SUBMISSION ON

‘Action for Healthy Waterways’

Draft NPS for Freshwater Management

Thursday 31st October, 2019

TO: Ministry for the Environment (consultation.freshwater@mfe.govt.nz)

NAME OF SUBMITTER: Horticulture New Zealand

Supported By: New Zealand New Zealand Kiwifruit Growers Incorporated (NZKGI), NZ Apple and Pears Inc , Association, , New Zealand New Zealand Kiwiberry Growers, Onions New Zealand, Vegetables New Zealand, Process Vegetables New Zealand, New Zealand Citrus Growers, Tomatoes NZ, Potatoes New Zealand , Central Otago Fruit Growers, Tevoit Fruit Growers Association

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Introduction

Horticulture New Zealand (HortNZ) thanks the Ministry for the Environment (MfE) for the opportunity to submit on the proposed Draft National Policy Statement for Freshwater Management (draft NPSFM).

Note: HortNZ has a separate submission on the proposed NES for freshwater.

HortNZ recognises the significant challenges in putting in place a land and water management regime within New Zealand that seeks to maximise opportunities for the environment, economy and communities, but at the same time ensuring alignment with the mandatory directives of the Resource Management Act 1991 (RMA).

HortNZ could not gain an advantage in trade competition through this submission.

HortNZ wishes to be heard in support of our submission.

Background to HortNZ

HortNZ was established on 1 December 2005, combining the New Zealand Vegetable and Potato Growers' and New Zealand Fruitgrowers' and New Zealand Berryfruit Growers Federations.

HortNZ advocates for and represents the interests of 5000 commercial fruit and vegetable growers in New Zealand, who grow around 100 different crop types and employ over 60,000 workers. Land under horticultural crop cultivation in New Zealand is calculated to be approximately 120,000 hectares.

The horticulture industry value is $5.7 billion and is broken down as follows:

Industry value	**$5.7bn**
Fruit exports	$2.82bn
Vegetable exports	$0.62bn
Total exports	**$3.44bn**
Fruit domestic	$0.97bn
Vegetable domestic	$1.27bn
Total domestic	**$2.24bn**

For the first time New Zealand's total horticultural produce exports in 2017/2018 exceeded $3.44bn Free On Board value, 83% higher than a decade before.

It should also be acknowledged that it is not just the economic benefits associated with horticultural production that are important. The rural economy supports rural communities and rural production defines much of the rural landscape. Food production values provide a platform for long term sustainability of communities, through the provision of food security.

The total investment in New Zealand's horticultural sector is estimated to be in excess of $52 billion.

HortNZ's vision is *"healthy food for all forever"* and its mission is to create an enduring environment where growers prosper. This is done through enabling, promoting and advocating for growers in New Zealand.

HortNZ's Resource Management Act 1991 Involvement

On behalf of its grower members HortNZ takes a detailed involvement in resource management planning processes around New Zealand. HortNZ works to raise growers' awareness of the Resource Management Act 1991 (RMA) to ensure effective grower involvement under the Act.

The principles that HortNZ considers in assessing the implementation of the RMA include:

- The effects based purpose of the RMA;
- Non-regulatory methods should be employed by councils;
- Regulation should impact fairly on the whole community, make sense in practice, and be developed in full consultation with those affected by it;

- Early consultation of land users in plan preparation;
- Ensuring that RMA plans work in the grower's interests both in an environmental and sustainable economic production sense.

As a founding member of the Land and Water Forum, HortNZ has played an active role as a submitter and in previous consultations with Central and Regional government reform of freshwater management. This submission is informed by HortNZ staff and contractors currently engaged in most aspects of Central and Regional management of freshwater across New Zealand.

The importance of water and highly productive land for horticulture

Water is essential for the production of food. Horticultural production in all regions of New Zealand is reliant on reliable supplies of fresh water that are suitable for sustained crop production and post-harvest washing and processing.

The values of food production land are inseparable from connected freshwater. Freshwater is a necessary component of food production land because:

- Freshwater processes formed much of our most productive land through erosion and deposition creating plains of arable soil in the lowlands. These make up the 5% of New Zealand that is available for high value horticultural production (versatile soils).
- The value of this finite and precious soil resource is compromised without clean fresh water to cultivate crops, to wash and prepare food.
- Food cannot be grown without water and therefore cannot occur without discharges. The values of land and water and interlinked.

Food security

Current projections around New Zealand's expected population increase and annual food volumes available for consumption in New Zealand show that domestic vegetable supply will not be able to sustain our future population consumption needs.[1]

Already many New Zealanders, are struggling to meet the recommended daily intake of 3 plus vegetables and 2 plus fruit a day. In 2016/2017, only 38.8 percent of New Zealand adults and 49.8 percent of children met the recommended daily fruit and vegetable intake.[2] Those living in the most deprived neighbourhoods were less likely to meet the recommended intakes and were more likely to be obese.[3] 1 in 5 children are living in food insecurity[4].

Abstractions and discharges are need to grow the food New Zealanders need to eat. Reasonably priced health food is essential for human health.

Submission Structure

1. Executive Summary
2. Draft NPSFM Provisions Discussion.
3. Conclusion

Appendix A –Decisions sought on Draft NPSFM
Appendix B – Legal opinion
Appendix C – Consultation questions

[1] Horticulture New Zealand. (2017). *New Zealand domestic vegetable production: the growing story*. http://www.hortnz.co.nz/assets/Media-Release-Photos/HortNZ-Report-Final-A4-Single-Pages.pdf

[2] Ministry of Health. (2017). Annual Data Explorer 2016/17: *New Zealand Health Survey*: https://minhealthnz.shinyapps.io/nz-health-survey-2016-17-annual-data-explorer/_w_e9a07e83/_w_aa03fb73/_w_320818d4/_w_26fa6ce8/_w_f50ad45f/_w_dbba0f02/#!/explore-indicators.

[4] (Ministry of Health, 2019) https://www.health.govt.nz/system/files/documents/publications/household-food-insecurity-among-children-new-zealand-health-survey-jun19.pdf

1. Executive Summary

NPSFM consultation process

There has been no consultation with HortNZ on the development of the draft NPSFM. We have concerns about the drafting and the potential for unintended consequences (see **Appendix B** – Legal opinion). Due to options and drafting, it is unclear to what extent the final version may differ from this version. The Government should release an updated draft and provide a hearing process. HortNZ wishes to present evidence to the panel of decision makers.

Te Mana o te Wai and Objective

HortNZ supports the concept of Te Mana o te Wai and the holistic framework for resource management that Te Mana o te Wai provides.

The description of Te Mana o te Wai needs to be developed to discuss the relationship with Section 5 of the RMA. We recommend the wording of the objective be refined to reflect the intention of Section 5 of the RMA (see **Appendix B** – Legal opinion).

The essential health needs of people should be defined to include food. The description of Te Mana o te Wai should acknowledge the importance of ecosystem services, including highly productive land for food production. There is an inseparable link between catchments and freshwater, and the values of land and the values of water.

The description of Te Mana o te Wai includes a description of participation in decision making. It includes the concepts of mana whakahaere, kaitiakitanga and manaakitanga. The intention of this aspect of Te Mana o te Wai should be more clearly expressed through definitions and clearer links to the policies.

Integrated management

We support integrated management. We are unclear how the draft NPSFM and New Zealand Coastal Policy Statement (NZCPS) work together. We support integrated planning for land use decisions that impact on water quality and quantity. Catchment values within freshwater management units (FMU) should be identified. This would include the productive capacity of highly productive land for food production.

Freshwater values

We support the inclusion of new compulsory values for threatened species and mahinga kai.

We propose that food production is recognised with its own value. Food cannot be grown without water. Compulsory and other values must have equal weight in decision making for outcomes, limits and action plans.

We support the spatial unit for values being the FMU. We are of the view that values should only be identified at a finer resolution if there are specific values to be represented.

Outcomes, limits, actions and timeframes

An integrated process for determining outcomes, attribute states, limits and actions must be adopted.

The spatial resolution of target attribute states, must relate to FMUs and specific values. Maintaining current state at a very fine spatial resolution supports grand-parenting, not sustainable management.

The impact on catchment values, such as food production, must be assessed as part of the process of refining sustainable outcomes and time-frames. Catchment values will also influence whether an action plan or limit process is more appropriate.

Monitoring and decision support modelling and accounting

Establishing the current state and determining trends relies on reliable monitoring and analysis. Methods vary across the country. National guidance is needed to develop robust method for collecting and analysing data.

Catchment scale decision support models are required to link the impact of outcomes on catchment values, and to understand the impact of limits and actions on achieving outcomes. The spatial and temporal resolution of models has a large bearing on the reliability of predictions. National guidance is needed to guide robust methods for modelling. Financial support is needed to help councils to develop robust tools.

Allocation management should be linked to water quality and quantity limits. Limits must be able to be revised within planning cycles to reflect improved science.

To speed up the planning process, a more streamlined and focused approach to monitoring, catchment modelling and accounting is required. Section 360 regulations should be developed so there is a consistent and robust approach adopted across all regions.

Exceptions

We accept that for some nationally significant infrastructure, exceptions to bottom lines may be appropriate. But any exception must be linked to assessment criteria.

In many catchments, enduring changes have been made to freshwater systems and catchments. For example, urbanisation, flood protection, drainage and hydro-electricity. Not all of this infrastructure is nationally significant. In these situations, action plans rather than limit-based approaches are likely to be required. In some sub-catchments some of the bottom lines may be unobtainable.

Wetland and streams

We support the intention to protect wetland and reduce future stream loss. The definition of constructed wetland needs to ensure that riparian planting and water treatment devices are not disincentivised. There should be recognition of interconnected performance of private and public drainage.

The stream offsetting provisions are supported. But recognition is required that in some places it may not be possible to for suitable offset to be provided. Clarification is needed about whether replacement of existing structures is captured.

National Bottom Lines

We support minimum standards to maintain existing state and improvement toward bottom lines, to reflect FMU values and outcomes. We support improvement above bottom lines, where this reflects values, and can be achieved sustainably.

The development of monitoring and analysis and modelling regulations is essential to support sustainable decision making. Hydrology and water quality must be considered together.

Currently councils analyse the monitored and modelled statistics for the attribute states inconsistently. Average annual models cannot reliably predict the statistics required to assess whether limits and actions will achieve target attribute states.

The attribute states only apply to target attributes states. Target attribute states are linked to outcomes which are linked to values at the FMU scale. Other sites may be monitored to inform analysis and modelling. But sites, not linked the outcomes, must not be subject to achieving target attribute states.

Specific water quality attributes are defined as being subject to limits or action plans. Where robust modelling indicates attribute states cannot be achieved with limits within a 30 -year time frame, or maintained in 30 years time, then limits that achieve attribute states should not be required and instead action plans, which may include limits, should be adopted.

Implementation planning process

The policy establishes a long-term vision. Strategic Plans under the Local Government Act 2001 (LGA) provide a means of achieving this. This Strategic Plan, would then define the elements to be implemented through the RMA process. The Strategic Plan would include policy and limits, and also other elements such as action plans and Local Government funding.

We are concerned about the loss of merit appeal rights. We strongly recommend that an independent Water Commission is established to assess whether a council has: given effect to the NPSFM, consulted adequately, taken account of all the values and to consider appeals on merit.

Summary of recommendations

1. We call for a hearing process for evidence of submitters to be considered.
2. Re-word the Objective that describes the Te Mana o te Wai hierarchy to reflect holistic and sustainable decision making consistent with Section 5 of the RMA.
3. Within Te Mana o te Wai - define essential human health needs to include food.
4. Within Te Mana o te Wai - state the inseparable links between the values of catchments and the values of freshwater, including ecosystem services.
5. Create a new national value – mahi mara, recognising water use and discharges are essential for food production.
6. Freshwater outcomes must only be set at the FMU scale and specific sites.
7. Terrestrial values within FMUs should be identified including highly productive land.
8. Develop a policy to state clearly the establishment of outcomes, attribute states, flows and levels cannot be established without assessing the effects of limits, actions and timeframes on the social, economic, cultural wellbeing of people and on the wider environment including the productive capacity of highly productive land.
9. Develop policy stating that target attribute states, must be linked to outcomes and outcomes must be linked to FMU values.
10. Allocation management should be linked to limits, but limits must be able to be revised within planning cycles to reflect improved science, that meet standards.

