Taranaki Regional Council

AGENDA
Policy & Planning

Tuesday 16 March 2021, 10.30am

Policy and Planning Committee

16 March 2021 10:30 AM

Agenda Topic Page

Apologies

An apology was received from Councillor M P Joyce.

Notification of Late Items

Purpose of Policy and Planning Committee meeting

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

Responsibilities

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

Monitor plan and policy implementation.

Develop biosecurity policy.

Advocate, as appropriate, for the Taranaki region.

Other policy initiatives.

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

Membership of Policy and Planning Committee

Councillor C L Littlewood (Chairperson)	Councillor N W Walker (Deputy Chairperson)
Councillor M G Davey	Councillor M J McDonald
Councillor D H McIntyre	Councillor C S Williamson
Councillor E D Van Der Leden	Councillor D N MacLeod (ex officio)
Councillor M P Joyce (ex officio)	
Representative Members	
Councillor C Young (STDC)	Councillor S Hitchcock (NPDC)
Councillor G Boyde (SDC)	Mr P Moeahu (Iwi Representative)
Ms B Bigham (Iwi Representative)	Ms L Tester (Iwi Representative)

Health and Safety Message

Emergency Procedure

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

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

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

Earthquake

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

Please remain where you are until further instruction is given.

Date 16 March 2021

Subject: **Confirmation of Minutes - 2 February 2021**

Approved by: A D McLay, Director - Resource Management

S J Ruru, Chief Executive

Document: 2724886

Recommendations

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

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

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

Matters arising

Appendices/Attachments

Document 2696913: Minutes Policy and Planning Committee - 2 February 2021

Date 2 February 2021, 10.30am

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

Document: 2696913

Members	Councillors	C L Littlewood	Committee Chairperson
		N W Walker	Committee Deputy Chairperson
		D M Davey	
		M J McDonald	
		D H McIntyre	
		C S Williamson	
		D N MacLeod	ex officio
		M P Joyce	ex officio
Representative Members	Councillors	C Young	South Taranaki District Council
		S Hitchcock	New Plymouth District Council
		G Boyde	Stratford District Council
	Mr	P Moeahu	Iwi Representative
	Ms	L Tester	Iwi Representative
	Ms	B Bigham	Iwi Representative
Attending	Councillors	D L Lean	
	Messrs	S J Ruru	Chief Executive
		M J Nield	Director – Corporate Services
		A D McLay	Director - Resource Management
		G K Bedford	Director - Environment Quality
		D Harrison	Director - Operations
		C Spurdle	Planning Manager
		S Tamarapa	Iwi Communications Officer
		C Wadsworth	Strategy Lead
	Miss	A Campbell	Planning Officer
	Ms	J Reader	Communications Manager
	Miss	L Davidson	Committee Administrator

One member of the media and three members of the public.

Apologies Apologies were received from Councillor E D Van Der Leden and Federated Farmers Representative Mr P Muir.

Littlewood/McDonald

Notification of - Māori constituencies.
Late items - Climate Change Commissioners Report.

1. Confirmation of Minutes – 24 November 2020

Resolved

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

a) takes as read and confirms the minutes of the Policy and Planning Committee meeting of the Taranaki Regional Council held in the Taranaki Regional Council chambers, 47 Cloten Road, Stratford on Tuesday 24 November 2020

b) notes the recommendations therein were adopted by the Taranaki Regional Council on Tuesday 15 December 2020.

MacLeod/Williamson

Matters arising
It was noted that Councillor M G Davey had attended the previous meeting.

2. Section 32 Position Paper – Sites of Significance to Māori

2.1 Mr A D McLay, Director – Resource Management, introduced Miss A Campbell, Planning Officer, who gave an excellent presentation, to introduce for Members information, the report on the sites of significance to Māori and answered questions arising.

Recommended

That the Taranaki Regional Council:

a) receives this memorandum entitled *Section 32 Position Paper – Sites of Significance to Māori*

b) notes that the findings of this report are contributing to the development of Plan provisions and spatial information seeking to project sites of significance to Māori

c) notes that as part of the sites of significance project approximately 800 sites have so far been identified

d) notes the policy recommendations presented in section 6.2 of the report

e) notes that the sites of significance identification process is ongoing and that Council will be further collaborating with tangata whenua to verify sites with the aim of completing the identification of all sites of significance to Māori across Taranaki.

Davey/Williamson

3. Analysis of Air Quality-related Incidents

3.1 Mr G K Bedford, Director – Environment Quality, spoke to the memorandum presenting the results of an analysis of complaints and incidents related to air quality in the Taranaki region, since the Regional Air Quality Plan for Taranaki (RAQP) came in to effect (July 2011), together with a more detailed analysis of incidents in 2020. It is intended that the findings of the assessment can be used by Council, community and iwi representatives on its committees, and the community at large, to inform the development of the *Natural Resources Plan* (NRP).

Recommended

That the Taranaki Regional Council:

a) receives the memorandum *Analysis of Air-Quality-related Incidents*

b) notes its findings, that Council's current regulatory regime appears robust for upholding and enhancing regional local air quality

c) references the agenda memorandum and accompanying internal memorandum at the time of its consideration of the sections of the *Natural Resources Plan* relating to air quality.

Boyde/Young

4. Quantitative Microbial Risk Assessment – Result of Pilot Study and Initiation of Second Stage Programme

4.1 Mr G K Bedford, Director – Environmental Quality, spoke to the memorandum informing the Committee of completion and publication of Stage One of a study into pathogenic and indicator micro-organisms in rivers in New Zealand, and the initiation of the study's Stage Two, with the ultimate intention to bring about an improvement in the monitoring and interpretation of results for public health protection.

Recommended

That the Taranaki Regional Council:

a) receives the memorandum *Quantitative Microbial Risk Assessment – Results of Pilot Study and Initiation of Second Stage Programme*

b) notes the inclusion of the Waitara River in the study

c) notes the objective of the national study is to improve interpretation of microbial water quality data in respect of public health significance.

Walker/McIntyre

5. Submission on NZ Standard for Management of Agrichemicals

5.1 Mr G K Bedford, Director – Environment Quality, spoke to the memorandum informing the Committee of the submission on the draft Standard NZS 8409:2021 Management of Agrichemicals, which was submitted to Standards New Zealand by 1 February 2021 and asking the Committee to retroactively approve that submission.

5.2 Councillor N W Walker moved a motion to add supplementary commentary to the submission regarding reducing agrichemical Residues in foodstuffs.

5.3 Some Members felt that the issue would be better raised directly with MPI around food health and general health.

Recommended

Councillor N W Walker moved a motion that the Taranaki Regional Council:

a) Include supplementary commentary around reducing agrichemical residues as part of the submission.

Walker/Tester

For – 4 (N W Walker, L Tester, C Littlewood, S Hitchcock)

Against – 10

Motion Lost

Recommended
That the Taranaki Regional Council:

a) receives the memorandum, submission on NZ Standard for Management of Agrichemicals

b) adopts the submission on the draft NZS 8409:2021 Management of Agrichemicals.

McDonald/Williamson

6. 2021 State of the Environment Report for Taranaki

6.1 Mr G K Bedford, Director - Environment Quality, spoke to the memorandum presenting for Members' information, a project update for the preparation of the Council's next State of the environment Report (SOER). The SOER is an omnibus collation of appropriate and up to date data and primarily about the physical environment of Taranaki and the effects of human activities and interventions.

Recommended

That the Taranaki Regional Council:

a) receives the memorandum 2021 State of the Environment report for Taranaki

b) approves the revised approach to the delivery of the SOER with the schedule for delivery of all online modules to be completed by December 2021.

Joyce/Williamson

7. Submissions on the Proposal to Amend the Regional Pest Management Plan

7.1 Mr C Spurdle, Planning Manager, spoke to the memorandum updating members on the public consultation process on the proposal to amend the *Pest Management Plan for Taranaki* (the Proposal) to declare mustelids as pests, including recommended changes to the Proposal as a result of submissions and to set out the process from here for adopting the Proposal.

Recommended

That the Taranaki Regional Council:

a) receives this memorandum *Submissions on the Proposal to amend the Regional Pest Management Plan*

b) adopts the draft recommendations contained within the attached *Officers Report*, subject to any amendments agreed by Council

c) agrees to hear submissions at the Ordinary meeting of 23 February 2021.

MacLeod/Walker

8. General Business/late items

Māori Constituencies

An announcement has been made by the Minister regarding Māori Constituencies in local body elections. Councillor D N MacLeod has requested a report to the Ordinary meeting of Council on Tuesday 23 February to address Māori constituencies for members consideration.

Climate Change Commission

Officers will produce a submission on the Climate Change Commission and send out electronically to Members for feedback prior to it being lodged, as the next Policy and Planning meeting is scheduled for after submission period closed.

There being no further business the Committee Chairman, Councillor C L Littlewood, declared the meeting of the Policy and Planning Committee closed at 12.20pm. The meeting closed with a karakia.

Confirmed

Policy and Planning

Chairperson:_____

C L Littlewood

16 March 2020

Date 16 March 2021

Subject: **Engagement on the Long-term Vision for Freshwater**

Approved by: AD McLay, Director – Resource Management

S J Ruru, Chief Executive

Document: 2694253

Purpose

1. The purpose of this memorandum is to introduce to Members, the engagement process on the long-term vision for freshwater that forms part of the review of the *Regional Policy Statement for Taranaki* (RPS).

Executive summary

2. The *National Policy Statement for Freshwater Management* (NPS-FM) requires that the Council engage with tangata whenua and communities in the development of a long-term vision for freshwater to be included in the reviewed RPS.
3. Engagement and development of the long-term vision for freshwater is proposed to take place across four stages:
   a) public survey and workshop engagement;
   b) Wai Māori group considers and provides feedback on the draft report on engagement including drafting recommendation for the long-term vision;
   c) targeted consultation on draft RPS that includes draft long-term vision; and
   d) public consultation on a Proposed RPS, that includes draft long-term vision, and notified under Schedule 1 of the *Resource Management Act 1991* (the RMA).
4. This item addresses the initial phase of engagement on the freshwater vision comprising the online survey and workshops.
5. Of note, engagement on the development of the freshwater vision has already commenced alongside engagement on the *Long Term Plan*.
6. Further engagement through workshops will occur in the latter half of March.

Recommendations

That the Taranaki Regional Council:

a) receives this agenda memorandum titled *Engagement on the long-term vision for freshwater*

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

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

Background

7. The Taranaki Regional Council (the Council) commenced a review of the RPS in September 2020[1].

8. As part of the review of the RPS, the *National Policy Statement for Freshwater Management 2020* (NPS-FM) directs that regional councils develop a long-term vision for freshwater in consultation with tangata whenua and the community to provide for the long-term (greater than ten years) aspirations and expectations for freshwater for future generations.

9. As Members are aware, the RPS sets the strategic direction for the Council in relation to the region's resource management issues. In relation to freshwater management, a revised RPS will set out the policy direction for addressing the region's aspirations for freshwater management, including giving effect to the NPS-FM and other parts of the *Essential Freshwater* package that the Council is working to implement.

10. At the Ordinary Meeting of 26 February 2021 it was noted that the engagement on the long-term vision for freshwater would take place concurrent with the engagement on the *Long Term Plan* which commenced on Wednesday 10th March.

11. The rationale for running the two engagement processes in parallel is that there are obvious synergies and advantages to the Council getting more detailed feedback from people while they may also be considering Council's resourcing requirements under the LTP process. The LTP focuses on the financial matters of the Council's business. Through the LTP process, the Council, amongst other things, is consulting on additional resourcing needed to meet increased and new monitoring, policy, consenting, and regulatory requirements arising from the introduction of the *Essential Freshwater Package*.

Issues

12. The Council is required to engage with tangata whenua and communities in the development of long-term vision for freshwater. The Council already has freshwater objectives and policies that are included in the RPS and its regional plans. However, the development of a vision is a new concept that sets out long-term aspirations that extend beyond the 'life' of the RPS and regional plans.

13. The long-term vision will set the high-level aspirations and policy direction that the community want in relation to fresh water in the region. The freshwater vision will in

[1] Policy and Planning Committee - 1 September 2020

turn inform other RPS objectives and policies. It is therefore timely to commence this engagement process early in the RPS review and development process.

Long-term vision for freshwater for Taranaki

14. The long-term vision for freshwater is a high-level objective to be included within the RPS that will set out the expectations and aspirations of tangata whenua and communities for freshwater for future generations. The vision may be set at the catchment level or for each freshwater management unit (FMU).
15. Under the NPS-FM, a long-term vision must be ambitious yet achievable (difficult to achieve but not impossible) and have a set timeframe by which the vision is to be achieved (e.g. 30 years).
16. The purpose of the long-term vision is it provides a broader lens for objectives and policies contained within the RPS and other RMA plans, which are generally developed with only a ten-year planning cycle in mind. Long-term vision allows the RPS to be more aspirational and have deliverables that extend beyond the life of that document.
17. The NPS-FM requires that the Council develop its long-term vision through engagement with communities and tangata whenua to reflect their long-term wishes and to be informed by an understanding of the history of, and environmental pressures on freshwater across the region.
18. The inclusion of a long-term vision in the Council's revised RPS will provide policy direction for the freshwater component of the *Natural Resources Plan*.
19. Engagement processes and options for developing a long-term vision for freshwater is an issue that all regional councils are currently grappling with. Otago Regional Council is the only council to date that has undertaken any engagement process on a long-term vision (November 2019) but has not yet made public its vision arising from that engagement.

Strategy for developing a long-term vision for freshwater

20. The NPS-FM places particular emphasis on the need for councils to work closely with tangata whenua in the development of strategic direction for freshwater management. This includes the NPS-FM directing that the long-term vision must be developed through engagement with tangata whenua and communities.
21. In response to this, Council officers will directly target tangata whenua in their engagement and have loosely socialized the process for engagement on the long-term vision with the Wai Māori Group. While an initial process for engagement with the Wai Māori Group has been outlined below, officers note that the particulars of their involvement may be refined over the course of the engagement as the group move their focus into this area.
22. The Council will undertake two initial channels of public engagement through an online survey and a series of small group workshops. The survey will focus on the identification of freshwater values (environmental, economic, social and cultural) and aspirations across the region with the workshops focusing on prioritizing between values and identifying which aspirations hold the highest importance.
23. The Council's process for developing a long-term vision for freshwater will take place in four broad stages:

Stage 1	Initial engagement with tangata whenua, stakeholders, and communities through online public survey and series of workshops. Workshop invitations extended to stakeholders, Wai Māori Group members and iwi authorities as well as public workshops.	March - April 2021
Stage 2	Survey and workshop results made available to the Wai Māori Group in a post engagement report with the opportunity for the group to provide feedback on the report and its recommendations on drafting the long-term vision.	Mid 2021
Stage 3	Development of draft long-term vision to be included in the Draft RPS which will be provided to stakeholders and iwi authorities for targeted consultation.	Early 2023
Stage 4	Notified RPS contains long-term vision for freshwater which are open for submissions under Schedule 1 of the RMA.	Late 2023

24. The survey and other publicly available information on the engagement on the long-term vision for freshwater was made available on 10 March on the Council website at www.trc.govt.nz/vision.

Financial considerations—LTP/Annual Plan

25. 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

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

Iwi considerations

27. 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.

28. The views of tangata whenua are essential to this work. Council officers will work closely with tangata whenua through iwi authorities, the Wai Māori Group and individual members of the community as targeted stakeholders in this work.

Community considerations

29. 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

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

Date 16 March 2021

Subject: **Good Farm Management and Water Quality Improvements (Past and Potential)**

Approved by: G K Bedford, Director - Environment Quality

S J Ruru, Chief Executive

Document: 2705897

Purpose

1. The purpose of this memorandum is to provide key findings presented in a suite of recently released research papers, concerning reductions in contaminant losses to water from pastoral farming that have been achieved to date, together with prospective future gains. This information can feed into the Council's implementation of the *National Policy Statement for Freshwater Management 2020* (NPS) and the Council's next *Natural Resources Plan* (NRP) (in preparation).

Executive summary

2. A suite of research papers provide a carefully modelled assessment and data analysis of the progress New Zealand has already made, and can expect to make in the future, in controlling and reducing a number of primary contaminants of water quality arising from pastoral agriculture.
3. The researchers have found that New Zealand's rivers would be in much worse condition today, if farmers had not been adopting better farm management practices since 1995. Significantly, more nitrogen (45% more) and phosphorus (98% more) would have entered catchments as yield from dairy farms over this period if farmers had not been changing their practices. Likewise, significantly more sediment (30% more) sediment would have entered rivers from sheep and beef farms, over this period
4. In terms of quantitative changes since 1995, sediment and phosphorus loads to water have reduced significantly, by about 25%. However, despite the implementation of measures that have successfully mitigated nitrogen losses, national annual loads of nitrogen to water have still increased, by about 25%, due to much heavier applications of urea fertiliser, increased stocking intensities, adoption of irrigation, and expansion of dairying beyond traditional land uses.
5. Key measures to reduce phosphorus, sediment, and bacterial losses to water include stream fencing, eliminating excessive irrigation, and better matching of effluent disposal and fertilisation to soil and pasture conditions. Measures to effectively reduce nitrogen loss on a national scale include eliminating excessive or superfluous irrigation and

improved management of effluent disposal to land. On hill country, land retirement would have the greatest effect in reducing phosphorus and sediment losses.

6. The modelling estimates that if all current and developing mitigation actions were to be implemented across the pastoral sector, national loads of nitrogen and phosphorus might reduce by a further one-third, and sediment by two-thirds. For many catchments, this would be enough to meet current NPS water quality objectives.
7. However, the researchers identified that even if all mitigations currently practiced or in development were to be introduced, then the proportion of catchment receiving waters across NZ that would still exceed NPS bottom lines of 1.00 gm^{-3} dissolved inorganic nitrogen and 0.018 gm^{-3} dissolved reactive phosphorus (DRP) would be 4% for DIN and 9% for DRP. A substantial proportion of Taranaki's ringplain is in this latter category. For farms in these catchments, de-stocking or a complete change of land use would be necessary if catchments were to attain NPS quality.
8. The findings presented across the various papers and reports discussed in this memorandum validate the interventions and methods of implementation that have been put in place by this Council in working together with the farming sector to improve the health of streams in the region. They also validate the reservations raised by this Council around the workability of the NPS.
9. Section 3.7 of the NPS specifically requires the Council to identify desired environmental outcomes and to adopt these as objectives; to determine the baseline state of attributes (measures) that help describe and quantify the outcomes; to set targets for every attribute; and to prepare action plans that describe how targets will be achieved. The information contained within the suite of research papers discussed today will assist the Council in determining what national limits or NRP targets might be practical, affordable, or even attainable.

Recommendations

That the Taranaki Regional Council:

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

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

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

Background

10. The National Science Challenges constitute the elements of a comprehensive recent approach to identifying needs for innovative research within key challenges of national importance facing New Zealand. They have now been in effect for some six years. Their founding concept is that they provide a mechanism for a comprehensive focus and commitment across the broad scientific community, and beyond it to stakeholders and interested parties, to address each challenge. Staff of this Council have actively participated at various levels in several of the Challenges.

11. One of the 11 Challenges has been '*Our Land and Water*' (OLW). Its objective is to work towards a re-imagined agricultural and fibre system for New Zealand that enhances the vitality of Te Taiao, across a diverse mosaic of land uses, by improving the health of land, water, and people. It is led by Dr Richard McDowell of AgResearch and Lincoln University, and previously by Dr Ken Taylor, formerly of ECan.
12. OLW has recently released a Briefing Note, which draws on a suite of work and publications by Dr Richard McDowell and several fellow researchers. The papers provide a carefully modelled assessment and data analysis of the progress New Zealand has already made in controlling and reducing a number of primary contaminants of water quality arising from pastoral agriculture; an examination of potential further reductions in contaminant loadings that could be achieved under current best practice and also in anticipation of prospective methods of mitigation still in development; and identification of the proportion of catchments across New Zealand where even best current and emerging practice will not allow the Government's mooted limits to be met, other than through stock removal and complete change of land use. The information is accompanied by maps that can be examined at catchment scale.
13. These studies provide information that is critical for the Council in its determination of appropriate policies and interventions in land and water management in Taranaki. They are described and discussed below.

Issues

14. As the Committee is aware, Council staff are progressing reviews of the existing regional plans for air, freshwater, and soil, with a view to meeting the obligation imposed by the NPS to have a new regional plan in place no later than 2024. In order to develop robust and effective policies and methods of implementation of policies around fresh water, it is essential that Council decisions be well informed by science.
15. The NPS has already been subject to challenge, review and amendment, and there is every indication that these processes will continue during this year. In order to participate meaningfully and usefully as these arise, it is important that the Council has an informed understanding of the options, opportunities and constraints for better environmental outcomes.
16. The NPS specifically requires the Council to identify and adopt desired environmental outcomes as objectives; to determine the baseline state of attributes (measures); to set targets for the attributes; and to prepare action plans that describe how targets will be achieved.
17. The NPS currently imposes a national limit on nitrate for the purpose of mitigating toxicity. The national bottom line for this purpose has been set at 2.4 gm^{-3}. The NPS currently imposes no national bottom line on Dissolved Reactive Phosphorus (DRP) in rivers, but deems a DRP concentration any greater than 0.018 gm^{-3} to cause or be likely to cause an adverse impact on ecological communities beyond natural variation, and to drive excessive primary production and significant changes in macroinvertebrate and fish communities.
18. The draft NPS (2019) proposed a national bottom line for Dissolved Inorganic Nitrogen, (DIN)[1] of 1.00 gm^{-3}. The draft NPS also proposed that the DRP threshold referred to

1 DIN includes nitrate together with ammonia and nitrite

above should be a compulsory national bottom line, rather than a non-compulsory attribute band. These proposals were then set aside at the time.

19. The Government has signalled it has reserved final decisions on its proposals on setting bottom line limits for DIN (dissolved inorganic nitrogen) and DRP (dissolved reactive phosphorus) through the NPS mechanism, until some time this calendar year. Decisions were deferred because the interpretation of the relevant science was not seen as unambiguous for either its justification or for any specific concentration. It can be expected that debate will continue this year and in terms of taking a position on the matter, it is again important for this Committee to be well-briefed.

20. This memorandum presents the Committee with the findings of recently published research from leading scientific researchers[2345], into trends and drivers of recent and prospective improvements in water quality, for the information of the Committee in addressing the above matters.

Discussion

Introduction

21. The aim of the studies was to estimate current annual loads and yields of contaminants from pastoral land in New Zealand, as affected by mitigation measures to date and with regard to greater uptake of available and potential future interventions in years to come. The data analysis and modelling work by the researchers characterised total nitrogen, DIN, total phosphorus, DRP, and sediment losses via three outputs in their studies: (a) gains in water quality to date and the proportion of catchments already meeting the proposed limits as of 2015; (b) potential reductions and the proportion of catchments that would meet the limits if all good practices in current use were to be applied universally; and (c) a '2035' scenario based on the assumption that all current practices and in addition, all prospective practices in development, were to be fully implemented by that time. Thus, the '2035' scenario effectively represents a best case scenario for NZ, for catchment water quality and for NPS attainment (or otherwise).

