, Present, Future research programme (also known as Lakes380[1]) for four Taranaki lakes and relevant lakes in the Manawatū-Whanganui region.

Discussion

9. This work compiled the results from three previous studies, summarised in the following table:

Assessment method	Summary description
Empirical modelling	Estimated stream reference conditions and an empirical modelling approach were used to estimate reference TN and TP, which were further extrapolated to model chl-a, Trophic Level Index (TLI) and Secchi disc depth in approximately 1,000 Aotearoa New Zealand lakes using nutrient mass loading models.
Reference-site approach	A large, nationwide lake water quality and biodiversity dataset was assessed based on best professional judgement to derive thresholds associated with 'reference lakes', along with interpretations of historical conditions using a small paleolimnological dataset.
Interpretation of local historical conditions (paleolimnological analyses)	Sediment cores were analysed for a range of proxies relating to water quality, catchment characteristics, biodiversity and lake health to provide detailed interpretations of historical conditions for selected lakes in the Taranaki (and Manawatū-Whanganui).

10. Different limitations and sources of uncertainty were associated with each assessment method; these must be considered when interpreting the results. Nonetheless, the findings presented in this report

[1] https://lakes380.com/

are considered the best available information for the purposes of estimating reference conditions of Taranaki lakes.

11. The key findings from this investigation are summarised below.

Empirical modelling

12. Of the 14 Taranaki lakes included in this analysis, seven (50%) had reference TP concentrations within band A, no lakes (0%) had reference TN concentrations in band A, and three (22%) had reference chl-a concentrations in band A (Figure 1). Concentrations of TN and chl-a were estimated to be in band B for most lakes. Lake Kaikura was estimated to have a reference TP concentration in band D however, it was determined that this is highly unlikely given that current lake TP concentrations are much lower (within band C).

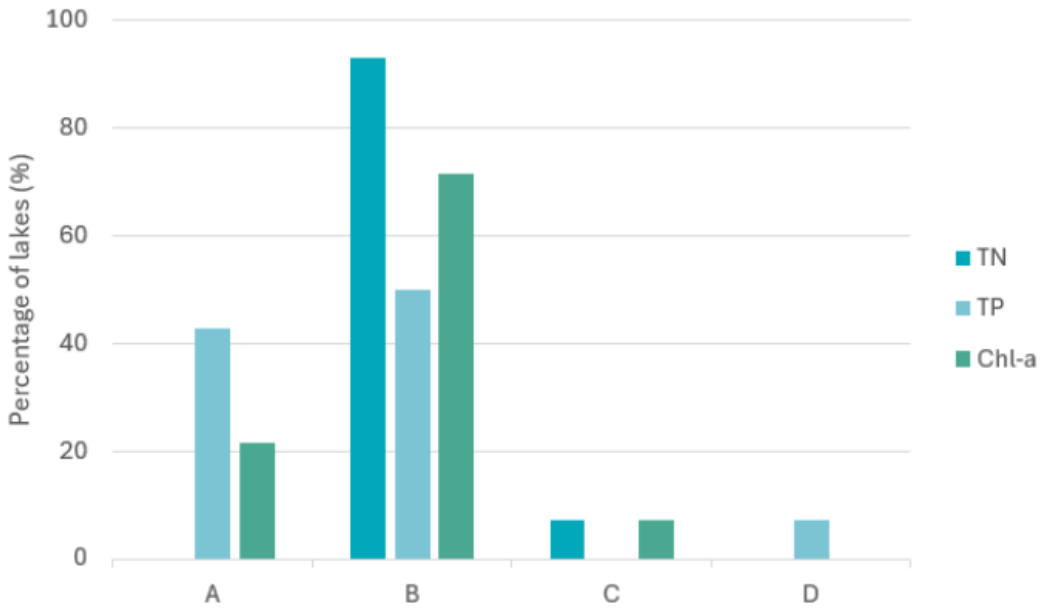


Figure 1 Number of Taranaki lakes (n = 14) in each National Objectives Framework (NOF) attribute band (A–D), as modelled by Abell et al. (2019, 2020)

13. The report authors describe various sources of uncertainty associated with this assessment method, including examples of nutrient reference states that were lower than currently indicated with monitored data. Therefore, the results from this study should be interpreted with caution, particularly when considered in isolation.

Reference-site approach

14. National lake survey data were assessed using an ecological integrity framework that encompasses a range of ecological indicators, including components of nativeness, pristineness, diversity and resilience. This dataset was analysed, and best professional judgement was used to determine which lakes were considered to have the highest ecological integrity. Those lakes were then deemed to be in a 'reference condition' (Schallenberg 2019).
15. Thresholds were determined for a range of water quality and ecosystem health attributes for three different lake classes in Aotearoa New Zealand: shallow lowland, deep and brackish.
16. Reference limits for shallow lakes were provided for two different reference categories: Tier 1, which represents the most unimpacted lakes (i.e. lakes in the 90th percentile for indicators of native

vegetation and ecological integrity); and Tier 2 lakes, which are slightly more impacted (i.e. within the 80th percentile for those indicators).

17. For Tier 1 shallow lowland lakes, the approach used by Schallenberg (2019) indicates that reference condition thresholds for TN and chl-a achieve NOF band A and TP band B. Shallow lowland Tier 2 lakes are expected to have reference threshold TN and TP concentrations within band C (equating to a eutrophic state), while the chl-a threshold would fall within band A (Table 3). For deep lakes, reference condition thresholds for TP and chl-a achieve band A.

Lake class	Attribute	Unit	Range for all lakes	Range for reference lakes		Limit for reference lakes	
Deep lakes	Total phosphorus	mg/m^3	1.8–227.0	1.8–3.1		≤ 3.1	
	Trophic Level Index						
	Chlorophyll-*a*	µg/L	0.3–44.0	0.6–1.0		≤ 1.0	
Brackish lakes / lagoons	Total nitrogen	mg/m^3	128–2,163 *			≤ 128 *	
	Total phosphorus	mg/m^3	2.4–510.0 *			≤ 2.4 *	
	Trophic Level Index		2.5–7.2 *			≤ 2.5 *	
	Chlorophyll-*a*	µg/L	0.3–80.4 *			≤ 0.3 *	
Shallow lowland lakes				**Tier 1**	**Tier 2**	**Tier 1**	**Tier 2**
	Total nitrogen	mg/m^3	151–3,672	235–277	235–692	≤ 277	(≤ 692)
	Total phosphorus	mg/m^3	2–492	2.0–11.7	2.0–23.0	≤ 11.7	(≤ 23.0)
	Trophic Level Index		1.8–7.2	1.8–3.5	1.8–4.4	≤ 3.5	(≤ 4.4)
	Chlorophyll-*a*	µg/L	1–116	0.7–3.2	0.7–5.7	≤ 3.2	(≤ 5.7)

* Values are based on only one reference condition lake and are therefore preliminary.

Figure 2 Summary of the 'most useful' pristineness limits for defining the reference conditions of deep lakes, brackish lakes / lagoons and shallow lowland lakes, adapted from Schallenberg (2019). Shaded colours indicate National Objective Framework (NOF) bands: blue = A, green = B, yellow = C.

18. There were 53 lakes in the Taranaki region where modelled water quality was able to be compared with these reference condition thresholds. None of the deep lakes or the brackish lakes / lagoons are currently estimated to be in a reference state for any attribute. Five shallow lowland lakes are estimated to meet Tier 2 reference state thresholds for TN, and five lakes are estimated to meet Tier 2 thresholds for Trophic Level Index (TLI).

19. As with the previous approach, there are limitations. The analysis relied on the use of single spot samples which are representative of lake conditions only at the time of sampling. There is a lack of reference condition lakes for certain classes (e.g. only one reference lake was used for brackish lakes/lagoons). In addition, reference limits for deep lakes were developed using only modified, deep glacial lakes, which are not transferable to other lake geomorphological types. The author recommends that, where possible, the specific history of individual lakes or lake types should be used.

Interpretation of local historical conditions (paleolimnological analyses)

20. Significant insights can be drawn from paleolimnological analysis of lakebed sediments, whereby a core of sediment is extracted from the lakebed and various markers are analysed in a laboratory to determine the current and historic health of each lake.

21. Because lakes are depositional environments which tend to infill with sediment and catchment run-off, the layers of sediment on the lakebed can provide an indication of how the lake and surrounding catchment may have changed through time. For example, the presence or absence of different types of pollen can indicate when certain plants arrived or disappeared from the surrounding catchment. Cadmium and lead are also used as markers to indicate agricultural fertiliser practices, and the introduction of motor vehicles.

22. Sediment cores have been collected from seven lakes in Taranaki as part of the Lakes380 programme and to date have been analysed for four lakes (Rotokare, Kaikura, Moumahaki and Waikare).

Lake Kaikura (Mangaroa catchment)

23. The sediment core collected from Lake Kaikura did not include sediment from the pre-human period. However, the pollen and charcoal analyses revealed landscape disturbance and burning likely occurred before European settlement. After European settlement in c.1840 CE, native vegetation declined further and there was an increase in pollen from grasses and non-native trees such as pines, indicating a rapid transition to pasture and corresponding increase in sediment inputs during this period. A transition to more intensive agriculture, from 1900s CE onwards, is marked by increases in cadmium and lead. Following European settlement several notable changes occurred within Lake Kaikura, including changes in lake plant species and decreasing light availability, indicating increasing eutrophication of this lake over the last 50 years.
24. Without data from the pre-human phase, it is impossible to infer the reference condition for this lake. However, based on the evidence from the sediment core, it is likely that at least in the early post-Māori settlement period the lake had relatively low chl-a (algae), with extensive macrophytes, and was probably in an oligotrophic to mesotrophic state.

Lake Rotokare (Tangahoe catchment)

25. Before human arrival, the area around Lake Rotokare was primarily covered by mature forest, with minor vegetation changes occurring post-Māori settlement in c.1400 CE. European settlement (c.1840 CE) led to further vegetation changes, including reduced sub-canopy tree populations.
26. Around 1970 CE, water quality at Lake Rotokare significantly changed, shifting from a stable, low-productivity lake with minimal biomass to a system dominated by cyanobacterial blooms and altered in-lake communities. This transition was unexpected as it did not closely align with human activities in the wider region or land-use change.
27. This decline in water quality was likely due to the introduction of perch c.1900 CE, which may have caused a gradual trophic cascade in this lake, i.e. the addition of perch reduced the number (or perhaps size or species) of zooplankton present, which in turn reduced the grazing pressure on algae and cyanobacteria.

Lake Moumahaki (Waitōtara catchment)

28. The geology surrounding the lake is primarily sandstone, which is subject to high erosion rates. Because of this high level of erosion, a sediment core measuring approximately 5 metres long was retrieved from the lake to try to capture the pre-human period. Unfortunately, the core was not long enough, and it covers only a period post-Māori settlement in the region.
29. Slightly elevated levels of bracken fern and tutu pollen and charcoal indicate that before European settlement in the region, some local vegetation change had already occurred. However, there was likely considerable native forest comprising beech and podocarps (particularly rimu) in the catchment. The presence of tree ferns remains high throughout the sediment record. After European settlement in c.1840 CE, the native vegetation declined further and there was a marked increase in grasses and pollen from pine.
30. Because the sediment core does not extend to the pre-human phase, it is not feasible to determine the reference condition for this lake. The sediment core data highlight the highly erodible nature of the region's soils, emphasising the need for careful management of vegetation removal in the catchment.

Lake Waikare (Waitōtara catchment)

31. The Lakes380 team attempted to collect a longer sediment core from Lake Waikare to capture evidence from the period before human arrival. However, during sampling the lake level was relatively low, and numerous submerged dead tree trunks were visible. These obstructions prevented the use of

the specialised long corer. It also suggests that the valley has flooded only relatively recently, and that the lake might have formed in the last 500 years or so.

32. Because the sediment core does not extend to a pre-human period, and it is likely the lake did not exist before human arrival, it is not feasible to determine the reference condition for this lake. Shifts in indicators such as the chl-a proxy and eDNA suggest that water quality in Lake Waikare may have deteriorated relatively recently. As observed for Lake Moumahaki, the sediment core data highlight the highly erodible nature of the region's soils, emphasising the need for careful management of vegetation removal in the catchment.

Conclusions and recommendations

33. Management and restoration of lake ecosystems requires an understanding of the state and range of natural, reference lake conditions (Abell et al. 2019). This information can help inform lake management and restoration by highlighting the current degree of departure from a lake's natural state while informing aspirational goals and targets for improvement (Schallenberg et al. 2011). Given the diversity of lakes in Aotearoa New Zealand, not all lake types are expected to have the same reference conditions (Drake et al. 2011).
34. In general, the results of the three assessment approaches indicated that the deeper lakes, particularly those in the hill country, were likely in an oligotrophic state (approximate to NOF band A) prior to human arrival, whereas the shallow lowland lakes were likely mesotrophic or oligo-mesotrophic (approximate to NOF band B). However, it is important to note that there is some degree of uncertainty in each approach.
35. It is also important to note that reference conditions alone are not always appropriate for setting restoration targets. There are several reasons for this:
    - The natural / pristine reference condition is not always static but can vary on timeframes that can be short (years or decades) or long (hundreds or thousands of years), due to human-induced or natural changes in climate
    - Additionally, other changes that may have taken place between the reference and the present or future target states, such as climate change, may counter the use of a lake's reference condition as a restoration target
    - It is also important to consider the current societal and cultural values of a lake. For example, if fishing for non-native species is now highly valued, and non-native fish are contributing to the current state of a lake, then aiming to return a lake to its historical pre-human condition is unlikely to be viewed favourably by the community and may not be achievable
    - It is also plausible that some changes – particularly human-induced changes such as changes in catchment land use or the introduction of non-native plant or animal species that alter food webs – may cause irreversible change and mean that it is impossible or extremely difficult to return a lake to its reference condition without significant investment.
36. The Council is cautiously using the information presented in this report to guide the development of draft targets for lake water quality attributes. The next steps will be to discuss and seek feedback on the draft targets with iwi/hapu and the wider community.
37. Potential further work that could be considered to improve information of reference conditions and / or assist in setting targets for lakes in the Taranaki region includes:
    - Collection and processing of additional sediment cores that represent a more diverse range of lakes, including the analysis of cores already collected from the remaining three lakes
    - Employing a range of other methods such as eDNA to assess historical communities of fish (or other organisms), where they are based on specific questions of relevance – i.e. what fish were present prior to human arrival.

References

Abell JM, Özkundakci D, Hamilton DP, van Dam-Bates P, McDowell RW. 2019. Quantifying the extent of anthropogenic eutrophication of lakes at a national scale in New Zealand. Environmental Science and Technology. 53(16):9439–9452.

Abell JM, van Dam-Bates P, Özkundakci D, Hamilton DP. 2020. Reference and current Trophic Level Index of New Zealand lakes: benchmarks to inform lake management and assessment. New Zealand Journal of Marine and Freshwater Research. 54(4):636–657.

Drake DC, Kelly D, Schallenberg M. 2011. Shallow coastal lakes in New Zealand: current conditions, catchment-scale human disturbance, and determination of ecological integrity. Hydrobiologia. 658(1):87–101. doi:10.1007/s10750-010-0452-z

Schallenberg M, Kelly D, Clapcott J, Death R, MacNeil C, Young R, Sorrell B, Scarsbrook M. 2011. Approaches to assessing ecological integrity of New Zealand freshwaters. Wellington: Department of Conservation. Science for Conservation 307

Schallenberg M. 2019. Determining reference conditions for New Zealand lakes. Wellington: Department of Conservation. Science for Conservation Series 344.

Schallenberg L A, Pearman J, Vandergoes M, Wood S A. 2023. Modelled National Objectives Framework attributes for Taranaki lakes and recommendations for baseline sampling. Cawthron Institute client report 3946, prepared for Taranaki Regional Council.

Schallenberg L, Pearman J, Vandergoes M, Howarth J, Lee X, Shepherd C, Gregersen R, Thompson L, Moy C, Rees A, Wood S. 2025. Estimated reference condition and paleolimnological analysis of Taranaki lakes. Nelson: Cawthron Institute. Cawthron Report 4123. Prepared for Taranaki Regional Council.

Taranaki Regional Council. 2023. Draft baseline state for Taranaki lakes (trophic state). Technical Memorandum.

Taranaki Regional Council. 2024. Draft catchment nutrient criteria and target attribute states for nitrate (toxicity), ammonia (toxicity) and dissolved reactive phosphorous. Technical Memorandum.

Appendices/Attachments

TRCID-1492626864-444: Estimated reference condition and paleolimnological analysis of Taranaki lakes

CAWTHRON

Estimated reference condition and paleolimnological analysis of Taranaki lakes

Cawthron Report 4123

World-class science for a better future

REVIEWED BY: Georgia Thomson-Laing

APPROVED FOR RELEASE BY:
Roger Young

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Estimated reference condition and paleolimnological analysis of Taranaki lakes

Lena Schallenberg,[a] John Pearman,[a] Marcus Vandergoes,[b] Jamie Howarth,[c] Xun Li,[b] Claire Shepherd,[b] Rose Gregersen,[d] Lucy Thompson,[a] Chris Moy,[e] Andrew Rees,[c] Susie Wood[f]

a. Cawthron Institute, Nelson
b. GNS Science, Lower Hutt
c. Victoria University of Wellington, Wellington
d. Waikato University, Hamilton
e. University of Otago, Dunedin
f. Lincoln University, Lincoln

Prepared for Taranaki Regional Council

Contents

Executive summary

The National Policy Statement for Freshwater Management 2020 requires regional councils to monitor and develop plans to ensure waterbodies within their jurisdiction meet national bottom-line standards. If a lake falls below these standards, action is required to bring it to at least the national bottom line while meeting community-aspired targets, which may require lake restoration or revitalisation efforts.

Attribute targets should be determined according to tangata whenua and community aspirations, provided they are set above the national bottom line. Robust information about the natural, unimpacted state of lake ecosystems (i.e. the reference condition) can be used to inform realistic environmental targets and aid in developing restoration activities.

To assist Taranaki Regional Council (TRC) in estimating the reference condition of lakes in the region, Cawthron Institute (Cawthron) was commissioned to:

- Provide advice on the reference condition of total phosphorus (TP), total nitrogen (TN) and chlorophyll-*a* (chl-*a*) using previous nationwide work on lake reference conditions (Abell et al. 2019, 2020; Schallenberg 2019).
- Collate the data generated by the national Our Lakes' Health: Past, Present, Future research programme (also known as Lakes380) for four Taranaki lakes and relevant lakes in the Manawatū-Whanganui region. For each of these lakes, Cawthron was asked to provide a summary that could help TRC determine the likely reference condition, key changes and timing of these changes.

After interrogating three lines of evidence regarding potential lake reference condition, we conclude:

- In general, the approaches supported one another and indicated that the deeper lakes, particularly those in the hill country, were likely in an oligotrophic state (approximately equates to a National Objective Framework [NOF] band A) prior to human arrival, whereas the shallow lowland lakes were likely mesotrophic or oligo-mesotrophic (equates to around NOF band B). It is important to note that there is some degree of uncertainty in each of the three approaches used in this report.
- Lake reference conditions are not always useful for setting restoration targets. For example, the natural / pristine reference condition is not always static but can vary on short (interannual to decadal) or longer (centennial to millennial) timescales due to natural forcing. Other factors such as climate change may have taken place between the reference and the present states, limiting the use of the reference condition as a restoration target. In addition, certain ecosystem changes can be permanent, or require significant investment and alteration to reverse, and so trying to restore a lake back to its reference condition may not be feasible. Some changes, such as the introduction of selected non-native species, may be highly valued by part of the community and factors such as this must be considered when setting restoration targets.

Potential future work that could be considered to improve information on reference conditions and / or assist in setting restoration targets in the Taranaki Region includes:

- **Processing more sediment cores.** Although sediment cores were collected from seven lakes, only four were analysed and only one

of these analyses reached the pre-human period.

- **Collection of additional sediment cores.** It is likely that there are specific lake types, or lakes in unique areas, that were not sampled as part of Lakes380; sediment cores could be collected and analysed from these to provide reference condition data from a more diverse range of lakes.
- **Additional analysis methods.** There are a range of other analysis methods that can be applied to the sediment core samples to provide additional information. For example, environmental DNA can be used to assess historical communities of fish (or other organisms).

1. Introduction and scope

The National Policy Statement for Freshwater Management 2020 (NPS-FM; MfE 2024) requires regional and unitary councils to 'maintain or improve' lake water quality in order to halt freshwater degradation. Regional councils must monitor waterbodies within their jurisdiction and develop plans to improve water quality to meet or improve on the NPS-FM National Objectives Framework (NOF) bottom-line standards (MfE 2024). If a lake falls below these standards, action is required to bring it to at least the national bottom line while meeting community-aspired targets, which may require lake restoration or revitalisation efforts. Restoration projects are cost- and resource-intensive, and so it is critical that clear actions are identified and there is a well-defined outcome.

It is essential that regional councils have up-to-date information on the number, type, location and state of lakes in their region. This work was recently undertaken for Taranaki Regional Council (TRC; Schallenberg et al. 2023a). However, the authors highlighted issues in the Freshwater Ecosystems of New Zealand (FENZ; Leathwick et al. 2010) database, which was used to identify lakes. Schallenberg et al. (2023a) noted that FENZ included waterbodies in the Taranaki Region that should be removed and an unknown number of lakes that should be added. A national-scale review of 'lakes' in FENZ has since been undertaken (Schallenberg et al. 2024a). In the present report we begin by providing an updated list of 'lakes' (i.e. waterbodies meeting the criteria for inclusion in the FENZ database) for the Taranaki Region.

Robust information about the natural, unimpacted state of lake ecosystems can be used to inform environmental targets and restoration activities (Schallenberg 2019). While the NPS-FM (MfE 2024) specifies national bottom lines for attributes related to lake ecosystem health and human contact, those bottom lines are not target values and meeting them does not necessarily provide for ecosystem health. Therefore, as outlined in the NPS-FM, attribute targets should be determined according to tangata whenua and community aspirations, provided they are set above the national bottom line. While such targets will differ according to community and tangata whenua values and aspirations, they may also differ due to a lake's physicochemical characteristics and its historical reference conditions (i.e. the condition the lake was in prior to any impacts caused by humans). For example, lake size, depth and geomorphic type affect the hydrological characteristics of a lake, which can influence lake functioning, resilience and nutrient cycling. Information on the reference conditions of a lake can be used to inform the development of realistic water quality targets and restoration goals.

To aid TRC in estimating the reference condition of lakes in the Taranaki Region, Cawthron Institute (Cawthron) was commissioned to:

1. Provide advice on the reference condition of total phosphorus (TP), total nitrogen (TN) and chlorophyll-*a* (chl-*a*) using previous nationwide work on lake reference condition (Abell et al. 2019, 2020; Schallenberg 2019).
2. Collate the data generated by the national research Our Lakes' Health: Past, Present, Future programme (also known as Lakes380) for four Taranaki lakes and relevant lakes in the Manawatū-Whanganui Region. For each of these lakes, Cawthron was asked to provide a summary that could help TRC determine the likely reference condition, key changes and the timing of these changes.

2. Lakes in the Taranaki Region

Schallenberg et al. (2023a) undertook a review of lakes in the Taranaki Region as determined in the FENZ database (Leathwick et al. 2010). FENZ originally described 86 lakes as being within the Taranaki Region. However, Schallenberg et al. (2023a) found that 19 lakes did not currently meet the FENZ definition of a lake (≥ 1 ha of open water) and should no longer be classified as lakes. Five lakes were not accurately presented in the database (i.e. the lake surface area was inaccurate, and the shapefile required updating). A further 17 lakes that had not been captured in the FENZ database were identified, although this was outside the scope of the study and an extensive investigation was not undertaken. Therefore, the authors noted it was likely that a greater number of lakes exist in the region than are currently recorded in the FENZ database.

In 2024, Schallenberg et al. (2024a) undertook a nationwide review of lakes in the FENZ database using a systematic approach to identify lakes that should be removed or declassified, and to identify new lakes not previously included in the database. Lakes were declassified if they did not meet a determined criteria, including having a surface area ≥1 ha. New lakes meeting the criteria were identified using two geographic information system (GIS) lake layers: polygons classified as 'Lakes or Ponds' in the Land Cover Database v5.0 (Manaaki Whenua – Landcare Research 2020); and the shapefile 'NZ Lake Polygons' from the New Zealand Topographic map series 1:50k (LINZ 2025). See Schallenberg et al. (2024a) for a detailed description of the methods. Using this approach, 94 lakes were identified in the Taranaki Region (Table 1, Figure 1), 63 of which appear in the original FENZ database.[1]

[1] https://data.mfe.govt.nz/document/25518-freshwater-ecosystems-of-new-zealand-fenz-lakes-november-2024-metadatapdf

Table 1. Lakes in the Taranaki Region (*n* = 94) resulting from the review of 'lakes' in the Freshwater Ecosystems of New Zealand (FENZ) database (Schallenberg et al. 2024a). LID = lake identification number. Geomorphic types: A = artificial, W = wind / aeolian, L = landslide, R = riverine, V = volcanic, P = phytogenic. Types of artificial lake: D= dam, C = constructed, M = mine.