11. Develop Section 360 regulations for monitoring and analysis, decision support modelling and freshwater accounting systems.
12. Direct funding to councils so they develop suitable decision support tools quickly.
13. Develop policy for assessing nationally significant exceptions.
14. Develop policy where action plans rather than limits must be used when limits alone cannot achieve outcomes within a 30-year timeframe.
15. Improve the definition of constructed wetland and amend the minimum criteria for mapping wetlands
16. Use the Strategic planning provisions under LGA to establish the NPSFM Te Mana o te Wai strategic plan. The plan would include RMA elements and other elements such as funding and action plans.
17. Establish an independent Water Commission for assessing council performance and for considering appeals on merit.

2. Draft NPSFM Provision Discussion

Preamble

The preamble to the draft NPSFM is currently unsatisfactory. The 2008 BOI Report gave the following guidance[5]:

> *'The Board considers that a preamble can provide a useful introduction to the NPS. It should outline in broad terms the challenges for freshwater management, and state national values, issues and goals*.'

Recommendation:

- Rewrite the preamble in line with the direction from the 2008 BOI Report.

Fundamental Concept Te Mana o te Wai

Te Mana o te Wai is a framework for water resource management. The description of the concept of Te Mana o te Wai in the NPSFM 2017 describes an interconnection between the health of water, people and the environment. The 2019 version (draft NPSFM) builds on this concept and describes two key parts to Te Mana o te Wai. The first element is about resource management governance, decision making and participation. The second element is a hierarchy of obligations.

In our view the description needs to be built on to define key terms, to discuss the links between values in catchments and values in freshwater and to discuss how Te Mana o te Wai hierarchy relates to the Section 5 of the RMA.

Recommendations:

- Define essential human health needs to include food.
- Recognise the values within catchments, and in particular the importance of highly productive land for food production as an ecosystem service.
- Describe the relationship between Te Mana o te Wai and section 5 of the RMA.

Definitions

The substantial amendments and insertions of new definitions is a particular concern as the mis-match between the definitions in the draft NPSFM and the RMA will cause confusion and potentially lead to unproductive legal challenges.

We consider that the changes will not decrease the extent of litigation, rather they will increase it – particularly because redrafted policies and objectives contain new phrases untested by case law. For example: removing 18 existing definitions, introducing 16 new definitions and redrafting 9 existing definitions.

Recommendation

- Justify and explain where definitions differ to the RMA to avoid future litigation.
- We provided specific comments in **Appendix A**.

[5] Report and Recommendations of the Board of Inquiry into the Proposed National Policy Statement for Freshwater Management (January 2010) at [254]

Application

The application of the NPSFM has expanded to include consideration of receiving environments in the coastal marine area, although the value and outcome setting process is confined to freshwater environments.

For example, bacteria discharged from land to freshwater can then impact on suitability of shell fish in open ocean beaches for consumption (Newcombe, et al., 2014). It appears that this effect could be recognised under section 3.4 (Integrated management), which includes the coastal environment and "other ecosystems", but freshwater attribute states and limits set for bacteria would be established based on freshwater values, like freshwater mahinga kai and swimming.

It is unclear how the draft NPSFM and the NZCPS will interact and what the consequences of this will be.

The temporal application is the date of gazette. We support this provision, but acknowledge it may have implications for the wide range of baseline dates that currently exist in regional plans.

Recommendation

- Provide greater clarity on degree to which values and outcomes in the coastal marine area are to achieved through the NPSFM policy, and how the concept of Te Mana o te Wai relates to marine waters.

Objectives

We recognise Te Mana o te Wai as a framework for directing freshwater management and ultimately a state where the health of water, people and the wider environment are provided for. Te Mana o te Wai provides guidance on how for the 13 policies in the draft NPSFM could be considered together using an integrated approach. However, the way the Objective is currently expressed, as a hierarchy of priorities, makes the Objective inconsistent with the purpose of the RMA.

Our interpretation is that the Te Mana o te Wai hierarchy seeks to explain how to integrate the bottom lines and the overall judgement approach of the Section 5 of the RMA. HortNZ considers the concept of Te Mana o te Wai is helpful in interpreting Section 5 for freshwater decision making, but in our view, further drafting is required to achieve an explanation that is legally robust (see **Appendix B** – Legal Opinion).

Recommendation

- Re-draft the objective to make it clear that the Te Mana o te Wai obligations are subject to an integrated holistic assessment of well beings

Policies

There are 13 policies proposed and they are similar to the NPSFM 2017 objectives.

There is inconsistent use of terms in policies within section 2.2 e.g. 'gives effect to', 'to ensure', 'action is taken', 'managed', 'involved', 'achieved', 'avoided', 'protected', 'safeguarded', 'enabled'. Some of these terms have meaning in law and others do not. An

unintended consequence of this drafting may well be arguments over the hierarchy of importance of the policies relative to each other.

In our view, the policies should direct integrated assessments that consider catchment and freshwater values together, and in particular ecosystem services such as the productive capacity of highly productive land, and its importance for food production.

Recommendation

- The drafting of these polices is reviewed. See detailed comments in the legal opinion in **Appendix B**
- Specific comments on the policies provided in **Appendix A**

Te Mana o te Wai.

The draft NPSFM involves councils establishing long term freshwater outcomes. In our view the long-term nature of the planning is suited a council strategy document.

The strategy document can be prepared under the LGA and the public can be engaged through the *Special Consultative Procedure (S82-S90)*. There are limited appeal rights, as the LGA appeal provisions apply, not the RMA appeal provisions.

A strategy prepared in this manner does have weight under the RMA as it is a *strategy prepared under other Acts* (e.g: s66(2)(c)(i) and s74(2)(b)(i)). Therefore, regional and district planning processes are required to have regard to such strategies.

Elements of the strategies, such as polices, limits and rules would be implemented though the RMA process. Other elements could be directed through Action Plans. Using the LGA provisions enables councils to direct funding towards actions.

The provisions include providing specific wording for RPS objectives. While Section 45A of the RMA states that a national policy statement may state 'objectives and policies that must be included in policy statements and plans'[6], this does not mean that national policy statements may direct local authorities to take steps which go beyond their functions, powers, and duties, in regards to policy statements and plans. See our legal opinion in **Appendix B.**

In our view there should be a requirement that councils update their RPS to articulate their Te Mana o te Wai visions by a certain date, as it is the first thing that needs to be done.

As there is no requirement for Section 32 assessment on including Te Mana o te Wai vision in the RPS, there must be no timeframe set on achieving the outcomes associated with Te mana or wai, stated in the RPS objective. The timeframe for achieving outcomes must be set as part of the integrated assessment accounting for all values within each FMU.

Recommendation

- Use the Local Government Act to develop a Council strategy to reflect a long term Te Mana o te Wai vision.
- See specific wording in **Appendix A.**

[6] Resource Management Act 1991 s45A(2)(e)

Tangata whenua roles and interests

Policy 5 and the Objective D1 in NPSFM 2017, are similar with both emphasising involving iwi and hapu and ensuring tangata whenua values and interests are identified and reflected. However, the implementation method in the NPSFM 2019 has shifted, and focuses on the engagement and involvement of tangata whenua, compared to the 2017 version, where the emphasis was on involving and working with iwi and hapu.

There is no link to concepts in the preamble, relating to the principles of mana whakahaere/governance, kaitiakitanga/stewardship and manaakitanga/respect and care. It unclear if these concepts refer roles for iwi, hapu and tangata whenua.

Matuaranga Māori is identified in the preamble and isn't picked up in this policy, it is picked up in obligations for council monitoring in section 3:13, but it is unclear if the policy envisages a role for Māori in mātauranga Māori.

Recommendations

- Improve clarity on roles and interests of iwi, hapu and tangata whenua in the objective and policy.
- It may require additional policies to reflect iwi, hapu, tanagta whenua roles in whakahaere, kaitiakitanga and manaakitanga.
- It may require an additional policy on enabling the application of broader systems of values and knowledge, such as mātauranga Māori, to the health and wellbeing of waterbodies and freshwater ecosystems.

Integrated Management

The polices are similar to those in the NPSFM 2017, the scope of ecosystems has broadened. In the 2017 version it was limited to associated ecosystems, in the 2019 version it includes "other ecosystems". Presumably this could include any ecosystem whether related to freshwater or not. In Waikato Plan Change 1, human health is recognised as part of the ecosystem health value.[7]

The policy has a range of elements including managing use and development of land, infrastructure and urban development. This policy is relevant to setting timeframes for achieving attribute states and for allocation of limits.

Land use can have considerable impacts on the hydrology of catchments and the hydro-morphology of receiving waters. For example, impervious surfaces change the amount recharge and increase surface runoff, these changes result in hydrological changes. Similarly, forestry can result in large changes to catchment hydrology, but would not be captured by abstraction rules. The land use activities that impact on water quality and quantity are regional council functions

We have concerns about the direction in [3.4] of the Draft NPSFM requires territorial authorities to undertake actions that go beyond their functions, powers, and duties. We consider this will cause confusion of implementation and likely will result in local authorities

[7] http://www.waikatoregion.govt.nz/assets/WRC/Council/Policy-and-Plans/HR/Dip-your-toes/PlanChange1-pdf-Adobe-Acrobat-Pro.pdf

acting ultra vires without being aware of their transgression, thereby opening them up to litigation. See legal opinion on **Appendix B**.

Recommendation

- Revising the over-arching objective to reflect integrated decision making
- Use the Local Govt Act provisions to develop a strategic plan that includes RMA, provisions and an Action Plan for achieving integrated management.
- Removing requirements that direct local authorities to take steps which go beyond their functions, powers, and duties, in regards to policy statements and plans.
- See specific comments on provisions in **Appendix A.**

Overview of national objectives framework

We have concerns about the fast-tracked process and the ability of growers to participate and for Councils to deliver quality plans. We are concerned about the impact on loss of appeal rights on the quality of decision making

In our view it is essential an independent body is established for challenging whether the Council has given effect to NPSFM, consulted adequately and taken account of all the values.

Recommendation

- Appoint an independent body to assess whether:
    - Council has given effect to NPSFM
    - Consulted adequately
    - Taken account of all the values.
    - Hear merit appeals

Identifying FMU's and monitoring sites

The policy directs identification of specific elements including primary contact sites within FMUs, and requires that monitoring sites are representative of the FMU and or representative of primary contact sites.

We are also of the view that catchment values should be identified, including highly productive land for food production.

Care needs to be taken to select FMU's that reflect surface water and groundwater relationships. The size of FMU's is influential on the analysis driving decisions as to whether outcomes are met or not. FMUs need to be sufficiently large for some flexibility of land use within them.

The size of the water course where monitoring occurs will have a considerable impact on the likelihood of bottom lines being met, national guidance on the establishment of site selection should be provided. The monitoring network is skewed to large rivers, where small streams are monitored, their quality is often much poorer than larger rivers. Water quality management decisions in rivers and streams cannot be compared, without consideration of hydrology.

The number of attribute states that are required to be linked to outcomes and monitored is significant. The cost and effort in collecting and analysing this data set will be considerable and must be well directed.

The state of environment monitoring sites, with the longest and most reliable data may not always be truly representative of the hydrology and contaminant load sources at an FMU scale. This is particularly true for background loads, small streams, urban and peri-urban environments, and for those attributes where a significant load is delivered in rain events.

We anticipate that over-time changes will need to be made to the monitoring network to make it fit for purpose for the FMU process.