22. The modelling took into account farm types, based on factors such as slope, climate, and soil characteristics, at a catchment scale for the whole of NZ. Further details of the modelling are set out at the end of this discussion.

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2 *Implications of water quality policy on land use: a case study of the approach in New Zealand* R McDowell, P Pletnyakov, A Lim, & G Salmon, in *Marine and Freshwater Research* FRODO 2702069

3 *Quantifying excess nitrogen loads in fresh water* Research Findings Brief, Our Land and Water FRODO 2688128

4 *Mitigating the impacts of pastoral farming on New Zealand's water quality II What has been achieved in the past 20 years?* R Monaghan *et al*, in draft FRODO 2690227

5 *Quantifying contaminant losses to water from pastoral land uses in New Zealand III What could be achieved by 2035?* McDowell et al, in *New Zealand Journal of Agricultural Research* FRODO 2702109

Improvements to date in nutrient loadings in catchments

23. The researchers report that New Zealand's rivers would be in much worse condition today, if farmers had not been adopting better farm management practices since 1995.
24. Significantly more nitrogen (45% more) and phosphorus (98% more) would have entered catchments as yield from dairy farms over this period if farmers had not been changing their practices. Likewise, significantly more sediment (30% more) would have entered rivers from sheep and beef farms, over this period, had farmers not implemented controls.
25. In terms of quantitative changes in contaminant loads to water since 1995 from pastoral lands, sediment and phosphorus loads have reduced significantly, by about 25%, over this period. Most of the reduction in phosphorus loss rates has come through mitigation activities on sheep and beef farms. However, despite the implementation of measures that have successfully mitigated nitrogen losses, national annual loads of nitrogen to water have still increased, by about 25%. This is due primarily to increased losses from land used for dairying.
26. Both yields (loss of nitrogen per hectare per year) and the total area of land devoted to dairying have increased since 1995. Drivers of increased nitrogen losses include stocking rate intensification, heavier applications of urea, expansion of dairying into non-traditional areas, and the adoption of pasture irrigation.
27. The researchers identify that the protection of riparian margins by fencing and/or planting is widely recognised as a priority consideration for livestock farming systems. Other key measures include precision nutrient management and adaptive control of irrigation and dairy effluent application. For sheep and beef properties, land retirement is most effective, with riparian protection and precision nutrient management lower but still worthwhile priorities. The value of farm plans, including their widespread adoption in Taranaki, is referenced.
28. The papers stress the importance of farm-specific mitigations rather than a blanket adoption of generic measures.

Potential future improvements in nutrient loadings in catchments

29. The modelling estimates that if all current and developing mitigation actions were to be implemented across the pastoral sector, potential national loads of nitrogen and phosphorus might reduce by a further one-third, and sediment by two-thirds. For many catchments, this would be enough to meet current water quality objectives.
30. Figures 1 and 3 show the extent of potential improvement (reductions in yields of contaminants from land).
31. The modelling of potential reductions in nutrient losses showed that for dairy farms, the biggest gains could be achieved on those farms located in wet climates or conversely where irrigation was heavily favoured in farm management. Better scheduling of irrigation, fertiliser application, and farm dairy effluent application were identified as the key factors to reduce losses.
32. For sheep and beef farms, the greatest reductions in losses could be achieved on steep grassed slopes, on stream margins marked by a current absence of fencing, and where soil P concentrations are higher than optimal. Land retirement was found to be the most effective intervention.

33. Greater nutrient reductions in yield (per hectare) could be achieved on dairy farmland than on sheep and beef farmland, because of the greater range of interventions that are available; conversely, because there is more land in NZ used for sheep and beef than for dairying, the total contaminant load from land used for sheep and beef farming is greater than from dairy land. Cumulatively across NZ, land used for sheep and beef grazing is estimated to account for 73% of N losses, 82% of P losses, and 86% of sediment losses, in the '2035' scenario. The relevant figures are set out below in Table 1.

Table 1: National estimates of annual loads and yields of nitrogen (N), phosphorus (P) and sediment under current and potential uptakes of mitigation measures

Land use (analyte)	**2015 Load***	**'2015' potential load (% redtn)#**	**'2035' potential load (% redtn)**	**2015 Yield****	**'2015' potential yield**	**'2035' potential yield**
Sheep (N)	99,011	95,421 (4%)	82,296 (13%)	12	11.5	10.4
Dairy (N)	69,293	45,513 (34%)	28,575 (59%)	47	31	19
Sheep (P)	6,457	5,007 (22%)	4,164 (36%)	0.8	0.6	0.5
Dairy (P)	1,579	1,172 (26%)	777 (51%)	1.1	0.8	0.5
Sheep (sediment)	57,544,294	-	18,3112,055 (68%)	696	-	222
Dairy (sediment)	5,816,516	-	3,134,729 (46%)	258	-	139

*load = tonnes/year **yield = kg/ha/year for N, P; and t/ha/yr for sediment

reduction against base year of 2015

34. Officers note that the figures in Table 1 above are nationwide averages, and do not necessarily represent any one farm type, nor the reductions that farms in Taranaki can be expected to achieve. For example, Overseer modelling of dairy farms in Taranaki computes much higher yields of N than estimated above for the baseline (2015) condition.

35. Current and future yields (losses of contaminant per hectare per year) are mapped in Figure 3, attached to this memo. Yields under each of the three scenarios are shown in the individual sub-figures. It should be noted that figure 3 illustrates reductions in yield, not compliance with NPS criteria.

36. Examination of the three scenarios reveals that losses of nitrogen can be significantly reduced as available control measures are introduced; there is thus a substantial potential to reduce losses (and thus concentrations of nitrogen in receiving waters). The modelling indicates yields can potentially become lower in Taranaki than in a number of other dairying areas.
37. For phosphorus, the situation is quite different: parts of the ringplain are modelled to remain sources of significant loss of phosphorus, and these yields would be amongst the highest in New Zealand

Improvements to water quality compared with compliance with the NPS bottom lines for DIN and DRP concentrations

38. One-third of catchments currently exceeding the NPS limit for DIN can potentially be improved to the extent they meet the limit, but two-thirds cannot. Half the catchments currently exceeding the NPS limit for DRP can potentially be improved to the extent they meet the limit, but half cannot. A substantial proportion of Taranaki's ringplain is in this latter category.
39. Modelling on a catchment by catchment basis showed that for DIN, 6.7% of catchments being used for primary production in 2015 were exceeding the proposed bottom line for the concentration of DIN in waterways. Universal adoption of current good practice would reduce this figure to 5.5%, and even if adoption of a comprehensive suite of future likely mitigations was added into the equation, 4.2% of catchments in primary production use would still exceed the DIN limit.
40. For DRP, the figures were considerably worse. The researchers found that for DRP, 25% of catchments being used for primary production in 2015 were exceeding the proposed bottom line. Universal adoption of current good practice would reduce this figure to 17%, and even with the adoption of future likely mitigations, 13% of catchments in primary production use would still exceed the DRP limit. One-quarter of currently non-complying catchments can be brought into compliance simply by universal uptake of current good practice.
41. These figures represent an aggregated (nationwide) estimation. Modelling results have also been published on a catchment by catchment basis for N and P nutrients. Attached to this memorandum are figures reproduced from Figure 1 in reference 1. They show the modelled extent of attainment of the DRP bottom line in Taranaki, currently (figure 1a); as predicted with universal uptake of current good practice (figure 1b); and assuming universal uptake of both current and developing good practice, together with exclusion of all catchments with natural DRP (figure 1c).
42. The figure shows that essentially all of the Taranaki ring plain, other than patches in the north-west and south-west, currently exceeds the DRP bottom line. This finding is consistent with the Council's own analysis, presented in its submission to the government on the draft NPS (Ordinary Meeting Agenda, Tuesday 5 November 2019), and so to this extent is not new information for the Council.
43. However, the research also identifies that even the complete implementation of current good farm practice for managing DRP would change the situation only a little. Streams on the northern and southern coastal plains (ie east of the ring plain proper) would reach attainment status [Figure 1(b)]. It would be only with comprehensive implementation of both current and prospective means of mitigating DRP, that the situation can be substantially changed, and even then the mid and lower reaches of the

rivers running predominantly north, east and south of the maunga would remain above the DRP bottom line. This is entirely consistent with the reality that the volcanic soils of Taranaki carry high natural levels of phosphate. Disturbingly, the researchers have advised staff that they applied the NPS DRP 'exemption' in calculating and mapping the '2035' scenario presented in Figure 1(c). In simple terms, compliance with the DRP NPS bottom line is out of reach across significant proportions of the ring plain, even with best endeavours.

44. This determination parallels that in the earlier discussion of opportunities to reduce yields (losses of contaminant per hectare per year), as shown in Figure 2 attached. As noted earlier, some sectors of the ringplain will continue to yield very high levels of DRP to receiving environments, even under a regime applying the full range of interventions that can be currently envisaged.

45. For DIN, the mapping of catchments in Taranaki undertaken by the researchers is much more encouraging. It shows that already, this region almost entirely would meet a DIN national bottom line of 1.00 gm^{-3}, other than in the lower reaches of a few rivers; non-compliance in these remaining reaches essentially vanishes when current established mitigations are fully implemented. The figure (Figure 1 in reference 2) is not reproduced herein.

46. It needs to be noted that figures 2 and 3 show data for a separate analysis, of annual catchment loads of nitrogen yielded from pasture, and not the moment by moment concentration of DIN (one form of nitrogen amongst others) in receiving waters. This separate approach takes into account further modelling and other NPS criteria and objectives, pertaining to acceptable annual losses in relation to periphyton and trophic state management in rivers, lakes, and estuaries. Officers note that these estimations are not necessarily directly applicable to Taranaki in the first instance. However, officers also consider it is important for the Council to be aware of this analysis, should further pressure be placed on councils to improve water quality in the future.

47. The modelling built up a national picture from a catchment by catchment basis. Officers have therefore approached the researchers to extract the Taranaki-specific data, in order to provide a more detailed picture for the region. This will be provided to the Council in due course.

Projected mitigation and the NPS limits- officers' commentary

48. As described above, the researchers have identified through modelling that even if all mitigations currently practiced or in development were to be introduced (a '2035' modelled output), then the proportion of catchment receiving waters across NZ still exceeding NPS bottom lines of 1.00 gm^{-3} dissolved inorganic nitrogen and 0.018 g m^{-3} dissolved reactive phosphorus (DRP) would be 4% for DIN and 9% for DRP (even taking into account an assumption of exemption of all catchments with significant natural DRP). That is, if these NPS limits are to be enforced, then the only options left to farmers in some instances are de-stocking their farms, or changing land uses altogether.

49. Officers note that this was the Council's finding also, as one key point of evidence in its submission on the draft NPS.

50. The research found that in respect of catchments non-compliant with the DIN limit, Canterbury and Southland were worst off. Current catchment nitrogen loads are estimated to be twice the maximum acceptable annual yield in parts of Waikato, Manawatu-Wanganui, Marlborough, Canterbury, Otago, and Southland.

51. However, for DRP, most regions in New Zealand have more than 10% of catchments at risk of non-compliance. This is primarily because of natural high-P volcanic geology.
52. A key point re compliance with the DRP is that the NPS allows dispensation from the DRP receiving waters limit where councils can prove natural sources are significant. The modelling assumed that all such natural sources had been identified and these catchments removed from non-compliant status before the projected non-compliance with DRP was finally estimated.
53. However, the NPS places the onus upon councils to identify such catchments, together with the degree of influence (source allocation) of volcanic soils upon in-stream DRP in each catchment. Officers note in passing that the identification of volcanic catchments provided by the researchers could very usefully be acknowledged by the government and recognised in an amended NPS, instead of every individual council having to undertake its own studies and lodge requests for exemption from DRP compliance where applicable.
54. Officers also note that there is currently a preoccupation with DIN in national conversations about the impact of pastoral farming on water quality. Yet the analysis described in paragraphs 29-30 above illustrates that (if a nutrient-based approach to water quality management is to be pursued further), DRP and not DIN is a much more widespread problem, and thus should perhaps instead be the primary target of interventions.
55. Officers note that widespread attainment of the DRP bottom line demonstrably cannot be achieved even with universal uptake of current good farm practices; the scope of future gains is extremely limited via this mechanism. The Taranaki region has to rely on the possibility of prospective good farm practices being successfully brought to bear, and of the acceptance by MfE of exemptions for catchments in the region that have volcanic soils. Figure 1(c) demonstrates that this is the only option in Taranaki that can make significant gains towards attainment, and even then is currently doomed to failure on a regional scale.

Keys to implementing appropriate interventions

56. The researchers identified that the key to reducing discharges to levels that meet regulatory bottom lines is to take a site-specific approach, given that catchments (and indeed individual farms) vary according to biophysical (eg climate and soil types) and socio-economic (e.g. demographics, debt, ownership structures, willingness to change) factors.
57. Given that for some farms, there has to be a change of land use if the limits are to be met, the researchers stress the need for provision of robust advice that is targeted to specific farms and catchment characteristics, in order to achieve change cost-effectively; the need for effective oversight of the development of content and implementation of farm plans; and the need for comprehensive monitoring of water quality aligned with active intervention where it is not improving.
58. The researchers point out that robust advice must recognise that nutrient loss does not occur uniformly across the whole of a farm property, but arises primarily from critical source areas (typically 10% or less of a farm property). Farm plans must be spatially explicit.
59. Officers note that this means that imposing a 'one size fits all' approach dictating standardised farm management practices is not supported by this research.

60. The researchers also raise serious concerns about the capacity of NZ to deliver farm plans across the primary sector within the time frames dictated by the NPS; and the danger of having farm plans imposed rather than co-developed together with producers. The researchers suggest an incentive approach to reward farmers for developing their plans should be adopted, to meaningfully encourage the pace and scale of change.
61. The researchers also call for support for farmers, to assist them as necessary to transition to land uses and practices with a lower DIN and DRP loss profile.

Basis of current regulatory framework

62. The researchers note that the push-back on the NPS bottom lines for nutrients as proposed in 2019 arose in part because the explanatory power of regression analysis (examination of the correlation between individual drivers and ecological health) was sometimes very weak. For example, nutrient concentration were found to explain only about 10% (6-13% range) of observed variations in macroinvertebrate metrics. Further, there were considerable doubts raised as to whether farms in some catchments had capacity to reduce nutrient losses to the extent required to meet the limits as proposed.
63. Officers note that in plain language this means that the concentrations of nutrients have only a little influence on stream health overall. This conclusion reinforces studies published previously, that across much of NZ stream health (especially periphyton health) is driven not by the concentrations of nutrients in streams, but by hydrological dynamics- i.e. the frequency and intensity of high flow events. Modelling by NIWA has confirmed that Taranaki is simply not susceptible to extended periods of excessive periphyton growth. The necessity and validity of a universal receiving waters concentration-based approach to managing nutrients is put into doubt.

Research findings and policy development

64. Section 3.7 of the NPS specifically requires the Council to identify desired environmental outcomes and to adopt these as objectives; to determine the baseline state of attributes (measures) that help describe and quantify the outcomes; to set targets for every attribute; and to prepare action plans that describe how targets will be achieved. Targets for attributes must be set at or above the current state, and must be at or above national bottom lines.
65. Each action plan must set out how the Council will or intends to deliver target attainment. Councils must identify the limits on resource use (controls to be imposed in regional plans) that will achieve the target states. The limits may apply to any land use or activity, and may apply at any scale (including a property or part thereof). The controls may control the areal extent of a use of land, or limit the inputs applied to that land (e.g. fertiliser or effluent), or limit the outputs from that land (eg rate of contaminant losses from that land).
66. In order for an action plan to be meaningful, it is critical that the Council has good information around the extent to which our current land uses affect fresh water and how those effects are changing. It is critical that the Council has an awareness of what future gains can be made, whether relying on either the completion of current programmes and policies, or on adoption of other interventions. It is critical that the Council informs itself, the community, and the government, as to whether NPS bottom lines are attainable, and the cost to the community that attainment of national bottom lines or community targets might carry.

67. The information contained within the suite of research papers discussed today will assist the Council in determining what national limits or NRP targets might be practical, affordable, or even attainable.

68. It should be noted that the papers under discussion do not examine what level of water quality a community could desire- in other words, what level of water quality makes a water body suitable for a purpose or value espoused by the community. They relate only to bottom lines previously proposed for the maintenance of ecosystem health, within a 'one size fits all' approach.

Modelling approach and its key elements

69. The modelling reflected that New Zealand has a diversity in landforms, climate, and land use and practices, so that there is a wide range of contaminant loss profiles. The adopted approach classified parcels of pastoral land across New Zealand into one of many specific categories that reflected: soil type including moisture-holding and water percolation characteristics; soil chemistry; climatic patterns (temperature, rainfall); landscape topography; and land use characteristics/farm management type. This system of classification generated over 60 types of dairy farm. The most common 20 types were found to cover more than 2/3 of all dairy land in NZ, while17 sheep and beef types covered 89% of land used for drystock farming. The modelling used this suite of farm types, recognising that some farm types were not well-characterised in respect of proven potential benefits from contaminant mitigation practices and that the study was pitched at a catchment and national scale, rather than attempting to model contaminant management for every individual farm.

70. The current mitigation measures recognised in the modelling encompassed stock exclusion and riparian vegetation along streams and their margins, the use of wintering off paddocks, dairy effluent management, and fertiliser management (rates and timing). Future mitigation measures (in development) recognised in the modelling included gully and edge of paddock retention dams and bunds, on-farm runoff treatment wetlands, solely dry-weather grazing of pasture and crops in critical source areas, chemical dosing of pastures and streams to capture and deposit sediment and nutrients, a switch to slow-release fertilisers, controlled drainage, reduced fertiliser application, use of nutrient catch crops, nitrification inhibitors, and some pasture conversion to forestry. The researchers noted that this list of options may well be incomplete- eg there are promising signs of reduced urinary N by feedstock amendment.

71. The modelling assumed no changes to underlying land use, stock numbers, and animal intake conversion efficiency for the next 20 years. Crucially for Taranaki-related interpretation, the model did not take into account any attenuation processes that occurred off-farm (eg aquifer denitrification- officers note this has been demonstrated under Taranaki soil types to eliminate up to 75% of N leached from a farm, prior to groundwater entry into a surface waterway; or in-stream attenuation of DRP via absorption followed by sedimentation; or soil anion exchange storage capacity for retaining $NO3^-$ or $PO4^-$). The researchers noted that their conservative approach may well therefore over-estimate future residual losses and thus under-estimate gains.

72. The '2015 potential' modelling for dairying assumed riparian fencing only for all larger streams (reflecting Government policy in 2017); balanced applications of fertiliser (nutrient budgeting); managed irrigation; dairy effluent discharge only onto unsaturated soils; and off-paddock wintering of stock (eg run-offs or barns/stand-off pads).

73. Officers note that in Taranaki, existing policy and implementation is that every stream, regardless of size, and whether permanent or ephemeral, is to be both fenced and planted. Therefore the '2015 potential' output would under-estimate the regional gains still to be made in reducing DRP, DIN , and sediment as the Council's riparian programme comes to fruition.
74. For sheep and beef, the modelling of 'potential 2015' assumed stock exclusion by fencing, but with intermittent grazing of stream margins for weed control; balanced fertiliser management; and land retirement based on land suitability classification.
75. The '2035' scenario was so-called in recognition of findings that peak adoption of new land use practices occurs on average 15-20 years after its inception. It also recognises that in some catchments there is a lag time between on-farm actions and consequent changes in surface water quality via groundwater flows.
76. These models of potential mitigations of contaminant yields and loads, were then matched as appropriate to existing water quality at the REC scale (ie 560,000 river reaches in New Zealand), to determine potential changes in water quality at the catchment scale.
77. Figures 1-3 attached to this memorandum illustrates the findings, which are also discussed above.

Financial considerations—LTP/Annual Plan

78. 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

79. 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*. Dissemination of the research information facilitates policy development by the Council.

Iwi considerations

80. 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. This memo reports external research undertaken by other parties. There has been no specific iwi involvement in the preparation of this memorandum. Dissemination of the research information facilitates participation by iwi in policy development.

Community considerations

81. 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. The National Science Challenges were developed and shaped by community input. Dissemination of the research information presented

in this memo facilitates participation by the community in policy development and advocacy by the Council.

Legal considerations

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

Appendices

Figure 1 (a), (b), and (c): Current and potential attainment of the NPS DRP bottom line

Figure 2 (a) and (b): Nitrogen loss in excess of NPS maximum acceptable load, and potential for reducing nitrogen loss

Figure 3: Current and potential attainment of DIN and DRP yields following mitigations

Attachments

Document 2688128: *Assessing the effectiveness of on-farm mitigation actions,* Research Findings Brief December 2020, Our Land and Water.