LID	Name	Geomorphic type	Type of artificial lake	Measured max. depth (m)	Modelled max. depth (m)	Longitude	Latitude	Area (ha)
15854		A	D		20	174.3287533 E	-39.58860533 S	2.1
15896		W			10	174.6008404 E	-39.78230117 S	1.8
15900		A	D		10	174.6277188 E	-39.79118099 S	1.1
16123		R			23	174.6660531 E	-39.70069023 S	3.1
16215		RL			22	174.7042095 E	-39.66793201 S	1.2
16267		AR	D		11	173.96884 E	-39.52766422 S	1.5
15823		W			0	174.3721569 E	-39.668554 S	5.3
16505		A	D		24	174.8723266 E	-39.5553013 S	1.2
7506	Lake Rotorangi	A	D		161	174.5243346 E	-39.50779899 S	548.9
16131	Lake Moumahaki	L		26	37	174.6695158 E	-39.68908882 S	32.2
20880	Lake Mangamahoe	A	D		24	174.1248263 E	-39.12323171 S	25.1
16392	Lake Ratapiko	A	D		38	174.3317997 E	-39.20569726 S	19.2
7512	Lake Rotokare	L		12	24	174.4110213 E	-39.45149972 S	15.7
15904	Lake Oturi	W		5	12	174.6208083 E	-39.77953897 S	11.9
16224	Lake Mangawhio	RL			17	174.7933541 E	-39.65200183 S	8.6
16222	Lake Waikare	L		18	24	174.8058091 E	-39.66900701 S	7.0
15907	Lake Waiau	W		2	16	174.6802672 E	-39.79463125 S	26.6

LID	Name	Geomorphic type	Type of artificial lake	Measured max. depth (m)	Modelled max. depth (m)	Longitude	Latitude	Area (ha)
15902	Lake Herengawe	W		5	19	174.641667 E	-39.79213043 S	14.7
20904	Lake Rotomanu	RA	D		7	174.1147415 E	-39.04058759 S	10.9
16280		AR	D		7	173.8621132 E	-39.45820761 S	6.0
15795	Lake Kaikura	W		5	6	174.4058363 E	-39.69925484 S	5.3
20893	Barrett Lagoon	L				174.0409923 E	-39.09093491 S	5.1
15898	Lake Okoia	W			13	174.6850515 E	-39.81848027 S	3.7
15840		W			12	174.2856364 E	-39.61658917 S	3.4
16269		W			4	173.8939921 E	-39.49096551 S	2.7
16233		R			27	174.7351143 E	-39.58566385 S	2.6
15937		A	D		8	174.6898874 E	-39.80456366 S	2.5
20767		(A)	D		21	174.2397672 E	-39.12237594 S	2.5
16165		L			22	174.6814739 E	-39.6704879 S	2.5
16190		L			21	174.6890592 E	-39.67825213 S	2.4
16213		L			22	174.6911904 E	-39.66991999 S	2.2
20919		A	C		11	174.203804 E	-39.08124517 S	2.2
16025		A	C		3	174.4848807 E	-39.76439529 S	2.0
16197		L			18	174.6900902 E	-39.67267606 S	2.0
16196		L			24	174.6870725 E	-39.67201444 S	1.6
16163		R			23	174.6098284 E	-39.6492573 S	1.5
16442		L			23	174.7865379 E	-39.55767395 S	1.4
15943		A	D		10	174.7515387 E	-39.82723286 S	1.3

LID	Name	Geomorphic type	Type of artificial lake	Measured max. depth (m)	Modelled max. depth (m)	Longitude	Latitude	Area (ha)
15855		A	D		18	174.3223636 E	-39.58393817 S	1.3
16193		L			12	174.6833645 E	-39.67680401 S	1.2
20943		A	D		21	174.2625519 E	-39.07962983 S	1.2
16325	Lake Dive	V			10	174.0591856 E	-39.33556125 S	1.2
16202		L		16	22	174.8018517 E	-39.6728958 S	1.2
20899		A	D		9	174.079008 E	-39.06562884 S	1.2
16219		L			20	174.7002602 E	-39.66269321 S	1.1
20771		A	D			174.1367163 E	-39.08584392 S	1.0
16591		R			21	174.4505287 E	-39.25992487 S	1.0
16502		A	D		22	174.8664238 E	-39.55683535 S	1.0
15909		A	D		14	174.6576632 E	-39.77921093 S	1.6
16237		A	D		21	174.7979608 E	-39.57627198 S	2.8
15886	Tapuarau Lagoon	W				174.679396 E	-39.84111262 S	7.3
20959	Waipu Lagoons	W			9	174.1360638 E	-39.02980726 S	1.0
15926	Lake Waikato	A	D		17	174.7856541 E	-39.82988587 S	7.5
15947		W			21	174.7650305 E	-39.82579429 S	3.1
16214		L			23	174.6901601 E	-39.66473756 S	9.2
16288		(P)				173.9315973 E	-39.36676153 S	1.3
13311		A	D			174.4275982 E	-39.70955363 S	1.0
15842		W			18	174.2909711 E	-39.61727674 S	2.9
13309		W			5	174.4327876 E	-39.72014155 S	1.4

LID	Name	Geomorphic type	Type of artificial lake	Measured max. depth (m)	Modelled max. depth (m)	Longitude	Latitude	Area (ha)
16159		R			17	174.605345 E	-39.65610623 S	1.1
20969		A	D		5	174.2351308 E	-39.01204926 S	14.7
15792		W				173.819914 E	-39.17718201 S	2.7
7445	Rotokawau	R			9	174.712705 E	-38.90020314 S	1.3
54768		A	D			174.3861961 E	-39.01847628 S	1.0
54935		A	D			174.2443346 E	-39.01268915 S	7.2
55076		A	C			174.6002409 E	-39.82058156 S	3.9
55090		A	D			174.5576051 E	-39.76041828 S	3.7
55178		A	D			174.2096226 E	-39.5749915 S	2.9
55221		W				174.0135102 E	-39.09366032 S	2.6
55398		A	D			174.2667568 E	-39.58193216 S	1.6
55475		A	D			174.4126399 E	-39.68991682 S	1.4
55514		A	D			174.6511237 E	-39.79850987 S	1.3
55520		A	D			174.3976669 E	-39.67945636 S	1.3
55627		A	D			174.4764053 E	-39.1883557 S	1.1
55648		A	D			174.2801273 E	-39.21767791 S	1.1
55652		W				174.7392491 E	-39.85909953 S	1.1
55653		A	D			174.7615866 E	-39.81077244 S	1.1
55668		A	C			174.1202934 E	-39.57640882 S	1.1
55675		A	C			174.2059398 E	-39.05720302 S	1.1
55999		A	M			173.9175142 E	-39.35614272 S	1.8

LID	Name	Geomorphic type	Type of artificial lake	Measured max. depth (m)	Modelled max. depth (m)	Longitude	Latitude	Area (ha)
56000		W				174.361873 E	-39.66221579 S	1.0
56001		A	M			173.9166537 E	-39.35984283 S	3.1
56002		AR	D			174.3333413 E	-39.25552964 S	1.1
56524		A	D			174.6530613 E	-39.78662263 S	2.1
56525		A	D			174.5913182 E	-39.77039629 S	1.4
56526		A	D			174.6373965 E	-39.75369786 S	1.3
56527		A	D			174.2260953 E	-39.59129039 S	3.7
56528		A	D			174.5214714 E	-39.32882976 S	2.0
56536		R				174.5525342 E	-39.75430055 S	1.0
56537		W				174.6448013 E	-39.79682986 S	1.5
56538		A	D			174.6249449 E	-39.78606732 S	1.2
56539		A	D			174.6686841 E	-39.75151263 S	1.5
56668		A	C			174.1399013 E	-39.02266743 S	4.1
56669		A	C			174.142856 E	-39.02286115 S	2.8

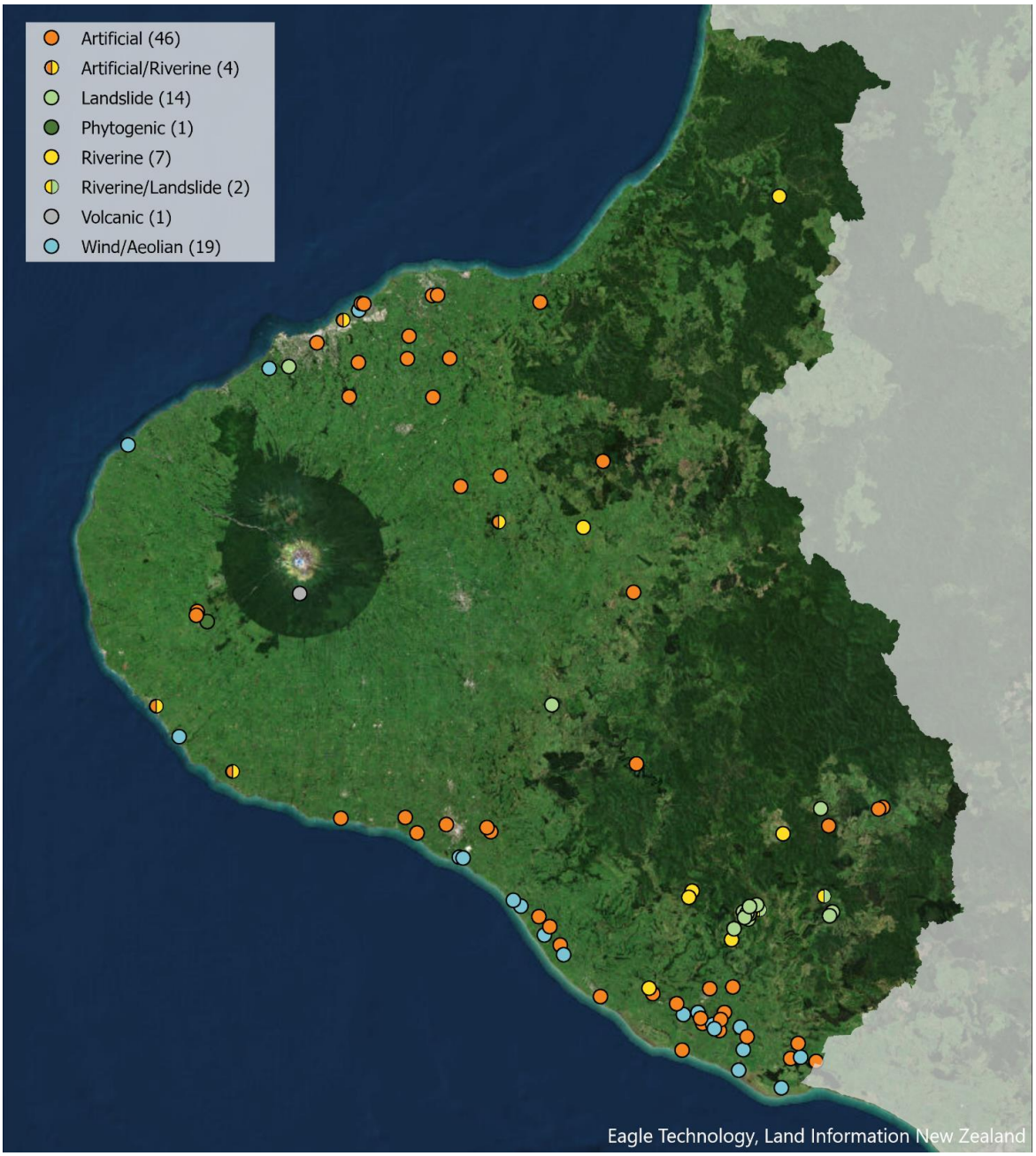

Figure 1. Lakes in the Taranaki Region (*n* = 94) as identified in the latest Freshwater Ecosystems of New Zealand (FENZ) lake review (Schallenberg et al. 2024a), coloured by lake geomorphic type.

While it would be ideal to present data in this report for the 94 lakes found in the most recent FENZ lake review (Schallenberg et al. 2024a), previously modelled lake reference condition data do not exist for the newly added lakes, and lake attributes have not been calculated to allow for an update of the models. Therefore, modelled data are provided for only 63 lakes.

3. Potential reference conditions for lakes in the Taranaki Region

Currently in the NOF, the attributes chl-*a*, TN and TP refer to A band as 'similar to natural reference conditions' (MfE 2024). However, lake reference conditions can be specific to certain lake geomorphic types, or to individual lakes depending on their vertical mixing, salinity and depth (Schallenberg 2019). There are five main approaches commonly used to estimate ecological reference conditions according to Stoddard et al. (2006). While these approaches focus on streams, they can be modified to determine lake reference conditions. The approaches are listed below:

1. **The reference-site approach**, where the condition of a set of minimally disturbed lakes can be quantified.
2. **Best professional judgement**, in which highly experienced limnologists develop an empirical understanding of the type of conditions that result from the absence of disturbance.
3. **Interpreting historical conditions**, where paleoenvironmental reconstructions can be made from lake sediment cores to provide information on the historical catchment and lake state.
4. **Empirical modelling**, where associations between biological indicators and human-disturbance gradients can be extrapolated to predict pre-human conditions.
5. **Ambient distributions**, where percentiles of an attribute's current distribution are used to determine which lakes are deemed in a reference state, when a pre-determined proportion of those lakes that are in a 'reference state' has been decided.

Four of these approaches have previously been used to estimate the reference condition of lakes in Aotearoa New Zealand. Here, we bring together results from three studies using these different approaches. The first (Abell et al. 2019, 2020) uses estimated stream reference conditions and an *empirical modelling* approach to estimate reference TN and TP, which were further extrapolated to model chl-*a*, Trophic Level Index (TLI) and Secchi disc depth in approximately 1,000 Aotearoa New Zealand lakes using nutrient mass loading models. The second approach (Schallenberg 2019) uses a large, nationwide lake water quality and biodiversity dataset and applies a *reference-site approach* calibrated by *best professional judgement* to derive thresholds associated with 'reference lakes', along with *interpretations of historical conditions* using a small paleolimnological dataset. The third approach analyses relevant local historical sediment cores for a range of proxies relating to water quality, catchment characteristics, biodiversity and lake health to provide detailed *interpretations of historical conditions* for selected lakes in the region. Below, we outline the methods and results from each approach, with specific reference to lakes in the Taranaki Region.

3.1 Lake reference condition modelling from Abell et al. (2019, 2020)

To explore the historical reference condition of lakes in Aotearoa New Zealand, Abell et al. (2019, 2020) used empirical nutrient mass loading models to estimate current and reference TN, TP, chl-*a*, Secchi disc depth and TLI for between 1,033 and 1,038 lakes across Aotearoa New Zealand. To model reference

conditions of TN and TP, reference stream nutrient concentrations (as estimated by McDowell et al. [2013]) were used as lake inflows for models of the least disturbed 'reference' lakes (n = 30 lakes for reference TN and n = 27 lakes for reference TP; Abell et al. 2019). Reference chl-*a* concentrations were predicted for 1,031 lakes as a function of reference TN and TP concentrations using a sub-sample of the least disturbed lakes (n = 66 lakes; Abell et al. 2020).

Twenty-seven lakes in the Taranaki Region were modelled using the Abell et al. (2019, 2020) approach. However, five of these lakes were removed during the review of FENZ lakes because they were too small, had dried up or were river reaches. An additional eight lakes were identified in the FENZ lake review as artificial in origin, having likely been built in the last 40–50 years, and determining a reference condition for these lakes is not particularly useful. Therefore, these lakes were removed from the Abell et al. (2019, 2020) results and the remaining 14 natural lakes are presented here (Figure 2).

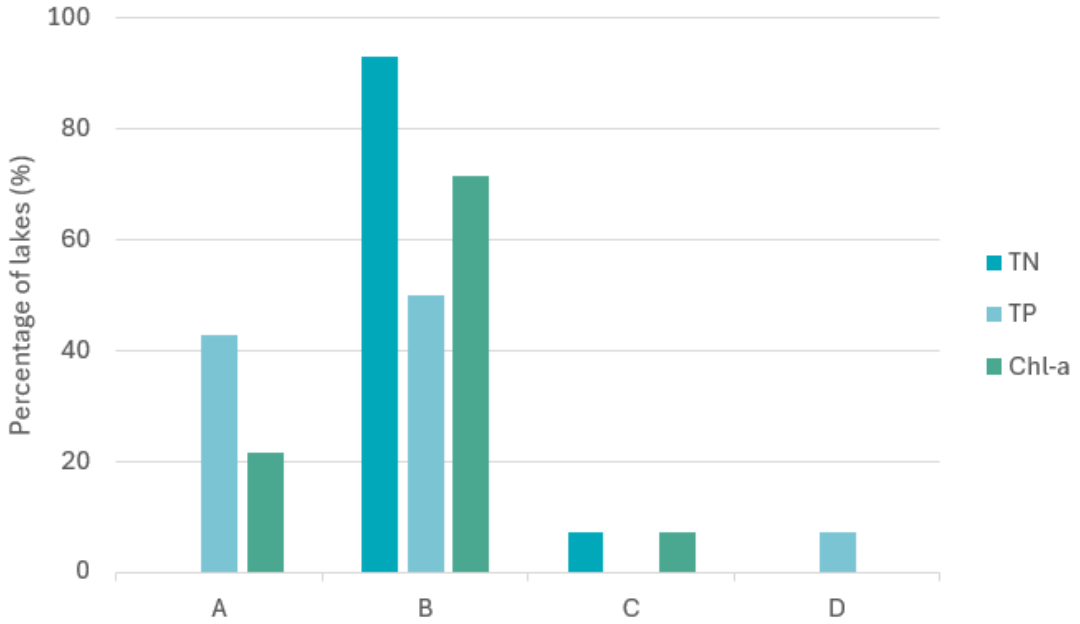

Figure 2. Number of Taranaki lakes (n = 14) in each reference modelled National Objectives Framework (NOF) attribute band (A–D), as modelled by Abell et al. (2019, 2020).

The model suggests that, of the lakes included in the Abell et al. (2019, 2020) analysis, only 50% of lakes in Taranaki had reference TP concentrations in the A band, 0% had reference TN concentrations in the A band and 22% had reference chl-*a* in the A band (Figure 2). For reference TN and chl-*a*, the majority of lakes were estimated to be in the B band, which corresponds to a mesotrophic state. While it would not be surprising for some shallow lakes – particularly dune lakes – to have mesotrophic reference conditions, Lake Kaikura (15795) was estimated to have a reference TP concentration in the D band

(60 ug/L). This is highly unlikely given that current lake TP concentrations (after significant land-use change to high-producing grassland) are largely < 40 µg/L,[2] which would place this lake in the C band.

Table 2 shows the estimated concentrations of these attributes for each lake in the Taranaki Region according to Abell et al. (2019, 2020), along with 95% confidence intervals for the estimates, illustrating the high uncertainties associated with modelling for some lakes. For example, Lake Kaikura (15795) has confidence intervals that are 2–4 times above or below the predicted value.

Limitations

It is worth noting that the model used for reference TN is not very robust for lakes with low TN levels. Consequently, this is reflected in the reference chl-*a* estimates that are modelled using reference TN. Abell et al. (2019) state that modelled average TN and TP concentrations were lower for current states than for reference states in a minority of lakes, with these lakes largely being at the lower nutrient range. Based on their models, current TN concentrations were lower than reference TN concentrations in 32% of lakes nationally, a result that is likely inaccurate. For the 14 Taranaki Region lakes, two have higher modelled reference TN than current TN (Lake Moumahaki and Lake 16214), meaning that the data for those lakes are of little value in establishing reference conditions.

Additionally, there are other uncertainties associated with the modelling approach (for details, see Abell et al. [2019, 2020]). In particular, the sub-set of lakes used to develop the reference condition TP and TN models were selected because they have reference inflow concentrations that were equal to or less than the maximum concentrations estimated across all streams under a reference state. This meant that only 30 lakes were used for developing the reference TN model and 27 lakes for the reference TP model. The input data for these reference models are also modelled, as opposed to measured, meaning that these data have errors associated with the estimates. Because of these uncertainties, the wide confidence intervals and resulting likelihood that the model data are inaccurate, we have not undertaken any further interpretation of the results from these reference condition models.

[2] www.lawa.org.nz

Table 2. Modelled reference condition chlorophyll-*a* (chl-*a*), total phosphorus (TP) and total nitrogen (TN) concentrations, along with corresponding lower and upper 95% confidence intervals (CI) and modelled depth (unless stated), for 14 Taranaki lakes, from Abel et al. (2019, 2020). LID = lake identification number. Colours correspond to current National Objectives Framework (NOF) attribute bands: blue = A band, green = B band, yellow = C band, red = D band. Artificial lakes were removed from the analysis.

LID	Name	Chl-*a*	Lower CI	Upper CI	TN⁺	Lower CI	Upper CI	TP	Lower CI	Upper CI	Depth (m)
7512	Rotokare	2.3	1.4	3.9	250	129	497	8.5	5.6	13.3	12*
15795	Kaikura	9.9	3.4	28.0	387	195	793	60.6	13.6	261.8	5*
15898	Okoia	4.0	1.5	10.1	306	158	597	16.5	4.0	70.8	13
15902	Herengawe	3.4	1.3	8.1	276	148	544	14.4	3.8	59.1	5*
15904	Oturi	3.7	1.5	9.6	311	168	602	14.5	4.3	60.0	5*
15907	Waiau	3.5	1.7	7.3	287	153	541	14.6	5.4	40.2	2*
15947		3.5	1.5	8.3	268	151	547	15.3	4.4	59.6	21
16131	Moumahaki	2.3	1.3	4.1	235	131	463	8.6	5.0	15.1	26*
16190		2.6	1.4	4.9	276	154	535	9.1	4.2	19.4	21
16214		2.5	1.3	4.8	287	155	554	8.1	4.2	17.2	23
16215		2.0	1.2	3.5	167	93	303	10.6	6.1	20.1	22
16222	Waikare	2.0	1.2	3.3	164	82	327	10.3	6.9	16.2	18*
16224	Mangawhio	2.6	1.4	4.4	263	138	511	9.3	5.1	17.2	17
16233		1.5	0.8	2.7	171	87	334	5.9	3.2	11.0	27

* Measured depth.

⁺ TN NOF bands were determined for each lake based on a lake's maximum depth as listed in the FENZ database, or measured depth if listed in the FENZ lake review 2024 (Schallenberg et al. 2024a).

3.2 Lake reference condition water quality limits from Schallenberg (2019)

Schallenberg (2019) combined two approaches to provide lake reference condition attribute thresholds for three different lake classes in Aotearoa New Zealand: shallow lowland (≤ 10 m maximum depth, < 25 km from the coast [as described in Drake et al. 2010] and with salinity < 600 µS/cm), deep (maximum depth > 10 m [Özkundakci et al. 2014]) and brackish (with saline intrusion or influence). First, national lake survey data (n = 73) were applied in a survey-calibration approach, using an ecological integrity framework that included components of nativeness, pristineness, diversity and resilience. This dataset was analysed, and best professional judgement was used to determine which lakes were considered to have the highest ecological integrity. Those lakes were then deemed to be in a 'reference condition' (Schallenberg 2019). A paleolimnological approach was also taken, and general qualitative information from lake sediment cores was provided and summarised for 16 lakes across deep, shallow lowland and brackish classes. In general, the study revealed that reference conditions for all three lake classes comprised low chl-*a*, nutrients and cyanobacteria, with a dominance of native flora and fauna, and often extensive macrophyte beds.

The survey-calibration approach was used to determine thresholds for a range of water quality and ecosystem health attributes. Here, we summarise and present components relating to pristineness, which can be described as the physicochemical, functional and structural components of an ecosystem that are often measured in routine monitoring, including chl-*a*, TN, TP and TLI (Table 3). Reference limits for shallow lakes are given for two different reference categories: Tier 1, which represents the most unimpacted lakes (i.e. lakes in the 90th percentile for indicators of native vegetation and ecological integrity); and Tier 2 lakes, which are slightly more impacted (i.e. within the 80th percentile for those indicators). Deep lake reference values relate to lakes within the 74th percentile for those indicators. Only one reference condition lake was used in the derivation of the brackish lakes / lagoons limit; therefore, those reference thresholds should be considered preliminary (Schallenberg 2019).

Table 3. Summary of the 'most useful' pristineness limits for defining the reference conditions of deep lakes, brackish lakes / lagoons and shallow lowland lakes, adapted from Schallenberg (2019). Reference values for shallow lowland lakes are given as Tier 1 (90th percentile) and Tier 2 values (80th percentile). Deep lake reference values are 74th percentile, while brackish lake values are based on one single lake and are therefore preliminary. Shaded colours indicate National Objective Framework (NOF) bands: blue = A, green = B, yellow = C.

Lake class	Attribute	Unit	Range for all lakes	Range for reference lakes		Limit for reference lakes	
Deep lakes	Total phosphorus	mg/m^3	1.8–227.0	1.8–3.1		≤ 3.1	
	Trophic Level Index						
	Chlorophyll-*a*	µg/L	0.3–44.0	0.6–1.0		≤ 1.0	
Brackish lakes / lagoons	Total nitrogen	mg/m^3	128–2,163 *			≤ 128 *	
	Total phosphorus	mg/m^3	2.4–510.0 *			≤ 2.4 *	
	Trophic Level Index		2.5–7.2 *			≤ 2.5 *	
	Chlorophyll-*a*	µg/L	0.3–80.4 *			≤ 0.3 *	
Shallow lowland lakes				**Tier 1**	**Tier 2**	**Tier 1**	**Tier 2**
	Total nitrogen	mg/m^3	151–3,672	235–277	235–692	≤ 277	(≤ 692)
	Total phosphorus	mg/m^3	2–492	2.0–11.7	2.0–23.0	≤ 11.7	(≤ 23.0)
	Trophic Level Index		1.8–7.2	1.8–3.5	1.8–4.4	≤ 3.5	(≤ 4.4)
	Chlorophyll-*a*	µg/L	1–116	0.7–3.2	0.7–5.7	≤ 3.2	(≤ 5.7)

* Values are based on only one reference condition lake and are therefore preliminary.

For Tier 1 shallow lowland lakes, the approach used by Schallenberg (2019) indicates that reference condition thresholds for TN and chl-*a* are in the NOF A band and TP is in the B band. Shallow lowland Tier 2 lakes are expected to have reference threshold TN and TP concentrations in the C band (equating to a eutrophic state), while the chl-*a* threshold is in the A band (Table 3). For deep lakes, reference condition thresholds for TP and chl-*a* are in the A band. Schallenberg (2019) also notes that all of the reference condition lakes used to define the deep lake thresholds are glacial lakes that have been modified as part of hydroelectric schemes. Therefore, the proposed deep lake limits do not strictly apply to smaller lakes and those not of glacial origin.

Currently, of the 94 lakes in Taranaki in the reviewed FENZ lakes layer (Schallenberg et al. 2024a), 38 can be classified by Schallenberg (2019) as deep lakes and 20 would be shallow lowland lakes according to the Drake et al. (2010) classification used by Schallenberg (2019) (Figure 3). However, we found that the classification criterion used for 'lowland' (e.g. lakes within 25 km of the coast) resulted in five high-elevation shallow lakes being erroneously included in that class (including Lake Dive and Rotokawau). After discussions with Marc Schallenberg (Otago University, original report author), we recommend that shallow lowland lakes are defined here as lakes ≤10 m maximum depth, < 25 km from the coast, < 100 m above sea level (according to FENZ data), and with salinity < 600 µS/cm (M. Schallenberg, pers. comm., February 2025). When these new criteria are applied (without salinity, as these data are not available), there are 15 shallow lowland lakes in the Taranaki Region (Figure 3). There is currently insufficient information in FENZ to determine whether lakes would classify as brackish, and there are no data on the maximum depth for 36 lakes; therefore, these lakes could not be classified using the Schallenberg (2019) approach.