In our view national regulations should be developed to include the following

- Standards for site selection within an FMU for target attribute states
- Standards for site selection within an FMU for informing models
- Minimum data length and quality standards for each attribute
- Statistical methods for current state attributes, flows and water level
- Statistical methods for NOF attributes,
- Statistical methods for trend and uncertainty analysis

Recommendation

- Identify freshwater and catchment values within FMUS.
- Catchment values include highly productive land for food production
- Develop section 360 regulations to provide consistent and robust methods for monitoring and analysis.

Identifying values and environmental outcomes

The process for identifying values includes recognition of the compulsory values, the decision as to whether any of the national values in schedule 1b rests with the council. The values within appendix 1 b include Mahinga kai and Wai tapu, presumably it would be appropriate for tangata whenua to determine where and whether these values exist within an FMU. Similarly, the values include irrigation, cultivation and food production. This value is very important to the horticulture sector, and we are of the view the sector should have a role in identifying its value.

The spatial scale for the value and outcome setting is described as for each FMU, or for individual waterbodies or freshwater ecosystems within an FMU. This is a considerable shift from the NPSFM 2017, where the environmental outcome was set at the FMU scale.

We understand that within FMUs there may be specific places where values are located, for example: a habitat of a threatened species, or a bathing site. Providing for outcomes to be set in specific places makes sense, however allowing the outcome to be set at stream scale rather than FMU for all or any attribute, reduces the potential for land use flexibility within catchments. It is aligned with a grand-parented approach to water quality allocation. It undermines integrated management.

The process includes setting numeric attributes, it is assumed these are the attributes that would be used for measuring whether the outcome is achieved, they would include the relevant attributes provided in the NPSFM for each value, but could also include any other attribute identified for any other value identified as part of the value identification process.

Modelling decision support tools of sufficient quality and resolution are required to enable the relationship between outcomes, attributes, limits and time frames to be predicted. These predictions are required for assessments of the social, cultural, environmental and economic effects of options to be considered.

The range and quality of decision support tools developed to date to support NPSFM 2017 decision making processes is extremely variable.

We see tools being used that lead to establishing limits that may not achieve target attribute states, because the temporal resolution insufficient this is especially relevant for *E. Coli* and Sediment. For example, when average annual models are used for modelling *E. Coli,* the effectiveness of stock exclusion in achieving swimming outcomes can be overstated. When daily model was used for modelling *E. Coli* for the Porirua Whaitua, it was apparent that the 95th percentile events were caused by wet weather flows from sheep and beef hill country, and stock exclusion of cattle and retirement of erosion prone land and wastewater overflow improvements achieved some reductions, but could not shift the attribute state past D or E band in most locations.[8].

In some Regions, robust ground water models have not been developed, this leads to councils to setting arbitrary abstraction limits.

If robust modelling standards were set, it would be possible for resource users to develop information that could then be adopted by Council, for example catchment collective models that integrate with FMU models.

In our view national regulations should be developed to include the following

- Spatial resolution of models required for setting FMU attribute states and limits
- Temporal resolution required for various parameters
- Circumstances where integrated groundwater and surface water models are required
- Statistical methods for attributes
- Calibration and verification standards that must be met for each attribute.

Some regions have been unable to fund the development of suitable models. Funding should be made available to these regions

Recommendation

- Consult with tangata whenua and communities when determining what values are relevant to an FMU
- Include catchment values as well as freshwater values, including highly productive land
- Values and outcomes must be set at the FMU scale, and monitoring sites for determining whether FMU outcomes are being achieved must be representative.
- Water-body specific values and outcomes should only be set where they relate to specific values.
- Require that decision support models are used to enable integrated assessments of outcomes, attributes, limits and actions and timeframes, while acknowledging the limitation of bottom lines and maintaining current state.
- Develop Section 360 regulations for catchment scale water quality and quantity models
- See specific comments on provisions in **Appendix A.**

[8] (Easton, Cetin, Shrestha, & Sands, 2019)

Identifying current attribute states, Setting target attributes states, Identifying limits on resources use and preparing action plans

This integrated assessment is missing from the NPSFM 2019, which seems to drive a process of selecting values, outcomes and attribute states, which may exceed bottom lines or may become increasingly difficult to obtain with climate change. This process seems to be directed to occur without reference to the limits and actions that would be required to achieve the outcomes. Setting limits and actions has social, economic and cultural consequences, including consequences for essential human health needs, and must be considered along freshwater values and outcomes.

In the situation where the outcome sought is maintenance of the existing state, the proposal links this to the statistical description of the existing state. Water quality and flow can vary significantly from year to year, and even accounting for 5-year rolling medians. Accounting for natural variability is particularly important, when the focus of the NPSFM 2019, has greater emphasis on responding to deterioration. Robust monitoring and analysis regulations are required to guide this process.

The process requires establishing resource use limits to achieve the attribute states for all attributes in Appendix 2a and an action plan approach for establishing actions to achieve the attribute states in Appendix 2B, in order to achieve any other target attribute states a Council may use limits, actions plans or consent conditions.

The process assumes it will always be possible to achieve the attribute target using the limit approach for specific attributes. In some circumstance, such as small streams in urban and peri-urban catchments and catchments with highly modified hydromorphology, this may not be possible, in some place limits and known actions may not achieve all of the bottom lines, for example Wairarapa Moana. The Ruamahanga Whaitua modelling indicted that extensive catchment mitigations could not achieve the bottom line attribute state in the Lake, and additional mitigations that involved deepening the Lake and re-introducing the Raumahanga River to the Lake, achieved some improvement but could not achieve the bottom lines. Achieving the bottom lines in Wairarapa Moana is likely to require a considerable change in the flood protection scheme that has so drastically altered the Lakes natural hydrology[9].

In the coming years significant changes in flow regimes are predicted as result of climate change. For example, the climate change modelling for the Ruamahanga Whaitua predicted a large change in low flows is expected by 2040 (average reduction up to 10%). [10]In some catchments significant changes in flow regime may occur as a result of increased forestation for emissions mitigation, for example lows can be expected to reduce by 50% when pasture if converted to plantation forest.[11]. The current proposals require limits that mitigate the impacts of climate change. This approach will be increasingly unrealistic with time.

The increased number of attributes and bottom lines, increases the likelihood that many rivers will not be able to meet all the of the bottom lines.

Where robust catchment scale modelling indicates that abstraction and discharge limits cannot sustainably achieve bottom lines or maintenance of current state within 30 years,

[9] (Allan, , Hamilton, , & Muraoka, 2017) http://www.gw.govt.nz/assets/Ruamahanga-Whaitua/A-coupled-hydrodynamic-ecological-model-to-test-management-options-for-restoration-of-lakes-Onoke-and-Wairarapa.pdf

[1010] (Zammit & Yang, 2017) http://www.gw.govt.nz/assets/FINAL-Impact-of-climate-change-on-inflows-to-the-Ruamahanga-groundwater-management-zone-February-2017.pdf

[11] (Duncan & Woods, 2004) https://waikatoriver.org.nz/wp-content/uploads/2014/09/24-Flow-Effects.pdf

then an action plan approach rather than a limit based method of achieving the outcome should be adopted. This is particularly likely to relate to urban and peri-urban streams. For example most of the Waitemata catchment fails either the proposed DIN or DRP attributes.[12]

Recommendation

- Require integrated assessments of outcomes, attributes, limits and actions and timeframes, while acknowledging the limitation of bottom lines and maintaining current state.
- Develop Section 360 regulations for monitoring and analysis
- Develop Section 360 regulations for catchment scale water quality and quantity decision support models
- Adopt an Action Plan approach when robust analysis indicates outcomes cannot sustainably be met using limits within 30 years, or maintained in 30 years.
- See specific comments on provisions in **Appendix A.**

Setting environmental flows and levels, Identifying take limits

The setting of environmental flows and limits must occur at the FMU scale and can occur at an individual waterbody scale. The environmental flows must be developed on the basis on environmental outcomes and must be expressed as a water level, flow rate and variability of flow. The flows and levels established are for the connected groundwater and surface water bodies.

This policy provides great clarity in how levels are set. We think this is particularly important for groundwater levels, where we have seen some Councils setting levels for groundwater as required by NPSFM 2107, without any meaningful link to achieving an environmental outcome, for example the minimum water level is bores as a limit in the Gisborne Freshwater Plan, when this is unlikely to be reliable indicator of aquifer water level, and unrelated to environmental outcomes.[13]

When setting levels and flows, councils are required to have regard to all the matters in section 3.9. This includes climate change. Given the attribute state is required to achieve the outcome, and the outcome is not subject to consideration of the impact of climate change, it appears, that in cases where climate change would result in a decline in flow or level, the environmental flow or level would not be able to reflect that adjustment.

When setting flows and levels, its also important to consider the impact on take limits and the essential human health needs as well as the social, economic and cultural wellbeing of people and communities.

The policy describes take limits as being designed to provide for the environmental levels and flows, which are in turn linked to environmental outcomes and values.

However, take limits, have an impact on the reliability of water supply. There are many competing users of water; e.g. domestic, livestock, recreation, industry, energy, environmental, cultural, as well as its use for crop irrigation and post-harvest washing and processing.

[12] (Local Government New Zealand, 2019)
[13] (Williamson & Soltau, 2019)

Reliability of supply of water in terms of volume, quality and timing is critical for growers and their production. Generally, reliability must be greater than nine in ten years to support high value horticulture. Root stock survival and crop survival water is of critical importance for horticulture. Preventing irrigation at critical times can result in crop failure, hydroponic growing is particularly vulnerable as are trees where lack of water can result in death or long term damage to trees and vines, for example as occurred in the 2013 Hawkes Bay drought.[14]

We would expect in many FMUs the value for Irrigation, cultivation and food production would have been identified within the FMU and should be considered when establishing the take limit.

There are a limited range of factors that take limits are linked to in section 3.12. It's unclear why these are provided rather than the values and environmental outcomes identified section 3.6. These considerations are all related to ecosystem health, which would be consistent with compulsory ecosystem health value.

However, in this section, specific method is made to the essential human health needs of people. Essential human health needs of people extend beyond drinking water, at a minimum they include food, shelter, clothing, hygiene. It is unclear why consideration of essential human health needs is only provided for as part of take limits

When setting take limits, it's essential to consider the impact of take limits on the essential human health needs as well as the social, economic and cultural wellbeing of people and communities.

We understand decisions need to be made with the best available information, but the policy need to enable decisions on limits to be reviewed if better information becomes available. Limits are established it achieve outcomes. While the outcomes sought ae likely to be stable over a planning cycle, the understanding of the limits and actions required to achieve the outcomes, may change with improved science.

Limits should be able to reviewed within planning cycles, where robust science, meeting monitoring, analysis and modelling requirements indicates limits should be reconsidered. In our view, this should be provided for within the consenting process.

Recommendation

- We support a clear link between flows and level and environmental outcomes that reflect values.
- The take limit should be linked to achieving environmental outcomes and values as described in section 3.6.
- The take limit must be the maximum amount of resource use for the outcome to be met
- The take limit itself is not the element that is to be maintained, it is existing state that is to be maintained, and therefore the limit should be able to be revised to reflect best science.

[14] (Archer & Brookes, 2018)https://www.hbrc.govt.nz/assets/Document-Library/TANK/TANK-Key-Reports/Modelling-Water-Restrictions-and-Nutrient-Losses-for-Horticulture-AgFirst-2018.pdf

- Require integrated assessments of outcomes, attributes, limits and actions and timeframes, while acknowledging the limitation of bottom lines and maintaining current state.
- Develop Section 360 regulations for monitoring and analysis
- Develop Section 360 regulations for catchment scale water quality and quantity decision support models
- Adopt an Action Plan approach when robust analysis indicates outcomes cannot be sustainably met using limits within 30 years, or maintained in 30 years.
- See specific comments on provisions in **Appendix A.**

Monitoring

The proposed monitoring provision require regional councils to establish of methods for monitoring progress towards attribute states and outcomes.

HortNZ supports the requirement for regional council's to be responsible for monitoring. The RMA states that every local authority has a duty to gather information, monitor and keep records (s35). State of the Environment monitoring is included within this (s35(1)(2)(a). There is also a requirement to make the monitoring findings available to the public at intervals of no less than 5-years (s35(2A).