Figure 1: a, b, and c: Current and potential attainment of the NPS DRP bottom line

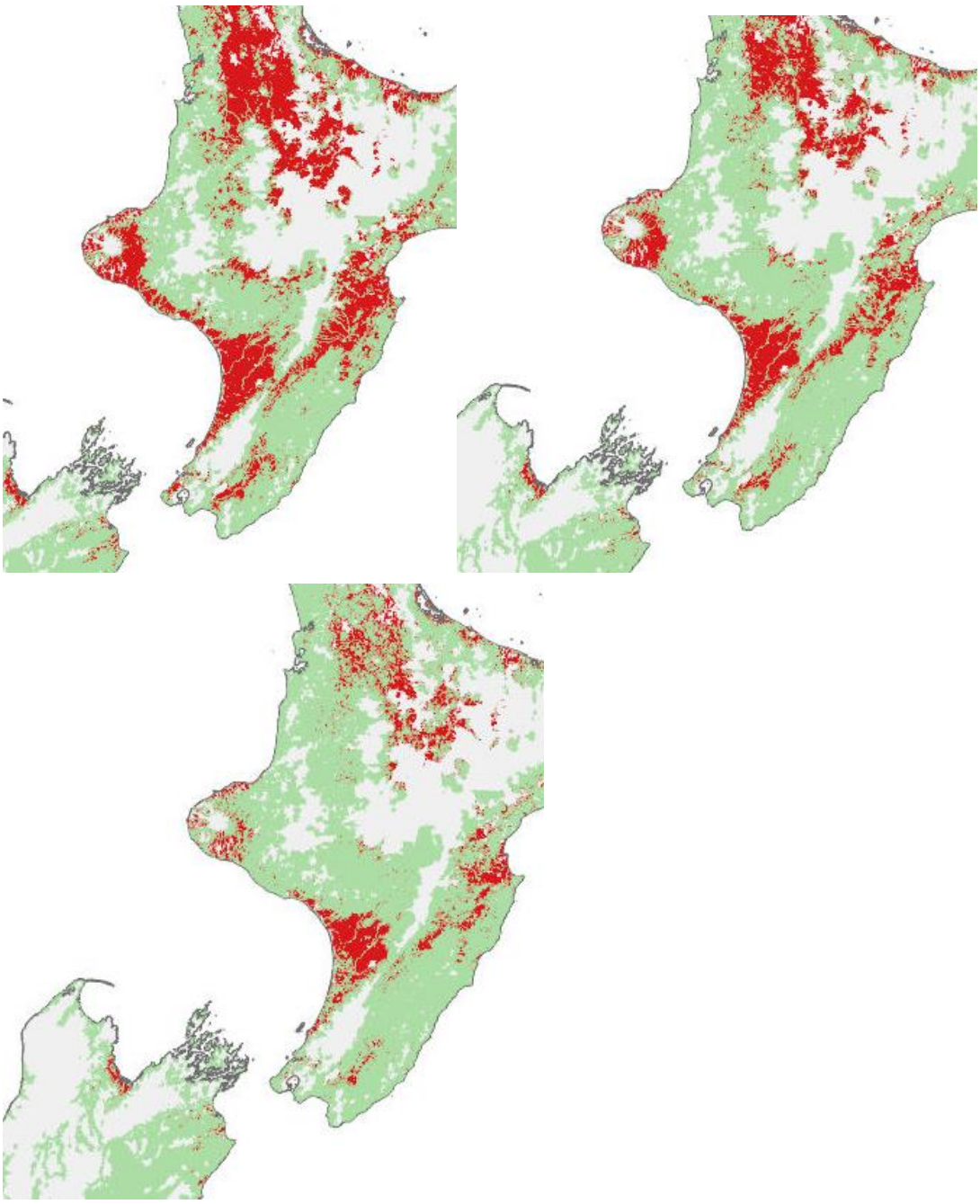


Figure 1 (reproduced from '*Implications of water quality policy on land use: a case study of the approach in New Zealand*' McDowell et al)

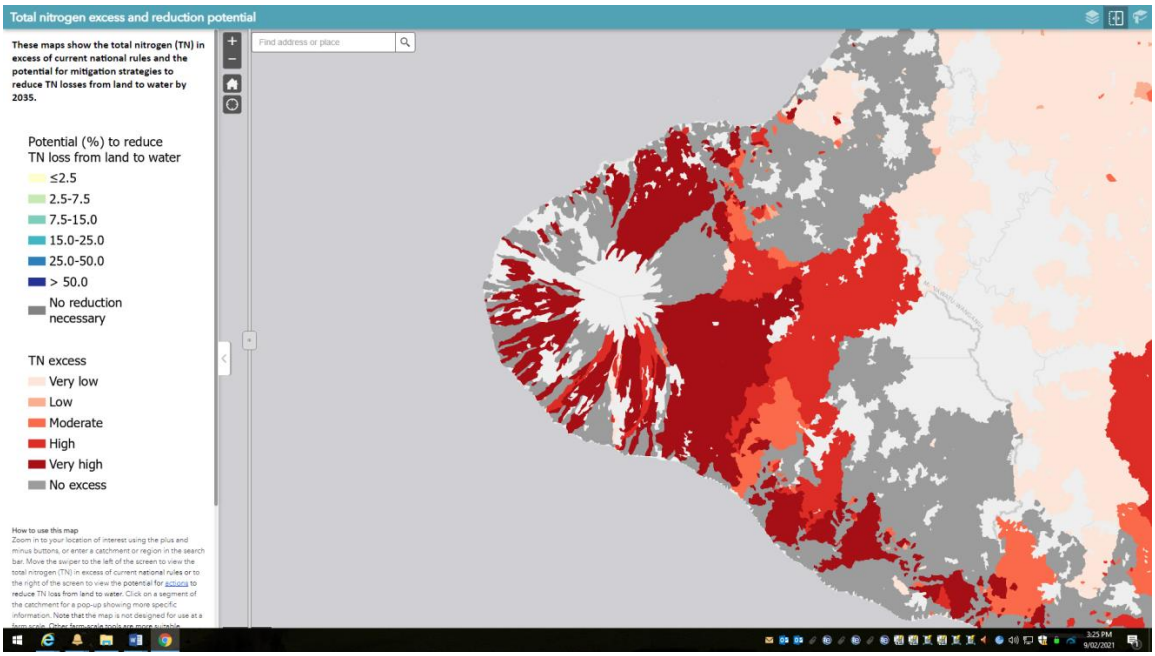
Key: green = compliant with DRP bottom line (<0.018gm^{-3}) Red = not compliant with DRP

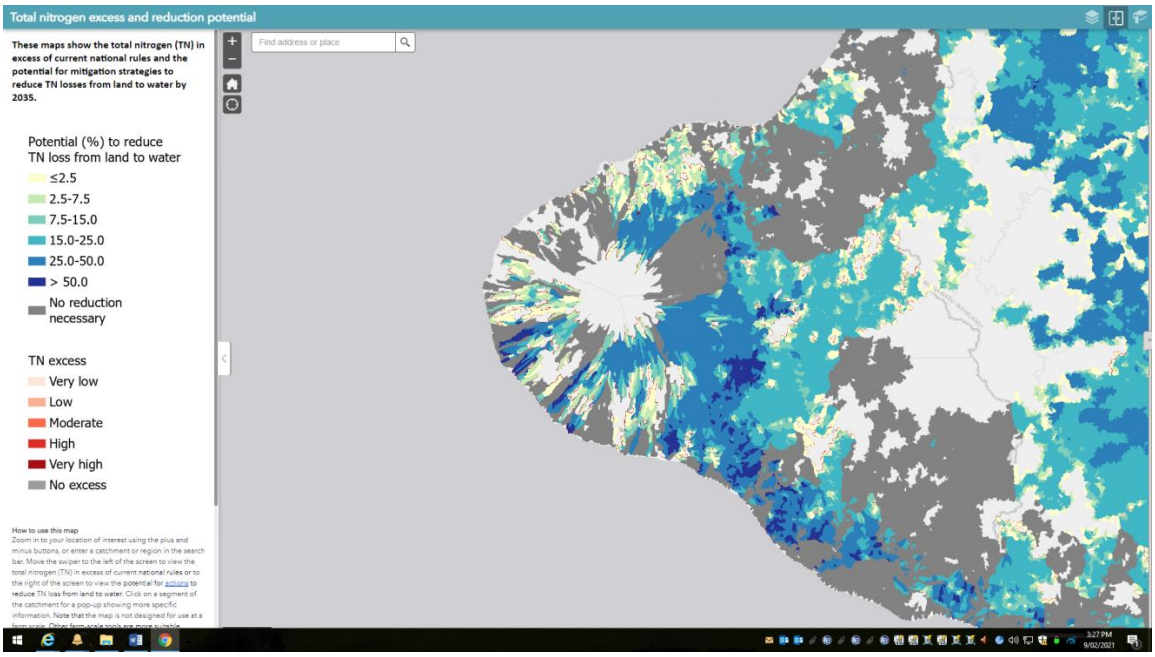
Figure a = 2015 attainment level

Figure b = potential attainment with universal uptake of current good practice

Figure c= potential attainment with universal uptake of both current and developing good practice ('2035 attainment')

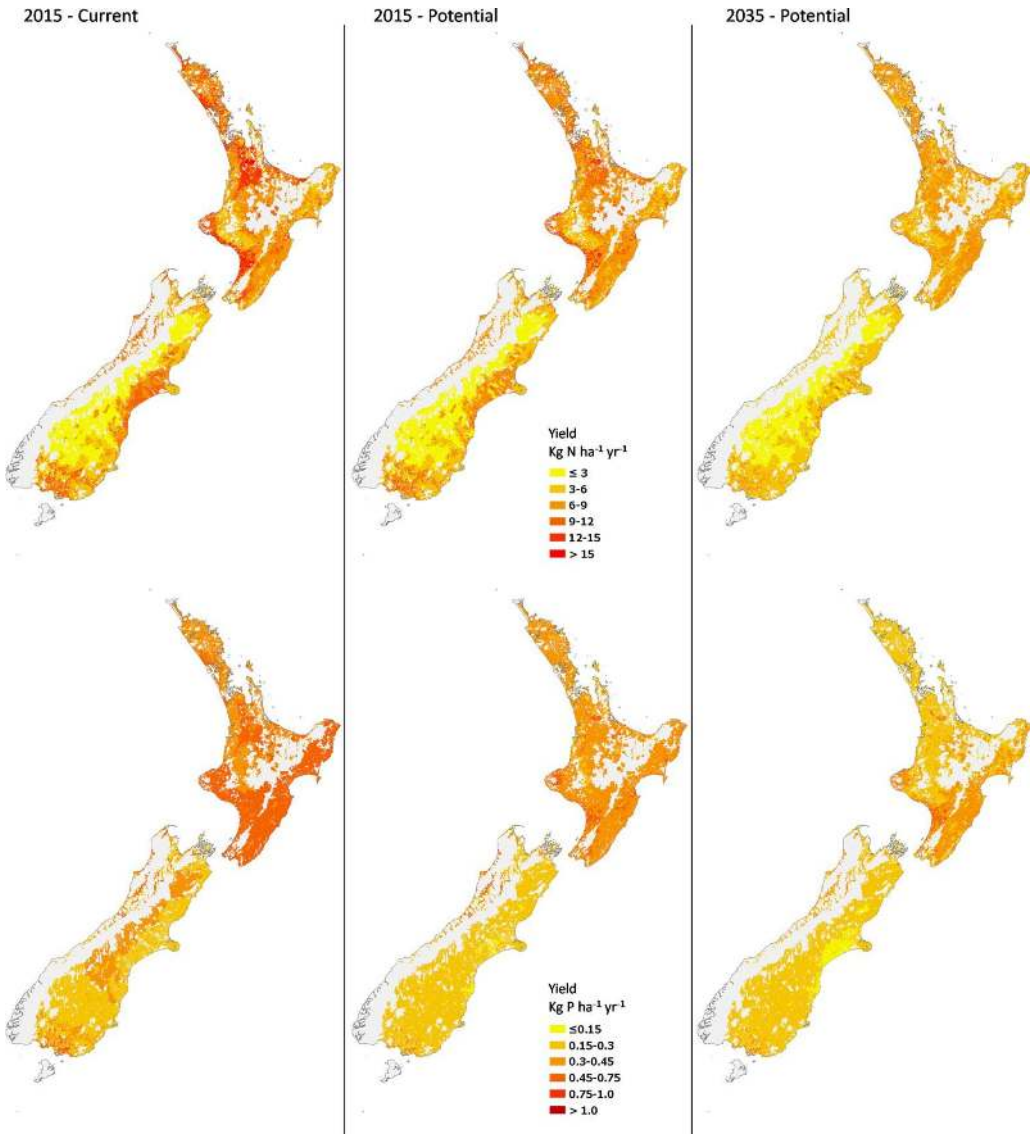
Figure 2: (a) Nitrogen loss in excess of NPS maximum acceptable load;
(b) potential for reducing nitrogen loss





Reproduced from on-line zoomable interactive maps at tinyurl.com/OLW-map

Figure 3: Current and potential nitrogen and phosphorus yields following mitigations (note that this information does not relate directly to NPS attainment or non-attainment)



Reproduced from '*Quantifying contaminant losses to water from pastoral land uses in New Zealand III. What could be achieved by 2035?* McDowell et al

Research Findings Brief

National Science Challenges | OUR LAND AND WATER | Toitū te Whenua, Toiora te Wai

Assessing the effectiveness of on-farm mitigation actions

WHO IS THIS RESEARCH BRIEF FOR?

Primary industry bodies

Catchment groups

Farm advisors

Farmers and growers

Central government

NGOs

Rural lenders

RESEARCHERS

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Our Land and Water National Science Challenge

Ross Monaghan
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PROJECT TIMELINE

October 2016 – December 2019

Key points

Our rivers would be in much worse condition today if farmers had not adopted better practices between 1995 and 2015.

Significantly more nitrogen (45% more) and phosphorus (98% more) would have entered rivers from dairy-farmed land between 1995 and 2015 if farmers hadn't changed their practices.

On sheep and beef farmed land, 30% more sediment would have entered rivers between 1995 and 2015 if farmers hadn't changed their practices.

Researchers estimated that if all known and developing mitigation actions were implemented by all dairy and sheep and beef farmers by 2035, potential loads of nitrogen and phosphorus entering rivers might decrease by one-third, and sediment by two-thirds, compared to 2015. For many catchments, this will be enough to meet current water quality objectives.

How can this research be used?

On dairy-farmed land, this research found that the most effective nitrogen and phosphorus mitigation practices used between 1995 and 2015 were stock exclusion, improved effluent management and better irrigation practices.

On sheep and beef farmed land, the most effective sediment mitigation practices used over the period were planting more trees, excluding stock from waterways, and soil conservation works.

If all known and developing mitigation actions were implemented by all dairy and sheep and beef farmers by 2035, the potential load of contaminant entering rivers would decrease by 34% (nitrogen), 36% (phosphorus) and 66% (sediment).

Additional research from Our Land and Water has enabled the identification of where reductions in nitrogen emissions are required to achieve the requirements of existing national regulations, and the amount by which this is necessary (Snelder et al, 2020). An interactive map of New Zealand showing total nitrogen in excess of current regulatory criteria and reduction potential has been created (**tinyurl.com/OLW-map**).

Adopting all known, established mitigation measures will enable most New Zealand catchments to meet current water quality objectives.

For some catchments and farms, applying all known and emerging mitigations may be less pragmatic than some change in land use or land use intensity.

Why is this issue important?

Farmers have been taking action to improve water quality for years. Despite much hard work and investment, some New Zealand rivers still aren't meeting community expectations for purity, swimmability and mahinga kai (food and resources). There is a risk of losing motivation to take further action without a measure of the overall impact of this work on New Zealand's water quality.

Expansion and intensification of the dairy sector (a 160% increase in production, with a 40% increase in dairy-farmed land area) has continued to put pressure on freshwater by increasing total nitrogen and phosphorus loss. This has made it harder to make improvements in water quality through actions. Nevertheless, improvements have been made and accelerating the adoption of mitigation actions will lead to significant further improvement in water quality.

What did we do?

Researchers connected to the Sources and Flows research programme undertook a national-scale assessment of the impact on water quality of adopting better practices on dairy, sheep and beef farms.

The researchers combined data on geographic and mitigation efficacy to model the total losses of N, P and sediment for around 130 farm typologies (depending on the contaminant), which considered landscape attributes (such as soil, topography and climate factors) and land use pressures (such as farm inputs and feed and stock management practices) that influence contaminant transport to water.

The research team estimated nitrogen (N), phosphorus (P) and sediment losses in 2015, and compared these to potential contaminant loads in scenarios including:

1. 2015, assuming the practices of 1995 were still in use (*Figure 1*)
2. 2035, assuming the full implementation of all regularly used and developing on-farm mitigation actions (*Figure 2*)
3. Introduction of national limits for dissolved reactive phosphorus (0.018 mg DRP/L) and dissolved inorganic nitrogen (1 mg DIN/L) – note this is not current policy (*Figure 3*)

What did we find?

Significantly more nitrogen (45% more) and phosphorus (98% more) would have entered rivers from dairy-farmed land between 1995 and 2015 if farmers hadn't changed their practices. On average over Aotearoa between 1995 and 2015:

- Dairy N losses increased from 46 to 49 kg N/ha/yr – but would have increased to ~72 kg N/ha/yr if farmers had not adopted better practices.
- Dairy P losses decreased from 1.7 to ~1 kg P/ha/yr – but would have increased to 2.1 kg P/ha/yr if farmers had not adopted better practices.
- Dairy sediment losses decreased from 350 T/ha/yr to 260 T/ha/yr – but would have decreased to about 320 T/ha/yr if farmers had not adopted better practices.
- Sheep and beef N losses increased from about 11 to 13 kg N/ha/yr – but would have increased to 14 kg N/ha/yr if farmers had not adopted better practices.
- Sheep and beef P losses decreased from 0.9 to 0.75 kg P/ha/yr – but would have decreased to 0.8 kg P/ha/yr if farmers had not adopted better practices.
- Sheep and beef sediment losses decreased from 840 T/ha/yr to about 700 T/ha/yr – a similar decrease to that expected if farmers had not adopted better practices.

Note: Despite lower per hectare emissions, sheep and beef accounts for about three-quarters of national N, P and sediment losses, because much more land is in sheep and beef (8.3 million hectares) than dairy (2.3 million hectares).

The effect of on-farm mitigations 1995–2015

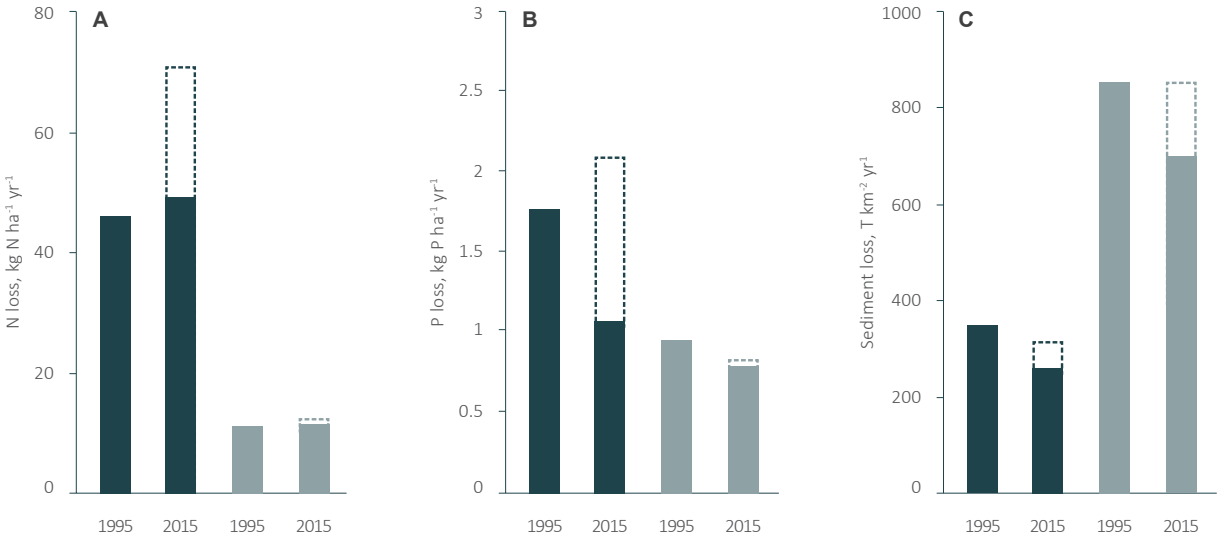
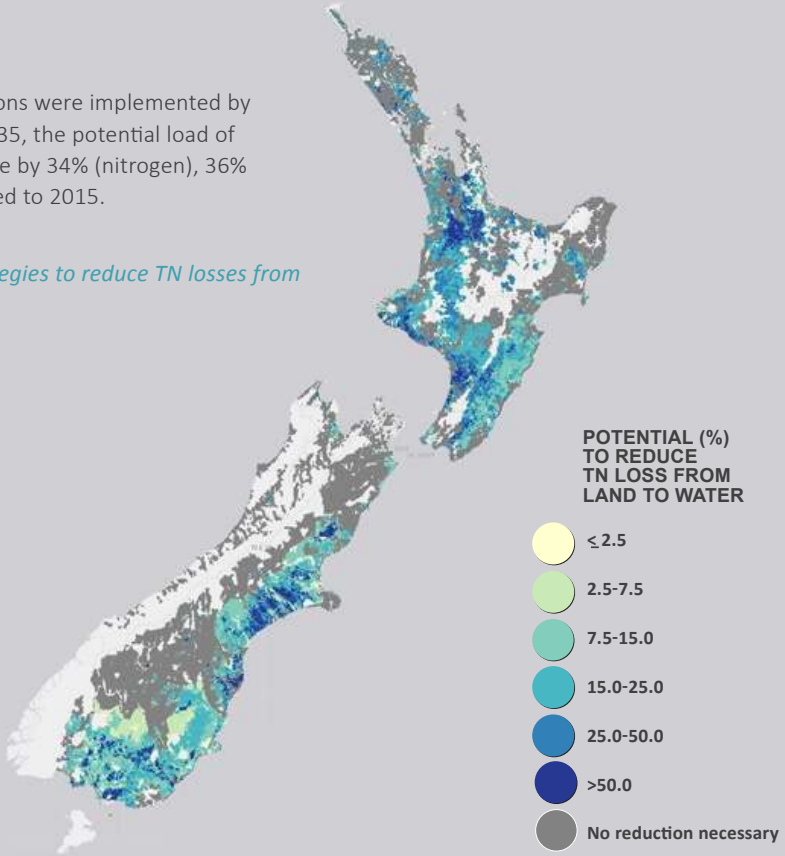


Figure 1. *Area-weighted estimates of (A) N, (B) P and (C) sediment yields from dairy (black bars) and sheep-beef (grey bars) farms with and without (including dashed bars) mitigation actions calculated for the period between 1995 and 2015.*

Best-case scenario for 2035

If all known and developing mitigation actions were implemented by all dairy and sheep and beef farmers by 2035, the potential load of contaminant entering rivers would decrease by 34% (nitrogen), 36% (phosphorus) and 66% (sediment) compared to 2015.

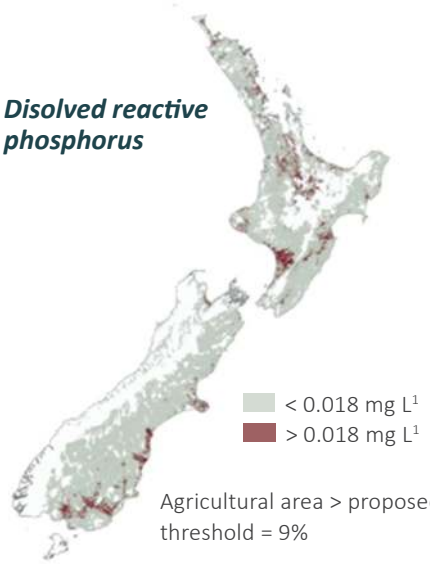
Figure 2. *The potential for mitigation strategies to reduce TN losses from land to water by 2035.*



See zoomable interactive map at tinyurl.com/OLW-map

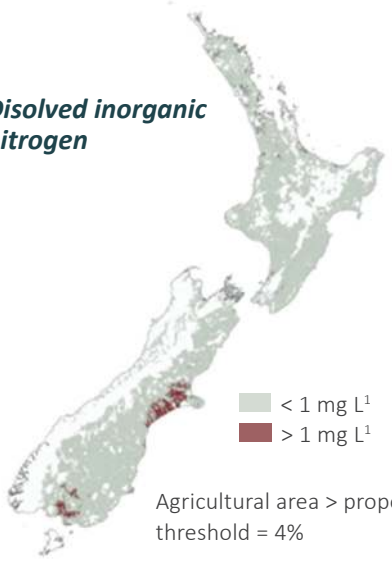
Potential future national thresholds

Disolved reactive phosphorus



Agricultural area > proposed DRP threshold = 9%

Disolved inorganic nitrogen



Agricultural area > proposed DIN threshold = 4%

Figure 3. *Catchment areas in excess of potential new national limits for dissolved reactive phosphorus (0.018 mg DRP/L) and dissolved inorganic nitrogen (1 mg DIN/L) if all known and developing mitigations were applied by 2035*

Why isn't water quality better?

Despite the efforts of many farmers to care for our water, at the same time on other farms land use changed and farming intensified.