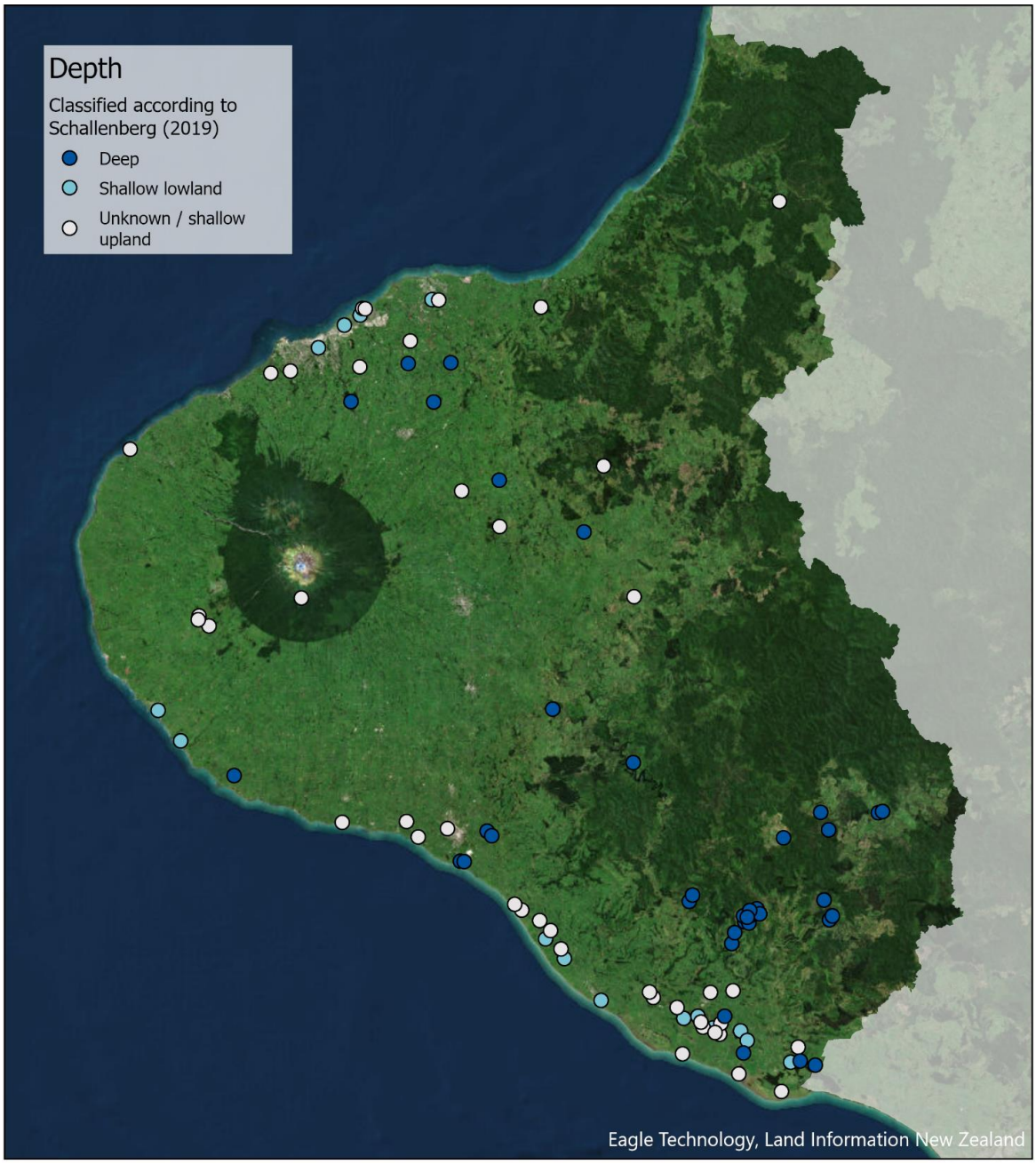

Figure 3. Lakes in the Taranaki Region coloured by lake classes used for reference condition threshold analysis in Schallenberg (2019), applying a modified approach where shallow lowland lakes are defined as ≤ 10 m maximum depth, < 25 km from the coast, < 100 m above sea level (according to FENZ data), and with salinity < 600 µS/cm. Unknown lakes are lacking modelled depth data, and upland lakes include shallow lakes that do not meet our modified definition because of their altitude.

Comparison of Schallenberg (2019) estimated reference condition with present-day modelled water quality

The current water quality of lakes in the Taranaki Region was modelled by Schallenberg et al. (2023a) using a Sediment Bacterial Index (SBI) approach (Pearman et al. 2022) to estimate chl-*a* (SBI-Chla), TN (SBI-TN), TP (SBI-TP) and TLI (SBTI). These data were compared against reference limit thresholds from Schallenberg (2019) to identify lakes where there has potentially been little deviation from the reference state.

There are 63 lakes in the Taranaki Region with modelled SBI attribute estimates. Of these, 53 can be classified into Schallenberg (2019) categories and compared with reference condition thresholds. Table 4 shows lakes in the Taranaki Region where at least one present-day modelled attribute is lower than the reference condition limit as set out in Schallenberg (2019). None of the deep lakes (> 15 m maximum depth) or the brackish lakes / lagoons are currently estimated to be in a reference state for any attribute. Five shallow lowland lakes are estimated to meet Tier 2 reference state thresholds for TN, and five lakes are estimated to meet Tier 2 thresholds for TLI (Table 4; Figure 4). However, it is important to note that SBI and SBTI data are modelled, and we recommend that these lakes are sampled to confirm model estimates. We also note that the Tier 2 thresholds for shallow lowland lakes are within the eutrophic range, so care should be taken when using this relaxed Tier 2 criteria as a reference state. Given that the data used to make these estimates are modelled, we strongly recommend that this information is used to guide sampling efforts, rather that used to guide management approaches.

Table 4. Shallow lowland lakes in the Taranaki Region that are currently estimated (using Sediment Bacteria Index [SBI] modelling) to meet reference condition thresholds according to Schallenberg (2019). Blue = meets Tier 1 thresholds for shallow lakes, green = meets Tier 2 thresholds for shallow lowland lakes, Geo. type = geomorphic type (W: Wind / Aeolian, A: Artificial, R: Riverine, V: Volcanic, L: Landslide), Chla = chlorophyll-*a*, TP = total phosphorus, TN = total nitrogen, SBTI = Sediment Bacterial Trophic Index.

LID	Name	Geo. type	SBI-Chla	TRC-Chla	SBI-TP	TRC-TP	SBI-TN	TRC-TN	SBTI	TRC-TLI
			µg/L		mg/L		mg/L			
13309		W	15.4		46.8		653		4.4	
15795	Kaikura	W	8.7	25.0	39.7	38.8	612	3066	4.7	5.8
16280	Opuke	RA	19		50.3		339		5.0	
20959	Waipu Lagoons	W	17.8		37.7		513		4.2	
20899		A	18.8		35.7		619		4.2	
15896		W	18.3		58.5		781		4.4	
15900		A	15.3		49.4		836		4.4	

Figure 4. Shallow lowland lakes in the Taranaki Region that are currently estimated (using Sediment Bacteria Index [SBI] modelling) to meet reference condition thresholds for total nitrogen (SBI-TN; left) and Trophic Level Index (SBTI; right), according to thresholds from Schallenberg (2019). Note that the lakes meeting Tier 2 based on this approach are eutrophic. Given that the data used to make these estimates are modelled, we strongly recommend that this information is used to guide sampling efforts, rather than used to guide management approaches.

Limitations

One of the major limitations of the approach applied by Schallenberg (2019) is the use of single spot samples in the nationwide survey, as these are not time-integrated and are representative of lake conditions only at the time of sampling. There is also a lack of reference condition lakes for certain lake classes, e.g. only one reference lake was used for brackish lakes / lagoons. In addition, lakes are grouped into three broad categories (shallow lowland, deep and brackish), while conditions will differ in lakes of differing geomorphology, geology and catchment type and with different natural disturbances. The fact that the reference limits for deep lakes were developed using only modified, deep glacial lakes and are not transferrable to other lake geomorphologies exemplifies this point. Where possible, the specific history of individual lakes or lake types should be analysed.

3.3 Lake reference condition insights from paleolimnological analyses

Paleolimnological analyses can be used to determine the historical state of lakes, including aspects of water quality, biodiversity and catchment condition (Short et al. 2022). Eight lakes in the Taranaki Region (Rotokare, Kaikura, Herengawe, Oturi, Waiau, Moumahaki, Waikare and 16202 [no sediment core was taken for this lake]) were sampled as part of the national Our Lakes' Health: Past, Present, Future programme, also known as Lakes380 (Figure 5). As part of this programme, water, surface sediment and

sediment core samples were collected. The water and surface sediment samples were analysed for nutrients, trace metals and bacterial environmental DNA (eDNA); these data are not included in this report. The sediment cores from four lakes (Rotokare, Kaikura, Moumahaki and Waikare) were analysed using various techniques to explore the historical changes in the lakes and help establish their reference conditions. The downcore analysis included pollen to infer vegetation changes in the catchment and lake, hyperspectral imaging as a proxy for chl-*a*, Itrax core scanning to assess erosion and anoxia, diatoms to explore changes in water quality, cadmium as a proxy for superphosphate fertiliser application in the catchment, and eDNA analysis of bacteria to investigate changes in community structure and infer functional shifts. Below, we provide an overview of the analysis methods and results for the four sediment cores and discuss these in the context of determining a reference condition for the lakes.

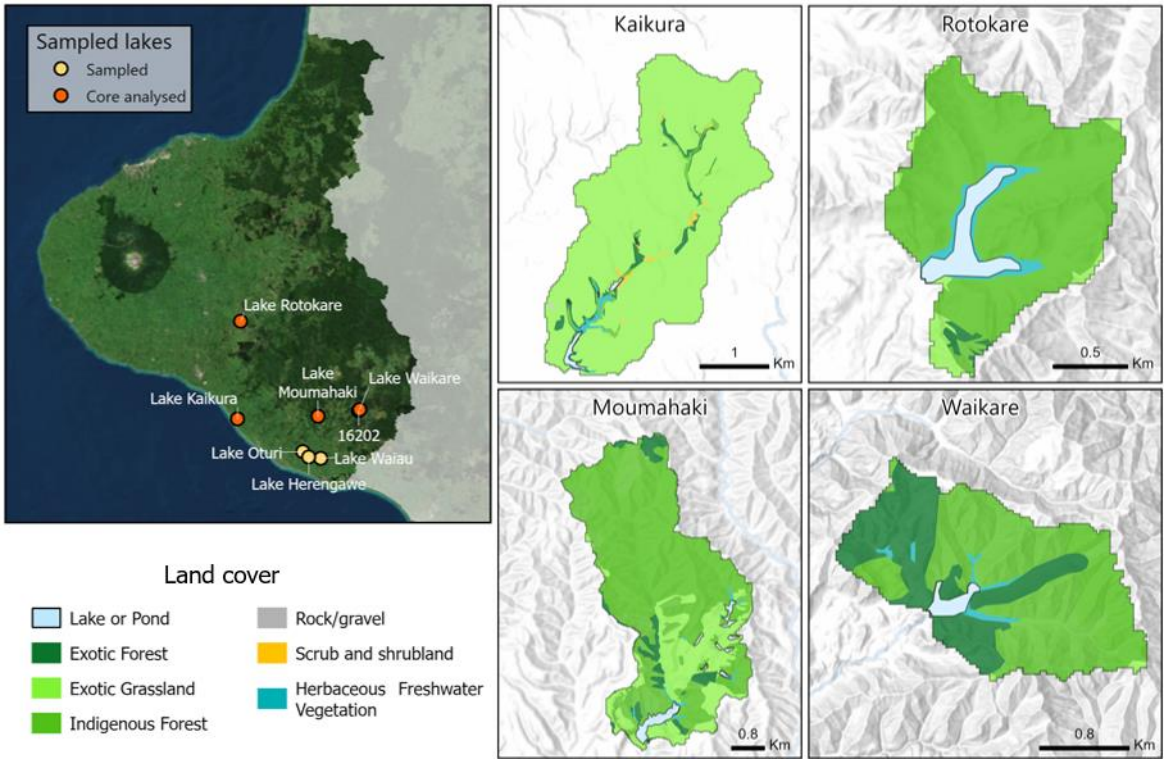

Figure 5. The eight lakes in Taranaki sampled as part of the Our Lakes' Health: Past, Present, Future programme (also known as Lakes380). Red dots highlight the four lakes with sediment cores that are discussed in this report – their catchment boundaries and current land cover are shown in the inserts. Source: Eagle Technology, Land Information New Zealand.

Methods

These methods have been taken from Wood et al. (2023) and modified slightly.

Sediment core collection and analysis

For all lakes except Lake Moumahaki, four sediment cores were obtained in October 2019 near the deepest part of each lake using a UWITEC gravity corer with 2 m-long, 90 mm-diameter polyvinyl chloride barrels. Due to the high sedimentation rate at Lake Moumahaki, the sediment core was collected using a Mackereth corer with 50 mm-internal-diameter plastic barrels. The barrels were cleaned with 2% sodium hypochlorite (bleach) prior to use. Once retrieved, the cores were sealed and stored in darkness at 4 °C for about 4 weeks before sub-sampling was conducted.

The sediment cores were split lengthwise using a Geotek core splitter and guillotine. To prevent potential contamination, 2–3 mm from the top of one half-core from each lake was removed using a sterile spatula. Samples of approximately 0.5 g were collected from the middle of the half-core at different depths using a sterile spatula. One part of the core was selected for pollen and DNA analyses, while the other half was designated for hyperspectral scanning. Not all sediment cores were analysed for every proxy (Table 5).

Table 5. Sediment cores analysed as part of this study, the earliest human occupation period covered by each core sample and the different parameters assessed for each lake.

Lake name	Location	Depth (m)	Occupation period of earliest sample	Proxies measured on sediment cores from each lake							
				Age model	Pollen	Itrax	Hyperspectral	Diatoms	Cadmium	Lead	eDNA – bacteria
Kaikura	Lowland	4.5	Post-Māori settlement	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rotokare	Hill country	12.0	Pre-human	Yes	Yes	Yes	Yes	–	Yes	Yes	Yes
Waikare	Hill country	26.0	Post-Māori settlement	–	Yes	Yes	Yes	–	–	–	Yes
Moumahaki	Hill country	18.2	Post-Māori settlement	–	Yes	–	Yes	–	–	–	Yes

A description of the type of information provided by each proxy / method listed in Table 5 is provided in Table 6.

Table 6. Description of the information provided by each proxy / method used to analyse sediment cores. Samples from selected depths are analysed unless indicated otherwise.

Proxy (method)	Information provided
Age model	Provides dates associated with each layer of the sediment core. This is determined using radiocarbon (^{14}C), lead-210 (^{210}Pb) analysis and pollen data.
Pollen	Indicates changes in catchment and in-lake vegetation and provides high-level vegetation data that can be used to assess the timing of different human occupation periods. The presence of charcoal can be used to provide evidence of burning in the catchment / region.
Itrax scanning **Entire core is scanned**	Indications of shifts in lake geochemistry, productivity and catchment erosion. In this report, we have selected: • titanium (Ti) relative concentrations normalised to incoherence (Inc) as a proxy for increased detrital input and fine-grained material • manganese (Mn) relative concentrations normalised to iron (Fe) as a proxy for past lake redox conditions.
Hyperspectral scanning **Entire core is scanned**	Shifts in chlorophyll-*a* concentrations.
Diatom communities	Indicates changes in water quality and other parameters such as depth and light availability.
Cadmium	A proxy for fertiliser application on land surrounding the lake. Cadmium is found in phosphate rocks, which are used to make fertilisers such as superphosphate.
Lead	A proxy for increases in population or urbanisation close to a lake. The lead is likely sourced from leaded petrol, which was phased out in Aotearoa New Zealand in 1996.
Environmental DNA of microbial communities (diversity and function)	Changes in bacterial communities related to shifts in water quality and shifts in three functions (denitrification, dissimilatory nitrate reduction to ammonia, and sulphate reduction).

Pollen

The sediment was treated with 10% hot hydrochloric acid and acetolysis and passed through a 6 µm sieve to extract pollen from 0.25 cm^3 of sediment. Each sample included exotic *Lycopodium* tablets to determine pollen concentrations. Pollen and spores were identified using standard references and the Aotearoa New Zealand reference collection held at GNS Science.

The data are presented as the relative frequency of a minimum pollen sum of 150 grains. This sum includes pollen from all dryland plants: trees, shrubs, herbaceous plants and non-native plant taxa. Bracken fern (*Pteridium esculentum*) was included in the dryland pollen sum because in a post-disturbance landscape its functional morphology is closer to a shrub than a fern, and a bracken stand is

ecologically equivalent to shrubland (McGlone et al. 2005). Pollen of other groups (wetland, aquatics, ferns, tree ferns and non-palynomorphs) were excluded from the sum, but their percentages were calculated as a proportion of dryland pollen, plus the respective group.

Chronology and human occupation periods

Chronologies were developed for Rotokare and Kaikura only. Terrestrial leaf macrofossils were extracted by picking *in situ* material from the split core surface. Macrofossils were cleaned and pre-treated using an acid–alkali–acid procedure to remove carbonates and fulvic and humic compounds. The pre-treated macrofossils were converted to carbon dioxide by combustion, graphitised and measured by accelerator mass spectrometry following Baisden et al. (2013). Conventional radiocarbon ages were converted to calendar years using the SHCaL20 calibration curve (Hogg et al. 2020), while those that returned modern ages were calibrated using the BHDCGO curve (Turnbull et al. 2017). A Bayesian framework was used to conduct age–depth modelling using OxCal 4.4 (Ramsey 2009). Briefly, pollen and charcoal biostratigraphy and calibrated ^{14}C dates were used in a P_Sequence prior model (with a variable event thickness constant, *k*) to generate probability density functions that were integrated with core depth (Ramsey 2008; Ramsey and Lee 2013) to produce an age model and estimates of age uncertainty.

Pollen data were used to delineate human occupation periods in the sediment downcore data. An increase in bracken fern is used across Aotearoa New Zealand as a chronological marker for the first presence of Māori activity and settlement, as it is both an indicator of landscape disturbance (i.e. it is one of the first successional species after vegetation clearance) and a nutritional source (McGlone and Wilmshurst 1999; McWethy et al. 2010; Newnham et al. 2018). In this report, the period before the increase in bracken fern is called the pre-human phase, and the period following it is referred to as post-Māori settlement. Pine (*Pinus* spp.) and other non-native taxa introduced by European colonialists are used to mark European activity in a landscape; this period is referred to as post-European settlement. In the graphs, the phases are indicated by lines that cross where the first pollen samples indicate the start of each period of human occupation.

Hyperspectral

The cores were scanned using a hyperspectral core scanner equipped with a Specim sCMOS-CL-50-V10E-SCB camera working in the visual to near-infrared range (400–1,000 nm). Measurements were captured with a spectral resolution of 1.3 nm and a spatial resolution of 41 µm. This study analysed spectral data using RABD660/670, which is correlated with the sedimentary pigment chl-*a* and its degradation products.

Environmental DNA (eDNA)

DNA was extracted from approximately 0.25 g of sediment per sample using the PowerSoil kit (Qiagen), and the V3–V4 region of the bacterial 16S rRNA gene was amplified by polymerase chain reaction. The data was processed as detailed in Pearman et al. (2020). Principal coordinates analysis ordinations were undertaken based on Bray–Curtis distance matrices to assess bacterial community change over time. Axis 1 from these ordinations was plotted.

Currently, it is challenging to make ecological inferences about changes in the sediment core bacterial communities, as the ecology of most species remains largely unknown. As a first step to draw some

ecological information from the sediment core data, the data were converted to inferred functions. The functional profiles of the bacterial communities were inferred from the 16S rRNA composition using the software Paprica (Bowman and Ducklow 2015). This places the 16S rRNA gene sequences into a phylogenetic tree containing bacteria with sequenced genomes. The probable metabolism was then predicted based on the functional capability of the nearest sequenced genomes in the phylogenetic tree. Genes encoding enzymes related to denitrification, dissimilatory nitrate reduction to ammonia and sulphate reduction formed a sub-set for analysis.

Analysis of these genes allows us to explore changes in:

- **Denitrification** – the process that converts nitrate to nitrogen gas. An increase in the presence of bacteria able to perform this function could suggest an increase in nitrates in the waterbody.
- **Nitrate reduction** – the process that converts nitrate to nitrite. This is generally an anaerobic process. An increase in this profile could be indicative of increased nitrates and lower oxygen levels.
- **Sulphate reduction** – sulphate reducers derive their energy from the anaerobic oxidation of organic compounds. An increase in this profile may be indicative of anoxia and / or low oxygen levels.

Diatom analysis

Diatoms were analysed for Lake Kaikura. Hydrochloric acid (15%) and hydrogen peroxide (25%) were used to remove carbonates and organic matter (Smol et al. 2001) from the samples. The slurries were permanently mounted onto slides using Naphrax. Counting and identification was undertaken on a microscope at 1,000× magnification. A minimum of 300 valves per sample were counted and identified to the highest taxonomic resolution possible (Foged 1979; Krammer and Lange-Bertalot 1986; Cassie 1989) and taxa habitat preferences were determined (Round et al. 1990; Table 7).

Table 7. List of selected diatom taxa observed in Lake Kaikura and included in the plots, and a brief description of their ecology.

Species	Ecology
Aulacoseira granulata var. *angustissima*	Planktonic; eutrophic
Aulacoseira subarctica	Planktonic; oligo-mesotrophic
Cocconeis placentula	Lives on plants and rocks; all trophic states
Cyclostephanos dubius	Planktonic; eutrophic
Discostella stelligera	Planktonic; ambiguous trophic state
Epithemia adnata	Benthic / planktonic; mesotrophic
Epithemia sorex	Epiphytic; eutrophic
Pseudostaurosira brevistriata	Benthic / planktonic; all trophic states

Itrax scanning

Relative major and trace elemental abundance data were obtained at 1 mm resolution down the sediment core using a Cox Analytics Itrax µXRF Core Scanner at the University of Otago Repository for Core Analysis (Dunedin, New Zealand). The surficial 1–2 mm of the sediment surface was scraped to remove potential contaminants and then scanned using a molybdenum X-ray tube configured at 30 kV, 55 mA and 10 s integration time. Although a suite of elements were analysed, only titanium (Ti) relative concentrations normalised to incoherence (Inc) are presented as a proxy for increased detrital input and fine-grained material, and manganese (Mn) to iron (Fe) relative concentrations as a proxy for past lake redox conditions (Davies et al. 2015).

Cadmium and lead analysis

Sediment core sub-samples were dried, passed through a 2 mm sieve, and analysed for cadmium and lead using acid digestion followed by inductively coupled plasma-mass spectrometry, based on the United States Environmental Protection Agency method 200.8 (US EPA 1994). Reporting limits (mg/kg) are 12.5 for cadmium and 0.075 for lead.

Results and discussion

Images of approximately the top 1 m of the lake sediment cores are provided in Appendix 1.

Lake Kaikura

Lake Kaikura (6 ha surface area, 4.5 m maximum depth) was formed when a stream channel was blocked by windblown sand, creating a lake and wetland. The earliest available aerial imagery shows that the wetland was well established within the gully in 1951 CE, and this had not changed much by 1984 CE (Figure 6).

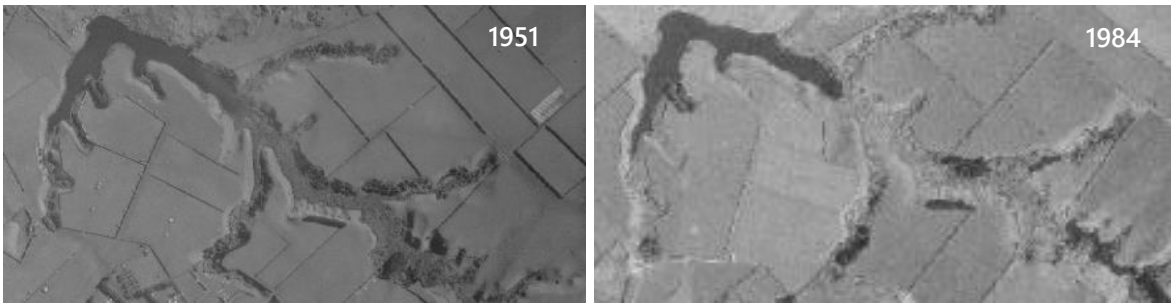

Figure 6. Images from Lake Kaikura in 1951 CE (left), and 1984 CE (right). Source: Retrolens (http://retrolens.nz, licensed by LINZ CC-BY 3.0).

Results

The Lake Kaikura sediment core does not include any sediment from the pre-human period. The pollen and charcoal results indicate that prior to European settlement in the region, significant vegetation change had already occurred (Figure 7). This observation is based on the high relative abundance of bracken fern and tutu, which are associated with landscape disturbance, and charcoal, which is often associated with burning of surrounding vegetation. Some native forest remained, indicating that it is likely that small stands of podocarps (particularly rimu, *Dacrydium cupressinum*) and beech (*Fuscospora* spp.) persisted in the region or around the lake. After European settlement in c.1840 CE, the native vegetation declined further and there was a marked increase in pollen from grasses and non-native trees such as pines (Figure 7).

There was a steady increase in the wetland plant raupō (*Typha orientalis*) and sedges through the post-Māori and post-European settlement eras. Seeds of the macrophyte *Myriophyllum* were present in high abundance during pre-European settlement, but these declined after c.1950 CE. In contrast, *Potamogeton* oospores increased in abundance from c.1980 CE to the top of the sediment core (Figure 7).

Four diatom species were abundant near the base of the sediment core, which likely aligns with early Māori settlement in the region around the lake. These were *Discostella stelligera*, *Cyclostephanos dubius*, *Aulacoseira subarctica* and *Ulnaria spathulifera* (Figure 8). Four diatom species became abundant in the mid- to late post-Māori settlement period: *Aulacoseira granulata* var. *angustissima*, *Discostella stelligera*, *Cyclostephanos dubius* and *Ulnaria spathulifera*. After an initial decline in abundance, *A. granulata* var. *angustissima* increased in prevalence until the 1970s CE, when it declined. *Asterionella formosa* increased steadily post-European arrival and *Fragilaria crotonensis* became abundant after c.1990 CE.

The chl-*a* proxy remained relatively constant until c.1945 CE, when there was a marked increase. It then remained elevated, albeit variable, and from c.1985 CE it steadily increased to the top of the sediment core.

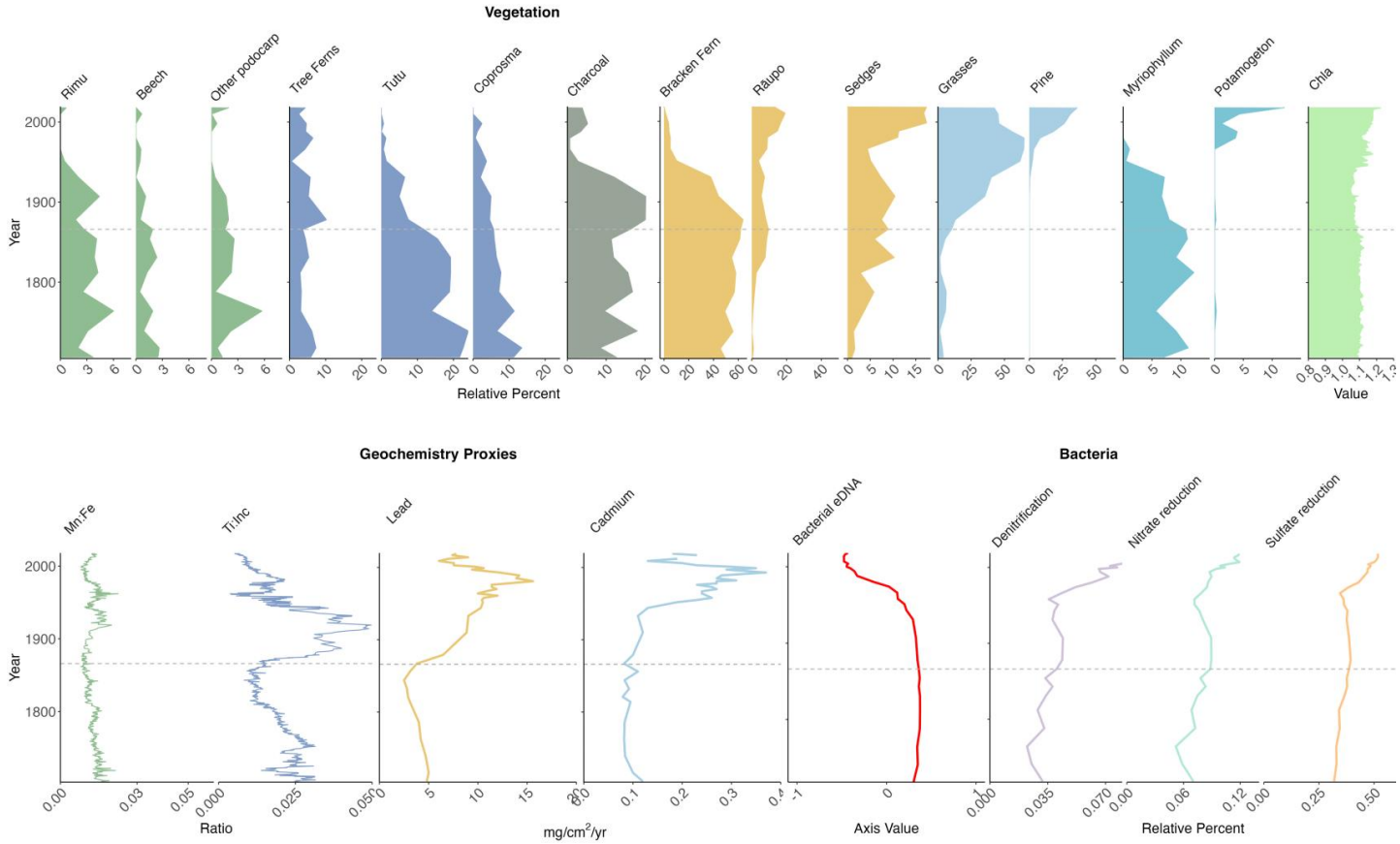

Figure 7. Downcore analysis results for Lake Kaikura. The dotted lines cross the first samples that include pollen indicative of the transition from Māori settlement to post-European settlement. Note that the scale on the x-axis varies. Chla = chlorophyll-*a*; Mn = manganese; Fe = iron; Ti = titanium; Inc = incoherence.