The monitoring methods, are required to include measures of health of indigenous flora and fauna. This appears not to only include monitoring to freshwater flora and fauna, but any flora and fauna. The primary focus on monitoring should relate to the freshwater values and outcomes that sought.

It may that as part of an integrated management approach, the action plan seeks to achieve values that are not only freshwater values. If this was the case then the monitoring should be clearly linked to these outcomes.

The methods include monitoring for matuaranga Māori. We note that matuaranga Māori is discussed in the preamble, relating to Te Mana o te Wai. We think it would be useful for describe how iwi, hapu, tangata whenua may be involved in its development.

We are of the view there should be national consistency in the development of the monitoring and analysis methods for measuring progress required under the NPSFM, to provide a consistent approach to measuring progress and responding to deterioration.

Recommendation

- Provide greater clarity in the other policies about how matuaranga Māori will be included in establishing values and outcomes and then the monitoring should be in the context of the outcomes sought
- Develop Section 360 regulations for monitoring and analysis
- See specific comments on provisions in **Appendix A**

What to do if deterioration detected

The section requires that if regional councils detect a trend indicating a deterioration or when an outcome is not meet, an action plan to halt or reverse the deterioration is developed. Care needs to be taken in interpreting when deterioration has occurred, or where changes are related to natural variability. For example, the evidence of Gilliam Holmes for the proposed Ngaruroro Water Conservation Order, demonstrated that the proposed periphyton

and DIN limits were subject to natural variability and unsuitable to be treated as limits that triggered action, without consideration of the wider hydrological system[15].

It is unclear if the action plan is only required for deterioration, and the other steps (regulatory and non-regulatory) are require for when target attribute states, flows, levels or environmental outcomes are not met.

It is unclear if action plan discussed in this section is an update or review of the action plan developed under section 3.10.

Recommendation

- Develop Section 360 regulations for monitoring and analysis
- Clarify the action plan process for deterioration is part of the Action Plan under section 3:10.
- See specific comments on provisions in **Appendix A.**

Minimum Intervention

The minimum intervention table identifies for the ecosystem and human health values and the attributes that are associated with the value. This is the process that is required under section 3.7. Presumably if mahinga kai or a tangata whenua values are included within the compulsory values, the associated attributes for these values and related outcomes would be added to this table.

The table relates to section 3:10 which requires that limits or action plans are developed for specific attributes. In all cases an action plan may be developed and for some attributes a limit must be developed.

The limits that are set under section 3.10 must meet the target attribute state. As discussed above, we are of the view there will be some locations where factors other than discharges are the dominant reason water quality attribute states cannot be met, and in these cases an action plan approach is more appropriate.

In many places multiple contaminants will fail the bottom lines, in these cases a process that enables Councils to prioritise regulations and action that will have the most benefit will be needed.

Recommendation

- Identify a process for Regional Councils to adopt an action plan approach rather than a limit approach, for those sub-catchments and FMUs where robust analysis indicates a limit for achieving bottom lines cannot be sustainably established within 30 years, or where current state cannot be maintained in 30 years.
- See specific comments on provisions in **Appendix A.**

Inland wetlands

The provisions provide definitions for inland wetlands. These wetlands presumably exclude estuarine wetlands.

[15] (Holmes, 2019) http://www.hortnz.co.nz/assets/Natural-Resources-Documents/Ngaruroro-River-WCO-Evidence/Horticulture-New-Zealand-Gillian-Holmes-Evidence-25-January-2019.pdf

The definitions refine the wetland definition in the RMA. It is technically desirable to differentiate types of wetlands in order to assess significance of wetlands and magnitude of effects. However, from a planning perspective, this can lead to ambiguity. Care should be taken to use the RMA definitions where possible and to relate refined definitions to RMA definitions to provide a logical planning framework. See legal opinion **Appendix B.**

In some regions we have found ourselves inadvertently caught up in discussions on wetlands in relation to implementing Good Management Practices, in particular sediment control ponds and off-stream water storage.

We also see risks with riparian planting, on lowland streams that may form swamp wetlands. If the provisions were to impact on planted riparian margins, it could disincentivise growers and farmers from planting area that revert to a wetland over time.

It is important that these Good Management Practices are not unintentionally constrained, thereby discouraging their use. The policy includes a description of constructed wetlands and a list of examples of constructed wetlands, these definitions aim to avoid the issue we are concerned with, but we think further refinement of this definition is required to avoid unintended and perverse outcomes.

We do not support the size class of 0.05ha and consider that a size class of 2ha should be the minimum criteria, as per the Landcare Research Wetland Delineation Protocols that refer to a small wetland as being <2ha. Mapping down to a scale of 0.05ha is not a practical measure We also consider that requirements should specify for mapping purposes, that they relate to existing natural wetlands.

Recommendation

- Revise the definition of constructed wetland
- Amend the minimum criteria in Subpart 3.15(5)
- See specific comments on provisions in **Appendix A.**

Streams

The provisions to protect stream form were not included within the NPSFM 2017

The term stream and river are used throughout the NPSFM, and the term stream has been defined to be used interchangeable with River. The RMA defines River to include stream. River is the term in common use.

The policy uses the word infill, it is unclear if this has the same meaning as the word reclaim in the RMA. Often culverting will require minor diversions and reclamation, for example because culverts are often straighter than rivers.

Recommendation

- Clarification of definition of stream

Fish passage

These provisions are about providing for fish passage when considering consents for structure in the beds of rivers.

Recommendation

- Retain intent of fish passage provisions.

Primary contact sites

This provision requires councils specifically identifies locations for primary contact recreation. This is an additional requirement in addition to the compulsory human health value that provides for the suitability of swimming.

This provision, is aligned with the monitoring and reporting Councils already do on bathing sites and may enable a better integration of the monitoring and reporting undertaken for bathing sites and the monitoring and of outcomes required for the NPSFM process.

Recommendation

- Retain intent of primary contact site provisions.

Water allocation

These provisions require Councils to include criteria for approving water transfers within their regional plans and policies to maximise the efficient allocation of water

Water transfers are an important element of achieving efficient water use with any transfer occurring within a catchment, and controlled from within each region.

The efficient use of water, should be considered from a reasonable use perspective. For horticulture the use needs to crops change with the age of the crop and with the season

The provisions require timeframes for the over allocation of water, an integrated assessment will be required to determine an appropriate timeframe.

For water over-allocation, similar to water quality over-allocation an action plan approach may be appropriate to enable communities to consider options for addressing over-allocation, beyond efficiency gains and reduction in use.

Water storage, augmentation, harvesting and artificial recharge are methods that could be considered within an action plan framework. Methods that encourage collective use of water should be encouraged.

Recommendation

- Retain the intention to improve efficient allocation of water, and including transfers
- Retain the intention to drive the efficient use of water.
- Encourage collective approaches to water use and management
- Retain the intention to establish time frames to phase out over allocation, the timeframes must be established including an assessment of the social, economic and cultural wellbeing of people and communities, including the essential human health needs.
- Adopt an action plan approach to manage phasing out of over-allocation over time.
- Encourage collective management in collectives and enterprises
- Overallocation should be linked to limits rather than outcomes to provide for stability in decision making.
- However, limits must be able to be revised to reflect improved science during planning cycles.
- See specific comments on provisions in **Appendix A.**

Accounting systems

The provisions provide greater detail about the information that should be collected and reported at the FMU scale on water quality and quantify.

To data there has been reluctance form some Council to develop sufficient accounting tools for water quality accounting, and this has led to limits being set at farm scale.

The provisions require recording and aggregation of data at the FMU scale, and including monitored and modelled water quality and quantify data.

Nationally consistent regulations to guide Councils in the development of robust and transparent tools for freshwater quality and quantity accounting are needed.

One of issues that has faced vegetables growers, is regulations that set water quality limits at the farm scale, impeding crop rotation. This method of limit setting, has been driven by a lack of water quality accounting tools. In Plan Change 1, one of the key objections of Council to enabling growers to manage vegetable growers at an FMU scale, was a reluctance from Council to manage the accounting system that would be required.

Recommendation

- Section 360 regulations for freshwater accounting
- See specific comments on provisions in **Appendix A.**

Assessing and reporting

The provisions require annual reporting and additional requirements as part of the 5 yearly state of environment report.

Recommendation

- HortNZ supports the direction to prepare a summary report (synthesis report) that is written and presented in a way that members of the public are likely to understand and refer to the government plan language guidance[16] as a starting point for regional councils.

Exceptions proposed

It is unclear what assessment criteria was used for determining the 6 hydroelectric schemes should be provided an exception, or how the assessment relates to the Te Mana o te Wai concept.

We accept that there will be some locations where due to significant changes in hydromorphology some bottom lines may never be met. Where these changes are a result of nationally significant infrastructure or a nationally significant activity, a case could be made that an exception is justified.

However, we are of the view a policy should be developed to direct an assessment against criteria. We recommend that in cases where exceptions are granted an action plan approach is adopted for those catchments to implement limits where possible, and to focus on the actions available and including the contribution the electricity companies might make, to achieving improved outcomes in the catchments.

[16] https://www.digital.govt.nz/standards-and-guidance/design-and-ux/content-design-and-management/how-to-write-for-the-web/plain-language?rf=1

In some places, we expect that bottom lines will also not be able to be met, not because of nationally significant infrastructure, but rather local or regional conditions, such as flood protection and land drainage schemes or urbanisation. In these cases, we recommend an action plan approach. The action plan approach would enable options to be explored beyond limit setting, and for options and limits to be re-visited to determine whether changes in law or technology may provide opportunities for outcomes to be met.

Recommendation

- Develop criteria exceptions for nationally significant infrastructure and activities only
- Use an Action Plan approach for exceptions.
- Develop policy where action plans rather than limits must be used when limits alone cannot achieve outcomes within a 30-year timeframe

Timing

While HortNZ supports implementation timelines as a method for directing progress towards a goal, these must achievable. HortNZ challenges the Government on this matter as we firmly believe that the date of 31 December 2025 will be unachievable without considerable support.

On a technical note, the 31st of December is outside the statutory dates in the RMA. We refer the Ministry to the definition of *'working day'* in section 2 of the RMA, in which the period from 20th December to 10th January is excluded.

Recommendation

- Take advice from regional councils and set an achievable date, we are doubtful the 2025 data can be achieved.
- Develop Section 360 regulations for monitoring and analysis
- Develop Section 360 regulations for catchment scale water quality and quantity decision support models
- Develop Section 360 regulations for freshwater accounting
-

Compulsory values

The policy includes a compulsory ecosystem health value and a compulsory human contact and threatened species value, and a possible mahinga kai or tangata whenua value.

The ecosystem health value is described differently to the NPS2017, it includes a discussion of the 5 elements. Of these elements the NPSFM regulates water quality and quantity and has a influence impact on river habitat, through the stream works and integrated management provisions. The definition doesn't recognise the link between freshwater, terrestrial and marine ecosystem health.

If a tangata whenua value was adopted as proposed, it's unclear what it would include, and as such we cannot support its inclusion.

Recommendation

- Retain the intent of the existing compulsory values
- We support the inclusion of threatened species and mahinga kai value

- Define the freshwater ecosystem value to recognise the link between freshwater, terrestrial and marine ecosystem health.

Other values Other values that must be considered

The other values that must be considered are the same as NPSFM2017. Like the NPSFM2017 process, Councils must determine which of these other values apply within an FMU.

For horticulture, the irrigation, cultivation, and food production value is important. We are concerned that for numerous reasons (time, complexity of the bottom lines, the hierarchy), councils may choose not to account for the other national values.

HortNZ supports the approach where *compulsory values* are always considered and *other values* that are relevant within a catchment must also be considered. All *compulsory values* and relevant *other values* are considered together and balanced to achieve the community freshwater outcomes. There should be not priority afforded to compulsory values (over and above that provided by the bottom lines), compared with other values.

Furthermore, food production values of freshwater have been identified in regional policy statements and plans in many parts of New Zealand[17].