Land area used by dairy expanded 40% between 1995 and 2015, and together with changes on farm, total dairy production increased by around 160%. The land area occupied by sheep and beef contracted, but the intensity of production per hectare increased.

This increased food production continued to put pressure on freshwater by increasing total nitrogen loss. Mitigations were not sufficient to offset these increased nitrogen loads.

Next steps

The 2035 scenario considered by this research assumes that actions are implemented 100%. However, we know that this is often not the case. To improve the level and rate of implementation, Our Land and Water is funding research to record efforts to improve water quality within catchments (Register of Land Management Actions), and research to identify how to best monitor the water improvement from those management actions (Environmental Catchment Monitoring). We hope this will help farmers and catchment groups learn from each other and instill confidence to act.

Existing catchment management groups have helped farmers and others take collective responsibility to try to achieve desired water quality outcomes. With further leadership and engagement, this approach could evolve into a more accountable, innovative and effective vehicle for advancing environmentally sustainable agriculture. Our Land and Water's New Models of Collective Responsibility programme will produce recommendations for how government and the primary sector can most effectively support catchment collectives.

Key publications

Quantifying contaminant losses to water from pastoral land uses in New Zealand II. The effects of some farm mitigation actions over the past two decades Ross Monaghan, Andrew Manderson, Les Basher, Raphael Spiekermann, John Dymond, Chris Smith, Hans Eikaas, Richard Muirhead, David Burger, Richard McDowell. *Preprint available on request*

Quantifying contaminant losses to water from pastoral land uses in New Zealand III. What could be achieved by 2035? R.W. McDowell, R.M. Monaghan, L.C. Smith, A. Manderson, L Basher, D. Burger, S. Laurenson, P. Pletnyakov, Spiekermann R (New Zealand Journal of Agricultural Research, November 2020) **https://doi.org/10.1080/00288233.2020.1844763**

Implications of water quality policy on land use: A case study of the approach in New Zealand R. W. McDowell, P. Pletnyakov, A. Lim and G. Salmon (Marine and Freshwater Research, October 2020) **https://doi.org/10.1071/MF20201**

Nitrogen loads to New Zealand aquatic receiving environments: comparison with regulatory criteria Ton H. Snelder, Amy L. Whitehead, Caroline Fraser, Scott T. Larned & Marc Schallenberg (New Zealand Journal of Marine and Freshwater Research, May 2020) **https://doi.org/10.1080/00288330.2020.1758168**

Research Findings Brief: Quantifying excess nitrogen loads in fresh water, Our Land and Water (Toitū te Whenua, Toiora te Wai) National Science Challenge 2020

OUR LAND AND WATER | Toitū te Whenua, Toiora te Wai

National Science Challenges

Our Land and Water (Toitū te Whenua, Toiora te Wai) is working towards an agri-food and fibre system that enhances the vitality of te Taiao with a diverse mosaic of land uses that improve the health of land, water and people.

Our Land and Water is one of 11 National Science Challenges that focus on defined issues of national importance identified by the New Zealand public.

Our Land and Water is hosted by AgResearch, funded by the Ministry of Business, Innovation and Employment, and supported by 16 partner research organisations.

Please use the following citation

Research Findings Brief: Assessment of the effectiveness of on-farm mitigation actions, Our Land and Water (Toitū te Whenua, Toiora te Wai) National Science Challenge 2020

Collaborators

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Date 16 March 2021

Subject: **Fonterra Co-operative Difference Payment Initiative**

Approved by: A D McLay, Director - Resource Management

S J Ruru, Chief Executive

Document: 2720711

Purpose

1. The purpose of this memorandum is to introduce for Members' information Fonterra's *Co-operative Difference Payment* initiative.

Executive summary

2. Fonterra has initiated a strategy as part of the *Co-operative Difference Payment* framework in which Fonterra will pay farmers for producing sustainable, high quality milk.
3. From 1 June 2021, Fonterra is introducing a *Co-operative Difference Payment* of up to 10 cents per kilogram of milk solids (kgMS) if the farm meets the on-farm sustainability and value targets.
4. The Co-operative Difference Framework includes an environmental component that seeks to encourage sustainable practices on farmland and will work towards better protecting the natural environment.
5. The environmental achievements to be met by Fonterra suppliers to qualify for the *Co-operative Difference Payment* are as follows:
    - Fonterra suppliers must have a farm environment plan that is implemented on the farm.
    - Fonterra suppliers must be participating in a product stewardship scheme for on-farm plastics and agri-chemicals.
    - Fonterra suppliers have a purchased nitrogen surplus at or lower than 138 kg/N/ha.
    - There must be no discharge of farm dairy effluent to water.
    - Fonterra suppliers must have 80% (or more) farm grown feed fed across the season.
6. The environmental achievements sought by Fonterra under the *Co-operative Difference Payment* (Te Pūtake) strongly aligns with national and local policy expectations for the farming sector.
7. It is an example of industry not waiting for the regulators to drive change.

Recommendations

That the Taranaki Regional Council:

a) receives this agenda memorandum titled *Fonterra Co-operative Difference Payment initiative*; and

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

Background

8. Fonterra launched its *Co-operative Difference Payment* initiative in 2019. The initiative sets out the framework in which Fonterra is seeking to ensure that on-farm practices will support the achievement of its Co-operative Strategy. The aim of Fonterra's Cooperative Strategy is to ensure that farm suppliers produce high quality milk in a sustainable way, which includes adapting and changing on farm practices to meet changing community expectations.

9. As part of the *Co-operative Difference Payment* initiative, Fonterra farm suppliers will begin receiving payment for their milk through the introduction of a new milk payment parameter. The initiative is set to begin on the 1 June 2021.

10. The *Co-operative Difference Payment* aims to sustainably produce higher quality milk, which in turn, will increase the value of all Fonterra milk. Milk payment parameters are to be used to determine the value of a farm's milk and can result in a farmer being paid slightly higher per milksolid (relative to the Co-operative average).

11. Milk payment parameters currently include the fat and protein composition of the milk, the volume, and going forward, will include achievement of two steps/considerations:

    - Te Pūtake (the start of the journey): Te Pūtake consists of 7 cents per kgMS for achievements addressing wider environmental and social considerations; and
    - Te Puku (the mid-point): Te Puku focuses on milk quality and consists of 3 cents per kgMS on qualifying milk. To achieve this phase the farmer must achieve milk quality excellence for at least 30 days during the season.

12. On completion of Te Pūtake and Te Puku, farmers will be eligible for the *Co-operative Difference Payment*. The 10 cent *Co-operative Difference Payment* will be funded out of the Farmgate Milk Price.

13. Following Te Pūtake and Te Puku, the focus is on Te Tihi. Te Tihi, is Fonterra's third and final step, and is about celebrating those in the Co-operative who consistently deliver high-quality milk. To achieve this a minimum of 90% of the days that farmers supply milk during the season must be at the excellence standard. There is no additional payment for this achievement; it is about recognition for excellent farming practices.

Te Pūtake and alignment with local regulation

14. Te Pūtake has an environmental focus. Te Pūtake contains four achievement areas for farmers that must be met and verified by the end of the season. They are as follows:

    - **Environment:** To achieve this goal, farmers must have a farm environment plan and must achieve key environmental practices (refer to discussion that follows).

- **Animals:** To achieve this goal, farmers must have implemented an Animal Wellbeing Plan developed and signed by the farms veterinarian and which addresses animal nutrition, health, environment and behaviour.
- **People and community**: To achieve this goal, farmers will need to complete all three sections of the DairyNZ Workplace 360 assessment and achieve 100% on the foundation level.
- **Co-op and Prosperity:** To achieve this goal, farmers will need to keep full and accurate Farm Dairy Records. These records will enable Fonterra to report on sustainability commitments.

15. Of particular, interest, are the environmental achievements sought by Fonterra, which are as follows:

    - First, there must be a farm environment plan in place and implemented on the farm. As Members are aware, the Council has worked with willing landholders for many years to prepare and implement a range of farm plans, including riparian plans and comprehensive hill country farm plans. More recently with the promulgation of amendments to the *Resource Management Act 1991* and the *Essential Freshwater* initiative, Government is requiring farmers to have certified freshwater plans. In time, the Council anticipates its new *Natural Resource Plan* will establish a regulatory and compliance regime that is underpinned by these farm environment plans (or their equivalent).

    In addition to the above, Fonterra suppliers must achieve at least three out of the following four key practices:

    - Second, Fonterra suppliers must also be participating in a product stewardship scheme for on-farm plastics and agri-chemicals. The Council supports the *Zero Waste Taranaki* initiative, which is run by the three district councils. The Taranaki Regional Council and three district councils also adopted the *Waste Minimisation Strategy for Taranaki* in 2016, which aims to reduce and better manage waste in the Taranaki region.
    - Third, farmer's must not exceed a purchased nitrogen surplus target (currently set at 138 kg/N/ha). The lower the nitrogen surplus the lower the risk that those nutrients are entering Taranaki waterways (or the atmosphere).
    - Fourth, farms must discharge dairy shed effluent to land. Discharges to land are recognised best practice and is consistent with Council's approach that discharges to water should only occur in exceptional circumstances. Avoiding discharges to water will allow for cleaner more healthy waterways by recycling nutrients and stopping bacteria from entering the waterways.
    - Fifth, farms must have 80% (or more) farm grown feed fed across the season. Farm grown feed is fundamental to New Zealand's low cost, low carbon footprint model of production. The practice also reduces water use and improves levels of soil organic matter.

16. The environmental achievements sought by Fonterra under Te Pūtake strongly aligns with national and local policy expectations for the dairy farming sector. In effect, it is an example of industry not waiting for the regulators to drive change, which this Council is very supportive of.
17. For further information, please refer to the Co-operative Difference Payment brochure, which is appended to this item.

Financial considerations—LTP/Annual Plan

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

Policy considerations

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

Iwi considerations

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

Community considerations

21. 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

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

Appendices/Attachments

Document 2723201: Co-operative Difference Payment Environmental factsheet

The Co-operative Difference

Fonterra Dairy for life

The Co-operative Difference Environment Factsheet

The Environment achievement ensures that practices on farm are aligned with the expectations of our customers, consumers and communities. By adopting good management practices we protect our water quality, reduce our greenhouse gas emissions and maximise the use of resources; ensuring we remain one of the most sustainable sources of dairy in the world.

Fonterra Co-operative Group.
2021

What do I need to do?

To meet the Environment achievement:

Achievement	Why it's important	How to get there
Your farm must have a Farm Environment Plan in place.	Every farm is different, so when it comes to protecting our environment Farm Environment Plans are a great way to develop the right solutions at a farm level. They're also great for showcasing the great work we're doing to our customers and community.	Fonterra offers a Farm Environment Plan service to all Co-op members at no additional cost. If you'd like to talk to one of our Sustainable Dairying Advisors, give us a call. Farm Environment Plans from other qualified providers will also likely meet the requirements.
In addition to this your farm must achieve at least three out of four key practices that are outlined below:		
1 Your purchased nitrogen surplus is at or lower than 138 kg/N/ha. The target will be reviewed annually and represents the point at which 3/4 of Fonterra farmers are already achieving.	Purchased nitrogen surplus tells us how efficiently a farm is turning imported nitrogen like feed and fertiliser, into milk. The lower the nitrogen surplus, the lower the risk that we're losing those valuable nutrients into our waterways, or the atmosphere.	It's important to first understand your current Purchased Nitrogen Surplus. You'll find this figure on your Fonterra Environment Report. If your number is close to, or over the target number, you should consider what actions you could take to reduce this number through reducing inputs or improving the efficiency with which these inputs are converted into milk.
2 Participation in a product stewardship scheme for on-farm plastics and agri-chemicals.	Responsible management of our plastic waste and agrichemicals is just the right thing to do; but increasingly our customers and communities are looking for companies that can show they are actively managing their waste streams/products.	Currently the approved product stewardship schemes are: • AgRecovery – managing all plastic drums and unwanted agrichemicals. • Plasback – collecting used silage wrap and plastic drums. The contact details of these schemes are listed below.
3 No discharge of farm dairy effluent to water.	We all want clean, healthy waterways for our kids to swim in and safe water to drink. It's what our customers and communities expect too. Spreading effluent onto land is also an effective way of recycling nutrients back into the farm system.	If you have an effluent treatment pond that has the capability to discharge effluent to water, permanently seal this up. Your are not required to surrender the consent if you have one, however any evidence of a discharge occurring may result in disqualification from the payment.
4 80% farm grown feed fed across the season.	Farm grown feed sits at the heart of our low cost, low carbon footprint model of production. It's attributed to lower water use and improved levels of soil organic matter. Best of all, our customers value it and will pay for the privilege.	Carefully consider your feed inputs on the farm and how you can maximise the use of farm grown feed in your production system.

Verification

We've got a range of checks and balances in place to validate the accuracy of data you provide.

- We automatically review all the data you submit in your Farm Dairy Records to check for accuracy.
- We verify the records of a proportion of farms each year.

At your Farm Dairy Assessment we will also check the following:

- Your Farm Environment Plan if it wasn't developed by Fonterra.
- Evidence of record keeping for fertiliser and feed inputs.
- Receipts and/or evidence of participation in a product stewardship scheme for on-farm plastics and agri-chemicals.
- That there is no opportunity for farm dairy effluent discharge to water.

Submission of inaccurate data may result in disqualification from the Co-operative Difference Payment for the current, and/or future seasons.

Fonterra Co-operative Group.
2021

Frequently Asked Questions:

Q. How is the Farm Environment Plan verified?

If you have a Farm Source FEP, we'll be looking for evidence that the plan is being implemented at your Farm Dairy Assessment.

For plans completed by other providers the FEP must cover the industry agreed Good Farming Practices in core areas and include dates and actions being taken. Again, evidence of this will be checked at the Farm Dairy Assessment. If the FEP is part of an audited, regulated framework, then you only need to provide evidence that that plan has passed its most recent audit.

Q. Can Agrecovery and Plasback cope with the increase in demand?

We've confirmed that both of these schemes have nationwide coverage, we will continue to work with them to ensure the service meets our needs.

Q. What does farm grown feed mean?

Farm grown feed is defined for the purposes of The Co-operative Difference as:

Any pasture, forage or fodder crop that is grown in NZ for the purpose of feeding to stock.

It explicitly excludes the following feed types:

- Process by-products and concentrates
- Fruit and vegetable waste
- Grains and cereals

Q. Does the farm grown feed definition include feed imported from off the milking platform.

The definition is not specific about where the feed comes from, as long as it is grown in New Zealand and meets the definition above.

Q. If effluent discharge to water is not in line with customer and community expectations then why do we still collect their milk?

As with all parts of The Co-operative Difference, we're working with our farmers to change practices and upgrade their systems. In time this will almost certainly form part of the Fonterra Farmers' Terms of Supply.

Q. I have infrastructure that works as both storm water diversion and effluent discharge, will this make me ineligible for this achievement?

Storm water diversion is still permitted, however there can be no infrastructure that would allow for effluent to be released into a stormwater diversion channel and all such infrastructure must be permanently blocked off or removed.

Q. My current Farm Environment Plan doesn't address the Good Farming Practices, does this disqualify me from this achievement?

Farm Environment Plans must address all of the Good Farming Practices to be eligible for the Co-operative Difference Payment.

Support

- Give us a call on **0800 65 65 68** – our Service Centre team are there to answer any questions, and they can put you in contact with our team of Sustainable Dairying Advisors if required.
- Check out your Environmental Report on the Farm Source website. This not only has your nitrogen surplus figures from last year but a full breakdown of the risk areas on your farm.
- Download the **Dairy Diary app** to make keeping your records easy.
- Jump onto the AgRecovery and Plasback websites and sign up if you haven't already.
  agrecovery.co.nz and **plasback.co.nz**
- Visit the DairyNZ website for resources relating to feed and managing the Nitrogen inputs on your farm.
  dairynz.co.nz

Fonterra Co-operative Group.
2021

Date 16 March 2021

Subject: **Draft Submission on Climate Change Commission Draft Advice**

Approved by: A D McLay, Director - Resource Management

S J Ruru, Chief Executive

Document: 2720924

Purpose

1. The purpose of this memorandum is to inform members of the Draft Submission prepared on the Climate Change Commissions Draft Advice to the Government on possible transition pathways to a zero carbon economy.

Executive summary

2. This item was prepared to inform members of the submission to be presented on the Draft Advice on Climate Change. The draft Advice sets out the results of the Climate Change Commissions' analysis of potential pathways to a zero-carbon future, in line with the Government's 2050 target. Officers have had a mixed reaction to the Advice, with the Draft Submission supporting, opposing and suggesting additions to the Advice. Points of fundamental concern are discussed below. The closing date for submissions is 28 March.

Recommendations

That the Taranaki Regional Council:

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

b) adopts (*alternatively* amends) the Draft Submission for presentation to the Climate Change Commission by the due date of 28 March

c) recommends sharing copies of the Submission, once approved, with the three district councils, Venture Taranaki and iwi authorities to encourage a consistent approach to Government from the region.

Background

3. The Climate Change Commission ("CCC") was established as part of the Government's goal of achieving zero-carbon status by 2050. One of CCC's key roles was analysing and reporting on possible pathways to achieve that target. Those pathways would then

inform policy, including National Policy Statements that will bind councils and other bodies to actions to help achieve the carbon goals.

4. CCC has spent the last year analysing and preparing those scenarios, which are contained in the 2021 Draft Advice for Consultation ("Advice") document. Interested parties were given 8 weeks to prepare submissions, which are due by 28 March. CCC will consider submissions and amend the Advice before submitting final advice to Government by 31 May. The Government has until 31 December to consider that advice, after which it will direct the Ministry for the Environment (MfE) to begin implementation.
5. Officers assessed the Advice and made the following observations:
    5.1. CCC was set a huge task in conducting a complex analysis with a small team in a very tight timeline. Considering those limitations, it has done a good job.
    5.2. That noted, the impacts of that haste show clearly in the level of detail, quality and the comprehensiveness of the analysis.
    5.3. A very clear Government agenda appears to not only be already driving recommendations, but also severely limiting key stakeholders' level of engagement.
    5.4. Officers support a number of recommendations, including the call for central and local government partnering on policy development. The recommended "whole of farm" approach to afforestation also aligns well with the Council's experience of successfully implementing land management programmes.
    5.5. That noted, a common theme on many of the recommendations that are supported are they could, or should, go further. For example, local government should lead regional solution development. Similarly, gas' role as a transition fuel needs greater emphasis and provision for continuing exploration.
    5.6. The Advice has a number of technical and policy short-comings. For example, the call for fully renewable electricity generation appears to overlook the intermittent nature of wind and solar generation. Similarly, the push for EV's overlooks many key factors, including capital cost, electricity pricing impacts and the impact of the loss of fuel excises.
    5.7. On the policy front, the focus on decarbonising energy supply means that energy efficiency and behaviour change are overlooked - which, despite the Advice's intent, effectively favours status quo solutions.
    5.8. Missed opportunities include failing to recognise the potential for carbon capture and sequestration in Taranaki oil and gas reservoirs. Denitrification, recognising the carbon sequestration in dairy soils and accounting for small block planting carbon capture (eg. riparian margins or small hill country blocks) also fit this category.
    5.9. The production accounting focus for carbon emissions omits the embodied carbon in the imported goods that support the transition pathways. In doing so, it distorts the true carbon impact of those options by allowing NZ to export emissions.
6. Taking a Taranaki-centric view, officers believe the Advice would impose burdens disproportionate to the region's contributions to national emissions levels. Severely limiting domestic oil and gas production, closing Methanex, limiting exotic forestry and reducing agricultural activity all significantly impact the regional economy. The national net employment impact from the Advice, optimistically assessed as a net loss of 600 jobs, is significant, especially given the expectation that any new jobs will be lower paid.

Importantly, while the Advice correctly identifies the need to support vulnerable populations, it does not include smaller rural communities in that category.

7. The net result of these assessments is that the Draft Submission contains a mix of (mostly qualified) support through to recommendations for inclusion of additional key matters and outright opposition to parts of the Advice.
8. The Draft Submission was circulated to the Committee ahead of the Agenda to allow greater time for review and input prior to the meeting. It was also circulated, at a similar time, to iwi for their information and input.
9. Next steps in the submission process are:
    9.1. Following this meeting, Officers to make any changes recommended by the Committee.
    9.2. Once those changes are made, officers will share the Draft Submission with the three district councils and iwi for information.
    9.3. Officers will also share the Draft Submission with Venture Taranaki, who have asked for a copy (as they have with other key stakeholders across all sectors in the region) so that they can align and offer support to the Council's submission.
    9.4. Final Submission will be sent to CCC by the required closing date.
10. In expectation of a need to respond to that centrally sourced policy direction - and wanting to do so in a way that is most beneficial to the region - officers have started working with counterparts in the three district councils and Venture Taranaki. That work is focusing on a combination of identifying common work opportunities, as well as developing possible strategies and tactics to respond to general climate change issues.

Financial considerations—LTP/Annual Plan

11. 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

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

Iwi considerations

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

Community considerations

14. 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

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

Appendices/Attachments

Document 2723963: Draft Submission on Climate Change Commission Draft Advice 2021

3 March 2021
Document:

Climate Change Commission
PO Box 24448
Wellington 6142

Attention: Submissions Analysis Team

Submission on Draft Advice 2021

Taranaki Regional Council ("TRC") thanks the Climate Change Commission ("CCC") for the opportunity to make this submission on the Draft Advice for Consultation ("the Advice").

TRC supports CCC's objectives in preparing the Advice. We recognise the significance of climate change and the need to move away from business as usual to ensure that New Zealand achieves a sustainable low carbon future. We offer the following comments as a contribution to helping to ensure that the Advice and the resulting policy serve New Zealander's well in achieving the necessary changes and carbon goals.

General comments

TRC support proactive strategies and tactics that meet our climate goals while supporting communities' environmental, social, economic and cultural well-beings.

TRC further supports the overall $CO_{2\text{-}e}$ targets. While they are a stretch, they set the tone for the "not-BAU conversation" noted above.

The split gas approach allows for greater specificity and detail in setting both targets and policy options. The treatment of methane as different from carbon dioxide in source, characteristics and reduction options is supported.

TRC also supports the seven principles that have guided the Advice preparation.

However we question whether the "decarbonisation principle" is over-weighted, despite the Advice implying equal weighting for all principles. As we note below, we believe this over-weighting negatively impacts the quality and breadth of the Advice. We would therefore submit that the scenarios be re-run with equally weighted principles.

Taking a national view means that significant regional impacts are not being considered

The Advice presents only macro level impacts of the proposed changes.

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Please quote our document number in your reply

However the reality is that the response strategies will be felt regionally – and that there will be significant variations in those impacts across the country.

By way of illustration, the following table compares Taranaki's emissions, economic activity and employment profiles to the national averages that are the focus of the Advice.