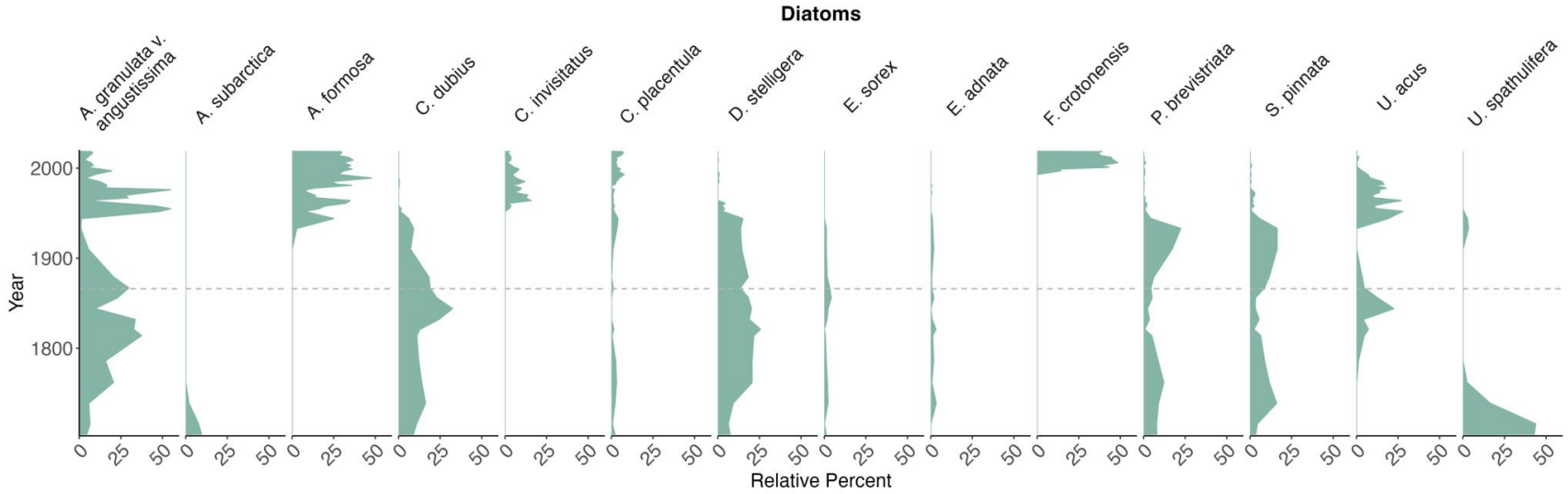

Figure 8. Downcore diatom results for Lake Kaikura. The dotted lines cross the first samples with pollen indicative of the transition from post-Māori to post-European settlement. A. granulata v. angustissima = *Aulacoseira granulata* var. *angustissima*; A. subarctica = *Aulacoseira subarctica*; A. formosa = *Asterionella formosa*; C. dubius = *Cyclostephanos dubius*; C. invisitatus = *Cyclostephanos invisitatus*; C. placentula = *Cocconeis placentula*; D. stelligera = *Discostella stelligera*; E. sorex = *Epithemia sorex*; E. adnata = *Epithemia adnata*; F. crotonensis = *Fragilaria crotonensis*; P. brevistriata = *Pseudostaurosira brevistriata*; S. pinnata = *Staurosirella pinnata*; U. acus = *Ulnaria acus*; U. spathulifera = *Ulnaria spathulifera*.

There were two notable shifts in the bacterial community composition. The first occurs c.1930 CE and the second c.1985 CE, after which there is a gradual change in the bacterial community to the top of the core. The bacterial functional profiles related to denitrification, dissimilatory nitrate reduction to ammonia and sulphate reduction were relatively constant until c.1950 CE, when there was a marked increase.

There was a notable peak in Ti:Inc values c.1920 CE, after which they decreased (Figure 7). Mn:Fe was relatively constant through the sampling period, with two small peaks observed c.1920 CE and 1965 CE (Figure 6). The cadmium concentrations increased markedly from the early 1900s and levels remained elevated to the top of the sediment core. Lead increased in abundance after c.1950 CE.

Discussion and comments on reference condition

The low abundance of native tree pollen in the samples from the post-Māori settlement phase, coupled with the high abundance of bracken fern, tutu and charcoal, is consistent with a landscape that has transitioned relatively rapidly from native forest to scrublands. This aligns with results from other studies that have undertaken vegetation reconstructions in the region (Bussell 1988; Wilmshurst et al. 2004). Post-European settlement, there was a rapid transition to pasture, as indicated by the increase in grass pollen. A corresponding increase in the Ti:Inc ratio in the Itrax data suggests increased sediment inputs during this period. A transition to more intensive agriculture, from 1900s CE onwards, is marked by increases in cadmium and lead.

Several notable within-lake changes occur shortly after European settlement and proceeding the period of increased sediment entering the lake. There was an increase in the chl-*a* proxy, which corresponds with a decrease in *Myriophyllum*. *Myriophyllum* is very tolerant of diverse water quality and habitats, so it is challenging to determine what this change indicates. It may signify a decrease in light availability due to deteriorating water quality / clarity or a change in water depth. Shortly before the decline in *Myriophyllum*, there was an increase in raupō, which might have been due to a shallowing of the lake edges due to sediment erosion in the catchment around the lake (supported by the evidence of increased Ti:Inc ratios at this time). There is also a marked change in the bacterial community during this period. We were unable to speciate the *Potamogeton* in the sediment record, but *P. crispus* is known to occur in this lake,[3] so it is likely that it is this species. *Potamogeton crispus* typically dominates only in highly eutrophic waterbodies (Clayton and Edwards 2006), providing further evidence for the eutrophication of this lake over the last 50 years.

Aulacoseira subarctica is a planktonic diatom that is often associated with oligo-mesotrophic conditions. Its presence early in the post-Māori settlement phase suggests the lake was in an oligotrophic to mesotrophic state at that time. The increase in *Aulacoseira granulata* var. *angustissima* during the post-Māori settlement phase suggests the water quality in the lake may have started to deteriorate over this era. The two most recent changes – increases in the colonial planktonic diatoms *Asterionella formosa* and *Fragilaria crotonensis* – are likely a response to eutrophication, as both of these species have been shown to be present in higher abundances with increasing nutrients (Bertrand et al. 2003).

[3] https://lakespi.niwa.co.nz/lake/15795

Without data from the pre-human phase, it is impossible to infer the reference condition for this lake. However, based on the evidence from the sediment core, it is likely that at least in the early post-Māori settlement period the lake had relatively low chl-*a* (algae), with extensive macrophytes, and was probably in an oligotrophic to mesotrophic state.

Rotokare

Rotokare (17.8 ha surface area, 12 m maximum depth) is a landslide-dammed lake located in the eastern hill country of Taranaki. It is fed by several natural springs within the catchment and has a single outlet (Ararata Stream) at its western end. No streams flow into the lake. Rotokare and the surrounding forest and wetland are the last remnants of the Ngaere Swamp, a now drained swamp that used to cover large parts of the region. Unlike most lowland lakes in Aotearoa New Zealand, the catchment of Rotokare has remained relatively intact, as shown in a 1929 CE photograph (Figure 9, left) and aerial images from 1943 CE (Figure 9, right). Rotokare is currently in a mainland island within a predator-proof fence that was completed in 2004 CE.

The first records of Eurasian perch (*Perca fluviatilis*) release into the lake by the acclimatisation society were in 1894, with further perch stocked in 1900 (Acclimatisation society 1894; Stocking lake 1900).

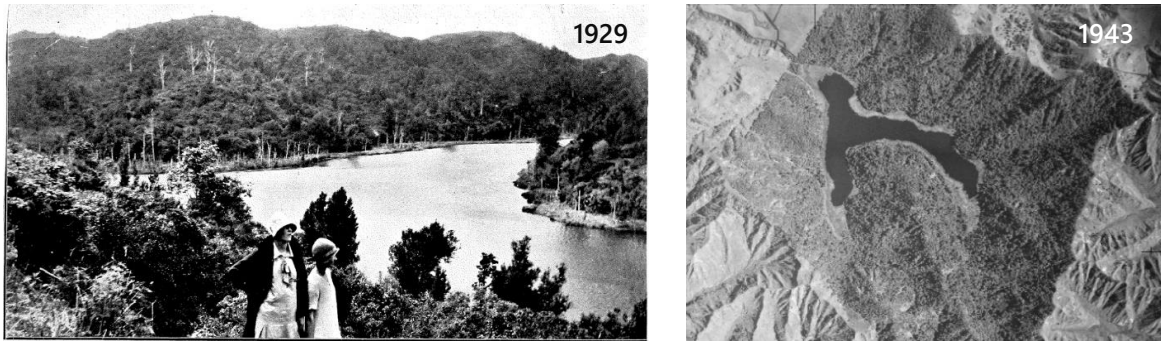

Figure 9. Left: Rotokare in 1929 CE. Note the relatively intact forest at the lake edge. Source unknown. Right: Aerial image of Rotokare in 1943 CE. Source: Retrolens (http://retrolens.nz, licensed by LINZ CC-BY 3.0).

Results

A more detailed description of the data obtained from the Lakes380 Rotokare sediment core is available in Greenaway (2024). The pollen results indicate that prior to human arrival, the vegetation in the catchment was relatively stable, comprising a forest dominated by podocarps, in particular rimu and mataī (*Prumnopitys taxifolia*), with a sub-canopy of tree ferns and smaller trees such as *Coprosma* spp. (Figure 10). The relative abundances of rimu, mataī and sub-canopy trees declined slightly in the post-Māori settlement period, which co-occurred with an increase in bracken fern and charcoal concentrations. The results indicate a further decline in the relative abundance of these tree species following European arrival, but this is most likely due to an increase in pollen from grasses and pine plantations blowing into the lake from the wider region rather than a change in vegetation around the lake, as imagery (Figure 9) and written reports indicate that the catchment vegetation remained

relatively intact through this period. Interestingly, raupō increased in abundance post-European settlement. This possibly indicates a slight reduction in native forest at the lake edge, leading to an increase in light levels, allowing more raupō to grow. Dead trees and a small wetland are visible around the lake edge in the 1929 CE photograph (Figure 9, left), supporting this theory. Macrophyte remains were not observed in sufficient abundance in the sediment core to draw any conclusions about changes in their abundance or composition.

Except for a spike at c.1300 CE, the chl-*a* proxies remained relatively constant and low until c.1965 CE, when they increased markedly and remained high, albeit variable. Data from a molecular method in Greenaway (2024) that quantifies cyanobacterial gene copies suggest that this change in chl-*a* is largely attributable to the occurrence of cyanobacteria (data not presented in this report). The Ti:Inc ratio is variable across the sediment record, and at least in the post-European settlement period the peaks generally align with significant storm events (see Greenaway [2024] for a more detailed description of these). Except for a peak in lead in c.1990 CE, cadmium and lead levels remain relatively constant and low across the sediment record (Figure 10).

There was a significant change in the bacterial eDNA data in the 1990s (Figure 10). The bacterial functional profiles related to denitrification, dissimilatory nitrate reduction to ammonia and sulphate reduction were relatively constant until c.1900 CE, when they all increased markedly. Greenaway (2024) characterised the micro-eukaryotic communities of Rotokare using eDNA methods. The data (not presented in this report) suggest stable communities until after c.1950 CE, when there were rapid and significant changes in micro-eukaryotic community composition.

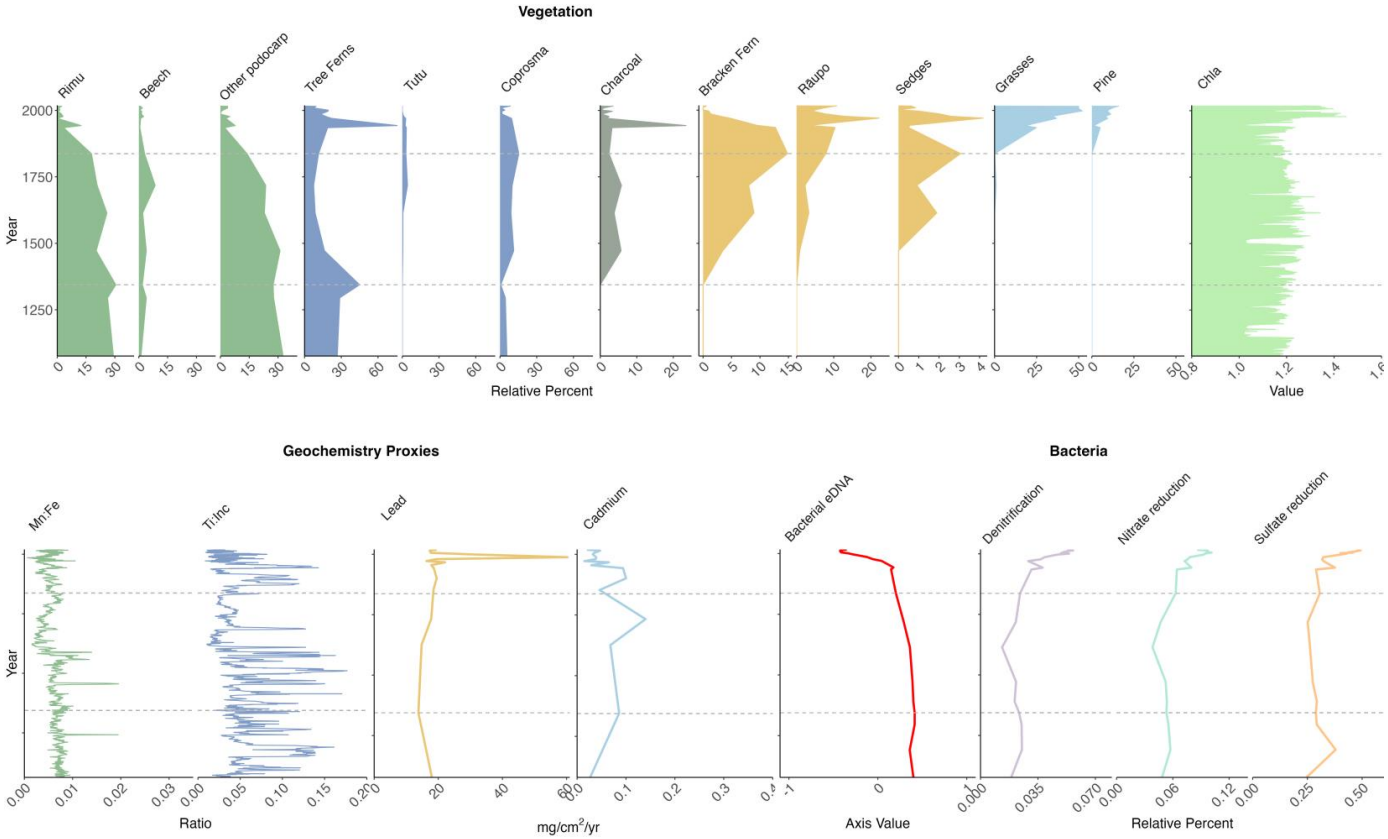

Figure 10. Downcore analysis results for Rotokare. The dotted lines cross the first samples where pollen indicates different human occupation eras: bottom line = transition from pre-human phase to post-Māori settlement; top line = transition from post-Māori to post-European settlement. Note that the scale on the x-axis varies. Chla = chlorophyll-*a*; Mn = manganese; Fe = iron; Ti = titanium; Inc = incoherence.

Discussion and comments on reference condition

Before human arrival, the area around Rotokare was primarily covered by mature forest, with minor vegetation changes occurring post-Māori settlement in c.1400 CE. European settlement (c.1840 CE) led to further vegetation changes, including a reduction in sub-canopy tree populations. Around 1970 CE, water quality at Rotokare underwent significant changes, shifting from a stable, low-productivity lake with minimal biomass to a system dominated by cyanobacterial blooms and altered in-lake communities. This transition was unexpected as it did not closely align with human activities in the wider region.

The decline in water quality of Rotokare is also unusual as, unlike most lakes in Aotearoa New Zealand, it is not linked to land-use changes. The most plausible explanation for the water quality decline is the introduction of perch c.1900 CE, which may have caused a gradual trophic cascade in this lake, i.e. the addition of perch reduced the number (or perhaps size or species) of zooplankton present, which in turn reduced the grazing pressure on algae and cyanobacteria. A decline in water quality and an increase in cyanobacterial bloom intensity is often exacerbated through negative feedback processes. For example, as the cyanobacterial biomass die, they add further nutrients to the lake sediment. Increased respiration through breakdown of the organic matter at the sediment surface can create anoxic conditions during summer stratification, which in turn triggers nutrient releases from the sediment, which can further enhance the growth of cyanobacteria.

Cladocera (i.e. *Daphnia* and other zooplankton) leave remains in the sediment core that can be identified using microscopy. Identification and enumeration of these would assist in understanding whether the introduction of perch caused a trophic cascade in Rotokare and whether this was responsible for the decline in water quality. Preliminary analysis of Cladocera was undertaken in Greenaway (2024) but this has now been repeated. The results from this are pending at the time of writing this report.

Regardless of the causes of decline, the sediment reconstruction provides compelling evidence that the reference condition of Rotokare would likely have been oligotrophic, with low algal biomass, aerobic conditions and low nutrient concentrations.

Lake Moumahaki

Lake Moumahaki (32.9 ha surface area, 26 m maximum depth) is in the eastern Taranaki hill country and was likely formed by a stream cutting down through marine terraces and then being blocked by a landslide. Its catchment is a mixture of regenerating native vegetation and grassland.

Results

The geology surrounding the lake is primarily sandstone, which is subject to high erosion rates. Because of this high level of erosion, a sediment core measuring approximately 5 m long was retrieved from the lake to try to capture the pre-human period. Unfortunately, the core was not long enough, and it covers only a period post-Māori settlement in the region.

Slightly elevated levels of bracken fern and tutu pollen and charcoal indicate that prior to European settlement in the region, some local vegetation change had already occurred (Figure 11). However,

there was likely considerable native forest comprising beech and podocarps (particularly rimu) in the catchment. The presence of tree ferns remains high throughout the sediment record. After European settlement in c.1840 CE, the native vegetation declined further and there was a marked increase in grasses and pollen from pine, particularly in the top 100 cm (Figure 11). There are no notable changes in the wetland plant pollen in the sediment core and macrophyte remains were not observed in sufficient abundance to draw any conclusions about changes in their abundance or composition.

The chl-*a* proxy was highly variable (Figure 11). This was likely due to sediment inputs from storms, which temporarily suppress the algae (chl-*a*). There were no notable changes in the height of the chl-*a* proxy peaks across the study period. Bacterial eDNA was sampled intensively across this core. There was a notable shift in the composition at about 360 cm, which aligns approximately with the time Europeans would have arrived in this region (Figure 11). Thereafter, the bacterial community changed gradually. The bacterial function plots are variable over the sediment record but increase notably in approximately the top 100 cm of the core.

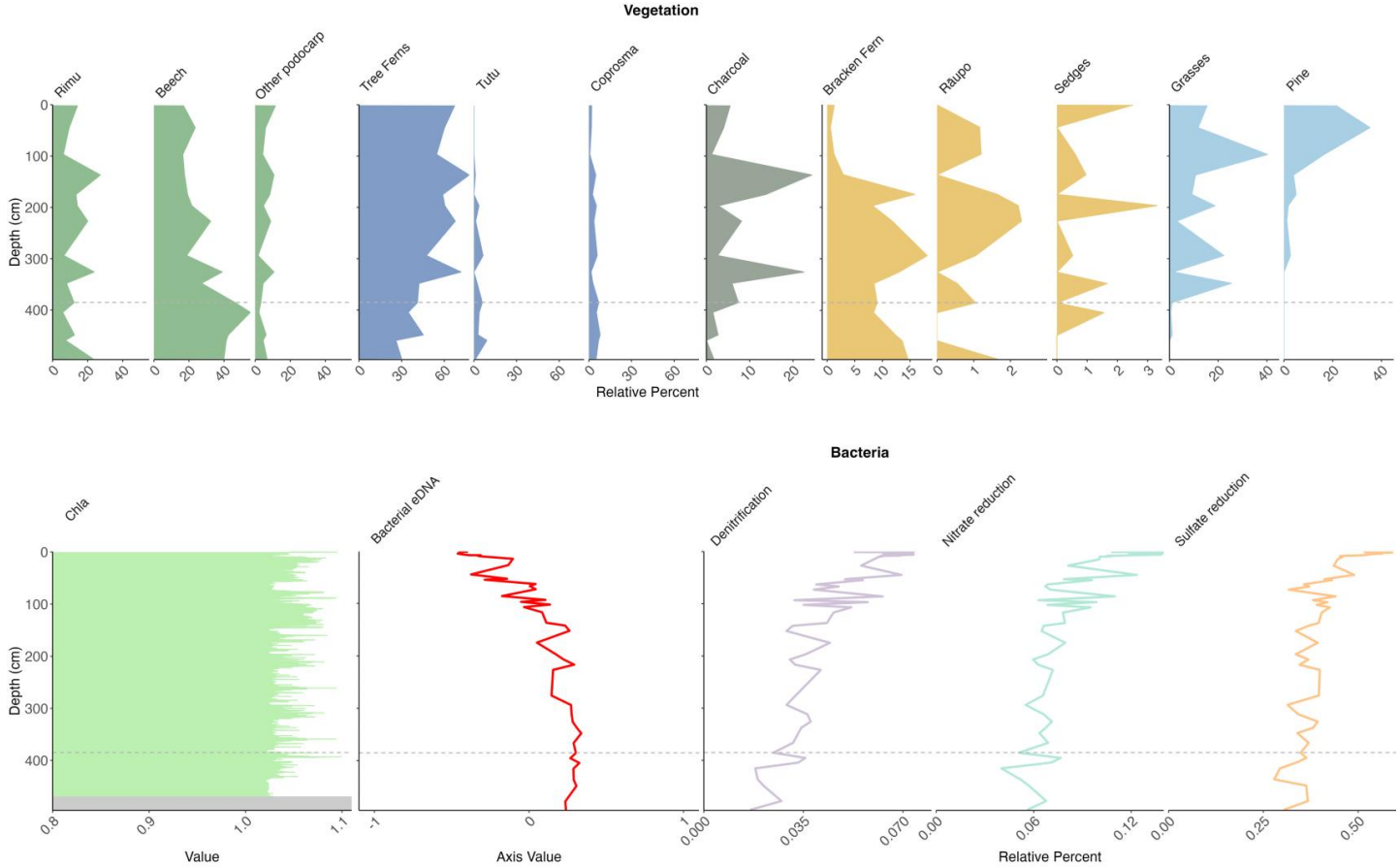

Figure 11. Downcore analysis results for Lake Moumahaki. The dotted line crosses the first samples where pollen indicates a transition from post-Māori to post-European settlement. Note that the scale on the x-axis varies. Chla = chlorophyll-*a*.

Discussion and comments on reference condition

Because the sediment core does not extend to the pre-human phase, it is not feasible to determine the reference condition for this lake. The sediment core data highlight the highly erodible nature of the region's soils, emphasising the need for careful management of vegetation removal in the catchment.

Lake Waikare

Lake Waikare is small lake (7.4 ha surface area, 18.2 maximum depth) in the eastern Taranaki hill country that was formed by a landslide. Its catchment is primarily pine plantation; however, the western lake margin is adjacent to a large area of native bush, which has been identified along with the lake as a Significant Natural Area by South Taranaki District Council. Inspection of aerial photographs show that by 1943 CE most of the native vegetation around the lake had been cleared (Figure 12, left) and in the 1960s pine trees were planted. By the 1980s, regrowth of native vegetation in the catchment was evident (Figure 12, right).

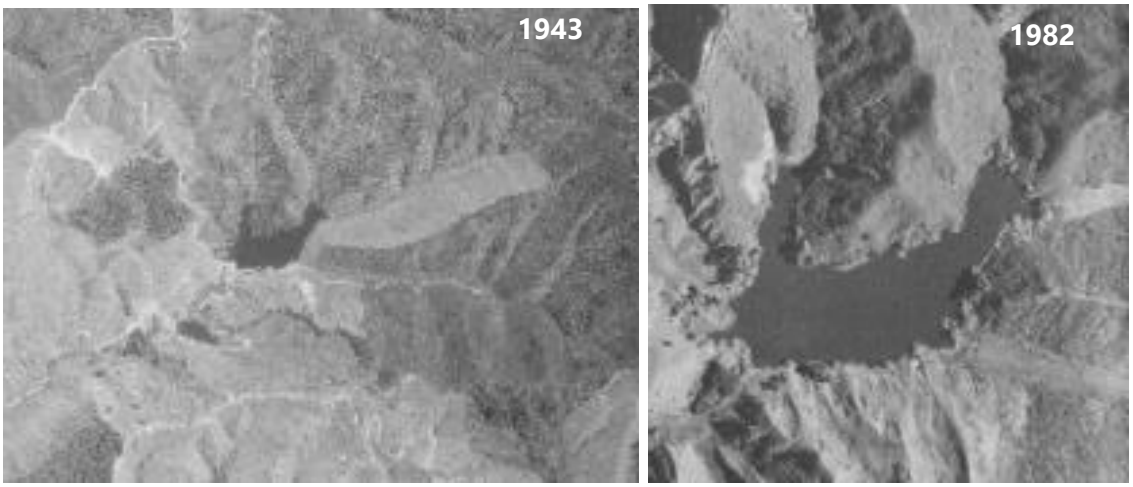

Figure 12. Images from Lake Waikare in 1943 CE (left) and 1982 CE (right). Source: Retrolens (http://retrolens.nz, licensed by LINZ CC-BY 3.0).

Results

The geology surrounding Lake Waikare is primarily sandstone, which results in high sediment erosion that washes into the lake. Because of this, the 1.4 m-long core represents only about 200 years of time, with only the deepest sample likely representing a period pre-European arrival.

Analysis of the one sample in the pre-European settlement period suggests that beech and podocarp (especially rimu) forests were present in the region (Figure 13). Post-European settlement, vegetation clearance increased. This is evident by the increase in charcoal and pollen from bracken fern and tutu. The presence of pine pollen increases markedly in approximately the top 15 cm of the core, likely indicative of pine plantations in the region. The presence of pollen from the wetland plant raupō also

increased at this time. Macrophyte remains were not observed in sufficient abundance to draw any conclusions about changes in their abundance or composition.