In our view food production and cultivation should be afforded a value separate to irrigation. The value that is sought to be protected by the proposed NPS highly productive land, is the ability of this land to produce food. Food cannot be grown without water, and water cannot be used for growing without discharges.

For the reasons outlined above, it is of great importance that food production is recognised with its own value.

Recommendation

- Retain the other values, amend the irrigation value to remove food production
- Add a mahi mara value to recognise the importance of cultivation and food production for human health.
- Clarify that all values (compulsory and other) have equal weight in considering appropriate outcomes.
- Provide an opportunity for stakeholder to identify these values well as councils.

<u>Appendix 2A and 2B: Attributes requiring limits and Action Plans</u>

HortNZ supports the concept of National Bottom Lines, it is critical to New Zealand communities and the New Zealand economy that these are set at appropriate levels that are supported by robust and independently peer reviewed science.

A consistent approach to statistical analysis is required. The statistics provide within the NPSFM are ambiguous, this was also the case with NPSFM2017. This had led to councils interpreting the statistical methods for calculating attribute states differing across the country.

The number of attribute states that are required to be linked to outcomes and monitored is significant. The cost and effort in collecting and analysing this data set will be considerable.

[17] Including Auckland, Northland, Waikato, Bay of Plenty, Gisborne, Hawkes Bay, Horizons, Wellington, Tasman, Marlborough, Southland.

The complexity of the data set increases the likelihood that many rivers will not be able to meet all the of the bottom lines. Prioritising action for improvements will be complex, and a values-based approach is recommended.

The limit-based approach assumes that a limit will be able to set to achieve the attribute states. This will not always be the case, particularly in urban streams and water courses that are highly modified due to flood protection and land drainage.

For some small low land streams, where their natural hydrology is highly disturbed due to land drainage and flood protection, the proposed DIN and DRP limits may be unachievable with a simple limit approach. These streams may not be identified as representative of the FMU, but in some catchments, particularly urban and peri-urban catchments, the only water courses that are monitored, are small and highly modified.

The benefits of achieving all of the target attribute states will vary depending on the hydrology of the stream. The ecosystem values in low and spring fed streams differ from hill stream and rivers, and applying limits uniformly may not be justified. [18]

Particular care needs to be taken with the analysis for attributes that are driven by rain events, where sampling design can have a significant impact on the representativeness of the data. This relates to *E. Coli*, sediment and nutrients.

It especially important for sediment attributes; in large rain events the average annual sediment load can be delivered to a receiving environment in a single day, for example in Porirua the large May 2015 event contributed more than three quarters of the total sediment load for the first six months of 2015 and more sediment than the combined loads for 2013 and 2014 for the Porirua stream[19]. When landslides occur, they can continue to deliver elevated sediment loads to receiving waters for many years. The natural variability of sediment delivery means particular caution needs to be applied in setting limits and measuring progress towards outcomes.

Recommendation

- Ensure robust and independently peer reviewed science is used for developing bottom lines, and their relevance for all locations
- Adopt an Action Plan approach when robust analysis indicates outcomes cannot be met using limits within 30 years, or maintained in 30 years
- Section 360 regulations for monitoring and analysis

Temporary exception for specified freshwater management units

In some places, we expect that bottom lines will not be able to be met, because of local or regional conditions, such as flood protection and land drainage schemes or urbanisation. These exceptions may not apply to the whole FMU.

In these cases, we prefer an action plan approach. The action plan approach would enable options to be explored beyond limit setting, and for options and limits to be re-visited to determine whether changes in law or technology may provide opportunities for outcomes to be met. Where robust analysis indicates a timeframe cannot be set for achieving the

[18] (Local Government New Zealand, 2019)
[19] (Morar & Oliver, 2016) http://www.gwrc.govt.nz/assets/Whaitua/Freshwater-Baseline-Modelling-Technical-Report.pdf

outcome attribute state, then a council would apply for a temporarily exception for specified freshwater management units

Recommendation

- Adopt an Action Plan approach when robust analysis indicates outcomes cannot be met using limits within 30 years, or maintained in 30 years

3. Conclusion

HortNZ is of the strong view that the NPS needs considerable redrafting. It has considerable inconsistencies with the RMA. The drafting will lead to uncertainty and inconsistent application.

We think the intention of Te Mana o te Wai is to be both an outcome and a holistic framework to guide resource management decision making. We support the concept but, with current drafting, it is unclear how to factor in the social, economic and cultural wellbeing of people in a sustainable way.

We support the approach of setting freshwater outcomes to reflect values. We support the concept of maintenance of existing state or improvement to achieve bottom lines as minimum outcomes. The time frame over which outcomes can be achieved, needs to be catchment specific and subject to an integrated assessment.

We are of the view that bottom lines must be set with robust science. The many extra bottom lines proposed will need a vast monitoring and analysis effort.

The target attribute monitoring sites must be representative of the freshwater management unit as a whole or linked to a site-specific values. An approach where many monitoring hold points are established within FMUs, reduces land use flexibility and supports grand-parenting, not sustainable freshwater management.

Currently there is an inconsistent approach to monitoring and data analysis across the regions. We recommend the government develop national guidance to provide a consistent approach to monitoring and analysis.

We support the involvement of communities and iwi, hapu and tangata whenua in setting values and outcomes. The proposed deadline of 2025 will put considerable pressure on Councils. We are doubtful this timeframe is achievable. We are concerned that growers will not be able to become involved in processes that are important to them.

There must be a feedback loop between outcome and limit setting decisions. Outcome decisions need to be considered in the context of the social, economic, environmental and cultural effects of the associated limits. Then, the desired outcomes, limits, actions and timeframes should be adjusted until a sustainable management approach is achieved. This feedback loop is not provided for in the policy at the moment. This omission is of considerable concern to us.

The policy identifies a limit-based approach for achieving outcomes for those attributes where it is assumed that the outcomes can be achieved with numeric limits on abstractions and discharges. The action plan approach is identified where other factors are influential. Actions plans can include limits and also include other mitigations and investments.

We support the limit concept, but it won't work everywhere. In some places, due to changes to river hydrology and form because of factors such as urbanisation, land drainage, electricity generation and flood protection, outcomes will not be able to be achieved using only a limit-based approach. In these places, an action plan approach should be adopted.

Councils need good quality decision support tools. In our view Councils need national support to ensure that good quality decision support tools are developed in a timely manner.

We understand that decisions need to be made with the information that exists at the time, it is equally important that limits and action plans can evolve over time as new information about how limits impact outcomes is improved.

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Appendix A: Decisions sought on draft NPSFM

Note: amendments sought to the notified text are shown in tracked changes, with additions shown in underline and deletions shown in ~~strikethrough~~, or to similar effect. The provisions are presented in the order in which they appear in the draft NPSFM.

(1) The specific provisions that HortNZ's submission related to are:	(2) HortNZ's submission is that:	(3) HortNZ seeks the following decisions from MfE
PART 1 Preliminary provisions		
Preamble	The preamble of the NPSFM 2017 has in the past assisted users with interpretation and administration of the NPS. The lack of preamble provides much less insight and direction into the NPSFM. The draft NPSFM would be improved by reintroducing a preamble in line with the direction from the 2008 BOI Report. The 2008 BOI Report gave the following guidance[20]: *The Board considers that a preamble can provide a useful introduction to the NPS. It should outline in broad terms the challenges for freshwater management, and state national values, issues and goals*.	**Include a preamble** in line with the direction from the 2008 BOI Report.
1.5 Fundamental Concept Te Mana o te Wai	HortNZ supports the consideration and recognition of the fundamental concept of Te Mana o te Wai. A concept well developed and recognised in the NPSFM 2017 as an integral part of freshwater management. However, this must be supported by a robust and effective resource management objective and policy suite. As proposed, it is unclear how Te Mana o te Wai works within a resource management context. The primary concern with the objective, is the manner in which priorities are now defined when the concept of Mana o te Wai appears more holistic and all encompassing. One element cannot occur without the other. If there is to be a priority, then it seems right that food security sits within the essential health needs of people. We find no definition of *essential health needs of people* but this cannot be simply contained to drinking water and water for sanitation. Without water there is no food, and this is an essential health need of people.	HortNZ supports the consideration and recognition of the fundamental concept of Te Mana o te Wai, our comments are to assist clarifying the meaning and application: **Explain how Te Mana o te Wai hierarchy of obligations works in the context of Section 5** of the RMA .For example: decisions recognise constraints on resource use are necessary to safeguard the wellbeing of water and the use of water is fundamental for the wellbeing of people, and that a holistic approach is used for resources management decisions, that considers the wellbeing of water and people when applying the hierarchy of obligations **Include discussion of ecosystem services** – particularly those services that contribute to the essential health needs of people.

[20] Report and Recommendations of the Board of Inquiry into the Proposed National Policy Statement for Freshwater Management (January 2010) at [254]

	Provisioning services refer to food yet the concept of ecosystem services are not explicitly developed in the policy – referred to only in the draft NPS-FM in the context of effects on wetlands. The relationship between the terms *essential health needs of people*, *ecosystem services* needs clarity. Appendix 1A describes the biophysical components to be considered in measuring freshwater ecosystem health, and the term ecosystem health should be appropriately linked to this Appendix in the text. HortNZ has suggested some amendments to Schedule 1A.	**Further define mana whakahaere** **Consider developing a single section with description, objectives and policies together**. **Provide a definition of essential health needs for communities** as follows: **"essential health needs for communities** incorporates ecosystem services such as: • the essential drinking water and sanitation needs of people • the ability of highly productive land to enable food security in relation to food production; and • other values assessed as being critical for the long term sustainability of communities."

Definition of "limit" / "limit on resource use".	A limit is now a "limit on resource use" or a "take limit". Water Quantity matters within the proposed NPS are now far more clearly linked to water quality matters; and this is supported. However, in our view the NPS does not appropriately link policies on the setting of quantity limits to requirement for efficient allocation in proposed Policy 7. One key change from the existing NPS is the removal of reference to a limit providing for the "maximum amount of resource available that allows a freshwater objective [environmental outcome] to be met". HortNZ supports the changes in general, but seeks to ensure that there is better connection to the requirement to be efficient (Policy 7, Part 2 of the proposed NPS) and enable production to the greatest extent possible; once the needs of waterbodies and essential needs are met. Limits that provide for rootstock survival water need to be linked the value of food production. Many existing limits simply provide a limit on resource use; particularly in the case of groundwater. A very good example (but by no means the only example) is the Gisborne Freshwater Plan; where aquifers in the Poverty Bay Flats specify a take limit but not an environmental flow or level. Often this is done when there is a poor natural resource accounting system; and the linkages between flows and an allocation volume cannot be made. Inefficient and precautionary allocation is extremely likely in poorly resourced regions. This will impact on regional development negatively and may hamper the Government's regional development programme if not managed carefully. HortNZ also notes that many plans will not be compliant with the proposed NPS in terms of water quality; either because: • in the case of a limit on resource use it is not expressly tied to a Schedule 2A water quality attribute; and • in the case of a take limit it is not clearly linked to an environmental flow or level.	**Signal the intention to develop a s. 360 regulation for hydrological accounting;** to support local decision making on resource use and development. Enable better freshwater accounting in catchments where ground and surface water hydrology are not appropriately measured and modelled; **through financial support for developing regions** to build better natural resource accounting systems**.** Decisions sought also relate to accounting; and on Environmental Flows and Levels 3.11. **MfE and MPI to publish an annual analysis of what limits on resource use and environmental flows and levels existing in current plans are compliant with the NPS.**