Emitting Sector	NZ Average			Taranaki		
	Emissions	GDP	Employment	Emissions	GDP	Employment
Transport	36%	5%	6%	2%	3%	5%
Major Industry	41%	13%	10%	26%	20%	16%
Agriculture	18%	4%	4%	60%	9%	7%

NOTE: Transport emissions include domestic vehicle use, whereas GDP and employment are for the ANZSIC sector only. Sources: Emissions – Climate Change Commission Draft Advice and TRC regional inventory; GDP//Employment – Statistics NZ

TRC is particularly concerned because the proposed scenarios' impact on Taranaki far exceed our relative contribution to New Zealand's total emissions. Reduced oil and gas, Methanex closure, reduced farming activity, reduced thermal electricity generation, reduced plantation forestry and impacts on rural communities are all significant negatives for Taranaki. The region's relatively small and dispersed population also limits communities' response and resourcing options.

Accordingly, TRC submits that the Advice should be reissued giving regional breakdowns of emissions targets and impacts. A further consultation round should be conducted once that detail is available.

Collaboration with local government is good – but doesn't go far enough

TRC supports the CCC's comments on the importance of engaging with local authorities to develop local solutions and providing funds and funding mechanisms to let them develop those solutions.

However, we believe that the Advice does not go far enough in supporting that collaboration.

More specifically, TRC submits that policy development and implementation should start with local government developing regional responses to address regional contributions to national emissions. Centralised policy could be used to then make up any shortfalls in aggregated regional contributions against the national targets.

TRC believes that this approach will generate more total reductions, will be more focused and will have greater local buy-in than centrally imposed policies.

The government must also take account of the resource pressure coinciding fresh water, water infrastructure and resource management legislation reforms are placing on local government. These pressures limit local government's effective and meaningful contribution

to climate change response. The comments below on the consultation and policy process timing apply equally here.

The focus on supply side and large energy user decarbonisation both ignores key opportunities and limits the effectiveness of potential strategies

As noted above, TRC is concerned that the Advice overly targets energy supply decarbonisation as the principal means of achieving the carbon targets.

This supply side focus means that the Advice largely ignores energy efficiency and behaviour change led emissions reduction.

Energy efficiency reduces energy related emissions, making targets more achievable. It can also create economic and social co-benefits that could offset some of the calculated negative impacts of the proposed scenarios.

Behaviour change led improvements are also often more permanent and cheaper to implement than changes imposed by regulations.

Accordingly, demand side solutions deserve more in depth analysis than the brief mention given in the Advice.

Not doing so risks dissociating average New Zealanders from their role in the required changes by painting the issue and solution as belonging to large industry and the energy sector. This "us versus them" separation ignores the reality that energy sector emissions are ultimately only in service of final consumers' energy demands.

Examples of demand side opportunities that TRC believes warrant strong investigation include:

- Reviewing and improving the Building Code – as it is well stated that the New Zealand housing stock is unnecessarily energy intensive
- A comprehensive home insulation retrofit programme
- Improving vehicle efficiency standards – a move that we note that the Government has announced since the Advice was published
- A robust review of the current MEPS programme – including limiting or prohibiting inefficient equipment (eg., incandescent light bulbs), expanding the programme breadth and reintroducing "Energy Star" type energy labelling.
- Providing incentives and support for industrial energy efficiency retrofits (beyond just LTPH) – eg., through tax and accelerated depreciation regimes.

Provide stronger incentives for innovation and development

The Advice is largely silent on expected sector-based contributions to the overall target (including in the evidence reports).

TRC believe that, for each sector, the Advice should identify the tranches of reduction available from those technologies, processes and strategies which are:

- currently commercially available or are being implemented

- viable and, with appropriate support, are feasible near term opportunities (eg., 3-5 years)
- longer term propositions

This detail will provide clear signals to the private sector as to commercialisation opportunities, which could accelerate the reduction pathway. It also creates opportunity for collaboration between public and private sector organisations.

Concern that the process is being rushed

TRC appreciates that the Advice is primarily about showing a required direction and distance of travel, rather than the full details of that journey. However, because the Advice will shape policy direction, well considered analysis and submissions are crucial to the process. Expecting that level of consideration of the Advice (and evidence) within six weeks is not consistent with "true consultation" and an "inclusive future".

Equally importantly, as the CCC recognises, achieving emissions targets requires social acceptance and community contributions at each step. Rushed consultation undermines that support.

The impact of undue haste can even be seen in the Advice and evidence, where response option discussions lack detail and largely deal in generalities.

The path forward after consultation shows a similar undue haste – such that it raises questions as to the Government's true commitment to considering alternatives raised in the consultation.

A further significant factor that CCC seems to overlook is the risk of "consultation fatigue" amongst key stakeholders. TRC is finding that, with the current reform volume, some key stakeholders are unable to give the input that they and TRC both desire. This comment is particularly true for many of our tangata whenua partners in Taranaki.

TRC urges CCC and the government to review their timelines to ensure that they provide meaningful and ongoing opportunities for public engagement to shaping and implementing climate change policies and actions.

There is a lack of transparency in the models and assumptions used to derive the scenarios

Despite volumes of evidence, numerous workshops and information presentations that are available on CCC's website, finding the detail that underlies the stated scenarios is difficult. Even the evidence content largely simply restates the Advice with little substantive increase in detail.

This factor magnifies the negative effects of the tight timelines.

Scenarios appear to overlook key issues with solution implementation, underplay costs and overlook the scale required for a number of factors

TRC is concerned that, while the Advice acknowledges that there will be costs and issues with implementing the possible transition pathway, the analysis contained in the Advice sometimes lacks the rigour and "real world grounding" needed to assess those impacts.

TRC would cite the following as examples of incomplete or questionable analysis:

- Appearing to ignore the 17% capacity factor for solar electricity and the 40% capacity factor for wind. Applying these capacity factors means electricity system decarbonisation will require increasing current generating capacity by 50% in the next 15 years.
- Even a cursory look at Transpower's grid upgrade history shows that the timing assumptions are optimistic – especially where community support is lacking (eg., the Whakamaru-Brownhill upgrade).
- EV promotion appears to not account for:
    - EV capital cost considerations, including initial affordability, accelerated depreciation relative to ICE vehicles due to shorter effective useful life.
    - The limited impacts of overseas incentive schemes. For example, Canada is held up as a success, but nearly 80% of new vehicle sales are "light trucks" and the top 3 light trucks outsell the top 3 EV's by 13:1.
    - The limited availability of vehicle types – both present and forecast. Especially relevant for non-city dwellers.
    - How the loss of petrol levies impacts transportation network funding
    - Related to the above, if those taxes are to be rolled into electricity prices, how that will be done. For example, will at-home car charging require separate ICP's and rates? Or will the general electricity price rise? Either option creates additional costs.
    - The end of life disposal costs on electric vehicle batteries
- The Advice does not discuss the impact of rolling stock availability/age and gauge on the ability to increase rail use. Electrification costs also appear to be glossed over.
- Sector discussions that are either completely or extensively missing include providing high temperature process heat without using coal or gas and the electricity pricing impacts for commercial and industrial users. Another significant oversight is the lack of any substantive discussion on how to increase the proportion of freight that is moved by coastal shipping (before any discussion on whether the fleet should be electrified).
- Commercial property energy use change scenarios appear to ignore how separation of capital costs (owners) and energy costs (tenants) has historically limited improvements in this sector.
- The assumed high level of labour mobility should be questioned in light of "2020 covid period" experience.
- The predicted 600 net job losses seems significantly understated. For example, PEPANZ and Venture Taranaki have shown that oil and gas has a total employment effect of 11,700 people, 7000 of whom are in Taranaki. If that sector was reduced as modelled, it is optimistic at best to assume that over 95% of those people will be re-employed.
- The Advice glosses over the expectation that gained jobs will pay less than lost jobs in a single sentence – which is totally inappropriate given the household income impact.
- The blanket assumption that all export industries must decarbonise should be rigorously tested. For example, our dairying is recognised as some of the lowest carbon intensity globally.
- The switch to use of forestry waste for bioenergy overlooks:
    - Technical issues which seriously inhibit collecting slash and skid waste for biofuel;

- The need for fossil fuels to operate forest equipment – including chippers;
- Collection and transportation economics;
- Fuel variability - which usually requires supplementary fuel oil in boilers;
- The impact of biomass removal on nutrients (ie., the need for increased artificial fertiliser) and in-forest biodiversity.
- Using specific fuel crops (or coppicing) is likely to require significant exotic species plantations, which is contrary to the Advice's focus on native forests.

These comments should be taken as expressing concern about the completeness of the analysis, rather than as inherent resistance to the need for any of the changes. This concern is driven by a desire to ensure that bad analysis does not lead to bad policy.

Support for use of gas as a transition fuel requires consideration of supply resilience

For the reasons set out in the Advice, TRC endorses the CCC recommendation to retain gas electricity generation for system support and dry year capacity until at least 2035. However there is some concern over the impact of current oil and gas exploration and production policies on supply availability.

A "necessary action" should be added calling for a consequential review of those policies.

Failure to consider CCS overlooks a significant near term response strategy

TRC supports CCC's view that New Zealand must work towards achieving ultimate reductions in gross emissions (versus reductions in net emissions). However, as New Zealand will struggle to meet interim reduction targets, any reduction in annual emissions, regardless of source, should be applauded.

To that end, TRC is disappointed that New Zealand's capacity for Carbon Capture and Sequestration (CCS) gets a cursory, one-sentence mention. The practice is well-established overseas and extensively researched in New Zealand. Depleted gas and condensate fields in Taranaki provide a technically feasible option for large-volume CCS.

TRC would therefore submit that the analysis should be reassessed with greater emphasis on CCS as an option.

The omission of a discussion on soil stocks of carbon and how they relate to NZ's emissions inventory is surprising.

TRC is disappointed that the discussion on carbon accounting and emission reduction methodologies largely ignores land use as a driver of sequestration rates or soil carbon loss.

A large body of published New Zealand-based research found intensive dairying on higher class soils retains more soil carbon than sheep and beef, forestry, urban subdivision/landscaping, or horticulture. Related research establishes good farm practices for protecting soil carbon stocks.

The findings of this research should be used and the results included in the Advice.

The systems approach is weakly implemented – and should be extended beyond purely CO_{2-e} based systems

The Advice notes that the CCC advocates a systems approach to scenario development. While TRC supports this approach, our reading of the Advice is that the approach has not been strongly applied.

For example, the discussion on transportation options on page 97 appears to view the different vehicle types as separate entities, rather than taking an overall approach to small vehicle efficiency. Similarly, the different household energy end uses appear to be discussed separately, rather than taking a "whole of house" approach.

The CCC's strong focus on CO_{2-e} reduction as the sole target variable means that it ignores associated environmental consequences of renewable energy generation and GHG emission reduction interventions.

For example, many of the rare earths used in EVs are mined in countries with minimal or non-existent health, safety and environmental controls and protections. Some commentators fear the universal failure of EV battery recycling markets in first-world countries is creating looming environmental and public health issues. The report rightly identifies the need to give effect to the values of He Ara Waiora tikanga. In the light of these values, it is inappropriate for the government to ignore the ethical and environmental externalities of its policies. TRC asks the CCC to highlight these consequences as a "necessary action" for government attention.

Related to the above, the production accounting focus means that we are ignoring the embodied carbon in some of the proposed scenario solutions.

Meeting the reduction targets requires significant imported capital and consumer goods. From a global point of view, the embodied carbon in producing and transporting this equipment is still a significant negative. A production accounting approach allows New Zealand to export – and ignore – this negative impact. It also fails to give effect to a broader understanding of He Ara Waiora values.

It is also worth noting that the EC is currently proposing a consumption accounting based carbon tax. The tax is designed to specifically address the issue of off-shore impacts of local consumption – and to address actions by companies and countries to export their carbon (in particular to LDC's).

The Advice's discussion of extensive electrification's impact on system vulnerability/resilience is brief and understated. Texas' recent experiences with the failure of electricity systems due to winter storms shows the danger of an under-diversified energy system. Yet the Advice seems to overlook system security; pushing strongly towards full electrification at the expense of back-up systems as diverse as gas for home cooking, diesel generation in hospitals and ICE powered car radios and equipment charging.

The scenarios seem to ignore the lessons of the 1970's oil shocks about concentrating risks about our energy future in focused parts of the globe. Economic, ecological, and political

challenges arise whenever we effectively export crucial parts of our energy futures to other countries. In this instance, possible risk comes from over-reliance on China, who control 95% of the world's supply of rare earths, the large majority of components for EVs, turbines and electric motors, plus energy and digital transition technologies.

Accordingly we believe that the analysis should be recast taking a fuller systems approach that accounts for:

- All environmental impacts of energy use and consumption
- A more complete sectoral system analysis
- The embodied carbon effects of solutions (including taking a more consumption accounting approach); and
- Energy supply security

Support for an extensive review of the implications for strategic industries

TRC welcomes the discussion on the importance of identifying and maintaining strategic fossil fuel dependent industries such as cement, steel and iron manufacturing.

TRC notes that the considerations for these industries, which lack alternatives to gas and coal, are different to those industries where renewables are an option (including electricity generation). We would restate our comments above about reviewing oil and gas policy as a necessary action. We also support strengthening the Advice's cautions over optimistic reliance upon options such as bio-energy or green hydrogen to displace fossil fuels in these industries.

TRC particularly notes and endorses the CCC's careful analysis of Methanex's role in providing secure baseload natural gas demand that supports exploration and production. The implicit warning within the Advice, that loss of Methanex could impact gas supply, including for electricity generation, should be given greater emphasis.

TRC submits that, as these strategic plants are often part of global corporations, their production should be viewed in terms of its global emissions impacts. Doing so ensures that policy favouring closing an efficient, cleaner producing New Zealand plants (such as Methanex) does not increase global emissions by pushing that production to "dirtier" foreign plants.

TRC gives qualified support to the forestry, land management and agriculture proposals

The following is based on TRC's experience working closely with Taranaki farmers on land management programmes since 1989. The comments reflect our experience both in the technical implementation and building community support for programmes.

TRC supports CCC's proposal of integrating trees into the farming landscape which include increasing native afforestation to avoid "the wrong tree in the wrong place" and "transition" management plans for farms converted entirely to forestry for carbon. To that end, we note that policy needs to recognise that farms are primarily businesses and that any diversification, whether for climate change or otherwise, must be commercially viable for landowners.

However, that support is tempered by a call for the CCC to recommend that regional councils are recognised and empowered as the primary lead to support landowners determining what to plant and where to plant. Again, our experience and the feedback from farmers is that regional councils have a unique and powerful role in this space. (We link this comment to our earlier submissions on the role of local government.)

The Advice should ensure that the afforestation policy is based on "carrot rather than stick". We understand that some regional councils have tried regulatory approaches to get uptake of soil conservation planting. However, TRC has achieved significantly more than those councils by using education, collaboration and advice. We would recommend this approach to the CCC – especially if coupled with strong economic signals (eg., an appropriately set carbon price).

Carbon pricing opens the door to CCC recommending a fully integrated approach to the policies around conversion of farmland from agriculture to forestry or horticulture. Some twenty years ago, afforestation policies focused heavily on logging revenues to encourage converting marginal sheep and beef farmland to forestry. Now there are far greater options, with carbon pricing and a wider range of horticultural options open. A comprehensive, advisory approach, with fit for purpose and "fit for farmer" support and information, is key to the success of this approach.

TRC submits that CCC need to broaden the recommendation on the target audience for advice and support in the transition from current farming practices. In Taranaki at least, the size of the proposed changes mean that ring plain farmers are every bit as much in need of support as the hill country farmers that CCC identifies as a target audience. The Advice should be amended accordingly.

TRC encourages CCC to recommend measuring the carbon capture of small scale plantings and blocks. Our experience is that there are significant small, permanently planted blocks that are currently not receiving carbon credits due to perceived difficulties with measuring the carbon sequestered. TRC notes that it has long deployed technology and processes to account for the impacts of riparian planting and other distributed planting throughout the hill country. While it may not meet full IPCC international accounting standards, if has sufficient accuracy to enable measuring tradeable carbon units. If widely deployed, it could be a significant benefit to landowners and could support the CCC's recommended increase in the uptake of native plantings.

Rural communities are largely over-looked in the discussion of equity impacts

While the Advice very correctly notes the need to ensure that the proposed scenarios do not have a disproportionate effect on Maori and low-income New Zealanders, another vulnerable group – rural and small town New Zealanders – appear to be overlooked.

The proposed reductions in farming and plantation forestry have greater impacts on this population than the emissions that they create. Additionally, this group has less alternative response options in a decarbonised environment.

Factors that make this group vulnerable include:
- Smaller population bases often create significant barriers to technology options

- Lack of mobility to follow work
- Poor infrastructure in these areas – especially electricity distribution systems

Engaging with and providing for rural communities should be a "necessary action".

Greater support needed for agricultural methane reduction activities and should include more on denitrification options

TRC strongly endorses the CCC's approach to managing agricultural sector emissions. Weighing up primary sector emissions efficiency and its importance for both New Zealand's economy and global food security is robust and logical.

TRC supports the CCC's call for large and early methane reductions to offset limited carbon dioxide reductions. This strategy, effectively asking agriculture to "do more than its share" for the wider good, is a real opportunity. We particularly support the suggested incentives and investments in technology acquisition and dissemination to help farmers meet this outcome.

TRC questions the absence of any reference to research on drivers of complete denitrification of nitrate in soils under pastoral land (ie., rendering of nitrate ions to benign dinitrogen instead of only to nitrous oxide). Research into the drivers and characteristics of this process, already undergoing field studies in New Zealand, is promising. TRC is therefore puzzled as to why the Advice seems quite pessimistic about such opportunities.

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Yours faithfully

S Ruru
Chief Executive

Date 16 March 2021

Subject: **Key Native Ecosystems Programme Update**

Approved by: D Harrison, Director - Operations

S J Ruru, Chief Executive

Document: 2704494

Purpose

1. The purpose of this memorandum is to present for Members' information an update on the identification of twelve new Key Native Ecosystem (KNE) sites.
2. A presentation on the implementation of the Key Native Ecosystem programme and its progress over the years will be made at the meeting.

Executive summary

3. The *Biodiversity Strategy for the Taranaki Regional Council* ('the Biodiversity Strategy') sets out four strategic priorities for the Taranaki Regional Council (the Council), one of which relates to protection of KNEs on privately owned land.
4. KNEs refer to terrestrial (land) areas identified by the Council as having regionally significant ecological values and which are targeted for ongoing protection.
5. Officers work with interested landowners, including iwi, and community groups to promote the voluntary protection and enhancement of ecological values associated with the sites.
6. All landowners can seek an assessment of their particular site for potential involvement in the KNE programme. When opportunities arise, new sites are assessed in relation to their regional significance, and/or existing information and databases updated.
7. Protection of KNEs is part of the Council's **non-regulatory** work and involves working with interested landowners and others through the preparation and implementation of biodiversity plans, the provision of environmental enhancement grant funding, and/or assisting with pest and weed control.
8. The ongoing identification and assessment of sites with potentially regionally significant indigenous biodiversity values has resulted in twelve new sites being identified as KNEs covering a total area of 938.13 ha to date this financial year.
9. With the addition of the new sites, the Council has so far identified 323 KNEs covering approximately 127,491 hectares in the region.

10. 269 of the KNE sites are partially or completely privately owned. Together, they cover approximately 17,745 hectares or 27% of the total area of indigenous vegetation in Taranaki in private ownership.
11. KNE sites target the most vulnerable and at risk types of indigenous vegetation and do not cover all indigenous vegetation types.
12. 185 KNE sites covering approximately 9,069 hectares are currently under active management through a Council Biodiversity Plan

Recommendations

That the Taranaki Regional Council:

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

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

Background

13. In 2017, Council reviewed and adopted the *Biodiversity Strategy for the Taranaki Regional Council* ('the Biodiversity Strategy'). The Biodiversity Strategy assists the Council in giving effect to its statutory functions for indigenous biodiversity, including those related to the *Resource Management Act* 1991.
14. The Biosecurity Strategy contains four strategic priorities, one of which relates to the Council focusing on protecting sites and places with regionally significant biodiversity values (i.e. KNEs), particularly those on privately owned land.
15. The Council's management approach is to work with interested landowners, community groups and other parties to undertake the voluntary protection and enhancement of ecological values associated with KNE sites on privately owned land. This involves the Council providing a property planning service and other assistance, including the preparation and implementation of biodiversity plans, the provision of environmental enhancement grant funding, and/or assisting with pest and weed control.
16. The identification of KNEs is ongoing by the Council. All landowners can seek an assessment of their particular site for potential involvement in the KNE programme. When opportunities arise, new sites are assessed in relation to their regional significance, and existing information and databases updated.

KNE site inventory process

17. Council officers have recently investigated and consulted with landowners to identify a further twelve sites totalling 938.13 hectares and recommend they be adopted as a KNE. The candidate sites are:
    - Messenger Bush
    - Meier QEII
    - Base Camp QEII
    - Van der Poel's Bush

- Watsons Hill Bush
- Twin Giants
- Menzies Road Hill Bush
- Lucas Block
- Hyview
- Eight Hundred Trust
- Wild Earth
- Pete's Spot.

18. All the sites have been assessed by officers as significant in accordance with criteria set out in Bio Policy 4 of the *Regional Policy Statement for Taranaki* (2010), i.e. rarity and distinctiveness, representativeness, and/or ecological context. Copies of the inventory sheets for the new sites are attached to this item.
19. With the addition of the new sites listed above the Council has so far now identified 323 KNEs (covering approximately 127,491 hectares), which includes public conservation land.
20. A total of 269 of the KNE sites, covering approximately 17,491 hectares, are partially or completely privately owned. This represents around 27% of the privately owned indigenous vegetation in the region. Of note KNE sites do not cover all indigenous vegetation in the region but rather the most vulnerable and at risk types of indigenous vegetation.
21. Identification of a site as a KNE does not have any extra bearing on the rules or controls that already apply to such sites in regional or district council plans. Identification of sites is undertaken by the Council to focus its **non-regulatory** efforts to work with and support landowners to protect biodiversity values on their land. As previously noted, protection is implemented through the preparation and implementation of biodiversity plans, the provision of environmental enhancement grant funding, and/or assisting land occupiers and/or care groups with pest and weed control.
22. The 2018–2028 Long Term Plan includes, amongst other things, a target to maintain and regularly update the Council's Inventory of KNEs. The identification of the additional KNEs gives effect to that commitment.
23. To date, the implementation of the Council's KNE programme has enjoyed very good land occupier support for enhanced protection for some of the most valuable and rare ecosystem types on private land. It also complements and adds value to landscape programmes being undertaken across the region that together are reversing the decline in biodiversity in the region.

Financial considerations—LTP/Annual Plan

24. 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

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

Iwi considerations

26. 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.
27. Some of the KNEs are associated with Maori land and consultation occurs. The majority are not and Council work on KNEs is reported to the Council and included in annual reports. Any interested iwi authorities are provided with the information on the site sheets.