The chl-*a* proxy is highly variable. This is likely due to sediment inputs from storms, which temporarily suppress algae (chl-*a*). This is reinforced by the Ti:Inc and Mn:Fe ratios in the Itrax data, which are also highly variable, suggesting spikes of sediment entering the lake and resulting periods of variable oxygen availability. There has been a slight increase in the heights of the chl-*a* proxy peaks in the lake in recent years (Figure 13). The bacterial eDNA data indicate a notable change in the community composition in approximately the top 15 cm of the core. This also corresponds with a slight increase in the three bacterial functional profiles (Figure 13).

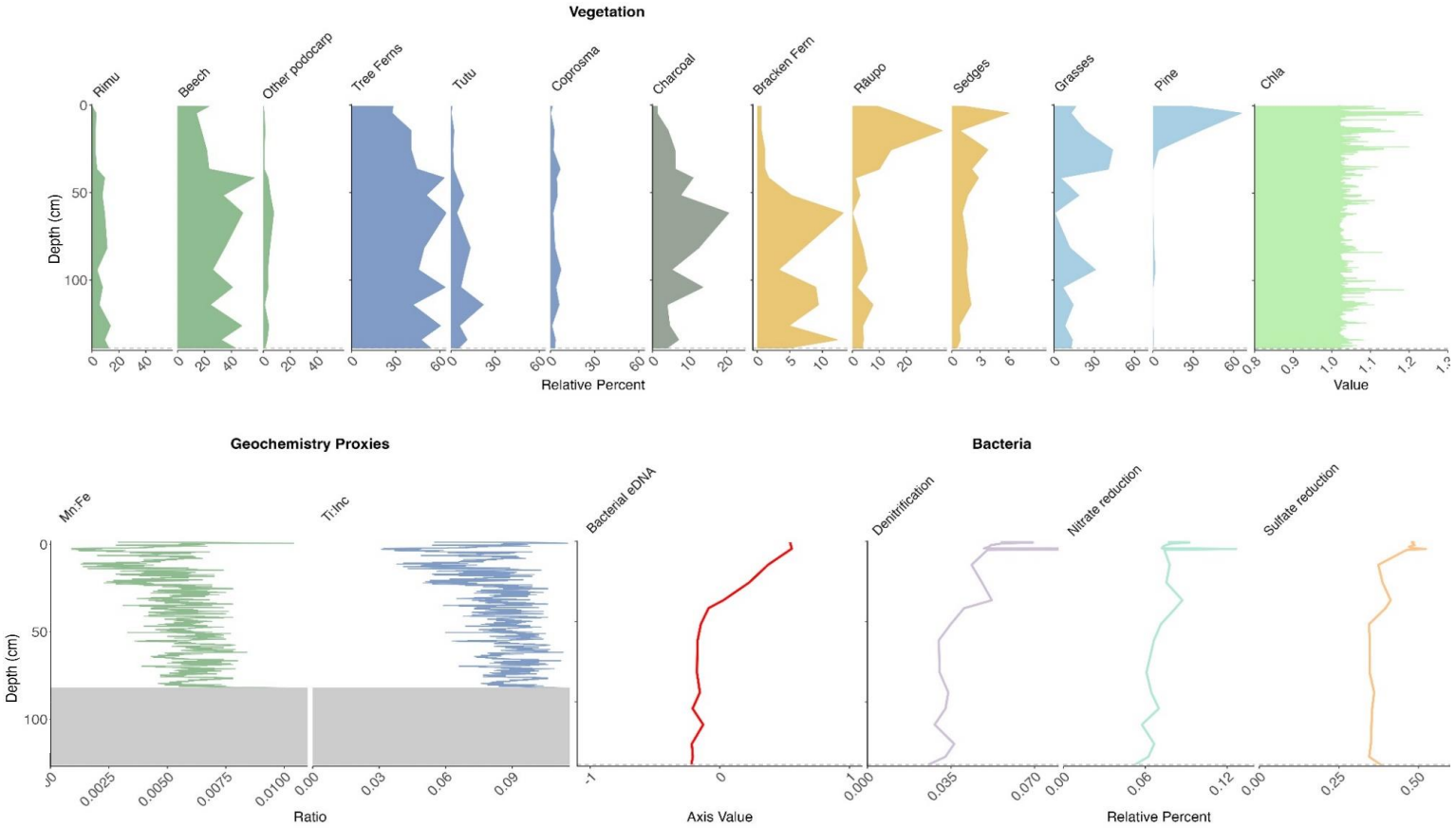

Figure 13. Downcore analysis results for Lake Waikare. Chla = chlorophyll-*a*; Mn = manganese; Fe = iron; Ti = titanium; Inc = incoherence. The grey shading in the geochemistry section indicates missing data.

Discussion and comments on reference condition

The Lakes380 team attempted to collect a longer sediment core from Lake Waikare to capture evidence from the period prior to human arrival. However, during sampling the lake level was relatively low, and numerous submerged dead tree trunks were visible. These obstructions prevented the use of the specialised long corer. It also suggests that the valley has flooded only relatively recently and that the lake might have formed in the last 500 years or so.

Because the sediment core does not extend to a pre-human period, and it is likely the lake did not exist before human arrival, it is not feasible to determine the reference condition for this lake. The sediment core data highlight the highly erodible nature of the region's soils, emphasising the need for careful management of vegetation removal in the catchment. Additionally, shifts in indicators such as the chl-*a* proxy and eDNA suggest that water quality in Lake Waikare may have deteriorated relatively recently.

Comparison with similar lakes in the Manawatū-Whanganui Region

Only four sediment cores collected from the Taranaki Region were analysed as part of the Lakes380 project and only one of these reached a period prior to human arrival in the region. Additionally, three of the four lakes were in hill country as opposed to lowland areas, which is where many of Taranaki's natural lakes are located (Figure 1). These lowland lakes are primarily formed by wind and the movement of sand dunes (geomorphic class: Aeolian). Many similar lakes exist in the Manawatū-Whanganui Region. An analysis of data from sediment cores in the Manawatū-Whanganui Region was recently undertaken (Wood et al. 2023). A summary of the findings pertaining to reference conditions from relevant lakes in that study are provided below to give further insights into the likely reference condition of Aeolian lakes in the Taranaki Region (Table 8). In addition to Aeolian lakes, Lake Oporoa was analysed in Wood et al. (2023). This lake was formed by a landslide in hill country, although the geology here is not as erodible as that at the three hill country landslide lakes covered in this report in the Taranaki Region. The methods used in Wood et al. (2023) followed those outlined in the present report, with the addition of eDNA analysis of selected samples that identify mammals, birds, aquatic organisms and plants.

Table 8. Summary of the likely reference conditions of selected lakes and their catchments in the Manawatū-Whanganui Region. A brief description of key changes after human arrival are provided. All lakes, except Oporoa, are lowland Aeolian lakes. Full descriptions are provided in Wood et al. (2023).

Lake	Catchment vegetation	Diatoms	Chlorophyll-*a* proxy (algal abundance)	Cyanobacteria reference condition
Oporoa*	**Reference condition:** Native forest dominated by podocarps, with a sub-canopy abundant in tree ferns (Oporoa only). **Change:** Gradual decline in native forest following Māori settlement. Pasture and non-native vegetation increase markedly following European settlement.	**Reference condition:** Probably oligotrophic with clear water. **Change:** Becoming increasingly eutrophic from c.1840 CE.	**Reference condition:** Low and stable algal abundance. **Change:** Variable levels post-European settlement and increasing in abundance after c.1960 CE.	**Reference condition:** Low abundance. **Change:** Increased markedly after c.1960 CE.
Kawau		Not analysed.	**Reference condition:** Low and stable algal abundance. **Change:** Increased steadily after c.1950 CE.	**Reference condition:** Low abundance. **Change:** Increased rapidly after c.1950 CE.
Wiritoa		**Reference condition:** Probably mesotrophic or better, with macrophytes, until c.1900 CE. **Change:** Becoming eutrophic after c.1940–50 CE.	**Reference condition:** Low and stable algal abundance. **Change:** Increased steadily after c.1950 CE.	**Reference condition:** Low abundance, no bloom-forming species present. **Change:** Increased in abundance after 2020 CE.
Alice**	**Reference condition:** Native forest dominated by podocarps, with a sub-canopy abundant in tree ferns (except Alice and Roto Mokoia, where pre-human sediment not present).	**Reference condition (note not pre-human):** Probably oligotrophic or mesotrophic with clear water until c.1840 CE, when macrophytes increased in abundance. **Change:** Becoming increasingly eutrophic from c.1900 CE.	**Reference condition:** Low and stable algal abundance. **Change:** Increased steadily after c.1930 CE, with a dramatic increase after 2000 CE.	**Reference condition:** Low abundance. **Change:** Abundance increased dramatically after c.1990 CE.

Lake	Catchment vegetation	Diatoms	Chlorophyll-*a* proxy (algal abundance)	Cyanobacteria reference condition
Roto Mokoia / Westmere*	**Change:** Significant decline in native forest following Māori settlement. Pasture and non-native vegetation increase markedly following European settlement.	**Reference condition (note not pre-human):** Probably mesotrophic or better until c.1900 CE. **Change:** Becoming eutrophic after c.1960 CE.	**Reference condition:** Low and stable algal abundance. **Change:** Relative rapid increase after c.1960 CE.	**Reference condition:** Low abundance. **Change:** Abundance increased markedly after c.2000 CE.
Pauri		Not analysed.	**Reference condition:** Moderate but stable levels that decrease in c.1450 CE. **Change:** Increasing from c.1840 CE.	**Reference condition:** Low abundance. **Change:** Abundance increased markedly after about 2020 CE.
Dudding		Not analysed.	**Reference condition:** Low and stable algal abundance. **Change:** Small increase in top 10 cm of sediment core.	**Reference condition:** Low abundance. **Change:** Slight increase in abundance in top 10 cm of sediment core.
William		Not analysed.	**Reference condition:** Low and stable algal abundance. **Change:** Increasing markedly in about top 40 cm of sediment core.	**Reference condition:** Low abundance. **Change:** Dramatic increase in abundance in top 20 cm.
Heaton		Not analysed.	**Reference condition:** Moderate and stable algal abundance. **Change:** Decrease about 90 cm, before increasing again to pre-human settlement levels after 50 cm.	**Reference condition:** Low abundance. **Change:** Dramatic increase in abundance in top 5 cm.

* Hill country lake.

** Pre-human period not captured in the sediment core.

Limitations

The main limitations associated with the paleolimnological approach used here are that some of the cores do not cover the pre-human phase due to differing rates of sediment accumulation across lakes. For example, in Lake Moumahaki, the pre-human period could not be reached despite a sediment core nearly 5 m long. The analysis of these cores is based on sediment proxies, which are indirect measures of past environments and can be influenced by multiple factors. In addition, sediment diagenesis occurs in lake sediment cores, whereby the sediments are affected by chemical and biological processes that can influence proxies, and more work is required to determine the influence of this on specific proxies.

4. Conclusions and recommendations

Management and restoration of lake ecosystems requires an understanding of the state and range of natural, reference lake conditions (Abell et al. 2019). This information can help inform lake management and restoration by highlighting the current degree of departure from a lake's natural state while informing aspirational goals and targets for improvement (Schallenberg et al. 2011). In this study, we explored three different approaches for estimating reference conditions of lakes in the Taranaki Region. In general, the approaches supported one another and indicated that the deeper lakes, particularly those in the hill country, were likely in an oligotrophic state (approximately equates to a NOF band A) prior to human arrival, whereas the shallow lowland lakes were likely mesotrophic or oligo-mesotrophic (equates to around NOF band B). However, it is important to note that there is some degree of uncertainty in each approach. For example, the Abell et al. (2019, 2020) modelling approach has considerable uncertainty, the work of Schallenberg (2019) provides a broadscale approach that does not take into account unique aspects of different lake types or individual lakes, and the paleolimnological approach relies on proxies to indicate water quality parameters such as nutrients and chl-*a*.

Given the diversity of lakes in Aotearoa New Zealand, not all lake types are expected to have the same reference conditions (Drake et al. 2010). For example, vertical mixing dynamics play a major role in how a lake processes nutrient inputs and maintains oxygen levels. Shallow lakes are typically more dynamic, oxygenated and susceptible to degradation from nutrients due to their lower buffering capacity and continually mixed water column. Benthic–pelagic coupling is strong in shallow lakes (Schallenberg 2019). Shallow lowland lakes are typically at the bottom of catchments, where they can receive marine subsidies via seabirds and anadromous fishes (Drake et al. 2010), while also having higher average water temperatures, further promoting productivity. In contrast, both brackish and deep lakes typically have a higher buffering capacity due to marine influence and a greater water volume, respectively. Therefore, the different reference conditions found for these lake types is not surprising. Although most lakes have been impacted by anthropogenic activities, the location, depth and geomorphology of shallow lowland lakes means they were likely always more susceptible to degradation, whether this be from natural disturbances or local geology.

Although methods such as those discussed in this report can be used to estimate reference conditions, it is important to note that reference conditions are not always useful for setting restoration targets. There are several reasons for this. The natural / pristine reference condition is not always static but can vary on short (interannual to decadal) or longer (centennial to millennial) timescales due to natural forcing. For example, the paleolimnological analysis presented in this report provides evidence of the short-term impact of large storm events on the chl-*a* concentrations on some Taranaki lakes, and a previous study of a lake on the West Coast of the South Island has illustrated the effect of repeated high-magnitude earthquakes on lake communities (Brasell et al. 2021). Additionally, other changes likely to have taken place between the reference and the present states, such as climate change, may limit the use of the reference condition as a restoration target. It is also critical to consider the current societal and cultural values of a lake. For example, if fishing for non-native species is now highly valued, then aiming to return a lake to its historical pre-human condition is unlikely to be viewed favourably by the community and is unlikely to be achievable. It is also plausible that some changes – particularly human-induced changes such as the introduction of non-native species that alter food webs – may cause

irreversible change and mean that it is impossible or extremely difficult to return a lake to its reference condition without massive levels of investment.

The paleolimnological data presented in this report provide some advantages over the other methods. This is because they also offer information on the extent of present-day environmental degradation in comparison to states in the past, as well as the nature of a potential future recovery target based on the ecological status of a lake in the absence of human impact. The data highlight a range of past conditions, thus providing decision makers a choice of previous conditions on which to base restoration strategies.

Potential future work that could be considered to improve information of reference conditions and / or assist in setting restoration targets in the Taranaki Region includes:

- **Processing more sediment cores.** Although sediment cores were collected from seven lakes, only four were analysed and only one of these reached the pre-human phase.
- **Collection of additional sediment cores.** It is likely that there are specific lake types, or lakes in unique areas, that were not sampled as part of Lakes380; sediment cores could be collected and analysed from these to provide data on reference conditions from a more diverse range of lakes.
- **Additional analysis methods.** There are a range of other analysis methods that can be applied to the sediment core samples to provide additional information. For example, eDNA can be used to assess historical communities of fish (or other organisms), as demonstrated in Schallenberg et al. (2023b) and Thomson-Laing et al. (2024). Diatom analysis could be undertaken on all sediment cores (not just Kaikura). The methods applied should be based on specific questions, e.g. what fish were present prior to human arrival?

5. Acknowledgements

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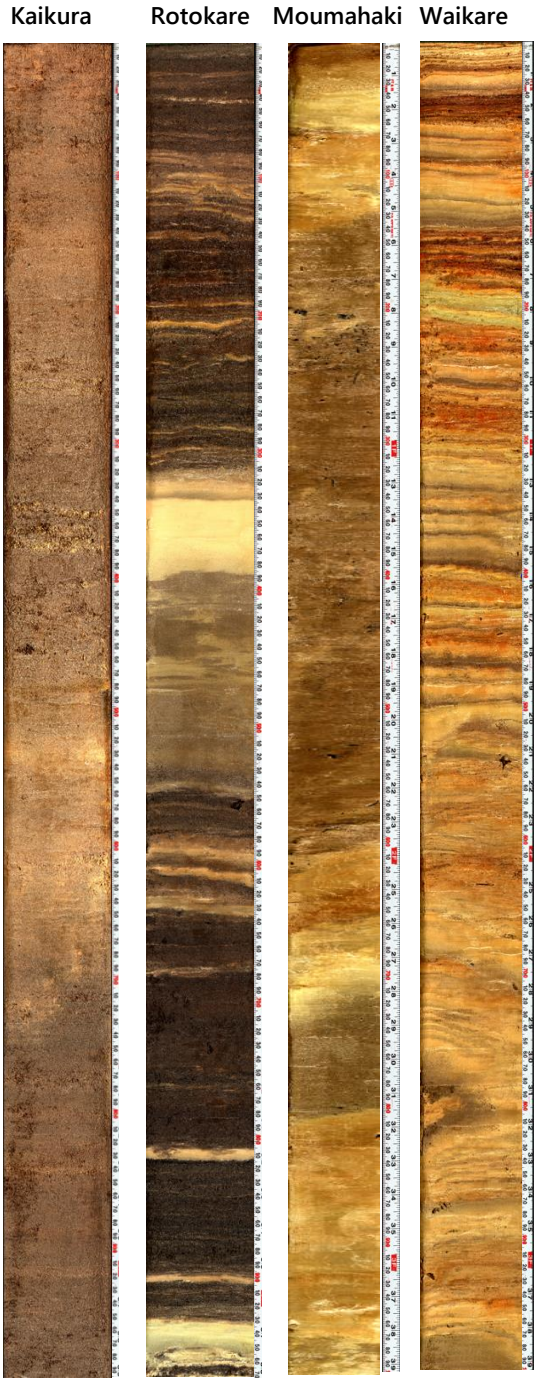
[4] www.ourlakesourfuture.co.nz/lakes

6. Appendices

Appendix 1. Sediment core images – approximately top 1 m



7. References

Standard methods used in this report are duplicated from Schallenberg et al. (2024b) and Wood et al. (2023).

Abell JM, Özkundakci D, Hamilton DP, van Dam-Bates P, McDowell RW. 2019. Quantifying the extent of anthropogenic eutrophication of lakes at a national scale in New Zealand. Environmental Science and Technology. 53(16):9439–9452.

Abell JM, van Dam-Bates P, Özkundakci D, Hamilton DP. 2020. Reference and current Trophic Level Index of New Zealand lakes: benchmarks to inform lake management and assessment. New Zealand Journal of Marine and Freshwater Research. 54(4):636–657.

Acclimatisation society. 2 October 1894. Hawera & Normanby Star. p. 2.

Baisden W, Prior C, Chambers D, Canessa S, Phillips A, Bertrand C, Zondervan A, Turnbull J, Kaiser J, Bruhn F. 2013. Rafter radiocarbon sample preparation and data flow: accommodating enhanced throughput and precision. Nuclear Instruments and Methods in Physics Research. Section B: Beam Interactions with Materials and Atoms. 294:194–198.

Bertrand C, Fayolle S, Franquet E, Cazaubon A. 2003. Responses of the planktonic diatom *Asterionella formosa* Hassall to abiotic environmental factors in a reservoir complex (south-eastern France). Hydrobiologia. 501(1):45–58.

Bowman JS, Ducklow HW. 2015. Microbial communities can be described by metabolic structure: a general framework and application to a seasonally variable, depth-stratified microbial community from the coastal West Antarctic Peninsula. PloS One. 10(8):e0135868.

Brasell KA, Howarth J, Pearman JK, Fitzsimons SJ, Zaiko A, Pochon X, Vandergoes MJ, Simon KS, Wood SA. 2021. Lake microbial communities are not resistant or resilient to repeated large-scale natural pulse disturbances. Molecular Ecology. 30(20):5137–5150.

Bussell MR. 1988. Mid and late Holocene pollen diagrams and Polynesian deforestation, Wanganui district, New Zealand. New Zealand Journal of Botany. 26(3):431–451.

Cassie V. 1989. A contribution to the study of New Zealand diatoms. Stuttgart: Schweizerbart Science Publishers.

Clayton J, Edwards T. 2006. LakeSPI: a method for monitoring ecological condition in New Zealand lakes. Technical report version 2. Hamilton: National Institute of Water and Atmospheric Research Ltd.

Davies SJ, Lamb HF, Roberts SJ. 2015. Micro-XRF core scanning in palaeolimnology: recent developments. In: Croudace IW, Rothwell RG, editors. Micro-XRF studies of sediment cores: applications of a non-destructive tool for the environmental sciences. New York: Springer; p. 189–226.

Drake DC, Kelly D, Schallenberg M. 2011. Shallow coastal lakes in New Zealand: current conditions, catchment-scale human disturbance, and determination of ecological integrity. Hydrobiologia. 658(1):87–101. doi:10.1007/s10750-010-0452-z.

Foged N. 1979. Diatoms in New Zealand, the North Island. Vaduz (Liechtenstein): J Cramer.

Greenaway K. 2024. Understanding causes of water quality decline in an Aotearoa New Zealand ecosanctuary through paleoenvironmental analysis [master's thesis]. Wellington: Victoria University of Wellington.

Hogg AG, Heaton TJ, Hua Q, Palmer JG, Turney CS, Southon J, Bayliss A, Blackwell PG, Boswijk G, Ramsey CB. 2020. SHCal20 Southern Hemisphere calibration, 0–55,000 years cal BP. Radiocarbon. 62(4):759–778.

Krammer K, Lange-Bertalot H. 1986. Bacillariophyceae. Süsswasserflora von Mitteleuropa. Stuttgart: Gustav Fisher Verlag. Band 2(1–4):1–4.

Leathwick J, West D, Chadderton L, Gerbeaux P, Kelly D, Robertson J, Brown D, Chadderton W, Ausseil A. 2010. Freshwater Ecosystems of New Zealand (FENZ) geodatabase: user guide. Version one. Wellington: Department of Conservation. http://tools.envirolink.govt.nz/assets/Uploads/FENZ-Leathwick-et-al-2010-FENZ-User-Guide-Version-One.pdf

Manaaki Whenua – Landcare Research. 2020. LCDB v5.0 – Land Cover Database version 5.0, Mainland New Zealand. LRIS Portal. Lincoln: Manaaki Whenua – Landcare Research. [updated 29 January 2020; accessed 15 May 2024]. https://lris.scinfo.org.nz/layer/104400-lcdb-v50-land-cover-database-version-50-mainland-new-zealand

McDowell RW, Snelder TH, Cox N, Booker DJ, Wilcock RJ. 2013. Establishment of reference or baseline conditions of chemical indicators in New Zealand streams and rivers relative to present conditions. Marine and Freshwater Research. 64:387–400.

McGlone MS, Wilmshurst JM. 1999. Dating initial Maori environmental impact in New Zealand. Quaternary International. 59(1):5–16

McGlone MS, Wilmshurst JM, Leach HM. 2005. An ecological and historical review of bracken (*Pteridium esculentum*) in New Zealand, and its cultural significance. New Zealand Journal of Ecology. 29(2):165–184.

McWethy DB, Whitlock C, Wilmshurst JM, McGlone MS, Fromont M, Li X, Dieffenbacher-Krall A, Hobbs WO, Fritz SC, Cook ER. 2010. Rapid landscape transformation in South Island, New Zealand, following initial Polynesian settlement. Proceedings of the National Academy of Sciences. 107(50):21343–21348.

[MfE] Ministry for the Environment. 2024. National Policy Statement for Freshwater Management 2020. Wellington: Ministry for the Environment. https://environment.govt.nz/publications/national-policy-statement-for-freshwater-management-2020-amended-october-2024

Newnham R, Lowe DJ, Gehrels M, Augustinus P. 2018. Two-step human–environmental impact history for northern New Zealand linked to late-Holocene climate change. The Holocene. 28(7):1093–1106.

Özkundakci D, Hamilton DP, Kelly D, Schallenberg M, de Winton M, Verburg P, Trolle D. 2014. Ecological integrity of deep lakes in New Zealand across anthropogenic pressure gradients. Ecological Indicators. 37:45–57. https://doi.org/10.1016/j.ecolind.2013.10.005

Pearman JK, Biessy L, Thomson-Laing G, Water S, Vandergoes MJ, Howarth JD, Rees A, Moy C, Pochon X, Wood SA. 2020. Local factors drive bacterial and microeukaryotic community composition in

lake surface sediment collected across an altitudinal gradient. FEMS Microbiology Ecology. 96(6):70–83.

Pearman JK, Wood SA, Vandergoes MJ, Atalah J, Waters S, Adamson J, Thomson-Laing G, Thompson L, Howarth JD, Hamilton DP, et al. 2022. A bacterial index to estimate lake trophic level: national scale validation. Science of the Total Environment. 812:152385.

Ramsey CB. 2008. Deposition models for chronological records. Quaternary Science Reviews. 27(1–2):42–60.

Ramsey CB. 2009. Bayesian analysis of radiocarbon dates. Radiocarbon. 51(1):337–360.

Ramsey CB, Lee S. 2013. Recent and planned developments of the program OxCal. Radiocarbon. 55(2):720–730.

Round FE, Crawford RM, Mann DG. 1990. Diatoms: biology and morphology of the genera. Cambridge (UK): Cambridge University Press.

Schallenberg L, Pearman J, Vandergoes M, Wood S. Modelled national objectives framework attributes for Taranaki lakes and recommendations for baseline sampling. 2023a. Nelson: Cawthron Institute. Cawthron Report 3946. Prepared for Taranaki Regional Council.

Schallenberg LA, Thomson-Laing G, Kelly D, Pearman JK, Howarth JD, Vandergoes MJ, Puddick J, Fitzsimons S, Rees A, Wood SA. 2023b. Insights into the ecological impact of trout introduction in an oligotrophic lake using sedimentary environmental DNA. Metabarcoding and Metagenomics. 7:e111467.

Schallenberg L, Thomson-Laing G, Steiner K, Shchapov K, Hampton H, Brasell K, Pearman J, Wood S. 2024a. Review of 'lakes' in the Freshwater Ecosystems of New Zealand database. Nelson: Cawthron Institute. Cawthron Report 4039. Prepared for Ministry for the Environment.

Schallenberg L, Pearman J, Hamilton D, Vandergoes M, Wood S. Modelled current and reference condition water quality attributes for Manawatū-Whanganui lakes. 2024b. Nelson: Cawthron Institute. Cawthron Report 4000. Prepared for Horizons Regional Council.

Schallenberg M. 2019. Determining reference conditions for New Zealand lakes. Wellington: Department of Conservation. Science for Conservation Series 344.

Schallenberg M, Kelly D, Clapcott J, Death R, MacNeil C, Young R, Sorrell B, Scarsbrook M. 2011. Approaches to assessing ecological integrity of New Zealand freshwaters. Wellington: Department of Conservation. Science for Conservation 307.

Short J, Tibby J, Vandergoes MJ, Wood SA, Lomax N, Puddick J, Pearman JK, Howarth JD, Moy CM, Sunde C, et al. 2022. Using palaeolimnology to guide rehabilitation of a culturally significant lake in New Zealand. Aquatic Conservation: Marine and Freshwater Ecosystems. 32:931–950.

Smol JP, Birks HJB, Last WM, editors. 2001. Tracking environmental change using lake sediments. Vol. 4, Zoological indicators. Dordrecht: Kluwer Academic Publishers.

Stocking lake: Rotokare. 21 March 1900. Hawera & Normanby Star. p. 2.

Stoddard JL, Larsen DP, Hawkins CP, Johnson RK, Norris RH. 2006. Setting expectations for the ecological condition of streams: the concept of reference condition. Ecological Applications. 16(4):1267–1276.

Thomson-Laing G, Howarth JD, Atalah J, Vandergoes MJ, Li X, Pearman JK, Fitzsimons S, Moy C, Moody A, Shepherd C, et al. 2024. Sedimentary ancient DNA reveals the impact of anthropogenic land use disturbance and ecological shifts on fish community structure in small lowland lake. Science of the Total Environment. 922:171266.