	HortNZ would predict that more surface water quantity limits will comply than groundwater quantity limits.	
1.6 Definitions ***Definition of FMU***	The new process to identify FMU's and to align monitoring networks to more appropriately measure FMU's is supported conditionally.	HortNZ conditionally supports these measures with the **addition of a requirement to identify all highly productive land within the FMU**.
1.6 Definitions ***Definition of "overallocation"***	Overallocation is now defined as being beyond a limit on resource use or a take limit or is being used to a point where one or more target attribute states is not being met. While there is a requirement to define environmental flows and levels and relate a take limit to the achievement of these; there is no reference to exceedances of environmental flows in relation to a take limit. There should be a connection if a take limit is required to support the environmental flow. Without it, a take limit may relate to anything at all; and this is not supported.	**Redefine overallocation** as follows: **"over-allocation**, in relation to both the quantity and quality of water, is the situation where the water: a. is beyond a limit on resource use or a take limit b. Take limits are revised within the life of plan to reflect analysis and modelling that meets the national standards. is ~~being used~~ utilised to a point where one or more target attribute states is not being met."
1.7 Application - Geographic application	The relevance of 1.7(1) is not clear. The relationship of the NPS with the coastal receiving environments and the NPSC is a consideration relevant to integrated management, and not setting outcomes, and limits. HortNZ also notes that the proposed NPS-HPL, has by its nature a geographic application. HortNZ seeks changes to the NPSFM to provide better linkages across the policy statements.	**Retain** as notified. **Make consequential amendments in policies and methods** to ensure the geographic application is clear.
1.7 Application - Temporal application	The draft NPSFM sets a national benchmark for current or existing vs. new as the date the NPS is gazetted. Furthermore the "maintain" threshold would now appear to relate to a new point in time. HortNZ supports the setting of a holistic baseline that determines the state of resources at the date this policy statement come into effect. Given that all plans are to be in place by 2025 and that transitional provisions exist, it will be necessary to extinguish the complexity of multiple benchmark periods in plans that related to prior NPS versions and regional policy.	**Retain** as notified. **Make consequential amendments in policies and methods** to ensure the purpose of the temporal application date is clear.
***1.*8 Application of section 55(2) of Act**	This relates to specific objectives or policies to be inserted into a policy statement or plan without use of the First Schedule process (s. 55 RMA) with clauses3.2(1) and 3.15(2) explicitly referred to:	**Clarify by identifying clearly** (and without qualifying language) **all parts of the proposed NPS as that are to be included via section 55(2).**

	• The draft NPSFM introduces new elements, including the requirement for every regional council to include a long-term vision (3.2(5)), methods (3.4(5)) and action plans (3.10). Clause 1.8 only identifies 2 matters to be included in policy statements or plans. Identified as examples. The reference in 1.8(1) to one objective and one policy could led to confusion that these are the only provisions that need including.	
PART 2 Objectives and Policies		
2.1 Objective	The NPSFM 2017 has 14 objectives, including Te Mana o te Wai (AA1) that is a logical extension from the preamble and national significance statement, supported by a suite of polices. The proposed structure is understood to translate the concept of Te Mana o te Wai, "the mana of the water", which refers to the fundamental value of water and the importance of prioritising the health and wellbeing of water before providing for human needs and wants. The draft NPS-FM states that this is an expression of New Zealanders' special connection with freshwater and that when Te Mana o te Wai is upheld, the future wellbeing of people and our unique ecosystems is protected. HortNZ supports the fundamental concept but not necessarily the manner in which Te Mana o te Wai has then been translated into a resource management objective with 13 proposed policies in the absence of clarity on where food security fits into this structure. The primary concern, is the manner in which priorities are now defined, when the concept of Mana o te Wai appears more holistic and all encompassing. One element cannot occur without the other. If there is to be a priority, then it seems right that food security sits within the essential health needs of people. We find no definition of *essential health needs of people* but this cannot be simply contained to drinking water and water for sanitation. Without water there is no food, and this is an essential health need of people. Given the interpretation issues and lack of clarity around food security, HortNZ supports a process whereby Te Mana o te Wai is able to be defined locally and where values and environmental outcomes are able to be locally determined. We propose amendments to make it clearer that the hierarchy of obligations within Te Mana o te Wai exist within an integrated and holistic decision making framework.	HortNZ supports the NPS Objective on the basis that **amendments are made to ecosystem services, to include food production** (including vegetable production) as a function of the essential health needs of communities, and the **description of how Te Mana o te Wai hierarchy relates to the overall sustainable management approach required by Section 5** of the RMA, is added to the Section 1.5.

2.2 Policies	There is a policy that enables people to provide for their economic wellbeing. No mention is made of their social and cultural wellbeing. There is no policy to enable people to provide for their essential human health needs. The structure of the NPS if such that, any growth in commercial vegetable production could only occur where water quality remains within current attribute states. This would be the case in all catchments irrespective of whether the community, iwi and local expression of Te Mana o te Wai determine that a growth objective is appropriate given the state of water. HortNZ conditionally supports these policies (with amendments) if allowance is made within the allocation limits and environmental flows for commercial vegetable production. This is a particular requirement for commercial vegetable production on highly productive land to enable the productive capacity the NPS-HPL seeks to protect. HortNZ notes that the NPS already provides for exceptions. This is the case for the named hydroelectric power systems, government related activities and any natural exception. It is HortNZs opinion that if exceptions can be made for nationally significant matters like infrastructure, then the NPS should also recognise and provide for the critical elements of the New Zealand food chain. It is here where an explicit linkage to the environmental outcomes sought through the NPS-HPL can be given effect to. HortNZ notes that the draft NPS includes an unpopulated "table of catchments" that are currently below bottom lines. Regional councils may set a target lower than a national bottom line for a timeframe set in this Appendix. It is not clear how this table will be populated. Our view is that an action plan approach is needed where robust analysis indicates that limits cannot sustainably achieve outcomes within a 30-year timeframe. HortNZ considers that the draft NPS-FM would be improved and provide the necessary linkages across national policy for food security (including the NSP-HPL) if a policy was added to address this issue. We note the draft NPS-FM includes a definition of ecosystem services as follows: *ecosystem services are the benefits obtained from ecosystems, which include:*	**Amend policies** as follows: **"Policy 2**: Freshwater is managed through the establishment of environmental flows and levels and a national objectives framework, in order to ensure that the currently existing health and wellbeing of waterbodies and freshwater ecosystems is maintained or improved." **Policy 4**: Freshwater is managed in an integrated way that considers the effects of the use and development of land on a whole-of-catchments basis, including: the effects on sensitive receiving environments; the utility of highly productive land; the provision of ecosystem services and the essential health needs of people. **Policy 7**: Environmental flows and levels are set to maximise resource use while achieving environmental outcomes, and ~~F~~freshwater is allocated and used efficiently, all existing over-allocation is phased out, and future over-allocation is avoided; **Policy 12**: Accounting frameworks for natural resources are established and improved over time, and Information on the adoption of management practices, the state of freshwater bodies and ecosystem health are regularly reported on and published; **Policy 13**: Communities are enabled to provide for their economic, social and cultural wellbeing while managing freshwater in a manner consistent with Te Mana o te Wai and as required by the national objectives framework and other requirements of this National Policy Statement.

	a) supporting services (e.g. nutrient cycling, soil formation, habitat creation); *b) provisioning services (e.g. food, freshwater, wood, fibre, fuel);* *c) regulating services (e.g. water purification, climate regulation, flood regulation, disease regulation); and d) cultural services (e.g. aesthetic, spiritual, educational, recreational)* Provisioning services refer to food yet the concept of ecosystem services are not explicitly developed in the policy – referred to only in the draft NPS-FM in the context of effects on wetlands. The relationship between the terms *essential health needs of people*, *ecosystem services* needs clarity in the context of food security and a specific policy response. HortNZ considers that there is also a key policy omission regarding guidance on the importance of setting environmental flows and levels to manage water quantity	
PART 3 Implementing objective and policies		
3.2 Te Mana o te Wai	HortNZ supports the concept of Te Mana o te Wai. Māori growers have emphasised the importance of this concept to us. Section 3.2 provides an objective (or words to the same effect) to be included in all regional policy statements. The section also includes direction for councils to *give effect* to Te Mana o te Wai and for Te Mana o te Wai to inform the interpretation of the policy. As proposed, it is unclear what the inclusion of the objective will mean, how does the council go about doing this, what does it mean at the plan level. HortNZ considers that there needs to be a date, by which the Te Mana o te Wai objective is articulated. This should be the first task in giving effect to the NPS. That articulation to occur through a council strategy prepared under the Local Government Act 2001and then incorporated into a regional policy statement. HortNZ notes that there is no requirement for a s32 evaluation and assessment, on the inclusion Te mana o te wai in the RPS. That being the case there needs to be a robust process whereby Te Mana o te Wai is able to be defined locally and where values and environmental outcomes are able to be locally determined. In accordance with the integrated and holistic concept of Te Mana o te Wai, HortNZ considers that it would not be appropriate to set timeframes on achieving	**Ensure the Vision for Te Mana o te Wai is articulated through a council strategy prepared under the Local Government Act 2001** and then incorporated into a **regional policy statement at least 2 years prior to the commencement of a Plan Change to implement the NPS Freshwater**. **Establish an independent Water Commission** to oversee Council implementation of the NPS & NES, ensuring in regulations that it is established to oversee water related matters for the general good of the public. **Appropriately resource the Commission** to respond to legitimate grievances raised when values are not appropriately recognised and provided for, or when communities are hampered by a regional authority's failure to implement the NPS correctly.

	the Te Mana o te Wai objectives in a regional policy statement objective. The timeframes to be determined through the FMU process.	
3.4 Integrated Management	HortNZ considers that revising the over-arching objective, providing a preamble and increasing the explanation of how Te Mana o te Wai concept can be used to guide decisions required to enable integrated decision making. The fundamental concept of Te Mana o te Wai is integrated management. In implementing the objective and policies via integrated management, it must be recognised that land use can have considerable impacts on the hydrology of catchments and the hydro-morphology of receiving waters. For example, impervious surfaces change the amount recharge and increase surface runoff, these changes result in hydrological changes. Similarly, forestry can result in large changes to catchment hydrology, but would not be captured by abstraction rules. The land use activities that impact on water quality and quantity are regional council functions. HortNZ recommends removing requirements that direct local authorities to take steps which go beyond their functions, powers, and duties, in regards to policy statements and plans.	**Amend** as follows: (1) Regional councils must, consistent with Te Mana o te Wai: a) recognise the interactions ki uta ki tai between freshwater, land, waterbodies, freshwater ecosystems, other ecosystems<u>, ecosystem services</u> and sensitive receiving environments, including the coastal environment; and b) manage freshwater, and land use and development, in catchments in an integrated and sustainable way, to avoid, remedy, or mitigate adverse effects, including cumulative effects; and c) <u>Where land use activities have a considerable impact on the hydrology, water quality, morphology and ecosystem health of receiving waters, but are not captured by the NPSFM provisions regulating discharges and abstractions, then an Action Plan approach to achieving long-term target attribute states must be adopted</u>
3.5 Overview of national objectives framework	3.5 Outlines the steps taken to give effect to the NOF: • Set FMU's • Values /attributes defined • Flows and levels set • Interventions implemented • Monitoring The previous NPS had adequate safeguards in terms of the Objective and Policies in Part CA. If no oversight is to be provided in the form HortNZ is seeking, we recommend the reinsertion of Objective CA and the accompanying policies.	HortNZ conditionally supports the outlined process as long as there is independent oversight and recourse to an independent Commissioner with appropriate powers to investigate and resolve grievance that can be justified. **Establish an independent Water Commission** to oversee Council implementation of the NPS & NES, ensuring in regulations that it is established to oversee water related matters for the general good of the public. **Appropriately resource the Commission** to respond to legitimate grievances raised when values are not appropriately recognised and provided for, or when

		communities are hampered by a regional authority's failure to implement the NPS correctly. **If an independent watchdog for freshwater processes is not established, HortNZ does not support the new proposed structure** and seeks maintenance of the appeal rights regime and the retention of Objective CA and the related policies from the prior NPS.
3.6 Identifying FMU's and monitoring sites	Care needs to be taken to select FMU's that reflect surface water and groundwater relationships. The size of FMU's is influential, they need to be sufficiently large for some flexibility of land use within them. The state of environment monitoring sites, with the longest and most reliable data may not always be truly representative of the hydrology and contaminant load sources at an FMU scale. HortNZ suggests that the government adopt regulations pursuant to section 360 of the RMA to describe monitoring and analysis standards, including spatial representation and water quality and quantity catchment modelling standards. Those regulations to be referenced into the NPS.	**Adopt regulations pursuant to section 360 of the RMA to describe monitoring and analysis standards** **Amend to include an information note** as follows: 6 Identifying FMUs and monitoring sites (1) Every regional council must identify FMUs for its region. (2) Every waterbody in the region must be located within an FMU. (3) Every regional council must also identify the following (if present) within each FMU: a) sites to be used for monitoring attributes; b) primary contact sites; c) the location of habitats of threatened species; d) outstanding waterbodies; e) inland wetlands (*see* clause 3.15). (4) Monitoring sites in an FMU must be located at sites that are either or both of the following: a) representative of the FMU: representative of one or more primary contact sites in the FMU **<u>Information note:</u>** <u>The Resource Management (Monitoring and Analysis standards) Regulations 2019 set out the standards for monitoring and analysis, including spatial representation and modelling standards</u>