Community considerations

28. 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

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

Appendices/Attachments

Document 2572115: Messengers Bush KNE Inventory

Document 2679852: Meier QEII KNE Inventory

Document 2683476: Base Camp QEII KNE Inventory

Document 2570440: Van der Poel's Bush KNE Inventory

Document 2619076: Watsons Hill Bush KNE Inventory

Document 2673855: Twin Giants KNE Inventory

Document 2673795: Menzies Road Hill Bush KNE Inventory

Document 2672210: Lucas Block KNE Inventory

Document 2654456: Hyview KNE Inventory

Document 2654415: Eight Hundred Trust KNE Inventory

Document 2661846: Wild Earth KNE Inventory

Document 2698315: Pete's Spot KNE Inventory

Messenger's Bush

At a glance

TRC Reference: BD/9701

Ecological District: Egmont

Land Tenure: Private

Area(ha): 63.75

GPS: 1701619X & 5653742Y

Habitat: Forest Remnant

Bioclimatic Zone: Lowland

Ecosystem Type: MF8.3: Kahikatea, rimu, kamahi forest

LENZ:	H4.1a Not threatened
	H1.3b Under protected
Local:	Significant Natural Area
National:	Priority 1 – Threatened Land Environment
	Priority 2 – Sand Dunes and Wetlands
	Priority 4 – Threatened Species
Regional:	Key Native Ecosystem
	Representative ecosystem type
Regional Ecosystem Loss:	Reduced 30-50% left
Protection Status:	Local Government
	NZNFR Trust Deed
Catchment:	Waitara (395)

General Description

The Messenger's Bush forest remnants are located at the end of Norfolk Road near Egmont National Park. The site consists of approx. 63ha of cut over or well regenerated native bush remnants which are occasionally separated by clearings or fingers of pasture. The site has been identified as a priority for management as a good example of MF8-3: Kahikatea, rimu, kamahi forest. This forest type is considered Reduced with less than 50% of this type of forest remaining in Taranaki. Notable vegetation includes a number of 'Threatened' species such as swamp maire, and three species of threatened rata. The Waitepuke stream and tributaries also provides habitat for notable fauna such as whio, shortjaw kokopu, koaro, redfin bully and longfin eel. The site provides very good connectivity between Egmont National Park and Vujcich Kamahi Swamp Maire KNE.

Ecological Features

Flora

The dominant canopy of the forest remnants is typical of damp/swamp forest vegetation in this area with a mix of kamahi, swamp maire and kahikatea. Other species also include tawa, rimu, miro and toro. Lower stature vegetation includes wineberry, marbleleaf, raukawa, hangehange, NZ fuchsia and kanono. Climbers and orchids are common with three species of threatened rata noted. Good ground cover is present including a variety of ferns, seedlings and saplings.

Fauna

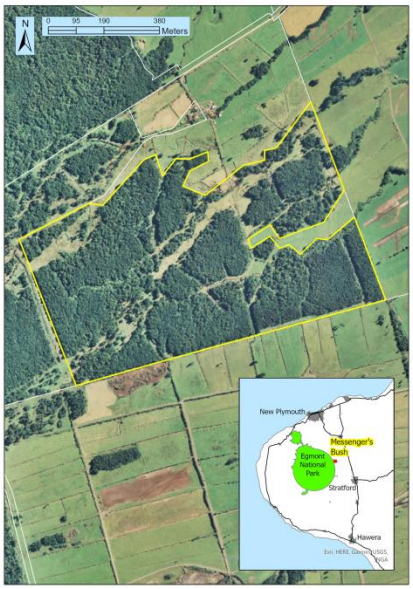
Birds found at the site include bellbird, grey warbler, tomtit, fantail, tui and kereru. Whio have also been recorded using the Waitepuke stream in this area, and are a notable species. There is adequate habitat for terrestrial and arboreal reptile species, ranging from deep leaf litter, logs on the forest floor, epiphytes in the canopy, and abundant foliage. No reptiles have been recorded for the site although will be present and may include threatened or regionally distinctive species. Notable native fish are likely to be present at the site including shortjaw kokopu, koaro and longfin eels. Aquatic and terrestrial invertebrate life will be diverse and may include notable species such as peripatus.

Ecological Values

Ecological context - High	The site provides very good connectivity between Egmont National Park and Vujcich Kamahi Swamp Maire KNE. The site also provides core habitat for a variety of threatened species.
Rarity and Distinctiveness - High	The site provides habitat for a variety of notable threatened species including whio (blue duck), shortjawed kokopu, koaro, swamp maire and three species of threatened rata.
Representativeness - High	The remnant is a good example of MF8-3: Kahikatea, rimu, kamahi forest. Over 50% of this type of forest has been lost in Taranaki due to clearance for other land uses. This site has been identified as a priority representative site for management.
Sustainability - Positive	In good vegetative condition. Key ecological processes still influence the site, and under appropriate management, it can remain resilient to existing or potential threats.

Other Management Issues

Habitat Modification - Low	Low risk of continued modification in the unfenced remnants although there are areas of historic clearance at the site.
Herbivores - Medium	Grazing by stock is currently an issue where fencing is incomplete for some of the remnants. Possums are in low numbers and impacts are currently low. Goats in the nearby National Park, have almost been eradicated and are not a threat to this site.
Possum Self-help	Within the self-help possum control area and receives possum control in conjunction with the National Park possum control program. Possums are currently present at low densities.
Predator Free signed up: Yes	Currently has seven A24 traps at the site which will be expanded on in the near future.
Predators - Medium	Mustelids, rats, cats, hedgehogs and possums are present at the site. The site is within the TPFT landscape mustelid control program and is in close proximity to the National Park mustelid trapping program which will be lessening the impact of some of these species on the native ecosystem.
Weeds - Low	Weed threats are currently low at the site (mainly blackberry) and generally contained to the bush margins.



Meier QEII

At a glance

TRC Reference: BD/7046

Ecological District: Egmont

Land Tenure: Private

Area(ha): 1.01

GPS: 1716547X & 5638770Y

Habitat: Forest Remnant

Bioclimatic Zone: Lowland

Ecosystem Type: MF7.3: Tawa, pukatea, podocarp forest

LENZ: F5.2a Acutely threatened

National: Priority 1 – Threatened Land Environment

Priority 4 – Threatened Species

Regional: Key Native Ecosystem

Regional Ecosystem Loss: At risk 20-30% left

Protection Status: QEII Covenant

Catchment: Patea (343)

General Description

The Meier QEII covenant is located on privately owned land, 5.5 km north-east of Eltham in central Taranaki. The site lies within the Egmont Ecological District and Patea River catchment. The covenanted area is a small (1.01 ha) tawa dominated forest remnant on gentle hill slopes leading into a small stream on the south side. The forest is of a type that is classified as 'At Risk' in Taranaki and falls within 'Acutely Threatened' Land Environment (LENZ) F5.2a. Remnants such as this provide important habitat for rare and threatened species. The site also offers good connectivity to other nearby habitats, covenants and Key Native Ecosystems in the area such as Mudfish 3 and the Ngaere Swamp Forest KNEs.

Ecological Features

Flora

The forest remnant canopy is dominated by tawa with occasional pukatea, rewarewa, titoki, swamp maire, mahoe, pigeonwood and kanono. A diverse range of native climbers are present including NZ jasmine, two species of clematis, NZ passionfruit and supplejack. The ground cover is intact with a diverse range of ferns, shrubs, seedlings and saplings. The site notably contains threatened species such as swamp maire, two species of rata and poroporo.

Fauna

Birds are generally in moderate to low numbers in the area and include kereru, tui, fantail, grey warbler and silvereye. A range of exotic species are also present. Good habitat exists for native reptiles including dense vegetation, epiphytes, loose bark, leaf litter, logs and ground cover. Native notable reptile species may be present such as the goldstripe gecko, forest gecko, striped skink and ornate skink. The habitat will contain a very diverse range of terrestrial invertebrates likely including notable species such as peripatus. A small stream is present which may contain notable native fish species.

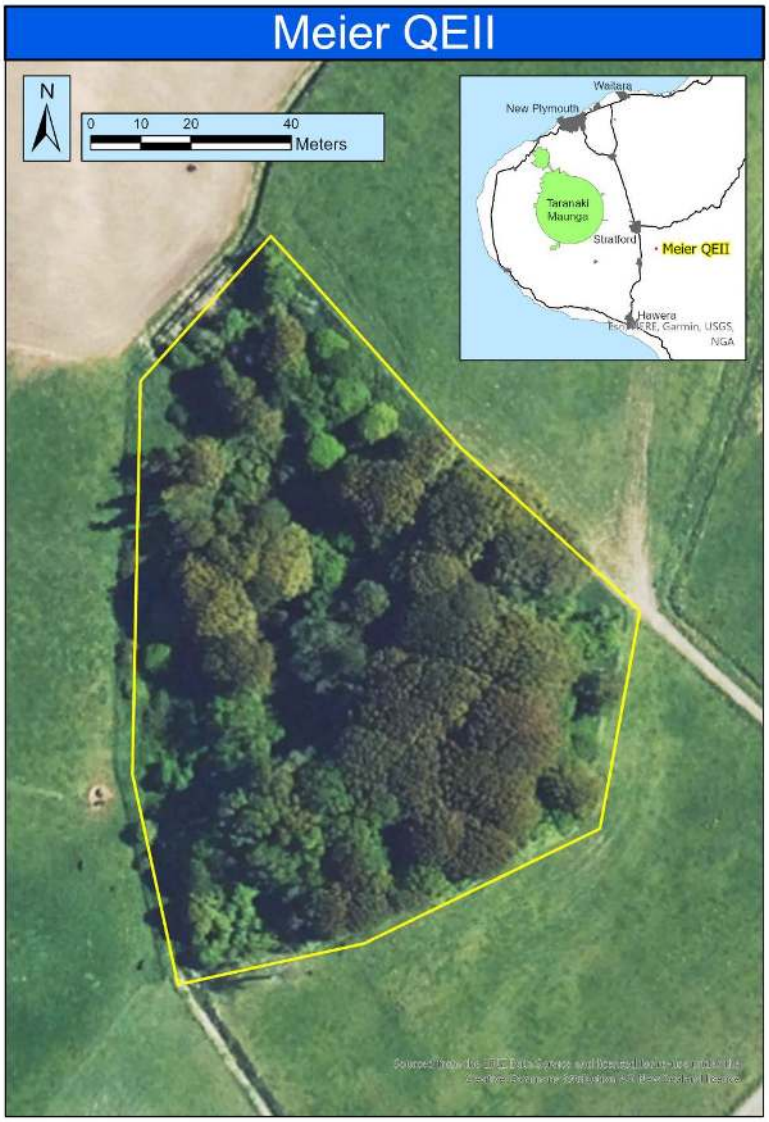
Ecological Values

Ecological Context - Medium	Provides good connectivity to other nearby habitats, covenants and Key Native Ecosystems in the area such as Mudfish 3 and the Ngaere Swamp Forests KNEs.
Rarity and Distinctiveness - Medium	Contains notable flora including swamp maire, poroporo and two species of threatened rata. Provides habitat for and likely to contain notable fauna including native fish, reptiles and invertebrates.
Representativeness - High	The remnant is an example of forest type MF7-3 (Tawa, pukatea, podocarp forest) and is considered 'At Risk' with only 20 - 30% of this type of forest remaining in the region. The site also falls within the 'Acutely Threatened' Land Environment (LENZ), F5.2a.

Sustainability - Positive	In good vegetative condition. Key ecological processes still influence the site. Under appropriate management, it can remain resilient to existing or potential threats.

Other Management Issues

Habitat Modification - Low	Currently fenced and in good condition. Potential risk from stock breach and human modification.
Herbivores - High	Potential high risk from browsing although currently fenced and stock proof.
Possum Self-help	The property is within the possum self-help area and receives sustained possum control.
Predators - Medium	Predators including rodents, mustelids, possums, feral cats and hedgehogs will be having an impact on native species at the site.
Weeds - Medium	Invasive exotic species are present mainly on the forest margins such as blackberry, barberry and aluminium plant.



Base Camp QEII

At a glance

TRC Reference: BD/7069
Ecological District: Egmont
Land Tenure: Private
Area(ha): 26.38
GPS: 1701390X & 5647889Y

Habitat: Forest Remnant/Wetland
Bioclimatic Zone: Lowland
Ecosystem Type: MF8.3: Kahikatea, rimu, kamahi forest

LENZ: H4.1a Not threatened
National: Priority 4 – Threatened Species
Priority 2 – Sand Dunes and Wetlands
Regional: Key Native Ecosystem
Representative ecosystem type
Regional Ecosystem Loss: Reduced 30-50% left
Protection Status: QEII Covenant
Catchment: Patea (343)
Waitara (395)

General Description

The Base Camp QEII covenant is located at the end of Radnor Road and is connected to Te Papakura o Taranaki (Egmont National Park). The site consists of 26.38ha of cut over and well regenerated native bush on a reasonably flat contour between the Te Popo and Kahouri Stream upper tributaries. The site has been identified as a priority for management as a good example of MF8-3: Kahikatea, rimu, kamahi forest. Native forest remnants are rare on the volcanic ring plain and this forest type is classified 'Reduced' from its former extent with less than 50% remaining in Taranaki. Notable vegetation includes a number of 'Threatened' species such as swamp maire, two species of threatened rata and the regionally distinctive green mistletoe. The streams also provide potential habitat for notable fauna such as whio, shortjaw kokopu, koaro, redfin bully and longfin eel. The site provides very good connectivity to Te Papakura o Taranaki and other habitats nearby.

Ecological Features

Flora

The dominant canopy of the forest remnant is typical of damp/swamp forest vegetation in this area with a mix of kamahi, kahikatea, hinau and black maire. Other species also include swamp maire, tawa, rimu, miro, northern rata and toro. Lower stature vegetation includes tree ferns, wineberry, marbleleaf, raukawa, hangehange, NZ fuchsia and kanono. Native climbers, epiphytes and orchids are common. Good ground cover is present including a variety of ferns, seedlings and saplings.

Fauna

Birds found at the site include bellbird, grey warbler, tomtit, fantail, tui and kereru. Brown kiwi and bush falcon are occasionally present in the area. Whio (blue duck) have also been recorded using the Te Popo stream near this area, and may be present. There is adequate habitat for terrestrial and arboreal reptile species, ranging from deep leaf litter, logs on the forest floor, epiphytes in the canopy, and abundant foliage. No reptiles have been recorded for the site although will be present and may include threatened or regionally distinctive species. Notable native fish are likely to be present at the site including shortjaw kokopu, koaro and longfin eels. Aquatic and terrestrial invertebrate life will be diverse and may include notable species such as peripatus.

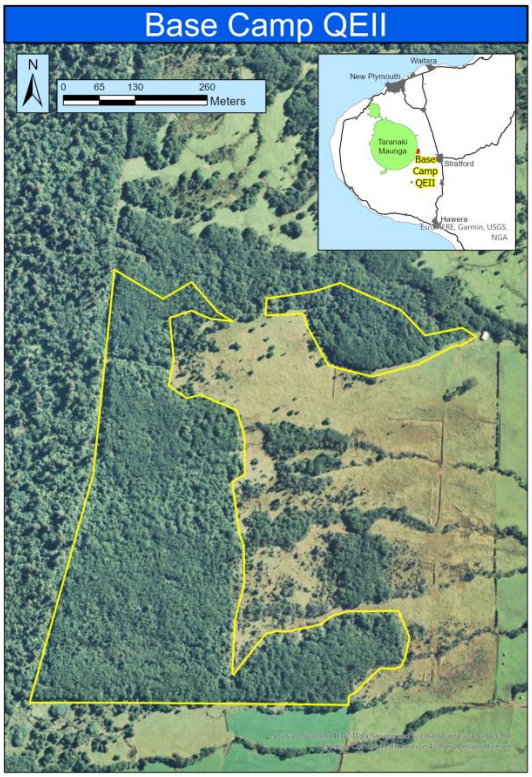
Ecological Values

Ecological context - High	The site provides very good connectivity with Te Papakura o Taranaki (Egmont National Park) and other habitats in the area. The site also provides core habitat for a variety of threatened species.

Rarity and Distinctiveness - High	The site provides habitat for a variety of notable threatened and notable flora species including swamp maire, two species of rata and green mistletoe. Brown kiwi and falcon occur occasionally at the site. Likely to contain notable fauna which may include whio (blue duck), shortjawed kokopu, koaro, redfin bully and longfin eel.
Representativeness - High	Although the land environment is considered Not Threatened (LENZ H4.1a) this forest type is considered reduced with less than 50% remaining in Taranaki. The remnant is a good example of MF8-3: Kahikatea, rimu, kamahi forest, and has been identified as a priority representative site for management.
Sustainability - Positive	In relatively good vegetative condition. Key ecological processes still influence the site, and under appropriate management, it can remain resilient to existing or potential threats.

Other Management Issues

Habitat Modification - Medium	Stock breach from the neighbours causing moderate modification to the covenant in this area.
Herbivores - Medium	Potential high risk from browsing although fenced and stock proof on the landowners pasture margin. The north property boundary is an unfenced stream and neighbours stock have breached this area and damaged the covenant understory in the past.
Predators - Medium	Predators including rodents, mustelids, possums, feral cats and hedgehogs will be having an impact on native species at the site.
Weeds - Low	Blackberry and exotic trees and shrubs are present although are confined to the forest margin.
Possum Self-help	Within the self-help possum control area and receives sustained possum control. Possums are present at low densities.



Van der Poel's Bush

At a glance

TRC Reference: BD/9626

Ecological District: Egmont

Land Tenure: Private

Area(ha): 1.3

GPS: 1671356X & 5657390Y

Habitat: Forest Remnant

Bioclimatic Zone: Semi-Coastal

Ecosystem Type: VS5.2, Northern rata, kamahi forest

LENZ: H1.3a Acutely threatened

National: Priority 1 – Threatened Land Environment

Priority 1 – Threatened Land Environment

Priority 4 – Threatened Species

Regional: Potential KNE

Regional Ecosystem Loss: At risk 20-30% left

Protection Status: QEII Covenant

Local Government

Catchment: Waiweranui (378)

General Description

van der Poel's Bush consists of a 1.3ha semi-coastal forest dominated by kohekohe and rewarewa. Forest remnants like this are under-represented in Taranaki owing to widespread clearance for agriculture and urban development. The site lies adjacent to the Waiweranui stream within the Egmont Ecological district. An area that is occasionally flooded by the stream has been historically modified and is now dominated by tradescantia. van der Poel's bush is in close proximity to other Key Native Ecosystems such as the Donald QEII, Tapuinikau Pa and Stent Road Bush.

Ecological Features

Flora

The canopy of the site is dominated by kohekohe with a smaller component of rewarewa, karaka and titoki, with pukatea in the wetter areas. The understory is regenerating and is comprised mainly of kawakawa, mahoe, pigeonwood and kanono along with a range of ferns. Recent myrtle rust threats have elevated potentially vulnerable native flora species to 'Threatened' status. Notably, two of these new threatened species are present at this site including two species of rata.

Fauna

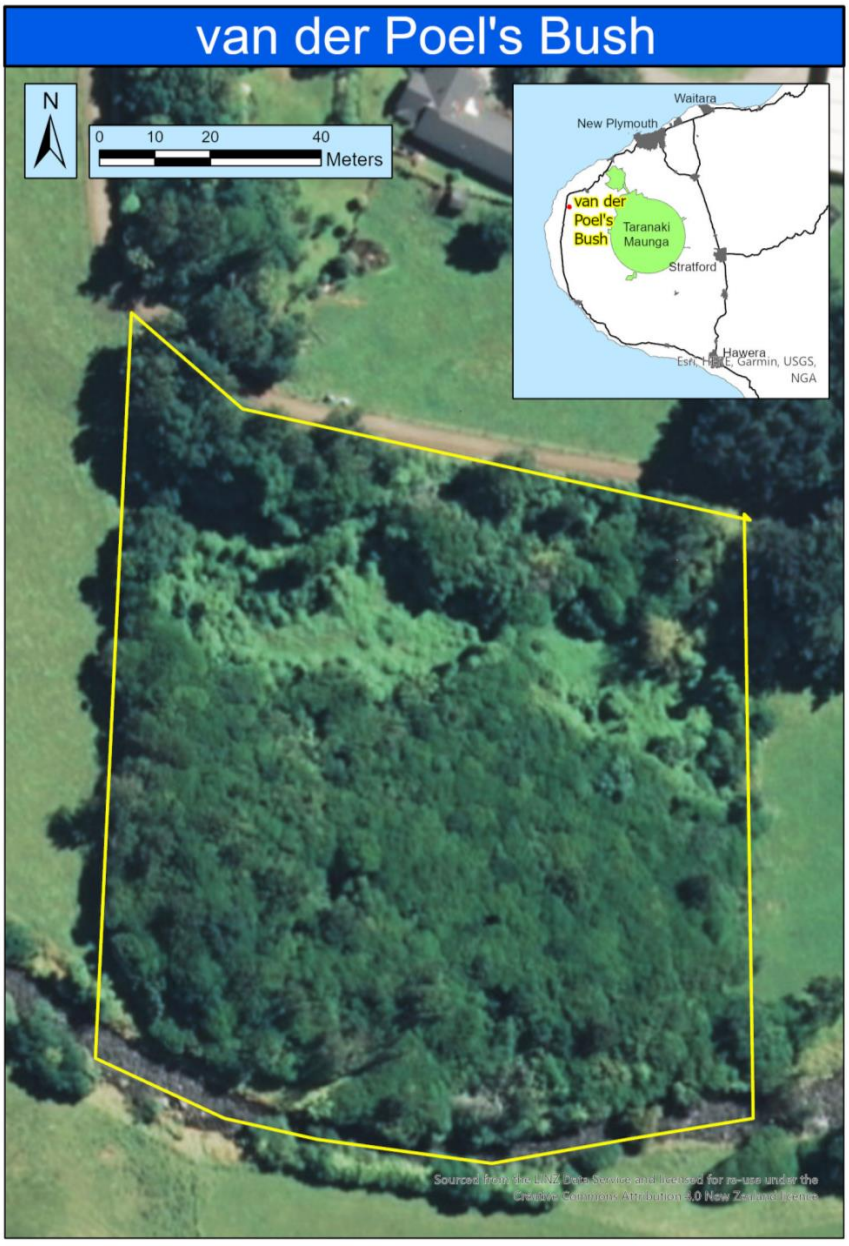
Birds present at the site include kereru, tui, silvereye, grey warbler, fantail, kingfisher, harrier and morepork. There is very good habitat for a range of other notable native species including freshwater fish, reptiles and invertebrates.

Ecological Values

Ecological Context - Medium	Enhances connectivity between fragmented indigenous habitats in this area including Donald QEII, Tapuinikau Pa and Stent Road Bush.
Rarity and Distinctiveness - Low	Likely to contain notable fauna species including reptiles and invertebrates. Also contains three newly listed 'Threatened' and 'At Risk' flora species due to potential vulnerability to myrtle rust including two species 3 species of rata.
Representativeness - Medium	VS5.2, Northern rata, kamahi forest
Sustainability - Positive	In good vegetative condition other than flood damaged area.

Other Management Issues

Habitat Modification - Low	Although the habitat is vulnerable to modification there are no immediate threats.
Possum Self-help	The site sits within the self-help program area. Control is carried out by shooting and poisoning. High possum numbers have the potential to impact on forest health.
Predators - Medium	Predators including rodents, mustelids, possums, feral cats and hedgehogs will be having an impact on native species at the site.
Weeds - High	Japanese Honeysuckle and Tradescantia threaten the integrity of this site.
Herbivores - Low	Stock are excluded from the site and remain a low risk while the fencing is good condition.