[LINZ] Toitū Te Whenua | Land Information New Zealand. 2024. NZ lake polygons (topo, 1:50k). LINZ Data Service. Wellington: Toitū Te Whenua | Land Information New Zealand. [updated 3 January 2025; accessed 17 January 2025]. NZ Lake Polygons (Topo, 1:50k) | LINZ Data Service

Turnbull JC, Mikaloff Fletcher SE, Brailsford GW, Moss RC, Norris MW, Steinkamp K. 2017. Sixty years of radiocarbon dioxide measurements at Wellington, New Zealand: 1954–2014. Atmospheric Chemistry and Physics. 17(23):14771–14784.

[US EPA] United States Environmental Protection Agency. 1994. Method 200.8: Determination of Trace elements in waters and wastes by inductively coupled plasma-mass spectrometry. Revision 5.4. Cincinnati (OH): US EPA. EPA Method 200.8: Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma-Mass Spectrometry | US EPA

Wilmshurst J, Higham T, Allen H, Johns D, Phillips C. 2004. Early Maori settlement impacts in northern coastal Taranaki, New Zealand. New Zealand Journal of Ecology. 28(2):167–180.

Wood S, Vandergoes M, Howarth J, Pearman J, Li X, Shepherd C, Gregersen R, Thomson-Laing G, Thompson L, Moody A, et al. 2023. Paleolimnological analysis of 14 lakes in the Manawatū-Whanganui Region. Nelson: Cawthron Institute. Cawthron Report 3949. Prepared for Horizons Regional Council.

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Date: 18 March 2025

Subject: **Te Uru Kahika Climate Adaptation Programme**

Author: F Kiddle, Strategy Lead

Approved by: AJ Matthews, Director - Environment Quality

Document: TRCID-1492626864-393

Purpose

1. The purpose of this memorandum is to provide an overview of the climate change adaptation work programme co-ordinated across the regional sector by Te Uru Kahika.

Recommendations

That the Taranaki Regional Council:

a) receives the memorandum titled *Te Uru Kahika climate adaptation programme*

b) notes that Te Uru Kahika has established a Climate Adaptation Programme Action Plan to support the sector.

Background

2. New Zealand's 16 regional and unitary councils have a long history of partnership and are collectively known as Te Uru Kahika - Regional and Unitary Councils Aotearoa.
3. As a regional sector we work together on areas of common interest while retaining our regional voices and priorities. Acting collectively, we are reducing duplication, gaining through efficiencies, and delivering more back to ratepayers and communities.
4. Council officers are actively engaged in Te Uru Kahika from the Regional Chief Executive Officers Forum through to the many special interest groups who regularly come together to better understand and respond to some of the country's biggest challenges and opportunities. This includes engineers, technicians, scientists, kaihautū, planners, policy experts, project managers, land managers, technology specialists, and community relations officers.
5. Climate adaptation has become a key focus for regional and unitary councils. Recent extreme weather events, from devastating floods to coastal inundation and landslides, have underscored the profound risks that climate change poses to communities, infrastructure, and ecosystems.
6. Through Te Uru Kahika, the sector is taking on the challenge of preparing communities for climate change impacts and working to reduce the risks to people, property, and our environments. Adapting to climate change is about safeguarding the well-being of our people, the environment, and the economy. It spans much of what regional councils do – from flood risk reduction and freshwater management to transport links and biodiversity conservation.

Discussion

7. Te Uru Kahika is leading a substantial programme of climate change adaptation work. Regional chief executives have identified climate change adaptation as a key strategic priority for the sector. Accordingly, Te Uru Kahika has been preparing the Climate Adaptation Action Plan (Action Plan) to deliver on the priority.
8. The Action Plan identifies four sub-priorities and three critical enablers. Subpriorities include:
    a. Improving community resilience: Supporting reform of the civil defence and emergency management system, and exploring impacts on tangata whenua
    b. Co-investment to protect infrastructure: Focused on the delivery of flood protection infrastructure and developing a sector insurance risk strategy
    c. Influencing climate adaptation infrastructure: Working with Government in the development of the climate adaptation framework
    d. Supporting resilient ecosystems: Developing a sector-wide strategy to support land and water-use resilience.

    Critical enablers include:

    e. Leadership & communication: Developing a shared message house on climate change adaptation and delivery of an annual climate workshop to support regional sector action
    f. Evidence base: Developing a climate data platform, engagement with the Hazard Resilience Research Platform, and exploring the economics of inaction
    g. Sector capability and capacity: Building flood asset management capacity and capability.
9. Progress has been made in these action areas already. In particular:
    a. Supporting two tranches of infrastructure investment. To date, $102 million of the Regional Infrastructure Fund has already been contracted to improve flood protection infrastructure, and further investment opportunities are currently being explored with Kānoa – Regional Economic Development & Investment Unit. A 15-year national programme of investment has also been submitted to the New Zealand Infrastructure Commission – Te Waihanga.
    b. A project has commenced to create a National Flood Mitigation Register and improve asset management tools and standards across the sector
    c. Te Uru Kahika continues to provide a strong contribution to the development of the climate adaptation framework, including submitting to the Climate Adaptation Inquiry
    d. A strategic response to the issue of flood insurance and litigation is shaping up
    e. Engagement is occurring with the National Emergency Management Agency on the Government's long-term vision to strengthen the emergency management system
    f. A potential strategy to support land and water resilience to climate change is being scoped.
    g. Te Uru Kahika is engaging on a range of climate data initiatives, including regarding dry weather conditions, inputting into the establishment of the $70 million Natural Hazards and Resilience Platform research programme, and evaluated applications to the Endeavour Fund.
10. Council officers are actively involved in a number of the regional sector work streams identified above. Our efforts to date have focused particularly on the four sub-priorities, as well as improving community resilience, and leading the development of the sector's climate adaptation programme overall.
11. Climate change adaptation is a key area where the regional sector is much stronger working in unison. Issues like the provision of large-scale flood infrastructure, insurance, data provision, and legislative development are large and complex problems. It is beyond the individual capacity of many councils, including Taranaki Regional Council to tackle these issues. By pooling our resources, we are able to provide much more comprehensive solutions that will best support our communities to adapt to the impacts of climate change.

12. While Taranaki Iwi/ Hapū have not directly engaged in the development of Te Uru Kahika Action Plan, the regional sector has an engaged and active group of kaimahi collectively known as Ngā Kairapu, who form a key part of the climate adaptation oversight group co-ordinating this mahi.

Date: 18 March 2025

Subject: **Climate Change Strategy Review**

Author: J Harvey, Climate Change Coordinator

Approved by: A Matthews, Director – Environment Quality

Document: Document ID Pending

Purpose

1. The purpose of this memorandum is to seek endorsement of the proposed approach for a new climate change strategy.

Executive Summary

2. Taranaki Regional Council has prioritised climate change in its Long-term Plan 2024-2034 (LTP), with a focus on regional adaptation, cross-regional partnerships, and community support for climate resilience. The Council's initial climate change strategy, which was drafted in 2020, provided a foundational approach to mitigating greenhouse gas emissions, adapting to climate impacts, and raising community awareness. The strategy was not formally endorsed by Council.
3. An independent review of the strategy by Tonkin + Taylor in 2023 found that the document was adequate in providing an introduction and framework for a strategy. The strategy outlined objectives, principles and planning actions. However, it was also clear that the strategy primarily leveraged activities that were already being progressed for other reasons, for example, updates to the coastal plan, rather than setting out a dedicated programme of work that aligned to the Council's strategic objectives or set out to address the complex challenges that Taranaki faces in responding to a rapidly changing climate.
4. The draft strategy has several gaps, for example, it could be improved by incorporating stronger language, specific deliverables and measurable actions, a clear monitoring framework and by placing a greater emphasis on adaptation in addition to mitigation and education. The strategy would also benefit from direct engagement with the community.
5. Since the strategy was drafted, we have improved our knowledge and understanding of the impacts of climate change in Taranaki. The recent severe weather events have led to changes in areas such as finance and insurance, and highlighted issues such as litigation risk and the ability for councils to meet public expectations. New legislation is pending. For example, the Government is developing an Adaptation Framework which seeks to strengthen how Aotearoa New Zealand prepares for the effects of climate change.
6. To address these gaps and new/evolving requirements a revised strategy is now required.
7. To date, several initiatives have already been launched to address climate change issues, including the commissioning of an organisational climate change risk assessment. The updated strategy will incorporate the findings of this assessment, which is due for completion by June 2025, and will include

clear goals, actionable steps, and regular review timelines. Workshops will be held to gather input from key stakeholders, including council staff, councillors, iwi/hapū, and district councils, to ensure the strategy reflects the broader community's needs and priorities.

Recommendations

That the Taranaki Regional Council:

a) receives the memorandum titled climate change strategy review

b) notes that the current climate change strategy has been reviewed, and the new climate change strategy will be drafted following completion of the organisational climate change risk assessment

c) endorses the proposed approach for drafting the new climate change strategy

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

8. Climate change is a key area of focus for Taranaki Regional Council, with new investment and reporting requirements introduced through the Long-term Plan 2024-2034 (LTP). Strategic priorities in the LTP include supporting development of a regional approach to climate change, a range of climate adaptation work and identifying new opportunities for cross-regional partnering and shared-service delivery. We also have an important role to play in supporting the community to understand and adapt to a changing climate. Responses on climate change issues during the LTP consultation process were varied with some submitters wanting to see urgent action and others concerned about affordability and the remit of the Council in relation to climate issues. Climate change is generally a "hot topic" and as such prompted significant debate during the LTP deliberation meeting on 6 May 2024.
9. The Councils first climate change strategy, *A Strategy to Guide the Taranaki Regional Councils Climate Change Response* (the Strategy) was drafted in 2020 and presented to Council's Policy and Planning Committee in September 2020. This Strategy provided a high-level introduction to climate change issues globally and nationally, laid out the role of local government and provided the planning context. It also discussed the regional context in relation to greenhouse gas emissions and the risks to the region from a changing climate.
10. The Strategy set out an overall strategic vision that "The Taranaki Regional Council strengthens the ability and willingness of the Taranaki community to adapt to and thrive under climate change risks and opportunities through cooperation and coordination on climate change action consistent with its statutory functions." It also included three objectives to meet the vision as follows:
    - Mitigation - Greenhouse gas emissions are reduced across all Taranaki Regional Council areas of influence, including its own operations, helping to create the conditions for a transition to a smart, innovative, low-carbon regional economy
    - Adaptation - Risks from climate-change related impacts are managed and resilience is increased through the application of sound and consistent adaptation planning based on best scientific information
    - Community engagement and awareness - Community awareness of climate change mitigation and adaptation solutions increases and individuals and organisations are better informed about what they can do to contribute to the transition to a low-carbon regional economy.

11. In 2023 Tonkin + Taylor were contracted to undertake a review of the Strategy and provide comments to direct any future updates and identify any gaps and potential improvements. Recommendations from the review included strengthening and supporting the Strategy by:
    - Undertaking a detailed climate risk assessment to ensure the risks captured by the Strategy remain relevant and up to date
    - Conducting a thorough audit of the status of the actions outlined in the Strategy
    - Working more closely with Treaty Partners and conducting extensive engagement with relevant stakeholders to further develop the Strategy
    - Establishing a robust monitoring and evaluation framework
    - Developing a comprehensive community engagement plan.
12. Tonkin + Taylor has recently been commissioned to provide a climate change risk assessment for Council. It is due for completion during the current 2024/25 financial year. The risk assessment will identify areas within the organisation that will be affected by climate change and to what extent. It will build an understanding of these risks and any opportunities. It will provide valuable information to help guide the priorities within the revised strategy.

Discussion

13. Reviews undertaken by Tonkin + Taylor and internally by Taranaki Regional Council officers raised concerns that without clear measurable objectives and transparent reporting timelines some items could be easily overlooked or lose their impact. An approach unlikely to result in any significant actions or meaningful behavioural change.
14. Although these concerns are valid, it must also be acknowledged that in 2020 when the Strategy was completed there was a stronger focus on mitigation. Following the severe weather events in 2023 however, more transparent climate action and adaptation at both the regional and national level became the priority. Without a clear communication pathway and the monitoring and reporting required to hold the Council to account, it is easy for some actions to go unnoticed, while others, once initiated, have the potential to be forgotten, lose momentum or lapse.
15. To date there have been limited legislative requirements placed directly on regional councils regarding climate change, therefore most work has been and will continue to be non-regulatory and driven internally by Council staff and regional policy direction. As such, it is necessary to prepare and maintain a climate change strategy that provides direction for the organisation as a whole. To date several significant workstreams have commenced to meet the needs of the organisation including the following:
    - Organisational climate change risk assessment – to define any potential risks from climate change to the Councils core functions and assets
    - Regional climate change working group – a regional group with its own terms of reference has been established to enable better cross-collaboration between Council, the regions district councils, emergency management and Iwi on regionally significant climate change issues.
    - Taranaki energy scenarios – as part of initial spatial planning work, Council is currently procuring work to investigate different energy development scenarios in the region that may play out over the next 30 years.
    - Modelling of high-risk flood plains – in partnership with Te Kaahui o Rauru, funding was sought and secured to commence modelling of the region, with a more targeted investigation into nature-based solutions for one of the region's most vulnerable catchments, Waitōtara
    - Exploring the potential for nature-based solutions to address both freshwater challenges and climate change in the development of Council’s Land and Freshwater Plan

- Regional hazards spatial gap analysis – in collaboration with the district councils we are undertaking a region wide gap analysis of natural hazard information from a land-use planning perspective.
- Organisation emissions baseline – A baseline framework was commissioned and completed in 2024 to provide the basis for the organisation's greenhouse gas emission reduction reporting, which will be further advanced later this year.
- Climate change scenarios incorporated in science – recent science modelling and reporting to inform the development of Council's proposed Regional Land and Freshwater Plan has incorporated climate change projections to help set freshwater targets and identify actions to respond to the impacts of a changing climate.
- Rural energy efficiency – the Council is contributing non-monetary support through involvement with the save energy on farm group
- Working as one - involvement with local government national climate change groups and networks – Council officers collaborate with other regional councils and Te Uru Kahika to deliver the regional sector's Climate Adaptation work programme, co-convene and contribute to the Climate Group. The climate team maintains connection with and receives updates from Aotearoa Climate Adaptation Network (ACAN) and Aotearoa Councils Climate Network (ACCN).
- Involvement with national policy direction – by providing advice and feedback on climate change related national discussion documents from a Taranaki specific viewpoint.

16. To facilitate a more purposeful climate change strategy, the climate change strategy will be re-drafted. To ensure the climate change strategy captures the full range of organisational risk and is up to date, as recommended in the Tonkin + Taylor review, the organisational risk assessment needs to be completed first to provide the basis for the strategy. Engagement with Council, iwi/hapū and other key stakeholders will help Council explore the results of the organisational risk assessment and inform the redrafting of the strategy.
17. The proposed climate change strategy will include overarching goals and actions designed to meet these goals for the year ahead, it will also establish a timeline for regular reviews and monitoring. The new strategy will be primarily internally focused but will include some provision in relation to the wider region; however, this will be mainly achieved through collaboration, advice and other types of non-monetary support due to current fiscal constraints.

Options

18. There are two options available:

    Option 1 – endorsement of a new strategy which will include:

    a. completing the Council's risk assessment within the current financial year;
    b. refreshing the climate change strategy once the risk assessment is complete; and
    c. presenting the completed strategy for formal Council approval during the next financial year.

    Option 2 – no new strategy is developed.
19. Option 1 is recommended. Climate change is a priority issue for Taranaki and the Council – as identified in the LTP. While officers could continue to advance climate-related activities in line with our LTP commitments in the short-term, a refreshed strategy endorsed by Council will ensure we have transparent and clear delivery on an agreed programme of work that supports the Councils climate change obligations, responds to identified risks, and better supports the resilience of our communities.

Significance

20. This decision is assessed as not significant with regards to the Significance and Engagement Policy. It will have no impact on levels of service, incur more than $10,000,000 budgeted or $5,000,000 of unbudgeted expenditure, or involve the transfer of ownership or control of a strategic asset.

Financial considerations—LTP/Annual Plan

21. 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. The actions outlined in this memorandum are consistent with the LTP 2024-2034, including the Year 1 Performance Target to review the Councils draft Climate Change Strategy and Roadmap. Deliverables will lay the groundwork for guiding the Council's efforts in adapting to and mitigating climate change.

Policy considerations

22. 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*.

Climate change considerations

23. This item will have a significant influence on the future climate change direction for the organisation. It is part of the workstream already approved through the LTP and will provide actions designed to help the Council meet its climate change goals.

Iwi considerations

24. 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. As part of the wider programme of work required to draft the new climate change strategy iwi will be engaged and given opportunities to provide input into its development.

Community considerations

25. 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. As discussed above, climate change is a challenging topic and community response can change in response to significant climate change related events. The proposed new strategy will be designed in consultation with our community to respond to these.

Legal considerations

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

Appendices/Attachments

TRCID–1492626864-336: T&T Draft - Strategy review report

REPORT

Tonkin+Taylor

Review of the Taranaki Regional Council Climate Change Strategy

Prepared for
Taranaki Regional Council
Prepared by
Tonkin & Taylor Ltd
Date
October 2023
Job Number
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Document control

Title: Review of the Taranaki Regional Council Climate Change Strategy					
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12/10/23	0.4	Draft report – Client Review	N. Shankar	P. Pringle	M. Benter-Lynch

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Taranaki Regional Council	1 electronic copy
Tonkin & Taylor Ltd (FILE)	1 electronic copy

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1 Climate change strategies

Climate change strategies are comprehensive, long-term strategic plans developed to mitigate and adapt to the impacts of climate change. They serve as a roadmap that outlines specific goals, objectives, and actions aimed at both mitigating the causes of climate change and adapting to its impacts. For Councils, these strategies encompass a range of sectors, including energy, transportation, agriculture, and infrastructure, and often involve the collaboration of various stakeholders, including governments, businesses, communities, and non-governmental organizations. A well-formulated strategy can provide a structured approach to reducing greenhouse gas emissions, limiting global warming, and enhancing the resilience of societies and ecosystems in the face of changing climate patterns.

Climate change strategies and plans are often used interchangeably, but a plan (or 'action plan') would usually focus on a set of clearly defined, timebound actions to contribute to the achievement of a set of strategic objectives ('the Strategy').

1.1.1 Adaptation and mitigation components

A climate change strategy can focus on either climate change mitigation (reduction of greenhouse gas emissions), climate change adaptation (adjustments to systems and processes in response to current or future climate change impacts) or a combination of both. Mitigation Strategies are focused on reducing greenhouse gas emissions and limiting global warming. They include:

- Reducing emissions through various types of initiatives, depending on the sector. This may include:
  - Energy: Promoting renewable energy sources like solar, wind, and hydropower.
  - Transport: Promoting public transport and active modes of transport.
  - Agriculture: Promoting practices that reduce emissions and improve the sustainability of agriculture.
- Restoring forests: Initiatives to plant trees and restore forests, as trees absorb carbon dioxide from the atmosphere.
- Carbon pricing: Implementing mechanisms like carbon taxes or cap-and-trade systems to put a price on carbon emissions, incentivizing businesses to reduce their emissions.

Adaptation strategies are aimed at building resilience to climate change impacts experienced now and those which may happen in the future. These strategies might focus on specific aspects such as:

- Infrastructure resilience: Designing and retrofitting buildings, roads, and bridges to withstand extreme weather events like tropical cyclones and floods or to make it easy for them to be repaired.
- Water resource management: Developing strategies to ensure a sustainable supply of water for agriculture, industry, and communities, particularly in regions facing increased water scarcity.
- Ecosystem conservation: Protecting and restoring ecosystems such as wetlands and mangroves, which act as natural buffers against climate impacts like sea-level rise and storm surges.
- Climate-resilient agriculture: Promoting farming practices that are better suited to changing climate conditions, such as drought-resistant crop varieties.
- Early Warning Systems (EWS): Developing systems to provide timely warnings about extreme weather events to reduce their impact on communities.

Climate change strategies should also take into account adaptive capacity (the potential or ability of a system, region, or community to adapt to the effects or impacts of climate change). In this case, this might include the capacity of the Council, its partners, and communities to deliver the strategy. A subsequent Action Plan might then seek to address capacity gaps.

Mitigation and adaptation strategies are crucial as they support reducing emissions, enhancing resilience, provide economic opportunities, and often align with broader sustainability development goals, and support global cooperation. These strategies can take various forms and are typically developed at local, district, regional, and national levels (see Table 1.1 for examples).

Table 1.1: Examples of climate change strategies from international to district level

National level	Regional level	District level
New Zealand's National adaptation plan It sets out New Zealand's long-term strategy and first national adaptation plan. The long-term strategy sets out the Government's approach to adaptation. New Zealand's Emissions reduction plan It contains strategies, policies and actions for achieving NZ emissions budget, as required by the Climate Change Response Act 2002. Reserve Bank of New Zealand's Climate Change Strategy The Strategy was developed to understand and help mitigate the risks to our objectives and core functions associated with both the physical impacts of climate change and the risks from transitioning to a low-carbon economy	Greater Wellington Regional Council's (GWRC) Draft Climate Change Strategy Its purpose is to provide an overarching document to align and coordinate climate change actions across GWRC's responsibilities and operations. It is developed to guide GWRC's climate resilience activities.	Whanganui District Council's Te Rautaki Huringa Āhuarangi / Climate Change Strategy The purpose of this strategy is to plot a course for action to both mitigate and adapt to climate change, and to provide a framework for collaboration across the Whanganui District and beyond among tangata whenua, iwi, neighbouring councils, central government, non-government organisations, private industry, education, our communities and people.

2 Taranaki Regional Council's (TRC) Climate Change Strategy

The TRC's Climate Change Strategy (also referred as "the Strategy") was developed in 2020 and presents a starting point to addressing the complex challenges posed by climate change in the Taranaki region. The Strategy is divided into 5 core sections:

1 Introduction: Outlines the background of climate change as a global problem and highlights New Zealand's role in responding to it. It discusses the unique challenges faced by New Zealand due to its emissions profile and the legislative framework in place to tackle climate change. It also touches upon the planning context, including relevant statutes, policies, and plans that influence TRC's climate change efforts (including how the Strategy relates to national and regional policies and legislation).

2 Regional context: Discusses the regional context, including greenhouse gas emissions in the Taranaki region and climate change risks specific to the area. It outlines TRC's current role in addressing climate change through various functions and responsibilities, with a focus mostly on mitigation and limited on adaptation.

3 A strategic approach: Introduces principles and a vision guiding TRC's climate change actions, emphasising cooperation, resilience, equity, and effectiveness. It outlines three core objectives related to mitigation, adaptation, and community engagement and awareness.

4 An Action Plan: Discusses policies and actions, both internal and external to the organization, and highlights the importance of adequate and equitable funding for successful implementation.

5 Review of the Strategy: Highlights the need for periodic reviews of the Climate Change Strategy to adapt to evolving circumstances.

The Strategy indicates a commitment from TRC to both mitigation and adaptation efforts (under Section 3.2). It emphasizes the importance of cooperation, resilience, equity, and efficiency as guiding principles, setting a vision for creating a low-carbon regional economy while ensuring the well-being of the community (refer to Section 3.1). Moreover, the Strategy recognises the need for community engagement and awareness for a meaningful change (reflected in section 3.2 under objective for Community engagement and awareness). With an action plan and periodic review, TRC aims to navigate the uncertainties of climate change while staying aligned with national policy direction and community aspirations. Overall, this document serves as an introduction and framework for the TRC Climate Change Strategy, outlining its objectives, principles, and planned actions to address climate change within its jurisdiction.

2.1 Scope of this review

The scope of this review was to provide an independent assessment of the current Climate Change Strategy and make high-level recommendations with regard to gaps, areas for strengthening and considerations for improvement. This review includes consideration of the changing regulatory environment, experience from strategies developed by other Councils, and updates to reflect internal and external work undertaken since the strategy was developed. This list of recommendations has been developed in the context of refreshing the Strategy, including the integration of recommendations flowing from the climate change risk assessment phase 1 and proposed work relating to an emissions inventory and emissions reductions planning.

3 In depth review of the TRC Climate Change Strategy

3.1 Introduction

The introduction is balanced in its presentation of information about climate change, New Zealand's role, and the legislative context. It serves as a background section, setting the stage for the specific climate change strategy for the Taranaki Regional Council. It provides the broader context within which the Strategy will operate, which is an essential component of any strategic planning document. The Strategy mentions the importance of adaptation, but it primarily focuses on mitigation, and there should be a more balanced emphasis on both. Below are some explanations:

- It provides an overview of various aspects related to climate change, including New Zealand's greenhouse gas emissions profile, the legislative framework, and the roles of local and central government.
- While this section mentions the importance of adaptation, it primarily focuses on mitigation. It is important to recognise that adaptation is equally essential, especially some climate impacts even with successful mitigation efforts may occur.
- The Strategy mentions various regional plans and documents (in the Section 1.3 Planning Context of the TRC's Climate Change Strategy), but it doesn't clearly demonstrate how the Strategy integrates with these existing plans. This integration is crucial for ensuring that climate change considerations are consistently incorporated into TRC's broader decision-making processes, and that climate action is mainstreamed across all relevant sectors.
- The national policy landscape regarding climate change has evolved rapidly in recent years. Therefore, it is necessary to refresh and align the Strategy with the latest national strategies/frameworks/plans, such as the National Adaptation Plan and the Emission Reduction Plan (in the Section 1.3 Planning Context of the TRC's Climate Change Strategy). Staying up to date with these developments ensures that TRC's strategy remains in sync with the broader national efforts to address climate change, enhancing its effectiveness and relevance in the ever-changing policy environment.

3.2 Regional context

3.2.1 Greenhouse gas emissions in the Taranaki region

This section could benefit from more specific details to provide a comprehensive overview of the greenhouse gas emissions situation in the Taranaki region. Additionally, the section doesn't fully tie in with other sections, as it primarily focuses on setting the stage and providing some background information on emissions, without clearly connecting this data to the broader climate action plan. Below are some explanations:

- It is missing a brief introductory sentence that sets the stage for the section, explaining why greenhouse gas emissions data is important for the Taranaki region and its residents.
- While providing regional context and background information on the greenhouse gas emissions in the Taranaki region, the document makes a recommendation to central government "to make available a regional breakdown of greenhouse gas emissions in the Taranaki region and what mitigation is occurring so that the Council can be kept informed. It is more of a recommendation than context setting". This would suit better in the Action plan than in this section.
- It is important to clearly explain the primary purpose of the inventories.
- Transition risks (the risks and opportunities of transitioning to become a low carbon, resilient region) should be addressed in the strategy.

- Instead of stating the percentages of emissions sources in isolation, it is beneficial to explain why these statistics are significant. For example, mention how knowing that agriculture contributes nearly 60% of emissions informs climate mitigation efforts.
- The Strategy does indeed present greenhouse gas emissions data for Taranaki broken down by sector but lacks explanatory context. This data covers the period from the early 1990s until the end of that decade, with no recent updates. Furthermore, it is important to note that these reports were ceased because the government decided that regional councils would no longer have a role in greenhouse gas mitigation. As a result, the regional inventory may not adhere to standard protocols such as the GHG Protocol.
- A notable omission in the document is any discussion of total emissions per capita and how they compare, both historically and in comparison, to other regions or national averages. This context is crucial for understanding the scale of emissions and their impact on the community and for setting meaningful targets and strategies for mitigation and adaptation. Without this additional information, the greenhouse gas emissions data presented lacks a comprehensive and relatable perspective.