3.7 Identifying values and environmental outcomes	HortNZ supports the change in terminology proposed in the draft in referring to values and outcomes. As evident in land change processes under previous versions of the NPSFM there is much confusion and inconsistency in how terms such as targets and objectives are used. The proposed changes support clearer interpretation and administration. HortNZ considers that consultation with tangata whenua and communities must occur when determining whether the values in 1b are relevant to an FMU. It is HortNZs opinion that values and outcomes must be set at the FMU scale, and monitoring sites for determining whether FMU outcomes are being achieved must be representative. Water-body specific values and outcomes should only be set where they relate to the items identified in section 3.6, o primary contact sites; o the location of habitats of threatened species; o outstanding waterbodies; o inland wetlands (see clause 3.15). o Or where an identified value has a limited spatial extent. A process must be established where the outcomes, limits, actions and timeframes are assessed before outcomes are set. A policy directing the use of robust decision support modelling tools should be provided. In our view national guidance is required to assist councils in developing suitable tools. The process for establishing attributes other than those identified in the NPSFM, must be subject to robust independent peer review.	**Amend** as follows: 7 Identifying values and environmental outcomes (1) Every regional council must identify the values that apply to each FMU, as follows: a) the compulsory values as set out in Appendix 1A; b) any of the other values set out in Appendix 1B that the council, community or tangata whenua considers applies; c) any other value as the council considers, after consultation with its community and tangata whenua, applies. (2) For each FMU, and for individual waterbodies or freshwater ecosystems within an FMU where specific values are identified, the regional council must describe the environmental outcomes that it wants to achieve for: a) the value Ecosystem Health, and each of its components; and b) the value Human Contact, and each of its components; and c) the value~~[s] [~~Mahinga Kai ~~or Tangata Whenua Value~~ and] Threatened Species; and d) any other values and components the council identifies. (3) A regional council may identify additional components and attributes for any of the compulsory values, and components and attributes for any additional values identified. (4) Any attributes developed by councils must be specific and, where possible, be able to be assessed in numeric terms, and independently peer reviewed. (5) Regional councils must include the environmental outcomes identified or described under this clause as an objective in their regional plans. 6) Prior to setting outcomes councils must assess the impact of limits and actions on the productive utility of HPL, ecosystem services, the essential human health needs of

		people and the social, economic and cultural wellbeing of people. **Information note:** The Resource Management (Monitoring and Analysis standards) Regulations 2019 set out the standards for monitoring and analysis, including spatial representation and modelling standards
3.8 Identifying current attribute states	It is HortNZs view that identifying current state must be based on robust scientific measurement. Regulators must use best practice based on good science when determining the current state. Furthermore, the measurement, data collection and reporting requirements must be relevant, practical, achievable and necessary. HortNZ considers that it is essential the current state is described in statistical manner that accounts for natural variability and sampling error. We recommend national guidelines are provide to clarify the minimum data length and statistical analysis required for describing the current state, and that guidance is provided to decision makers on how to account for uncertainty in decision making. Those regulations to be referenced into the NPS.	**Amend** as follows: 3.8 Identifying current attribute states 6) where new science is developed through monitoring and modelling that meets the 360 regulations, this must be taken into account in decision making, **Information note:** The Resource Management (Monitoring and Analysis standards) Regulations 2019 set out the standards for monitoring and analysis, including spatial representation and water quality and quantity catchment modelling standards
3.9 Setting target attributes states	It is HortNZs opinion that a process must be established where the essential human health needs of people and the social, economic and social wellbeing of people is considered, in the process of selecting and prioritising values, outcomes and the associated attributes for FMUs. • The essential human health needs of people and the social, economic and social wellbeing of people must be a key consideration in determining the appropriate time scale for achieving interim and target attribute states. • HortNZ supports a maintain and improve approach to establishing target attributes, but this should be within attribute bands and provide for statistical variability to ensure effort directed towards halting and reversing deterioration described in section 3.14 is not misdirected. • A policy requiring suitably robust modelling decision support tools to inform decision making is required. Identify a process for those places where robust analysis indicates a timeframe for achieving bottom lines cannot be established. In these locations we	**Amend** as follows: 3.9 Setting target attribute states (1) In order to achieve the environmental outcomes described under clause 3.7, every regional council must set a target attribute state for every attribute, as at each relevant monitoring site. (2) Every target attribute state must: a) for attributes relating to the value Human Contact, be above the current state of that attribute as determined under clause 3.8; and b) for all other attributes, be at or above the current state of that attribute and as determined under clause 3.8.

	recommend interim targets and interim timeframes are set and reviewed to account for improving information and technology. In these situations, an action plan approach, that may include limits, rather than a limit approach must be adopted.	(3) However, if the current attribute state is worse than the national bottom line for that attribute (as identified in Appendix 2A or 2B), the target attribute state must be set at, or better than, the national bottom line (*see* subpart 4 for exceptions to this). (4) Every target attribute state must: a) specify a timeframe for achieving the target attribute state; and b) for attributes for compulsory values, be set in terms of the requirements of Appendix 2A or 2B, as appropriate; and c) for any other attribute, be set in any way appropriate to the attribute. (5) Timeframes for achieving target attribute states: a) may be of any length or period; but b) if timeframes are long-term, they must include interim targets (set for intervals of not more than 10 years) to be used to assess progress towards achieving the target attribute state in the long-term. c) <u>where robust analysis indicates a timeframe for achieving bottom lines cannot be established. In these locations we recommend interim targets and interim timeframes are set and reviewed to account for improving information and technology. In these situations, an action plan approach, that may include limits, rather than a limit approach must be adopted.</u> (6) When setting target attribute states, regional councils must: a) have regard to the following: i. the foreseeable impacts of climate change; ii. the long-term vision set under clause 3.2; iii. the environmental outcomes set under clause 3.7(2);

		iv. the connections between waterbodies; v. the connection of waterbodies and coastal water; and b) use the best information available at the time; and c) not delay making decisions because of uncertainty about the quality or quantity of the information; and d) take into account results or information from freshwater accounting systems; and e) consider the requirements of all other national directions. (7) If an attribute applies to more than one value, the most stringent target state that is required to achieve the environmental outcomes described under clause 3.7 must be applied wherever that attribute applies. (8) Prior to setting attribute states, councils must assess the impact of limits and actions on the productive utility of HPL, ecosystem services, the essential human health needs of people and the social, economic and cultural wellbeing of people. 6) where new science is developed meeting national; standards, this must be taken into account in assessing the degree which limits are overallocated. **Information note:** The Resource Management (Monitoring and Analysis standards) Regulations 2019 set out the standards for monitoring and analysis, including spatial representation and water quality and quantity catchment modelling standards
3.10 Identifying limits on resources use and preparing action plans	The process prescribed in the NPS assumes it will always be possible to achieve the attribute target using the limit approach for specific attributes. In some circumstance, such as urban and peri-urban catchments and catchments with highly modified hydromorphology, this may not be possible. the action plan approach provides more scope, for achieving attribute states, in those locations	**Amend** as follows:

	where water quality and flow is not simply a function of discharges and abstractions. As part of Te Mana o te Wai , every regional council must develop, and articulate, a long-term objective that gives effect to Te Mana o te Wai, as discussed above we see this would be contained within a council strategy prepared under the Local Government Act 2001. • This approach would also useful for the action plan, because it can direct actions that are outside of the limitations of the RMA, such as local authority spending. HortNZ also believes that the community as a whole must work towards achievable target attribute states. An action plan approach can drive innovation.	Identifying limits on resource use and preparing action plans (1) In order to achieve the target attribute states for the attributes in Appendix 2A, every regional council: a) must identify limits on resource use that will achieve the target attribute state; and b) must include the limits on resource use as rules in its regional plan; and c) may prepare and publish action plans; and d) may impose conditions on resource consents. e) <u>where robust analysis indicates a limit for achieving bottom lines cannot be established, or where climate change is significantly impacting trends, in these situations, an action plan approach, that may include limits, must be adopted.</u> (2) In order to achieve the target attribute states for the attributes in Appendix 2B, every regional council: f) must prepare an action plan for achieving the target attribute state within the specified timeframe; and g) must publish the action plan; and h) may identify limits on resource use and include them as rules in its regional plan; and i) may impose conditions on resource consents. j) <u>The Action plan should be part of the strategy document can be prepared under the Local Government Act 2001 and the public can be engaged through the Special Consultative Procedure (s82-s90).</u> Include a review function in Clause 3.10(5) by inserting a new subclause c) where a take limit or a limit on resource use relies on limited data, Council must review the limit within 5 years, and can review it more frequently.
3.11 Environmental	Environmental flows and levels must be set to support the 3.7 “freshwater outcomes” developed, for groundwater this has not often been done. There is a	**Signal the intention to develop a s. 360 regulation for hydrological accounting within the accounting method;**

Flows and Levels	real danger this will not be done well; particularly in under-resourced regions. There must be guidance on how it should be done. All freshwater management should start with the fundamental building blocks of a natural resource accounting model. Almost all of these require a hydrological model at the base of them; so it is recommended a s.360 regulation be promulgated that describes good practice criteria and minimum standards for hydrological modelling to be accepted as evidence. We believe that s360 regulations for freshwater accounting will enable better freshwater accounting in catchments where ground and surface water hydrology are not appropriately measured and biophysical relationships are complex.	to support local decision making on resource use and development. Enable better freshwater accounting in catchments where ground and surface water hydrology are not appropriately measured and modelled; **through financial support for developing regions** to build better natural resource accounting systems**.**
3.12 Identifying take limits	HortNZ questions why volume *or* rate and not both are specified when appropriate. For groundwater the rate may be less important. For surface water the volume may be less important. However often both are desirable limits – but sometimes they are not. The policy should be clear on what is required for sound management of the natural resource.	**Amend** as follows: Specify that take limits must be described as both a volume and a rate when the resource reaches greater than 75% of the estimated environmental flow or level is allocated.

3.13 Monitoring	HortNZ considers it critical that the NPS is supported by national standards and methods for monitoring and analysis. It may that as part of an integrated management approach, the action plan seeks to achieve values that are not only freshwater values, may include catchment values such as ecosystem services. If this was the case then the monitoring should be clearly linked to these outcomes.	**Amend** as follows: Every regional council must establish methods for monitoring progress towards achieving target attributes states and identified environmental outcomes for values and components. (2) The methods must include: a) measures of the health of indigenous flora and fauna; and b) mātauranga Māori. (3) Monitoring methods must recognise the importance of long-term trends in monitoring results, and the relationship between results and their contribution to evaluating the environmental outcomes set under clause 3.7(2).