Watsons Hill Bush

At a glance

TRC Reference: BD/9703

Ecological District: North Taranaki

Land Tenure: Private

Area(ha): 2.9

GPS: 1716946X & 5668891Y

Habitat: Forest Remnant

Bioclimatic Zone: Lowland

Ecosystem Type: WF13: Tawa, kohekohe, rewarewa, hinau, podocarp forest

LENZ:	F5.2a Acutely threatened
National:	Priority 1 – Threatened Land Environment
	Priority 4 – Threatened Species
Regional:	Key Native Ecosystem
Regional Ecosystem Loss:	Chronically threatened 10-20% left
Catchment:	Waitara (395)

General Description

Watsons Hill Bush is located on privately owned land on Toe Toe Road, 3.5Km north-west of Tarata. The site is a 2.9 ha remnant of lowland tawa, kohekohe, rewarewa, hinau, podocarp forest, on short steep slopes descending to the Waitara River. The forest provides good connectivity to nearby wetlands and forest, including the Taramoukou, Tarata and Junction Road Conservation Areas and Fairy Forest KNE.

Ecological Features

Flora

The canopy of the bush remnant is dominated by tawa, rewarewa, pukatea, kahikatea, rimu and miro. A variety of native vines and epiphytes are present. The understory is in recovering condition following fencing and contains hangehange, nikau, pate, parataniwha and numerous ground and tree ferns, grasses and herbs. Riparian species can be found on reefs, cliffs and alluvial terraces along the river.

Fauna

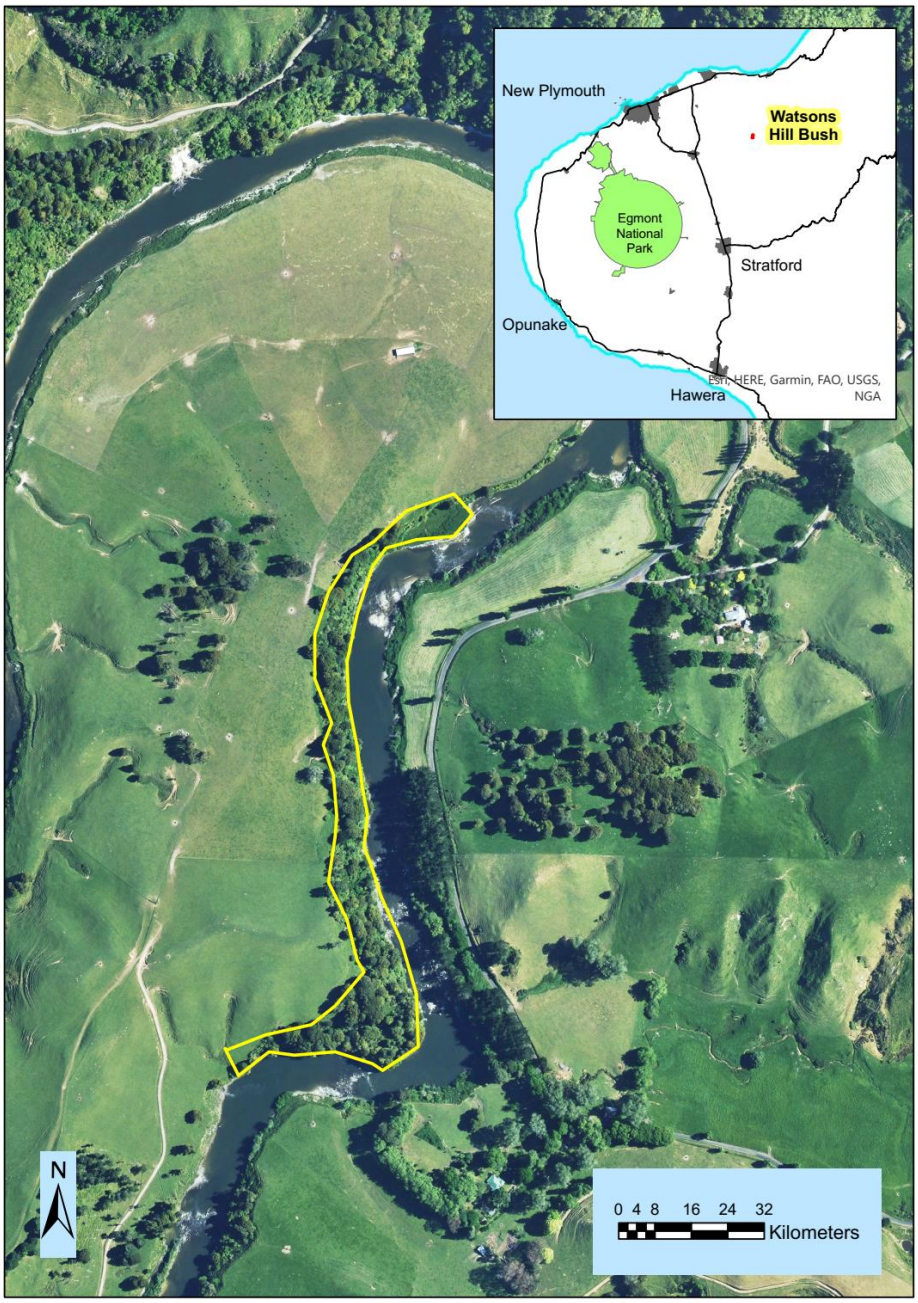
Good forest bird life is present, including kereru, tui, grey warbler, silver-eye, bellbird, fantail and harrier. Also provides good habitat for riverine fauna; kotare, grey duck, paradise shelduck, white faced heron, shag, lamprey, freshwater mussel, longfin eel and Galaxid fish species. Longtailed bats may be present in the Taramokou CA and may use the Waitara River corridor as part of their feeding territories. There is adequate habitat for terrestrial and arboreal reptiles, although no confirmed records to date.

Ecological Values

Ecological context - High	Provides good forested habitat on the banks of the Waitara River. Within 500 meters of extensive forest habitat in Taramokou Conservation Area, and near to various other KNEs.
Representativeness - High	Classified at a regional level as ecosystem type WF13, Tawa, kohekohe, rewarewa, hinau, podocarp forest - 16% remaining. Classified at a national level as being an 'Acutely Threatened' (F5.2a) land environment.
Rarity and Distinctiveness - Medium	Site provides habitat for the 'Threatened, Nationally Critical' grey duck, three species of 'Threatened, Nationally Vulnerable' rata, and the 'At Risk, Uncommon' pygmy tree orchid and black shag.
Sustainability - Positive	Key ecological processes still influence the site. Under appropriate management it can remain resilient to existing or potential threats.

Other Management Issues

Habitat Modification - Low	The landowners are working with the QEII National Trust to protect the site the site with a conservation covenant.
Herbivores - Medium	Vegetation condition at the site would benefit from possum control. Goats are in low numbers and are controlled by the landowners. Livestock are excluded by basic fencing.
Predators - High	Control of rodents, mustelids, feral cats, possums and hedgehogs would benefit indigenous birdlife, insects and reptiles at the site.
Weeds - Medium	Pest plants are patchy and localised, and could be controlled with modest effort.



Twin Giants – KNE inventory sheet

At a glance

TRC Reference: BD/9709
Ecological District: Egmont
Land Tenure: Private
Area(ha): 0.6
GPS: 1719967X & 5632482Y

Habitat: Forest Remnant/Wetland
Bioclimatic Zone: Lowland
Ecosystem Type: WF8: Kahikatea, pukatea forest

LENZ: F5.2a Acutely threatened
Local: Significant Natural Area
National: Priority 1 – Threatened Land Environment
Priority 2 – Sand Dunes and Wetlands
Priority 4 – Threatened Species
Regional: Potential KNE
Regional Ecosystem Loss: Acutely Threatened <10% left
Protection Status: Local Government
Catchment: Tangahoe (348)

General Description

Twin Giants wetland forest is located on privately owned land on Sangster Road, 8km east of Eltham in the South Taranaki District. The site is a 0.6ha remnant of kahikatea, pukatea wetland forest on the margins of the Eltham Swamp complex. A small drain flanks the site, which is located within the Tangahoe Catchment. The forest is an important remnant example of what would have been an extensive forest type in the area, and is located in close proximity to the Lake Rotokare Scenic Reserve, and a number of other KNEs, including Campbell's Bush SR, Menzies Hill Road Bush, Maata Road QEII Covenants and Willy Wetland.

Ecological Features

Flora

The canopy at the wetland forest remnant is dominated by pukatea, tawa and kahikatea. A diverse range of vines and epiphytes are present, including tank and perching lily, kiekie, spring orchid, NZ jasmine, supplejack, large leaved Muehlenbeckia and NZ passionflower. The understory is sparse and modified by a recent livestock incursion event and rabbit browsing, and includes kawakawa, kanono, poroporo, pate, nikau, mamaku, wheki and silver tree fern. Terrestrial ferns and herbs are also sparse, and include kiokio, hen and chicken fern, climbing hard fern, shining and sickle spleenwort and parataniwha.

Fauna

Good birdlife is present in the remnant, including tui, kereru, grey warbler and fantail. Long tailed bats are present at the nearby Lake Rotokare Scenic Reserve and may use this area in their wider foraging. Potential roost trees are also present. There is adequate habitat for native reptiles, and native freshwater fish in the flanking drain may include notable species. The habitat will contain a range of terrestrial invertebrates.

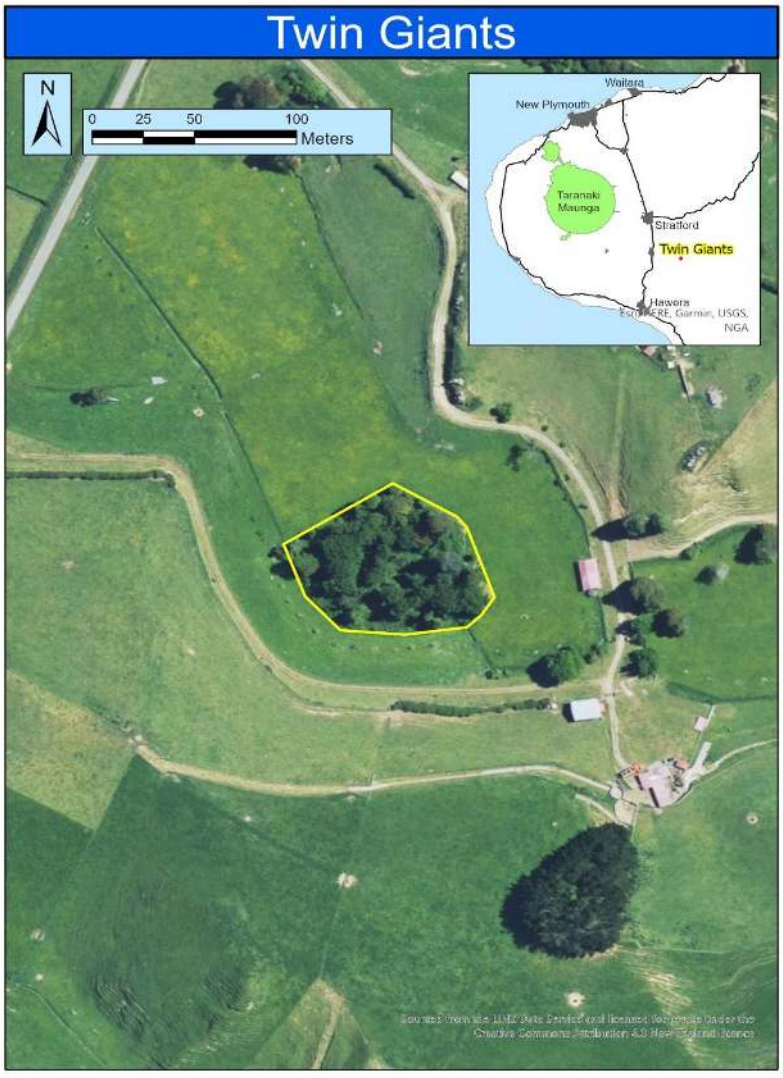
Ecological Values

Sustainability - Positive	Key ecological processes still influence the site and with appropriate management it can remain resilient to existing or potential threats.
Representativeness - High	The ecosystem type is classified as WF8, kahikatea, pukatea swamp forest, of which there is only 4% remaining in Taranaki. Contains indigenous vegetation on the 'Acutely Threatened' (F5.2a) LENZ environment.
Rarity and Distinctiveness - Medium	TBC

Ecological context - High	The bush remnant provides good connectivity to other KNE/QEII sites in this area, and is just 520 meters west of the Lake Rotokare Scenic Reserve and is within the LRSR Trusts 'Halo' management area.

Other Management Issues

Habitat Modification - High	The site could benefit from fencing upgrades and could be protected by a conservation covenant. The site is subject to district and regional plan rules.
Herbivores - Medium	Possum control is ongoing and the site has had occasional livestock incursion and could benefit from fencing upgrade.
Possum Self-help	The property falls within the Skinner Road Possum Self Help Area. Trapping and poisoning methods are used
Predators - Medium	Predators including rodents, mustelids, possums, feral cats and hedgehogs are receiving some control but will be presenting ongoing impacts on native species at the site.
Weeds - High	Invasive exotic species such as elderberry and barberry are present on the wetland forest margins and in some places within the forest.



Menzies Road Hill Bush

At a glance

TRC Reference: BD/9707

Ecological District: Matemateaonga

Land Tenure: Private

Area(ha): 4.32

GPS: 1721026X & 5634159Y

Habitat: Forest Remnant/Wetland

Bioclimatic Zone: Lowland

Ecosystem Type: MF7.3: Tawa, pukatea, podocarp forest

WF8: Kahikatea, pukatea forest

LENZ: F1.3b Less reduced, better protected

F1.1b Not threatened

National: Priority 4 – Threatened Species

Priority 1 – Threatened Land Environment

Priority 2 – Sand Dunes and Wetlands

Regional: Key Native Ecosystem

Regional Ecosystem Loss: At risk 20-30% left

Acutely Threatened <10% left

Protection Status: QEII Covenant

Local Government

Catchment: Patea (343)

General Description

Menzies Road Hill Bush is located on privately owned land on Rawhitiroa Road, 8.5km East of Eltham in the South Taranaki District. The 4.32 ha lowland forest remnant is a modified example of MF7-3 Tawa, pukatea podocarp forest, located within the Patea catchment and the Matemateaonga Ecological District. The site also presents a small element of WF8, Kahikatea, pukatea forest. Much of the original podocarp component of the forest has been logged, though a range of podocarp species are re-establishing well. The site is steep and descends the flank of a ridge to a small stream, with colluvium and alluvial soils on its banks. The site provides an example of the typical forest type of the hills and flats of the area, and is located in proximity to other KNEs within the area, including the Lake Rotokare and Campbell's bush Scenic Reserves, Mangamingi Recreation Reserve and the privately owned Twin Giants KNE.

Ecological Features

Flora

Part of the site contains WF8 Kahikatea, pukatea (Acutely threatened) on colluvial and alluvial landforms at the foot of slopes and stream terraces. It should be noted these areas are a small component of the site identified via discrete local field assessment, and this classification does not feature on standard GIS datasets.

Fauna

Potentially provides habitat for pateke/brown teal, as spillover potential from the Lake Rotokare Scenic Reserve. Pateke are a highly mobile species and the site is clearly good habitat for mallard and paradise duck.

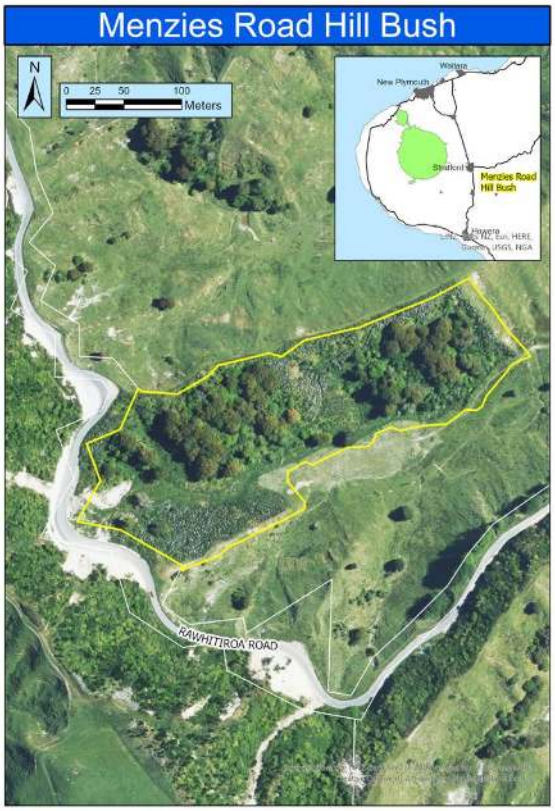
Ecological Values

Ecological context - High	Situated in close proximity (700m) to Lake Rotokare Scenic Reserve and within the Rotokare Halo area, and potentially provides important spillover habitat for a range of threatened fauna. Also contains a small percentage of WF8 Kahikatea, pukatea swamp forest (Acutely Threatened)
Representativeness - Medium	The majority of the site is on land environments considered either 'Not Threatened' or Less Reduced and Better Protected nationally (F1.3b & F1.1b, LENZ), and an ecosystem type classified at a

	regional scale as being 'At Risk' (MF7, Regional ecosystem map for Taranaki, Singers & Lawrence). A small, unmapped component of the area is kahikatea, pukatea swamp forest, WF8. Wetlands are now rare in Taranaki and are considered 'Acutely Threatened' ecosystems.
Sustainability - Positive	The site is legally protected from disturbance via a conservation covenant between the owners and the QEII National Trust. The site is securely fenced to exclude grazing livestock. At a little over 4ha, the site is of sufficient scale to provide sustainable forest cover, despite being semi-compact in shape with moderate potential for edge effects. The site is located within the Rotokare Halo and so receives regular trapping for predatory and browsing pest animals. The incidence of ecological pest plants at the site is low.

Other Management Issues

Habitat Modification - Low	QEII Covenant conditions apply
Herbivores - Medium	Possums and occasional goats.
Possum Self-help	Situated in margin of Skinner Road SHP block (property is on extreme eastern boundary of SHP area).
Predator Control	Some trapping hardware in place through LRSRT Halo project. Will liaise with them in time and confirm what is there and locations.
Predators - Low	Predator species will be being trapped by LRSRT Halo ranger.
Weeds - Low	The incidence of ecological pest plants is currently understood to be low.



Lucas Block

At a glance

TRC Reference: BD/9704

Ecological District: Egmont

Land Tenure: Private

Area(ha): 2.8

GPS: 1692477X & 5671372Y

Habitat: Forest Remnant

Bioclimatic Zone: Semi-Coastal

Ecosystem Type: WF13: Tawa, kohekohe, rewarewa, hinau, podocarp forest

LENZ: F5.2b Acutely threatened

Local: Significant Natural Area

National: Priority 4 – Threatened Species

Priority 1 – Threatened Land Environment

Regional: Potential KNE

Regional Ecosystem Loss: Chronically threatened 10-20% left

Protection Status: Local Government

Catchment: Huatoki (389)

General Description

The Lucas block site consists of a 2.8ha semi-coastal forest fragment at the head of a small gully system of the Huatoki Stream catchment. The site is located at the south western fringe of New Plymouth and lies in the Egmont Ecological District. The site is comprised of ecosystem type WF13: Tawa, kohekohe, rewarewa, hinau, podocarp forest, and enhances connectivity between fragmented indigenous habitats in this area. Forest remnants like this are under-represented in Taranaki owing to widespread clearance for agricultural and urban development. The site is in close proximity to Key Native Ecosystems in the area including the McQuoid, Huatoki Scenic Reserve, Omata Bush, McGlashan Bush and the Ratapihipihi Scenic Reserve.

Ecological Features

Flora

The main canopy of the old forest area is dominated by kohekohe, pukatea, tawa, rimu and rewarewa. The lower canopy is dominated by mahoe, pigeonwood and tree ferns. A good mix of seedlings and saplings are present including kawakawa, mapou, pigeonwood and Coprosmas. A variety of native ferns dominate the groundcover including kingfern 'At Risk' and jointed fern which is listed as 'Regionally Distinctive'.

Fauna

The forest remnants provide habitat for native birds such as tui, kereru, fantail, grey warbler, shining cuckoo and bellbird. Good habitat exists for native reptiles and invertebrates which will include notable species. The stream flowing through the site has koura and long fin eel present.

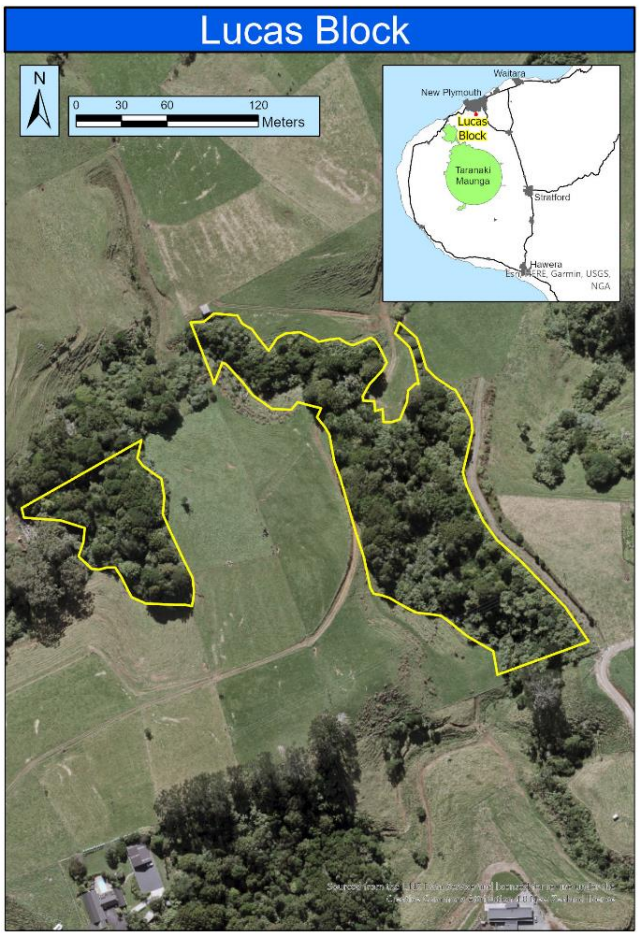
Ecological Values

Sustainability - Positive	In good vegetative condition. Key ecological processes still influence the site. Under appropriate management, it can remain resilient to existing or potential threats.
Ecological context - High	The site provides good connectivity to Key Native Ecosystems in the area including the McQuoid, Huatoki Scenic Reserve, Omata Bush, McGlashan Bush and the Ratapihipihi Scenic Reserve.
Representativeness - High	Contains vegetation on an 'Acutely Threatened' (F5.2b) land environment. Is a remnant of an ecosystem considered 'Chronically Threatened' (WF13: Tawa, kohekohe, rewarewa, hinau, podocarp forest) from it's pre-European extent. Only 16% of this native forest ecosystem type remains in Taranaki. Native biodiversity in these environments has been severely reduced, and remaining habitats

	are sparsely distributed in the landscape. Risks to biodiversity from fragmentation have become severe, and the persistence of many species is threatened in these environments. Further habitat loss will disproportionately exacerbate risks to biodiversity.
Rarity and Distinctiveness - High	Contains the 'Regionally Distinctive' jointed fern and 'At Risk' kingfern. Recent myrtle rust threats have elevated potentially vulnerable native flora species to 'Threatened' status. Notably, three of these new threatened species are present, Metrosideros fulgens, M. diffusa & M. perforata.