3.2.2 Climate change risks for Taranaki

This section of the document provides some valuable context, but requires updating, with more detail. It would benefit from translating headline messages from the climate projections into plausible risks for the region so that the possible consequences for the region's communities and economy are made clear. The completion of a climate change risk assessment will provide valuable input in this regard; however, it should be possible to strengthen this aspect immediately. This section also lacks depth in discussing past climate-related hazards, which are crucial for understanding vulnerabilities and adaptation strategies. Below are some explanations:

- The data and statistics on projected climate change presented in this section are outdated (now 15 years old). These need updating, along with a greater emphasis on the urgency and speed of change emphasised in more recent scientific literature (e.g. IPCC AR6).
- Greater consideration is recommended of physical and transition risks which occur outside of the region but will affect Taranaki District.
- Including a brief introductory paragraph or two at the start of this section could enhance its readability by providing context and relevance to Taranaki residents and policymakers. It could effectively underscore the local impact and consequences of climate changes and associated risks.
- Discussing past climate-related hazards is crucial when addressing climate change risks and adaptation strategies. Reflecting on historical climate events can provide valuable insights into the vulnerabilities and challenges a region like Taranaki has faced and may continue to face in the future.
- It would be helpful to incorporate visual aids such as charts, graphs, or maps to illustrate climate change trends, temperature projections, rainfall variations, and other relevant data.
- The description of climate change risks for Taranaki is relatively general and lacks a detailed assessment of specific risks to the region.
- Ending the section with a brief summary or key takeaways to reinforce the importance of understanding these climate change risks and how they may affect Taranaki would be useful.

3.2.3 Taranaki Regional Council's current role in addressing climate change

This section could benefit from restructuring and expansion, with a clear focus on mitigation and adaptation efforts. Below are some explanations:

- It is important to describe in detail how TRC has taken on different roles and approaches to address climate change. It lacks emphasis on how TRC's actions align with relevant laws, regulations, and climate-related policies. It stresses TRC's commitment to working in harmony with national policies and guidelines related to climate change.
- This section lacks specific actions and initiatives that were undertaken by TRC to reduce greenhouse gas emissions. It also lacks the measures and strategies that TRC has put in place to adapt to the effects of climate change.

3.3 A strategic approach

This section may be better positioned at the start of the document, thus clearly setting the tone and structure for the contextual information to follow. There is no description of the process of how the principles, vision and objectives were developed; this is important as it provides rigor and evidence of buy-in and internal commitment to the Strategy. The section is very brief and feels imbalanced when contrasted with the contextual information. This is section is the heart of the Strategy but feels under-developed and somewhat hidden.

3.3.1 Principles and vision

The section discussing principles and the strategic approach of the Climate Change Strategy could benefit from further balance and detail. While the vision statement and listed principles are comprehensive, providing simpler explanations for and a brief rationale would enhance clarity. Below are some explanations:

- The Strategy could benefit from addressing the role of technology and innovation in achieving its goals. Exploring and encouraging innovative solutions to reduce emissions and adapt to climate change should be considered.
- The principles listed here are comprehensive, but it might help to briefly explain each principle in simpler terms. For instance, provide a sentence or two explaining what “Precaution” means in the context of climate change.
- The addition of principles like “Lawfulness”, “Effective”, “Efficient”, and “Robust” is good, but it would be helpful to provide a brief explanation for each principle. Why are these principles important, and how do they guide TRC's actions?
- While the vision statement is concise and to the point, it would be beneficial to add a brief explanation or elaboration on what this vision entails.
- There is no specific reference to how TRC will work within existing legal frameworks and regulations. Detailing how TRC will navigate legal requirements and seek legislative changes, when necessary, would be valuable.

3.3.2 Objectives

The section outlining the Strategy's objectives could benefit from more specificity and clarity. It is crucial to clarify that community engagement is a component within the broader climate change strategy, not the Strategy itself. Below are some explanations:

- The Strategy provides broad objectives but does not break them down into specific sub-objectives or key result areas. It should include clear and actionable objectives for mitigation and adaptation. For example, the Strategy discusses the importance of reducing greenhouse gas emissions throughout the document but lacks specific emission reduction targets for the Taranaki region.
- It is important to consider adding a brief explanation of why each objective is essential.

- While it's important to emphasize community engagement and awareness of the objectives, it's also crucial to acknowledge that community engagement is a broader approach. Community engagement can be a crucial component of a climate change strategy, but it is not a strategy for addressing climate change. Instead, it is a set of actions and approaches used within a broader climate change strategy.

3.3.3 Policies and actions

It is good to distinguish between internal and external policies and actions. Detailed commentary on the internal and external policies and actions are presented in section 3.4.

3.3.4 Implementation

This section could be improved by offering a balanced perspective that highlights the benefits of taking action, the risks of not, as well as the risks associated with transitioning to a low carbon, resilient community and inclusion of monitoring and evaluation (M&E) framework. Below are some explanations:

- It is crucial to maintain a balanced view by not only highlighting the benefits of taking action but also emphasizing the risks of inaction. Additionally, it is essential to address the potential risks associated with transitioning to a low-carbon, resilient society (transition risks).
- It is important to show that TRC is actively exploring ways to fund climate change initiatives without imposing a heavy burden on ratepayers. The Strategy mentions the need for funding but lacks a detailed discussion of potential funding sources and mechanisms, such as applying for grants, partnerships with private organizations, or leveraging central government resources.
- The document lacks a clear M&E framework to track, and a record of actions implemented, in progress, or planned for the future. This absence of systematic tracking and reporting hinders the ability to assess the Strategy's effectiveness and measure progress toward its goals.

3.4 An action plan

The existing content in the action plan section may benefit from some rephrasing and clarification, as it contains a mixture of objectives, strategies, and action items. Below are some explanations:

- The TRC’s Climate Change Strategy lacks a comprehensive and well-structured action plan. Usually, an action plan provides the necessary roadmap for turning strategic goals and objectives into practical initiatives and tangible results. It typically outlines specific actions, tasks, responsibilities, and timelines that guide the organization toward achieving its goals.
- The action plan presents a list of policies and actions, both internal and external to the organization. However, these policies do not align well with the components typically found in a comprehensive climate change strategy. The document includes a mix of objectives, strategies, and action items, making it difficult to determine a clear hierarchy of priorities.
- The term “policy” should be avoided in action plan, as “policy” usually refers to a mandated statement or document that outlines an organisation's perspective, guidelines, and principles regarding a particular issue or topic.
- It is noted that the progress made on the listed policies or actions within the plan appears to be limited, and there is no robust system in place for tracking and monitoring these actions (as mentioned in Section 3.3.4). Without a clear and systematic approach to measuring progress, it becomes challenging to assess the effectiveness of the plan and determine whether the intended outcomes and objectives are being achieved.

3.5 Review of the Strategy

While the Strategy mentions the need for periodic review, it lacks specific details regarding the frequency of these reviews and the criteria that will be used to evaluate progress.

3.6 Other observations

- The status of the TRC's Climate Change Strategy within TRC appears to be relatively unknown and we understand there is limited awareness of the Strategy among Council members and staff. This could potentially indicate a gap in communication or dissemination of the plan's details within the organization. When the key stakeholders are not fully aware of or engaged with the plan, it can lead to a lack of commitment to its implementation.
- The Strategy acknowledges the importance of adaptation; however, it is primarily inclined towards mitigation efforts. While mitigation is crucial for reducing greenhouse gas emissions, the Strategy's emphasis on this aspect overshadows the significance of adaptation. Taranaki, like many regions, faces specific climate-related risks, including coastal hazards, erosion, flooding, and changes in weather patterns. A more balanced approach is suggested to ensure that the Strategy effectively addresses both aspects, acknowledging the region's unique challenges and the necessity to build resilience against ongoing climate change effects.
- While the document provides comprehensive information, a more concise summary or executive summary at the beginning could make the key points more accessible.
- The Strategy briefly mentions community engagement and awareness but lacks a detailed plan for involving stakeholders in climate change initiatives. It should outline specific strategies for engaging with the community, local businesses, and Te Tiriti Partners to ensure their active participation.
- The document appears to lack a clear structure, making it challenging to determine how TRC intends to implement its climate change strategy effectively. Additionally, there is a need for improved clarity regarding which action items have been delivered and which ones are pending. A more structured and transparent presentation of the Strategy's implementation plan would significantly benefit the TRC in advancing toward its climate change goals.
- A clear statement of desired outcomes and specific, measurable goals is essential for any strategy. These outcomes and goals provide a sense of direction and purpose, helping to measure success and progress over time. Without them, it's challenging to determine what the Strategy aims to achieve.
- Effective strategies often outline the key strategic priorities or focus areas that will receive the most attention and resources. These priorities help stakeholders understand where the organization will concentrate its efforts to achieve its goals.
- A dedicated section on how TRC plans to monitor and evaluate the Strategy's progress and outcomes is missing. This should include details on data collection, reporting mechanisms, and periodic reviews.

4 Recommendations

4.1 Recommendation for strengthening the Strategy and Action Plan

- Emphasising the value of the Strategy development process, alongside the final document, is crucial for ensuring that all stakeholders are engaged, informed, and committed to the climate change strategy's success. A transparent, inclusive, and well-structured process not only leads to a more robust and widely supported strategy but also ensures collaboration, innovation, and shared ownership among Council members, staff, and the broader community. By placing greater importance on the process of strategy development, TRC can harness the collective

wisdom and expertise of its stakeholders, ultimately enhancing the Strategy's effectiveness and long-term impact.

- According to the New Zealand's National Adaptation Plan (NAP), "from 30 November 2022, councils will be required to 'have regard to' this plan when making or changing regional policy statements or regional or district plans." To ensure alignment with the NAP, consider incorporating goals or objectives related to key thematic areas such as the "natural environment," "homes, buildings, and places," "infrastructure," "communities," and "economy and financial system" into the adaptation strategy. This approach will help address a comprehensive range of adaptation needs.
- The successful implementation of a climate change strategy is dependent upon buy-in and commitment from TRC, Te Tiriti Partners, and TRC's stakeholders. According to the New Zealand's National Adaptation Plan, "strong governance and accountability mechanisms are needed to make continuous progress". Without the support within TRC and from its stakeholders, a climate change strategy risks remaining a blueprint, lacking the necessary resources, regulatory frameworks, and coordinated efforts to translate strategies into tangible actions. Furthermore, political, and institutional commitment is crucial in encouraging collaboration, engaging stakeholders, and driving the transformative changes needed to address the urgent challenge of climate change.
- According to the New Zealand's Emission Reduction Plan, "local government is fundamental to meeting our 2050 targets, mitigating the impacts of climate change and helping communities to adapt to climate change". It is important to align this strategy with the Emissions Reduction Plan, specifically focusing on ensuring that mitigation goals encompass key sectors like "Transport," "Energy and industry," "Building and construction," "Agriculture," "Forestry," "Waste," and "Fluorinated gases." This alignment is essential for coordinated and effective climate action across these domains.
- Commitment and alignment with its other plans and documents would be helpful for more effective horizontal integration. To achieve this, it is recommended that TRC establishes clear mechanisms for cross-referencing and harmonizing its climate change strategy with existing statutory documents, policies, and plans. This approach ensures that climate change considerations are integrated into TRC's broader initiatives (or goals or objectives), making it easier for stakeholders to navigate and understand the strategic landscape. By breaking down silos and enhancing horizontal integration, TRC can optimise resource allocation, streamline decision-making, and create a coherent and coordinated approach to addressing climate change across all its functions and responsibilities.
- The Strategy's objectives should align with the broader objectives of TRC. To achieve this alignment, it is recommended that TRC conducts a thorough review of its Climate Change Strategy to ensure that its goals and actions are fully compatible with TRC's overarching objectives, particularly those related to climate change mitigation and adaptation. This alignment will help integrate climate change considerations seamlessly into TRC's existing strategic framework, ensuring that climate resilience and sustainability are core components of TRC's long-term vision and planning. For instance, the TRC's Long Term Plan acknowledges that TRCs are required to consider the effects of Climate Change in their local communities and act accordingly (in section "Climate Change"-Page 36).
- A balanced approach between adaptation and mitigation efforts in the Strategy would be beneficial. This balance can be achieved by conducting a comprehensive review of existing strategies, initiatives, and resource allocation to assess whether adaptation and mitigation activities are adequately represented. TRC should consider establishing clear metrics and targets that reflect this balance, ensuring that both adaptation and mitigation objectives receive due attention and resources. TRC can effectively address immediate climate impacts

while simultaneously working towards long-term emissions reduction and resilience-building goals.

- Achieving a balance between scene-setting, strategy, and action planning is essential to create a robust and actionable strategy. To address this, TRC should consider reevaluating and enhancing the document's structure. Specifically, TRC could focus on strengthening the strategy component by providing a more comprehensive and detailed outline of its strategic objectives, priorities, and key performance indicators.
- Prior to developing the strategy, TRC could establish emission reduction targets. These targets can serve as a foundation for the strategy's development and subsequent action plan. Having well-defined emission reduction targets will provide a more focused and goal-oriented approach to addressing climate change in Taranaki.
- It is recommended that TRC conducts a thorough audit of the status of existing climate change actions outlined in the current strategy. This audit should assess which actions have been implemented, which are in progress, and which have not yet been initiated. By documenting the progress and outcomes of these actions, TRC can gain valuable insights into what has worked well and where improvements are needed.
- It is recommended that TRC works with Te Tiriti Partners and conducts extensive engagement with relevant stakeholders, including local communities, businesses, environmental organisations. This engagement should aim to gather diverse perspectives, share information, and seek feedback on the current strategy. Through this process, TRC can identify new priorities, validate existing objectives, and ensure that the strategy aligns with the evolving needs and expectations of the community. TRC should then develop a detailed action plan that translates the Strategy's objectives into concrete actions, tasks, responsibilities, and timelines. The action plan should clearly outline how TRC intends to achieve its climate goals, including mitigation, adaptation, and community engagement efforts. It should also specify potential funding sources and mechanisms for each action.
- It is recommended that TRC establishes a robust monitoring and evaluation (M&E) framework. This framework should include key performance indicators (KPIs) and reporting mechanisms to track the progress and effectiveness of climate actions over time. Regular M&E reports should be made accessible to the public to enhance transparency and accountability.

4.2 Recommendations for supporting the Strategy

- A detailed climate change risk assessment should be conducted by following A guide to local climate change risk assessments published by the Ministry for the Environment to ensure that latest risks that are relevant to the Taranaki region are captured and updated. This supports in including specific examples or case studies related to Taranaki where applicable. It also emphasises the unique climate risks in Taranaki region.
- TRC may wish to consider developing a comprehensive Community Engagement Plan which could provide the basis for ongoing dialogue on climate change issues in the region. This would outline how TRC intends to engage the community on climate change, both on a project-specific basis and in terms of broader awareness and involvement. This approach ensures that community engagement efforts are well-structured, consistent, and aligned with the overall strategy.
- It is recommended that TRC conducts an internal capacity assessment to understand its resource and skill gaps in the context of climate change initiatives. This assessment will help identify areas where additional resources, expertise, or training are needed to implement the Strategy successfully. By addressing these gaps, TRC can enhance its ability to execute climate mitigation and adaptation plans efficiently, thereby increasing the likelihood of achieving its climate goals. This internal capacity assessment will also provide valuable insights into TRC's

readiness to respond to the evolving challenges posed by climate change, ensuring that it remains well-equipped to safeguard the interests of its community.

- It is recommended that TRC utilises the resources being developed by Ko Tātou LGNZ to support councils in progressing their climate change work. LGNZ's initiatives and tools can provide valuable guidance, best practices, and shared knowledge that can assist TRC in aligning its climate change strategies and actions with national goals and standards.

5 Applicability

This report has been prepared for the exclusive use of our client Taranaki Regional Council, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

Report prepared by:

.....

Neeraj Shankar
Disaster Management Consultant

Authorised for Tonkin & Taylor Ltd by:

.....

Markus Benter-Lynch
Sustainability and Climate Change Specialist

Technical reviews by:

.....

Paddy Pringle
Principal Consultant – Climate Risk and Resilience

Appendix A TRC's Climate Change Strategy

Climate Change Strategy

A strategy to guide the Taranaki Regional Council's climate change response

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1 Introduction

1.1 Background

A global problem

Climate change is an established global environmental, social, cultural and economic problem. The overwhelming consensus of scientific evidence across multiple disciplines is that human induced climate change is occurring and is intensifying. Its impact will be far reaching and will affect us all in many different and unknown ways over generations to come.

Increasing concentrations of greenhouse gases in the atmosphere from human activity has led to rising global temperatures, melting ice caps, and extremes of weather including more frequent storms and droughts.[1] This is in turn is resulting in rising sea levels, more severe flooding and erosion and risks to people and property including vital infrastructure. Pests and diseases may spread.

At the same time as posing major challenges, however, addressing climate change presents us with many opportunities in transitioning to a low-carbon economy. For example, it creates real opportunities for greater energy security, cleaner air, better water quality and reduced vehicle congestion. Warmer temperatures may also present opportunities for new crops and land uses.[2]

While strong mitigation policies to reduce greenhouse gas concentrations in the atmosphere are needed, adaptation policies are also required to respond to the changes we are already seeing and will continue to see, even with global reductions in future emissions.

New Zealand's role in tackling global climate change

New Zealand's greenhouse gas emissions are about 0.17% of total global emissions. However, despite its small contribution to global emissions, about 25% of global emissions come from small emitters, so that 'collectively, small emitters do matter and a global, concerted effort is needed'.[3]

New Zealand's greenhouse gas emission profile differs markedly from other developed nations. Nearly half of our emissions, (48.1%) are from agriculture, more than any other developed country. The energy sector accounts for 40.7% of which transport, the largest emissions source, has been the greatest contributor to rising emissions. Industrial processes (6.1%) and waste (5.1%) make up the balance.[4]

New Zealand's unique emissions profile presents us with some challenges in tackling global climate change. Rising transport emissions reflect a small and dispersed population in a geographically challenging landscape where mobility by private vehicles is largely unavoidable given current technology and the cost of alternatives. Furthermore, while we have a large proportion of agricultural emissions, it is internationally recognised that our agricultural production efficiency means we generate less emissions per unit of product than agriculture in most other

[1] https://www.mfe.govt.nz/climate-change/why-climate-change-matters/evidence-climate-change

[2] These benefits may be may be limited by the negative effects of climate change.

[3] New Zealand Productivity Commission, 2018. *Low emissions economy*.

[4] Ministry for the Environment, 2019. *New Zealand's greenhouse gas inventory 1990-2017*.

countries. This is a critical consideration in a world where food security is an ever-growing issue, brought about by increasing populations, loss of productive soils, conflicting demands for land for biofuels production and re-afforestation.

At the same time however, New Zealand has enough forestry to offset just under a third of gross emissions (29.6%) – a high proportion by international standards. New forest plantings provide time for reductions in emissions to be developed but there are also disadvantages in using forests as permanent sinks with risks from fire, disease and other natural events, as well as social impacts from changing land use.

Central government is responsible for developing policy on climate change. The Paris Agreement which came into force in 2016, commits signatory nations (of which New Zealand is one), to limit global warming to below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 degrees Celsius.

In response, the New Zealand Parliament passed the Climate Change (Zero Carbon) Amendment Bill in October 2019 which amended the Climate Change Response Act 2002. The Act commits New Zealand to reducing net emissions of all greenhouse gases (except biogenic methane) to zero by 2050 and reducing emissions of biogenic methane to 24-47% below 2017 levels by 2050, including to 10% below 2017 levels by 2030.

The Act also establishes a system of emissions budgets to act as stepping stones towards the long-term target and establishes an independent Climate Change Commission to provide advice to the Government. It also includes provisions to promote adaptation through the development of a National Adaptation Plan which will be preceded by a Climate Change Risk Assessment Framework.

The main tool in delivering on central government's greenhouse gas targets is the New Zealand Emissions Trading Scheme (NZ ETS). However, the Government is concerned that the NZ ETS is currently not being used to its full potential and has introduced legislation that would significantly improve the operation of the NZ ETS. Other legislative and policy changes will also be required over the coming years.

Local government's role

Local government does not yet have an explicit role in mitigating greenhouse gases across their local districts or regions – this is intended to be the role of central government. An amendment to the Resource Management Act in 2004 prevented regional councils from considering climate change effects when assessing applications for resource consents to discharge to air. Councils, however, were permitted to have particular regard to the effects of climate change when exercising functions and powers under the Act. These provisions remain in force.

However, the Local Government Act 2002 provides that the purpose of local government includes the promotion of the social, economic, environmental and cultural well-being of the community now and in the future.[5] While climate change is not specifically mentioned in the purpose statement, the wording is sufficiently broad to capture it.

Furthermore, many of local government's policies and plans, while prepared to achieve other objectives (for example in resource management or transport) will also have co-benefits for greenhouse gas emissions reductions. There is also a role for local government to reduce

[5] See section 10 of the Local Government Act 2002, for the full description of the purpose of local government.

emissions from its own operations, such as through its vehicle purchasing policies and waste management practices (although central government policies such as the NZ ETS will impact on these).

Much of the responsibility for adaptation to climate change will however, fall on local government through its environmental planning and regulatory role and through its role in providing local infrastructure. Territorial authorities will have a particularly important role to play through their provision or control of road networks, water supplies, stormwater management, wastewater disposal, building design, urban development patterns, sea level rise adaptation and managed retreat etc. However, local councils cannot address these issues by themselves and will require national policy guidance and support from central government, businesses, insurers, the banking industry, community and all parts of society, as well as a wide range of tools (not just regulation) to effectively manage the risks that climate change presents.

The local government sector has publicly committed to mitigation and adaptation actions through the Local Government Position Statement on Climate Change.[6] A Local Government Leaders' Declaration on Climate Change accompanies the position statement.[7]

The Chairman of the Taranaki Regional Council is a signatory to the Local Government Leaders' Declaration on Climate Change.

The Position Statement and Leaders' Declaration commit to local government led action on climate change and to policies that outline what local government requires of central government These include a national campaign to raise awareness of climate change; policy alignment and a clear legislative mandate to address climate change; a decision on fiscal responsibility for adaptation; and co-investment with central government to support low-carbon, climate resilient infrastructure.

Some local authorities have adopted climate change policies, declared 'climate emergencies', prepared greenhouse gas inventories or taken other actions to address climate change.[8]

Working together is vital because action on climate change requires a comprehensive, coherent, coordinated and consistent framework across central and local government and all sectors of society.

However, local government, including the Taranaki Regional Council, recognises that the need for action on climate change is becoming ever more imperative in the face of growing national and international concern. Further action now is necessary to avoid or reduce future risk and to better adapt to an emerging and very different future.

This Strategy will therefore align with the Council's current statutory roles and responsibilities to provide a focus for climate change in the region. It will be reviewed regularly as circumstances change, legislation is amended and policy develops in future.

1.2 Purpose and scope

The purpose of the Taranaki Regional Council's Climate Change Strategy is to:

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[6] Local Government New Zealand, 2018. *Local Government Position Statement on Climate Change.*

[7] Local Government New Zealand, 2017. *Local Government Leaders' Climate Change Declaration.*

[8] Local Government New Zealand records climate change actions of local government.

- provide an overarching document to align and coordinate climate change actions across the Council's responsibilities and operations;
- respond to and raise awareness of climate change throughout the community; and
- help coordinate collaboration and partnership between councils, central government and the community.

The Strategy is intended to provide regional leadership on climate change and a clear focus and strategic direction to the Taranaki Regional Council on its climate change intentions and priorities.

The scope of the Strategy are those actions that fall within the Taranaki Regional Council's current functions, responsibilities and spheres of influence in the Taranaki region. It will help set the platform for other plans and strategies that link with it.

1.3 Planning context

The strategy is a non-statutory document that is designed to complement national policy direction on the one hand and to complement other key statutory and non-statutory Council documents on the other. Community and iwi co-development and collaboration on climate change policy will be a key feature.

National policy direction comes from specific climate change legislation and related policy[9] and the many policy and technical guidance documents that exist at central government level.[10] At the regional level the key statutes that determine what the Council does and how it does it are the Local Government Act 2002, Resource Management Act 1991, Biosecurity Act 1993, Soil Conservation and Rivers Control Act 1941, Land Transport Management Act 2003, Maritime Transport Act 1994, and the Civil Defence Emergency Management Act 2002.

From these statutes come a range of statutory documents and related non-statutory strategies, operational plans and guidelines. These include the Long-Term Plan, Regional Policy Statement, regional plans, a pest management plan, biosecurity and biodiversity strategies, a Civil Defence Emergency Management Group Plan, a Regional Land Transport Plan, the Regional Public Transport Plan, a Walkways and Cycleways Strategy, asset management plans and an infrastructure strategy, among others.

In addition, there are documents that are prepared by other organisations that will influence what the Council does. Included among these are Iwi Management Plans, *Tapuae Roa: Make Way for Taranaki,* Strategy and Action Plan (the regional economic development strategy for Taranaki) and the *Taranaki 2050 Roadmap* (a plan to transition Taranaki to a low-emissions future).

The diagram contained in Appendix 1 shows the connections between the Climate Change Strategy and other key planning documents, as well as the main legislation under which the plans and strategies are produced. It illustrates how the Climate Change Strategy will act as coordinating and integrating mechanism on all climate change issues relevant to the Council.

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[9] This includes National Policy Statements prepared under the Resource Management Act which the Council is required to give effect to.

[10] See for example https://www.mfe.govt.nz/climate-change; https://www.mpi.govt.nz/protection-and-response/environment-and-natural-resources/climate-change-and-the-primary-industries/

2 Regional context

2.1 Greenhouse gas emissions in the Taranaki region

From the early 1990s until the end of that decade, the Taranaki Regional Council prepared annual inventories of greenhouse gas emissions by sector in the Taranaki region. The inventories were reported to the Taranaki Regional Council to keep the Council regularly informed and up-to-date on the status of greenhouse gas emissions in the region while central government worked on its national and international policy response to the issue.

The inventory reports identified the main sources and quantities of greenhouse gas emissions in the region and their relative contributions to the enhanced greenhouse effect. Typically, the reports found that the agricultural sector accounted for approximately 59.9% of total emissions, major industrial facilities 25.6%, and the transport sector 1.7%. Other sectors accounted for 12.8%.[11]

The Council ceased preparing the reports when the Government at that time decided that regional councils would have no role in greenhouse gas mitigation.[12]

The Government has since developed its own policy further and now collects detailed information on greenhouse gas emissions sources.[13] The Council should request that central government make available a regional breakdown of greenhouse gas emissions in the Taranaki region and what mitigation is occurring so that the Council can be kept informed, advocate to central government and show leadership on behalf of its community on climate change. It also makes the Government more transparent and accountable for its policy.

2.2 Climate change risks for Taranaki

Dealing with uncertainty

Projections of climate change and associated risks depend on many different factors, including future greenhouse gas emissions, technological advancements and societal expectations. There is ongoing uncertainty about future global processes and impacts and competing ideas about what should be done, who should do it and who should pay.

There are also limitations in the science and modelling used and the potential for poorly considered interventions to be made that have inequitable, inefficient or inappropriate or unintended economic, social, cultural and environmental consequences.

All of these aspects involve uncertainty and risk. These risks include not only physical environmental risks associated with climate change, but also legal, insurance, financial and political risks.

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[11] Taranaki Regional Council, 2000. *Emissions of Greenhouse gases in Taranaki. Annual report 1998-99.* Internal Report.