Other Management Issues

Habitat Modification - Medium	Listed as a Significant Natural Area (NPDC District Plan) and fenced.
Weeds - High	Occasional patches and individual weeds such as woolly nightshade, wild broom, gorse, blackberry, Tradescantia and holly.
Herbivores - Low	Currently stock proof. Feral goats and deer are rare/ absent on the ringplain.
Possum Self-help	Site is in the Self-Help possum programme. Landowner has 10x bait-stations which are serviced & baited on a regular basis.
Predators - High	Rodents, mustelids, feral cats and hedgehogs will be impacting on fauna values at the site.



Hyview

At a glance

TRC Reference: BD/9691
Ecological District: Egmont
Land Tenure: Private
Area(ha): 2.4
GPS: 1697234X & 5660114Y

Habitat: Forest Remnant

Bioclimatic Zone: Lower Montane
Ecosystem Type: MF8.3: Kahikatea, rimu, kamahi forest

LENZ:	H1.3b Under protected
National:	Priority 2 – Sand Dunes and Wetlands
	Priority 4 – Threatened Species
Regional:	Potential KNE
	Representative ecosystem type
Regional Ecosystem Loss:	Reduced 30-50% left
Protection Status:	Local Government
Catchment:	Waiwhakaiho (392)

General Description

The Hyview site is located on privately owned land approximately 8 km south west of Inglewood. It lies in the Egmont Ecological District.
The wetland forest remnant is 2.4 ha in size and is situated on the western bank of the Waiwhakaiho River in north Taranaki. It is comprised of lowland forest that lies on flood deposits of alluvial gravel and sand (known as the Hangatahua Gravels). The forest was previously logged but the canopy has now recovered and is up to 20 metres in height.

Ecological Features

Flora

The main canopy species include kamahi, rimu, swamp maire (Nationally Threatened), mountain totara, hinau, kahikatea, tawa and miro. The subcanopy commonly comprises pigeonwood and tree ferns, with locally abundant supplejack. Hen and chicken fern, gully fern, crepe fern and water fern is found in damp parts of the ground cover, along with other ferns and seedlings. The understory is a mix of kanono, rimu, miro and tawa saplings over a groundcover of crown fern etc.

Fauna

Good habitat is present for a range of native forest birds and the site is in close proximity to Te Papakura o Taranaki and Taranaki Mahood Lowe KNE. Forest birds present include tui, korimako, kereru, rironiro, piwaiwaka, miromiro, pipiwharauroa, koekoea and tauhou. Other species likely to be present will include notable species such as karearea (falcon). Whio (blue duck) are present and are breeding in the Waiwhakaiho River which provides very good habitat. There is adequate habitat for terrestrial and arboreal reptile species ranging from deep leaf litter, logs on the forest floor, epiphytes in the canopy and abundant foliage. No records are known for the site although reptiles will be present and may include notable species. Notable native fish are also very likely to be present.

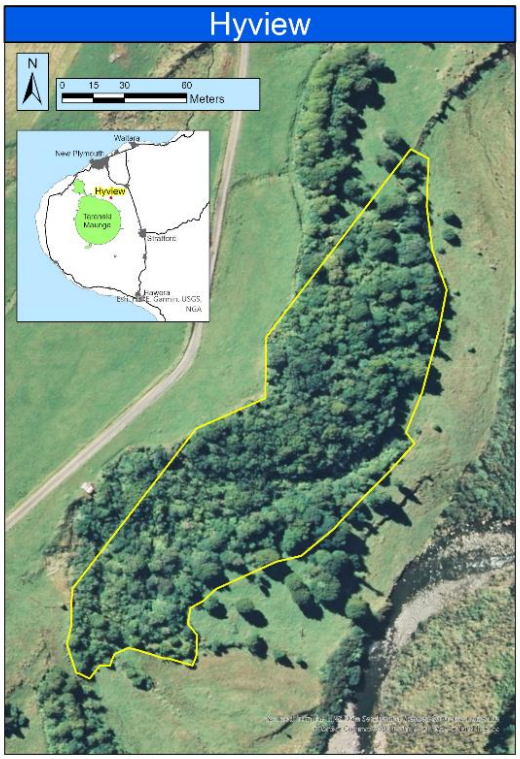
Ecological Values

Sustainability - Positive	In relatively good vegetative condition. Key ecological processes still influence the site and, under appropriate management, it can remain resilient to existing or potential threats
Representativeness - High	Contains vegetation associated with land environment H1.3b. Less than 20% of areas like these have formal protection in New Zealand and are considered 'Under-protected'. The ecosystem type represented here (MF8-3, Kahikatea, rimu, kāmahi forest) is also

	considered 'Reduced' from its former extent in Taranaki with only around 35% remaining.
Rarity and Distinctiveness - High	Several threatened plants have been recorded from the site including swamp maire and a variety of climbing ratas. Threatened whio (blue duck) are present and breed in this area. The site will contain significantly more notable species including reptiles, native fish and invertebrates.
Ecological context - High	Close proximity to Te Papakura o Taranaki and Taranaki Mahood-Lowe KNE which both have significant indigenous biodiversity values.

Other Management Issues

Possum Self-help	The site lies within the possum self-help programme. Landowner undertakes possum control on a regular basis.
Habitat Modification - Low	The site is listed as LSNA in the NPDC District Plan and vegetation clearance rules will apply.
Herbivores - Medium	Currently fenced and stock proof although vulnerable to stock browsing if fences were breached. Currently under good possum control although vulnerable if possum numbers were high.
Predators - Medium	Predators such as rats, mustelids, feral cats and hedgehogs are present at the site and will be having an impact on native fauna. Landscape scale predator control is ongoing in the wider landscape as part of TPFT predator free rural programme.
Weeds - High	High risk although currently under a successful long running weed control programme. Small localised areas of blackberry and African clubmoss.



Eight Hundred Trust KNE

At a glance

TRC Reference: BD/9708

Ecological District: Matemateaonga

Land Tenure: Private

Area(ha): 827

GPS: 1733863X & 5640445Y

Habitat: Forest Remnant

Bioclimatic Zone: Lowland

Ecosystem Type: MF7.2: Rata, tawa, kamahi, podocarp forest

MF7.3: Tawa, pukatea, podocarp forest

LENZ: F1.1d Not threatened

National: Priority 4 – Threatened Species

Priority 2 – Sand Dunes and Wetlands

Regional: Potential KNE

Regional Ecosystem Loss: At risk 20-30% left

Less reduced >50% left

Protection Status: Local Government

Catchment: Patea (343)

General Description

The Eight Hundred Trust KNE is located on privately owned land near Tututawa in eastern Taranaki. The site lies in the Patea River catchment and is located in the Matemateaonga Ecological District. The KNE covers 827 ha and is a mix of original and cut over lowland forest with large areas of modified regenerating native forest. The gully's are interspersed with small areas of palustrine lowland swamps. The KNE is surrounded by adjacent native forest including a 2.3km boundary with the Waitiri Conservation Area. Other nearby protected areas includes the Tahunamaere Scenic Reserve, Forest & Bees KNE and Omoana Bush QEII.

Ecological Features

Flora

Regenerating native scrub (manuka, kanuka, mamaku, wheki, ponga, katote) dominates the majority of the area with secondary forest evident (miro, rimu, totara, tawa, hinau and rewarewa). There are areas of mature native forest (tawa, miro, rimu, hinau, rewarewa and pigeonwood) along the boundaries of Omoana KNE and Waitiri Scenic reserve. The 'Regionally Distinctive' Tawhirikaro (Pittosporum cornifolium) was observed in perching epiphytes of larger canopy trees and other notable species may be present.

Fauna

Populations of forest birds are present within the KNE including kereru, fantail, grey warbler, tui, korimako, tomtit and ruru. Notable bird species present include North Island robin, fern bird, NZ falcon, whitehead and North Island brown kiwi. Whio have also been recently recorded on the neighbouring Omoana KNE in the Tahunamaere stream. There is good habitat for terrestrial and arboreal lizard species and notable or threatened or at risk species such as the Pacific gecko, barking gecko, forest gecko, ornate skink and striped skink could be present. Long-tailed bats are present in the neighbouring Omoana KNE and there is potential for short-tailed bats to also be present. Native fish recorded to date includes longfin eel, shortfin eel, redfin bully and koura. The site will also contain other notable species including invertebrates.

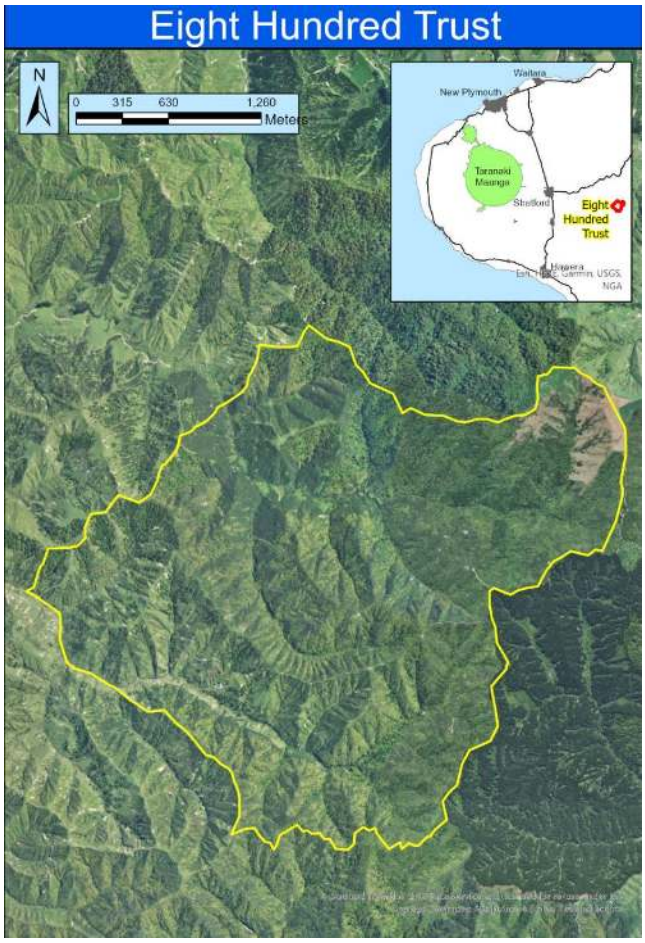
Ecological Values

Sustainability - Positive	In good vegetative condition. Large area in a circular shape. Key ecological processes still influence the site. Under appropriate management, it can remain resilient to existing or potential threats
Ecological context - High	Close to and provides connectivity to Waitiri Scenic Reserve, Waitotara Conservation Area and Omoana KNE.

Rarity and Distinctiveness - High	This site contains the 'Threatened' longtailed bat and includes the 'At Risk' North Island brown kiwi, NZ falcon North Island robin, North Island fern bird, North Island pipit and the 'Regionally Distinctive' Tawhirikaro (Pittosporum cornifolium).
Representativeness - Medium	Although the wider eastern hill country landscape is still relatively well vegetated, this site is a remnant of a forest ecosystem type considered At Risk in Taranaki with less than 30% remaining in the region.

Other Management Issues

Herbivores - High	Population of feral goats and possums at the site are high.
Habitat Modification - Medium	The soil geology makes the area potentially more at risk from natural erosion. The forest is recovering from the effects of previous land use in places, logging and farming.
Predator Control	Landowner to date has 112 traps which are checked on a regular basis (mix of A24s, DOC 200's and SA kat traps). Scope for expansion working with TKT
Herbivore Control	Landowner undertaking feral goat control
Weeds - Low	Currently low impact of weeds in this area.



Wild Earth

At a glance

TRC Reference: BD/9710

Ecological District: Matemateaonga

Land Tenure: Private

Area(ha): 3.0

GPS: 1743501X & 5664027Y

Habitat: Forest Remnant/Wetland

Bioclimatic Zone: Lowland

Ecosystem Type: MF7.3: Tawa, pukatea, podocarp forest

LENZ: F7.2a At risk

National: Priority 2 – Sand Dunes and Wetlands

Priority 4 – Threatened Species

Regional: Potential KNE

Regional Ecosystem Loss: At risk 20-30% left

Protection Status: QEII Covenant

Catchment: Patea (343)

General Description

The Wild Earth site is located on privately owned land, 6.7km west of Whangamomona, in the Matemateaonga Ecological District.
The remnant consists of a small (3 ha) area of lowland forest/wetland which is comprised primarily of tawa, miro, totara, black maire, white maire and rimu on the steeper slopes with kahikatea and pukatea along the banks of the small stream and lower wetland fringe. The remnant is connected by riparian vegetation along the Makahu stream.

Ecological Features

Flora

The forest canopy consists of tawa, pukatea, kahikatea, rewarewa, pigeonwood, miro, rimu, totara, black maire and white maire. Sub canopy contains tree ferns, mahoe, manuka, kanuka and putaputaweta. Understorey has a range of Blechnum ferns, spider orchids with some saplings and seedlings present. Lianes/ epiphytes include kareo, two rata sp, clematis, Astelias and orchids (bamboo, Drymoanthus). Forest wetland contains kahikatea, pukatea, Carex secta, C.geminata and knobbly club rush. Notable species may be present in the perching epiphytes of the site

Fauna

Native birdlife recorded in and around the site include the kereru/NZ pigeon, riroriro/grey warbler, piwaiwaka/fantail, tui, ruru/morepork, karearea/NZ falcon, miromiro/tomtit, matuku/grey faced heron, putangitangi/paradise duck, korimako/bellbird and pukeko. There is good habitat for terrestrial and arboreal lizard species and notable or threatened or at risk species such as the Pacific gecko, barking gecko, forest gecko, ornate skink and striped skink could be present. Long-tailed bats are present in the nearby Awahou Scenic Reserve. There is a small clear stream running through the site which has good invertebrate life present. A future fish survey is required.

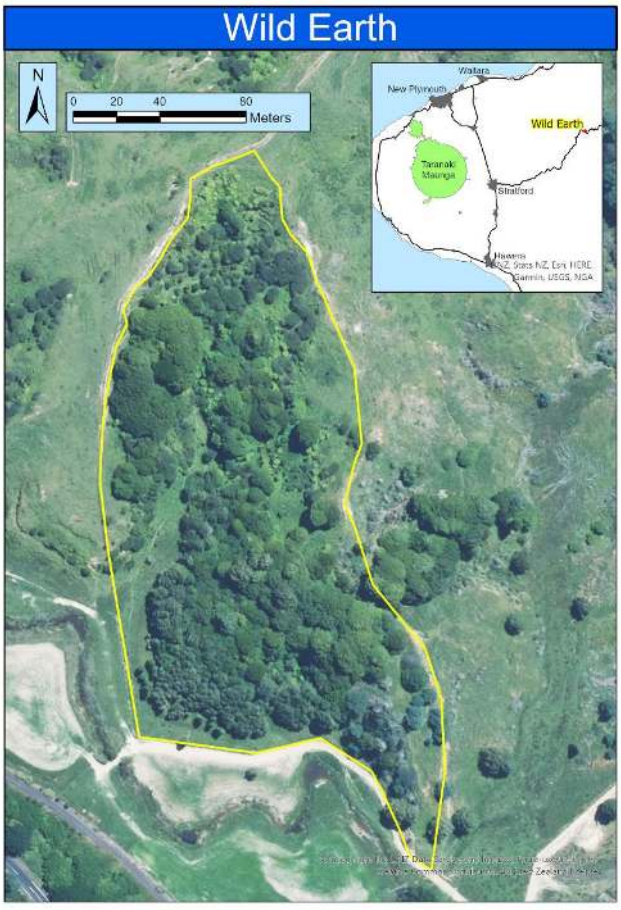
Ecological Values

Sustainability - Positive	Key ecological processes still influence the site. Under appropriate management, it can remain resilient to existing or potential threats
Representativeness - Medium	Contains vegetation on an "At Risk" land environment (F7.2a Land Environment New Zealand). The ecosystem type (MF7.3 Tawa, Pukatea podocarp forest) is considered At Risk in Taranaki with only 26% remaining in the region. As a wetland, the site is also significant as wetlands are now increasingly rare habitats in New Zealand.

Rarity and Distinctiveness - Medium	This site provides habitat for the 'At Risk' New Zealand falcon and black shag. Two species of Threatened climbing rata and At Risk manuka are also present.
Ecological context - High	Close to and provides connectivity to Awahou Scenic Reserve, Matirangi Conservation Area.

Other Management Issues

Weeds - Medium	There are several weeds present that will displace native vegetation; Blackberry, barberry, wattle and Selaginella
Predators - High	Possums, feral cats, hedgehogs, rats and mustelids are present at the site and in the larger landscape.
Herbivores - High	The site is currently part of an active deer farm. Possums are also present.
Herbivore Control	Landowner currently uses possum master kill traps and leg-hold traps for routine control. Landowner also controls goats over the rest of the property.
Habitat Modification - Medium	Currently going through the QEII covenant process.



Pete's Spot

At a glance

TRC Reference: BD/9711

Ecological District: Egmont

Land Tenure: Private

Area(ha): 6.17

GPS: 1701632X & 5674402Y

Habitat: Forest Remnant

Bioclimatic Zone: Semi-Coastal

Ecosystem Type: WF13: Tawa, kohekohe, rewarewa, hinau, podocarp forest

LENZ: F5.2b Acutely threatened

Local: Significant Natural Area

National: Priority 1 – Threatened Land Environment

Priority 4 – Threatened Species

Regional: Key Native Ecosystem

Regional Ecosystem Loss: Chronically threatened 10-20% left

Protection Status: QEII Covenant

Local Government

Catchment: Waiongana (394)

General Description

Pete's Spot is comprised of two forest fragments situated on private land in the New Plymouth District, 3.7 kilometres south of Bell Block. Dissected by Manutahi Rd, one site is located to the north of the road and the other to the south. Both sites border the Waiongona River and are located in the Egmont Ecological District. The remnants are protected by a QEII Covenant and are scheduled as Significant Natural Areas (SNA) under the NPDC District Plan. In total they make up 6.17 hectares of semi-coastal forest, classified as ecosystem type WF13 'Tawa, kohekohe, rewarewa, hinau and podocarp forest'. The forest site to the north is in good condition with a dense mix of canopy and understory species. The southern site is in fair condition with a mix of good canopy species however the understorey lacking. The two sites provide good stepping-stone habitats between other forest fragments and wetlands in the area.

Ecological Features

Flora

The canopy of the forest remnants is dominated by tawa, puriri, kohe kohe, rimu, kahikatea, pukatea and titoki, with occasional karaka, rewa rewa, mahoe, pigeonwood and mamaku tree ferns. The understorey is dense in places at the northern site, and includes mapau, nikau palms, kawakawa and coprosmas. Ground cover seedlings and ferns are present throughout the forest, along with vines and epiphytes, mosses, lichens and fungi. The southern site understorey is sparse in comparison.

Fauna

Native birds present include kereru, tui, silver-eye, grey warbler, fantail and morepork. Kingfisher, black shag, shining cuckoo and Australasian harrier also use the site as part of their wider habitat. There is good habitat for a range of reptiles and invertebrates.

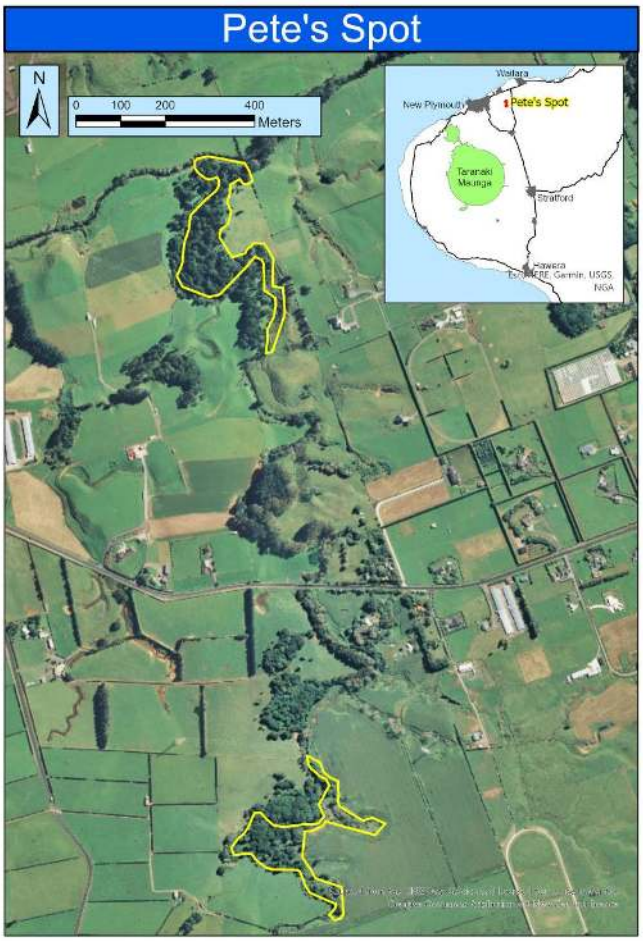
Ecological Values

Sustainability - Positive	In good vegetative condition. Under appropriate management, the forest fragments can remain resilient and continue to contribute to the wider ecological context.
Representativeness - High	Contains indigenous vegetation on an 'Acutely Threatened' LENZ environment (F5.2b) and is of an ecosystem type (WF13: Tawa, kohekohe, rewarewa, hinau, podocarp forest) considered to be 'Chronically Threatened' as only 16% remains in the region.
Rarity and Distinctiveness - High	Contains good habitat for the 'At Risk' longfin eel and banded kokopu. 'Nationally Critical" ramarama and three "Nationally Threatened" rata species are also present.

Ecological Context - Medium	Enhances stepping-stone connectivity between fragmented indigenous habitat and Key Native Ecosystems in the area, such as Tegel Bush QEII, Lepperton Bush, Te Wairoa, Cardenica Woodlot, Tarurutangi Swamp and Townsend Road KNE's.

Other Management Issues

Possum Self-help	The fragments are situated within the 'Bell Block' zone of the regional Possum Self Help programme.
Habitat Modification - Low	Both fragments are legally protected with QEII covenants, and are securely fenced to exclude livestock.
Predators - High	Species that prey on native birds, lizards and invertebrates include rodents (rats & mice) and hedgehogs, along with possums, mustelids and feral cats roving the wider landscape.
Weeds - High	Weeds are currently present in localised areas and present the main priority for management in the short term. In the northern fragment Tradescantia is the priority species for control. In the southern fragment woolly nightshade, tradescantia, cherry and holly form the priority species for control.
Herbivores - Medium	Possums will be present in low densities, and also prey on insects and chicks, but present greatest threat to vegetation through browsing. Stock are excluded and there are no goats or pigs in the area however the southern fragment borders a deer farm.



Whakataka te hau

Karakia to open and close meetings

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

Nau mai e ngā hua

Karakia for kai

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