[12] See comment under 1.1 Background on Local Government's role in greenhouse gas mitigation

[13] See for example https://www.mfe.govt.nz/publications/climate-change/new-zealands-greenhouse-gas-inventory-1990-2017

The recommended approach for climate change planning and decision-making therefore, is one of risk management in the face of uncertainty. This will involve a dynamic adaptive pathways planning approach (DAPP) to future decision-making.[14]

Projected climate changes for Taranaki

Climate change trends for Taranaki are contained in a 2008 report by NIWA[15] commissioned by the four councils of the region, and more recently on the Ministry for the Environment's website[16].

According to the Ministry for the Environment, temperatures in Taranaki are likely to be 0.7 degrees Celsius to 1.1 degrees Celsius warmer by 2040 compared to 1995 and 3.1 degrees Celsius warmer by 2090. By 2090, Taranaki is projected to have from 5 to 41 extra days where maximum temperatures exceed 25 degrees Celsius. Frosts are likely to become increasing rare in Taranaki by 2090.

Rainfall will vary locally within the region. North Taranaki will become slightly wetter and South Taranaki will become slightly drier. The largest changes will be for particular seasons rather than annually with up to 9% more rainfall in New Plymouth over winter by 2090. According to the most recent projections, Taranaki is not expected to experience a significant change in the frequency of extreme rainy days as a result of climate change.[17]

The NIWA report projects an increase in drought risk with severe droughts projected to at least double by the 2080s under a 'medium-high' scenario in central and southern parts of Taranaki.

The frequency of extremely windy days in Taranaki by 2090 is not likely to change significantly. There may be an increase in westerly wind flow during winter, and north-easterly wind flow during summer.

Some increase in storm intensity, local wind extremes and thunderstorms are likely to occur but future changes in the frequency of storms are likely to be small compared to natural inter-annual variability. The NIWA report projects some higher intensity ex-tropical cyclones may produce larger storm impacts in Taranaki as the 21st century progresses, but maintains that how these cyclones affect New Zealand after they transition to ex-tropical cyclone status remains uncertain.

In terms of sea level rise, the Ministry for the Environment states that New Zealand tide records show an average rise in relative mean sea level of 1.7mm per year over the 20th century.[18] Globally, the rate of sea level rise has increased and further rise is expected in New Zealand in future. However, sea level rises are not uniform around the world and neither are they consistent around

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[14] See Ministry for the Environment, 2017. *Preparing for coastal change. A summary of coastal hazards and climate change guidance for local government*, for a discussion of the dynamic adaptive pathways planning approach. The approach identifies ways forward (pathways) despite uncertainty, while remaining responsive to change (dynamic) should this be needed.

[15] NIWA, 2008. *Climate Trends, Hazards and Extremes – Taranaki. Synthesis Report.*

[16] https://www.mfe.govt.nz/climate-change/likely-impacts-of-climate-change/how-could-climate-change-affect-my-region/taranaki

[17] Ibid.

[18] Ibid.

New Zealand's coastline.[19] In the Ministry for the Environment's *Our marine environment 2016* report, data on sea level rise at New Plymouth showed very large variations from year to year with current sea heights somewhat lower than 60 years ago and lower than other sites around New Zealand where long-term monitoring had taken place. Potential increases in storm surges may present a more significant risk in Taranaki.

For Taranaki, climate change impacts are not expected to be as severe as in some other regions of New Zealand.

Key climate change risks

Key climate change risks for Taranaki are as follows.[20]

- **Coastal hazards:** There could be increased risks to coastal roads and coastal communities and infrastructure from coastal erosion and inundation, increased storminess and sea-level rise, threatening vulnerable beaches and low-lying areas.
- **Erosion, landslides and flooding:** More frequent and intense heavy rainfall events are likely to increase the risk of erosion and landslides. Flooding is likely to become more frequent and severe.
- **Drought:** By 2090, the time spent in drought ranges from minimal change to more than double depending on the climate model and emissions scenario considered. More frequent droughts are likely to lead to water shortages, increased demand for irrigation and increased risk of wildfires, as well as increased animal stress, pasture decline and loss of agricultural production.
- **Disease:** Warmer winters may alleviate cold-related illnesses and reduce cold-related deaths, while hotter summers will likely cause heat stress and promote the spread of sub-tropical diseases and their vectors.
- **Biosecurity and biodiversity:** Warmer, wetter conditions could increase the risk of invasive pests and weeds over time. Climate change can adversely affect important ecosystems.
- **Agriculture:** Warmer temperatures, a longer growing season and fewer frosts could provide opportunities to grow new crops. Farmers might benefit from faster growth of pasture and better crop growing conditions and better (more prolonged) use of seasonally-based infrastructure. However, these benefits may be limited by the negative effects of climate change such as prolonged drought or greater frequency and intensity of storms. Competition for water resources may increase, and greater stock losses may be experienced as a result of more extreme events.

[19] See Ministry for the Environment and Stats NZ, 2017. *Our atmosphere and climate 2017*, and Ministry for the Environment and Stats NZ, 2016. *Our marine environment 2016*.

[20] See https://www.mfe.govt.nz/climate-change/likely-impacts-of-climate-change/how-could-climate-change-affect-my-region/taranaki

2.3 Taranaki Regional Council's current role in addressing climate change

The Taranaki Regional Council has a wide range of roles, responsibilities, functions and powers that relate to the climate change risks outlined above. While these various roles and responsibilities are prescribed by law and undertaken to achieve objectives other than climate change objectives, there are co-benefits for climate change in achieving them.

Some of these functions and responsibilities fall within the scope of mitigation (reduction) of greenhouse gas emissions while others fall within the scope of adaptation to climate change that is already happening. Other functions involve ongoing engagement, awareness and community support on climate change.

Reference has already been made in Section 1.3 (Planning context) to Appendix 1 that shows the linkages between the statutes, policies and plans that the Council works under and the Climate Change Strategy.

Expanding on these statutory responsibilities, the following lists the practical work that the Council undertakes in assisting climate change mitigation and adaptation objectives:

- **Resource management:** managing the effects of the use of freshwater, land, air and the coast through the Regional Policy Statement and regional plans and through the issuing of resource consents, compliance monitoring and enforcement, pollution incidents and response, water shortage management, state of the environment monitoring and resource investigations.
- **Sustainable land management and plant supply:** promoting riparian management and sustainable land use by promoting the fencing and planting of riparian margins and sustainable land use in the hill country through individual property plans and a plant supply programme. These programmes are seeing significant areas of land undergoing land use change to more sustainable uses such as forestry and reversion or planting of native species to address soil loss, land instability, river bank erosion and water quality enhancement.
- **Biosecurity:** regional pest management to minimise the adverse effects of pests on biodiversity, primary production, the regional economy and the environment.
- **Biodiversity:** maintaining and enhancing the indigenous biodiversity of the region.
- **Transport**: regional land transport planning and contracting public transport services across the region. This area of work provides an opportunity to promote alternatives to the use of private motor vehicles such as public transport and walking and cycling and the use of electric vehicles and buses.
- **Hazard management:** supporting within the Taranaki community, an integrated and comprehensive emergency management system including hazard awareness, reducing risk, maintaining readiness and providing response and recovery capabilities.
- **Flood protection and river control:** providing flood control advice, undertaking minor works and managing and maintaining river control schemes to minimise and prevent damage by floods and river erosion.
- **Recreation, culture and heritage:** supporting and developing regional gardens, Puke Ariki regional museum and library and Yarrow Stadium.

- **Regional representation, advocacy and investment management:** this area of work involves maintaining effective and open community representation as an important part of the democratic process; advocating on behalf of the Taranaki community on matters of regional interest; implementing and further developing a programme of information transfer, advice and education on the Council's activities and ensuring that the Council's equity, property and treasury investments are managed efficiently.

The ways in which the Council achieves these various roles takes a number of forms. The Council from time-to-time takes on the roles of an advocate, facilitator, or educator or can take a more direct role of a funder, service provider, monitor or regulator. In many cases the Council will be involved in more than one way in furthering its objectives within the community. This makes the Council well placed to further promote the community's climate change objectives but this must be done in a way that aligns with national policy direction, is consistent with the Council's statutory functions and takes into account community wishes and ability to pay.

3 A strategic approach

3.1 Principles and vision

The Council's Climate Change Strategy is guided by the following seven principles outlined in Local Government New Zealand's *Local Government Leaders' Climate Change Declaration*.[21]

- **Precaution:** act now to maximise co-benefits, reducing future risks and costs associated with climate change and minimise actions which hinder adaptation.
- **Stewardship/Kaitiakitanga:** flexible action and climate policies that enable all to do their bit to reduce emissions and enhance resilience.
- **Equity/justice:** prioritise action to the most vulnerable communities and sectors.
- **Anticipation:** anticipate change and take a long-term perspective, with a clear and consistent pathway to a low carbon future that will provide benefits and certainty for all.
- **Understanding;** grow understanding around the potential impacts of climate change and use the best available information and evidence in education, community consultation planning and decision-making.
- **Cooperation:** act together in partnership and build relationships across countries, communities, cultures and organisations.
- **Resilience:** enhance the resilience and readiness of communities and businesses so they can thrive in the face of change.

The following principles can be added to these.

- **Lawfulness:** act in accordance with the law as provided through legislation and regulation, including seeking amendment to lawful powers when appropriate and justified.

[21] Op. cit.

- **Effective:** avoid perverse outcomes and unintended consequences while being able to deliver the desired outcomes.
- **Efficient:** avoid duplication of roles, responsibilities and actions.
- **Robust:** ensure that any interventions can endure through financial and political cycles.

Applying these principles gives us the following overall strategic vision for the Taranaki Regional Council action on climate change:

> *The Taranaki Regional Council strengthens the ability and willingness of the Taranaki community to adapt to and thrive under climate change risks and opportunities through cooperation and coordination on climate change action consistent with its statutory functions.*

3.2 Objectives

Objectives are statements of a desired outcome. The Strategy has three core objectives that together span the range of areas that the Taranaki Regional Council will focus on to achieve its vision: mitigation, adaptation and community engagement and awareness.

Mitigation involves actions to reduce greenhouse gases in the atmosphere whereas adaptation is responding to the changes we are already seeing and will continue to see, even with reductions in future emissions of greenhouse gases. Community engagement and awareness of both mitigation and adaptation solutions encourages businesses, communities and individuals to adjust their behaviour in ways that reduce emissions and improve resilience.

Mitigation

The overarching objective to relation to mitigation is that:

> *Greenhouse gas emissions are reduced across all Taranaki Regional Council areas of influence, including its own operations, helping to create the conditions for a transition to a smart, innovative, low-carbon regional economy.*

Adaptation

The overarching objective in relation to adaptation is that:

> *Risks from climate-change related impacts are managed and resilience is increased through the application of sound and consistent adaptation planning based on best scientific information.*

Community engagement and awareness

The overarching objective in relation to community engagement and awareness is that:

> *Community awareness of climate change mitigation and adaptation solutions increases and individuals and organisations are better informed about what they can do to contribute to the transition to a low-carbon regional economy.*

3.3 Policies and actions

A policy means a specific statement that guides or directs decision-making. It indicates a commitment to a course of action in working towards an objective.

An action on the other hand, means a specific programme, procedure, technique or action to carry out a policy.

In line with the purpose and scope of this Climate Change Strategy (section 1.2), and consistent with the above objectives, the Taranaki Regional Council's policies and actions on climate change focus on the following two broad areas:

1. Those policies and actions that are **internal** to the organisation; and
2. Those policies and actions that are **external** to the organisation.

Policies and actions that are internal to the organisation are those that focus on building the Council's knowledge, capacity and capability on climate change and which ensure climate change mitigation and adaptation are factored into the Council's internal decision-making processes. This is the Council leading by example.

Policies and actions that are external to the organisation are those that focus on the work we do in the region, engaging with our communities and raising awareness of climate change. This is the Council requiring or encouraging others to take action that will have benefits for climate change.

Presenting the policies and actions in this way enables the translation of the vision and objectives into practical day-to-day initiatives or actions that the Taranaki Regional Council will pursue or consider.

3.4 Implementation

Implementing and resourcing the Action Plan will require careful consideration. Many of the actions proposed reflect the Council's current statutory responsibilities, which are carried out for reasons other than climate change or make good financial sense to do anyway. There are many co-benefits for climate change management and response in undertaking them.

However, if the Council was to significantly expand its existing programmes or introduce new programmes for climate change, the added costs and obligations would fall on the ratepayers of the region, while the Council would still be required to meet the prudent financial and other obligations under the Local Government Act 2002. In many cases, central government funding or funding from other sources would be required to reduce the financial burden on ratepayers.

Adequate and equitable funding to successfully implement the Strategy in the medium to long-term is of fundamental importance.

4 An Action Plan

The policies and associated actions set out in Table 1, constitute the Action Plan under the Taranaki Regional Council's Climate Change Strategy.

5 Review of the Strategy

The Taranaki Regional Council's Climate Change Strategy is a living document. It will be subject to periodic review and will be changed if required. This will provide an opportunity to review progress and to set new or different goals for the Council. [22]

[22] Important triggers for review will include improvements in our knowledge and understanding of climate change, market changes such as in the financing and insurance industries, regulatory change, significant and more frequent extreme events, risks of litigation and public expectations.

Climate change is an area where ongoing change, not only in the environment but also in our understanding of climate change and how we need to respond to it, will be the norm. It is important that the Council continues with actions that it can manage, that we do not place an unreasonable and unsustainable burden on ratepayers and that we are still able to deliver to the community on the Council's many other roles and responsibilities.

We agree with central government that we must all focus on a 'just transition' where everyone will be enabled to adjust to the new demands being placed on us by a changing climate. This will require agility in the face of uncertainty and a commitment to work together over the long term.

Table 1 Taranaki Regional Council Climate Change Strategy: Policies and actions

Internal policies and actions

Policies	Actions			Mitigation, adaption or community engagement
	Existing, underway or planned	Within the next 5 years	5 years and beyond	
1. Better understand our carbon footprint as a basis for future action		• Undertake a baseline audit to establish the Council's current carbon footprint and mitigation options	• Consider adopting a net zero carbon target for the Council with timelines and interim carbon reduction targets • Explore all carbon mitigation options for offsetting organisational emissions including tree planting on Council land, land purchase for tree planting and other carbon sinks • Develop a monitoring and reporting system to track progress and inform further action	Mitigation
2. Ensure appropriate and explicit consideration of	• Climate change is recognised in the Council's own internal strategy and planning documents	• Undertake a review of the Council's legal obligations and	• Long-Term plans, Annual Plans and other internal documents are changed to reflect changes in	Mitigation and adaptation

Policies	Actions			Mitigation, adaption or community engagement
	Existing, underway or planned	Within the next 5 years	5 years and beyond	
climate change in the Council's Long-Term Plans, Annual Plans and other internal procedure documents and guidelines	but these will need to be reviewed to ensure climate change is appropriately, robustly and visibly factored into Council decision making	potential liabilities with respect to climate change • Include appropriate climate change policies and actions in the Council's Long-Term Plan and Annual Plans to ensure climate change is considered in all aspects of Council decision making • Review all internal procedures documents, guidelines and templates for Council papers, reports and project plans to ensure appropriate consideration of climate change • Review the Council's current investment portfolio to ensure consistency with climate change objectives • Ensure robust climate change information and science is available to support decisions • Increase the visibility of the Council's climate change work, for example by providing annual updates on key matters	climate change law, policy, science and information	

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Policies	Actions			Mitigation, adaption or community engagement
	Existing, underway or planned	Within the next 5 years	5 years and beyond	
3. Reduce our carbon footprint by reducing emissions from : - vehicle usage and corporate travel - waste generation and disposal - energy and electricity use - purchasing and procurement and - general administration	• Continue policy on car pooling • A review of vehicle needs and potential for EVs has been completed • Maintain the Council's Sustainability Group. Waste minimisation, reuse and recycling programmes introduced. Biennial waste audits carried out. Other appropriate initiatives identifed by staff • Reviews into lighting and heating carried out. New energy efficient lighting installed. Lighting, heating and cooling systems to be reviewed as part of accommodation review in 2019/2020	• Review vehicle fleet needs and opportunities for increased fuel efficiency and conversion to EVs as costs and technology allow • Review corporate travel including limits on travel, no-travel options (e.g. web-based meetings), use of offsetting and use of accommodation with complementary environmental policies • Review purchasing and procurement policy to include specific climate change objectives • Review general administrative policies to ensure carbon footprint is reduced as far as possible (e.g. through reviewing use of printers) • Add specific climate change objectives to work of Sustainability Group	• Consider advancements in technology and costs associated with EVs, solar panels, lighting, heating and cooling, and smart technology in all aspects of the Council's work and consider investment in technology taking a whole of life view	Mitigation
4. Staff actively support a low carbon workplace, lifestyle	• Continue with current initiatives (see 3 above)	• Consider implemeting a comprehensive travel plan for staff travelling to work	• Investigate incentives for staff to undertake low carbon actions	Mitigation and adaptation

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Policies	Actions			Mitigation, adaption or community engagement
	Existing, underway or planned	Within the next 5 years	5 years and beyond	
and economy and have the capability and capacity to deliver on the Council's climate change goals		• Increase climate change awareness throughout the Council (e.g. through regular Intranet postings and a new climate change webpage on the TRC website) • Develop an education or information pack for staff use (e.g. as part of Council induction) • Ensure staff actively contribute to national and regional direction on climate change through for example, membership of regional and national working groups that drive climate change • Review staff recruitment, training and individual job descriptions, and development programmes to ensure staff have the skills required or have opportunities to learn about and apply new skills and planning techniques relevant to climate change		
5. Establish appropriate governance		• Consider what, if any, changes might be required to the terms of	• Review organisational structure	

Policies	Actions			Mitigation, adaption or community engagement
	Existing, underway or planned	Within the next 5 years	5 years and beyond	
arrangements for climate change		reference for Council committees in relation to climate change • Consider the establishment of a senior management position with responsibilities for climate change priortities within the Council • Consider 'low carbon champions' for each department of the Council		

External policies and actions

Policies	Actions			Mitigation, adaption or community engagement
	Existing, underway or planned	Within the next 5 years	5 years and beyond	
6. Progress climate change mitigation and adaptation through existing work programmes	• Continue all existing work programmes recognising the benefits for climate change mitigation and adaptation, undertake planned or scheduled reviews of policies and stratagies and incorporate explicit and appropriate climate change objectives and policies into existing work programmes • Include climate change pressure, state and response in the Council's 2020/21 state of the environment report	• Finalise the Proposed Coastal Plan making appropriate provision for sea level rise, storm surge and other climate induced hazards • Review the Regional Policy Statement for Taranaki and consider the need for updated climate change policies • Prepare a Natural Resources Plan with rules and other methods to address climate change issues that are within the Council's jurisdiction • Review and adapt the Council's Riparian Management Programme, Sustainable Land Management Programme, Biodiversity Programme, biosecurity programmes, wetlands restoration and environmental enhancement grants programme, as necessary and appropriate, to further support mitigation and adaptation to the effects of climate change	• Investigate the risk of increasing pest numbers and species and effects on work programmes and resources • Investigate the use of electric buses or low-carbon or alternative fuels on the region's contracted bus services • Respond to changes in climate change law and policy and amend work programmes as appropriate	Mitigation, adaptation and community engagement

Policies	Actions			Mitigation, adaption or community engagement
	Existing, underway or planned	Within the next 5 years	5 years and beyond	
		• Review the current contracted bus fleet and prepare a transport emissions report • Investigate the potential for existing contracted bus services and new public transport technologies to reduce carbon emissions • Consider initiatives for walking and cycling, car pooling and ride sharing, new public transport services, and greater use of rail • Consider the implications of flood risk induced by climate change, on the Council's flood protection schemes and on other river and flood control works in the region • Work through the Regional Solid Waste Management Committee to continually improve waste practices, reduce the generation of waste and increase recycling • Ensure climate change is appropriately considered in the Civil Defence Emergency		

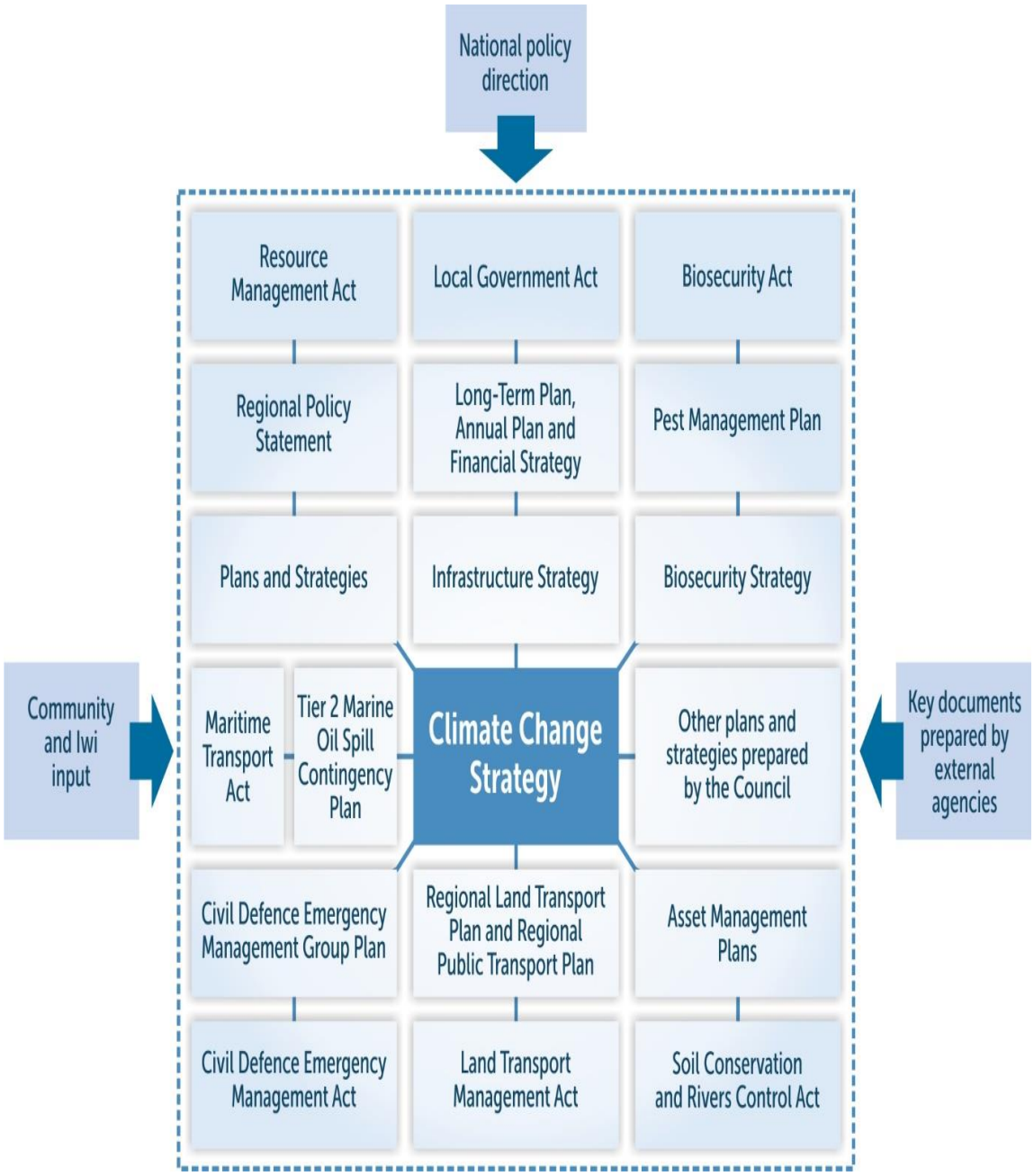
Policies	Actions			Mitigation, adaption or community engagement
	Existing, underway or planned	Within the next 5 years	5 years and beyond	
		Management Group Plan for Taranaki • Consider opportunites and priorities for undertaking climate change related research, resource investigations and projects (e.g. update of the Renewable Energy Assessment for the Taranaki region, 2006, or research into the role of soil as a carbon sink at a farm scale in Taranaki) • Work with the Board of Port Taranaki Ltd to align their programmes for reducing emissions with those of the Council		
7. Develop an integrated, coordinated regional response to climate change	• Continue to work through the Mayoral Forum to discuss and develop a regional response to climate change • Continue to promote implementation of the Taranaki 2050 Roadmap and Tapuae Roa • Continue to engage with and advocate to central government	• Develop a region-wide emissions inventory • Undertake an initial region-wide climate change risk assessment based on community and ecological vulnerabilities • Develop region-wide emissions reduction targets	• Prepare climate change policies, plans and strategies in accordanace with central government policy	Mitigation, adaptation and community engagement

Policies	Actions			Mitigation, adaption or community engagement
	Existing, underway or planned	Within the next 5 years	5 years and beyond	
	to develop coherent, effective and appropriate national policy on climate change • Continue to work with other agencies to promote resource use and development that is integrated with transport, infrastructure and with well-designed, compact regional form			
8. Work with other agencies to identify and obtain key information relating to climate change and associated risks	• Support region-specific research into climate change impacts and implications where it relates to Council roles and responsibilities and where knowledge gaps exist • Request central government make available a breakdown of greenhouse gas emissions in the Taranaki region and what mitigation is occurring • Share any information and knowledge obtained with the regional community	• Contract appropriate agencies to update climate change projections and risks for the region	• Develop an ongoing climate change monitoring programme to help assess regional climate change threats and vulnerabilites and report the results to the community	Mitigation, adaptation and community engagement

Policies	Actions			Mitigation, adaption or community engagement
	Existing, underway or planned	Within the next 5 years	5 years and beyond	
9. Raise awareness of climate change and build an engaged and resilient regional community	• Continue to advocate on behalf of the regional community for action on climate change • Continue to publicise and celebrate climate change and resilience success stories in the region to inspire positive behaviour change • Continue to involve the regional community in decisions on climate change that affect them • Develop and maintain an on-line portal that will allow hill country farmers to access from one site, information on the benefits, costs and returns on investment from planting more trees on hill country properties	• Investigate with others, practical community initiatives to build community understanding of and resilience to climate change (e.g. through Curious Minds projects, Enviroschools initiatives and Envirolink and other projects) • Develop in conjunction with iwi and hapū, specific options of relevance to tangata whenua, for reducing greenhouse gas emissions or adapting to the effects of climate change • Publish up-to-date information on greenhouse gas emissions in the Taranaki region and what mitigatioin is occurring (see action under Policy 7 above) • Identify successful local government examples of adaptation actions and evaluate their suitability for addressing climate risks in the Taranaki region and make the results available to the community	• Develop an on-line platform to serve as an information repository and as a means to connect with the community on climate change responses regionally and nationally	Community engagement, mitigation and adaptation

Policies	Actions			Mitigation, adaption or community engagement
	Existing, underway or planned	Within the next 5 years	5 years and beyond	
		• Encourage and support communities to make their own contributions to combating climate change • Take an active leadership role in fostering public debate and awareness through public fora and other events		

Appendix 1
The relationship between the Taranaki Regional Council's Climate Change Strategy and other key regional planning documents



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Whakataka te hau

Karakia to open and close meetings

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

Nau mai e ngā hua

Karakia for kai

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

AGENDA AUTHORISATION

Agenda for the Policy and Planning Committee meeting held on Tuesday 18 March 2025.

Confirmed:

Not Submitted

A D McLay

Director Resource Management

Approved:

11 Mar, 2025 3:37:05 PM GMT+13

M J Nield

Director – Corporate Services