3.14 What to do if deterioration detected	The is a need to establish national standards and statistical methods for defining thresholds for determining deterioration for the various attributes, and including the ability to consider natural variability due to extreme or climate change. There is also a need to clarify the action plan process to be followed.	**Amend** as follows: (1) If a regional council detects a trend indicating a deterioration, <u>using analysis that meets national standards,</u> in any attribute state, or a failure to achieve identified environmental outcomes for values or components, it must prepare an action plan for halting, and if possible reversing, the deterioration. (2) The ~~action~~ <u>adaptive management plan</u> must include actions to identify the causes of the deterioration, methods to address those causes, an evaluation of the effectiveness of the methods, and processes for regular review and adjustment. (3) Where a target attribute state, environmental flow or level, or environmental outcome is not being met, the regional council may take any other steps, which may be regulatory (such as making rules or implementing methods), non-regulatory, or both, to assist the improvement of water quality, and avoid over-allocation, within defined timeframes. **Information note:** <u>The Resource Management (Monitoring and Analysis standards) Regulations 2019 set out the standards for monitoring and analysis, including spatial representation and water quality and quantity catchment modelling standards</u> **HortNZ request that MfE publish guidance on interpretation of the NPS** giving timeframes for determination of a trend; that are tailored to the natural fluctuations present in individual attributes, this method would be provided within 360 regulations for monitoring and analysis.

Minimum interventions	The table relates to section 3:10 which requires that limits or action plans are developed for specific attributes. In all cases an action plan may be developed and for some attributes a limit must be developed. The limits that are set under section 3.10 must meet the target attribute state. As discussed above, we are of the view there will be some locations where factors other than discharges are the dominant reason water quality attribute states cannot be met, and in these cases an action plan approach is more appropriate.	**Identify a process for Regional Councils to adopt an action plan approach rather than a limit approach**, for those sub-catchments and FMUs where robust analysis indicates a limit for achieving bottom lines cannot be established
3.15 Inland wetlands	If definitions are not clear, the rules could create a disincentive to create soft-engineering approach such as ponds and wetland for water quality treatments. If planted swamp riparian margins were counted as natural wetlands, this would create a disincentive to planting buffers (as opposed to leaving buffers in grass). We do not support the size class of 0.05ha and consider that a size class of 2ha should be the minimum criteria, as per the Landcare Research Wetland Delineation Protocols that refer to a small wetland as being <2ha. We also consider that requirements should specify for mapping purposes, that they relate to existing natural wetlands.	**Amend definition to exclude planted riparian margins.** HortNZ also comment on wetland definitions and provisions in our submission specific to the proposed NESFM. **Amend the minimum criteria for mapping wetlands** to 2ha and specify for mapping purposes, that they relate to existing natural wetlands.
3.16 Streams	Part 3.16 requires regional councils to change regional policy statements and plans to require no net loss in extent or the ecosystem health of stream through permanent diversion or culverting and avoiding the filling of streams unless no other practical alternative methods provide for an activity. HortNZ conditionally supports the proposal on the basis that the NPS and changes to regional policy statements and plans continue to recognise that in some circumstances no other practical alternative methods provide for an activity. Furthermore, offsetting must remain a viable method to address stream loss scenarios. It should be clear that access to land for rural production purposes is provided for; particularly access ways which were existing and lawfully established prior to the gazetting of the NPS and NES FW.	**Retain 3.16** as proposed with **Insert a new 3.16(5b)** as follows: <u>Is required for the purpose of maintaining legal access to a property.</u>

3.19 Water allocation	Councils to develop criteria for transfers, identify methods for efficiency and to claw back overallocation so that the limits on resource use and take limits are reduced to levels that meet the objective and policies of this National Policy Statement. HortNZ supports the use of a method to manage transfers and efficiency but considers some changes are required to make the method more applicable to other activities that may improve overallocation. In particular, there is a real need to encourage group management of freshwater resources and some irrigation infrastructure also deserves consideration in the rule framework.	**Amend Method 3.19** as follows: 3.19 Water allocation (1) Every regional council must make or change its regional plan to include criteria for: a) deciding applications to approve transfers of water take permits; and b) collective management in groups and enterprises; c) deciding how to improve and maximise the efficient allocation of water. (2) Every regional council must identify in regional plans methods to encourage the efficient use of water; and to promote collective management of water. (2A) Every regional authority must identify the highly productive land within each FMU; and adopt policies and methods providing for the utility of highly productive land. (3) Regional councils must define a timeframe within which over-allocation is phased out, and methods to achieve that, so that the limits on resource use and take limits are reduced to comply with the environmental flows and levels that meet the objective and policies of this National Policy Statement.

3.20 Accounting systems	HortNZ supports greater detail being provided on the expectation on Council to develop suitable and appropriate accounting tools at the FMU scale. To align with the outcomes sought through the NPS accounting systems must developed by a set time. To achieve this standard methods and reporting is required. HortNZ considers that the accounting policies of both regional and central government are generally inadequate for the planned government work programme in the NPS and in particular those related to allocation of resources. It remains the missing and critical building block in the development of sound resource management decisions. It seems inconsistent that so little coordination or leadership is being provided by government agencies in this area. NPS policies are however gradually improving and the policy on accounting within this proposed NPS is a small step up. Natural resource accounting requires the development of integrated biophysical models that are continuously improved through data collection to help predict spatial and temporal changes in the impacts of climate, soil, weather and ultimately land-use. Decision support models are critical to: (1) developing links between environmental outcomes and environmental flows, levels; limits on resource use and take limits; (2) estimating the fate of contaminants beyond the root zone; (3) allocating responsibility for discharges and ensuring water taken and used is within take limits and limits on resource use; (4) Predicting the trajectory of freshwater resources in flux when landuse change or subdivision, use and development proposals are being considered and authorised; (5) Supporting the development and cost benefit analysis required to by communities tasked with developing limits and attribute states; and determining the local expression of environmental outcomes to support Te Mana o te Wai; and (6) Establishing numeric estimations of natural resources available for allocation.	**Amend** as follows: By 2025 Every regional council must operate and maintain, for every FMU for which target attribute states and limits have been or are being set,: a) a freshwater quality accounting system; and b) a freshwater quantity accounting system. HortNZ recommend as discussed above that Govt. signal the intention to develop section 360 regulations for freshwater accounting within the accounting method. There is a clear need to support local decision making on resource use and development. Changes are required to regional policy to enable better freshwater accounting in catchments where ground and surface water hydrology are not appropriately measured and modelled. To assist this actually occurring new funding is required to provide financial support for developing regions to build better natural resource accounting systems. **HortNZ recommend amending Method 3.20** as follows: 3.20 Accounting systems (X1) Every regional council must make or change their regional policy statement to the extent needed by 2023 to provide for the integrated management of resource by: "requiring every FMU where regional authorities develop a decision support tool for public use to support implementation of NPS FW Method 3.20".

3.22 Exception for large hydro schemes	It is unclear what assessment criteria was used for determining these schemes should be provided an exception, or how the assessment relates to the Te Mana o te Wai concept. We accept that there will be some locations where due to significant changes in hydromorphology some bottom lines may never be met. Where these changes are a result of nationally significant infrastructure or a nationally significant activity, a case could be made that an exception is justified. However, we are of the view a policy should be developed to direct an assessment against criteria. We recommend that in cases where exceptions are granted an action plan approach is adopted for those catchments to implement limits where possible, and to focus on the actions available and including the contribution the electricity companies might made, to achieving improved outcomes in the catchments.	Develop criteria exceptions for nationally significant infrastructure and activities only Use an Action Plan approach for exceptions. If the exemptions framework is retained, then commercial vegetable production as a nationally significant activity should be provided with an enabling framework, particularly on highly productive land.
3.24 Transitional exception	Regional councils may set target attribute states that are worse than national bottom lines in respect of freshwater ecosystems identified in Appendix 4, until the times, or for the periods, specified in that appendix. In some places, we expect that bottom lines will also not be able to be met, not because of nationally significant infrastructure, but rather local or regional conditions, such as flood protection and land drainage schemes or urbanisation. In these cases, we prefer an action plan approach. The action plan approach would enable options to be explored beyond limit setting, and for options and limits to be re-visited to determine whether changes in law or technology may provide opportunities for outcomes to be met. Where robust analysis indicates a timeframe cannot be set for achieving the outcome attribute state, then a council would apply for a temporarily exception for specified freshwater management units.	**For other places where robust analysis indicates bottom lines cannot be met, use the Action Plan approach**, and the potentially temporarily setting outcomes below bottom lines or longer timeframes.

4.1 Timing	The final decisions on changes to policy statements and plans that are necessary to give effect to this National Policy Statement must be publicly notified no later than 31 December 2025. While HortNZ supports implementation timelines as a method for directing progress towards a goal, these must achievable. HortNZ challenges the Government on this matter as we firmly believe that the date of 31 December 2025 will be unachievable. Removing the natural justice protections of merit appeals presents significant concerns for HortNZ. The removal of merit appeal rights exert significant responsibilities for local government agencies. It is reasonable to expect that some poor decision making will be encountered within local communities. This is why HortNZ is calling for an Independent Water Commission. All sectors, iwi and technical specialists will be stretched to provide the resourcing for informed and constructive scientific input to the truncated processes. Efforts to improve natural resource accounting will require use of all public and private science resources to inform the construction of NPS compliant plans and the development of the local Vision for Te Mana o te Wai. At the same time it is likely that local and regional government will be required to invest heavily in monitoring, measuring and reporting. The strain on the resource planning system will be considerable. The truncated processes must be supported by Central Government to avoid unintended consequences of poor community outcomes from insubstantial planning frameworks. Resourcing should also be provided to Regional Councils to support accounting, monitoring and FMU identification initiatives. The consequences of setting limits that are poorly informed by science in catchments and FMU's with significant development are particularly likely to undermine the economic opportunities in developing regions.	**Seek advice from regional councils and set an achievable date.** **Provide support to Councils** to increase the pace. In our view technical guidance on modelling and monitoring and analysis could assist in streamlining the process somewhat.

Appendix 1A: Compulsory values	The policy includes a compulsory ecosystem health value and a compulsory human contact and threatened species value, and a possible mahinga kai or tangata whenua value. HortNZ considers that healthy ecosystems by definition provide ecosystem services including provisioning services.	**Support introduction of Mahinga Kai**, rather than tangata whenua value. **Amend Schedule 1A** as follows: 1 Ecosystem health In relation to a waterbody in an FMU, ecosystem health refers to the extent to which the FMU supports an ecosystem appropriate to the type of waterbody (eg, river, lake, wetland, or aquifer), and the ecosystem services provided to the FMU by the waterbody. There are 6 biophysical components that ~~contribute to~~ indicate freshwater ecosystem health, and it is necessary that all of them are managed. They are: Water quality – the physical and chemical measures of the water, such as temperature, dissolved oxygen, pH, suspended sediment, nutrients and toxicants Water quantity – the extent and variability in the level or flow of water. Habitat - the physical form, structure and extent of the waterbody, its bed, banks and margins, riparian vegetation and connections to the floodplain. Aquatic life – the abundance and diversity of biota including microbes, invertebrates, plants, fish and birds. Ecological processes – the interactions among biota and their physical and chemical environment such as primary production, decomposition, nutrient cycling and trophic connectivity.

Appendix 1B: Other values that must be considered	The policy reflects the same other national freshwater values. HortNZ supports the approach where *compulsory values* are always considered and *other values* that are relevant within a catchment must also be considered. All *compulsory values* and relevant *other values* are considered together and balanced to achieve the community freshwater outcomes. There should be not priority afforded to compulsory values (over and above that provided by the bottom lines), compared with other values. The concern for HortNZ is that as proposed, the value for irrigation, cultivation and food production has significantly less weight than before, with the new interpretation of Te Mana o te Wai and the addition of new compulsory values and attributes. Unfortunately, there seems to be a heavy focus on reducing the importance of provisioning services; (food security and food production) as a way of reducing the environmental effects of excessive primary production; despite our dependence and reliance on these essential human health requirements. The Government has recently released national direction around highly productive land. This has been done to preserve the productive capacity of finite high class soils; (for food production). HortNZ strongly disagrees with the inclusion of food crops within the irrigation value. Significant change is being sought from rural communities. Growers will be more open to that change if their values are more adequately recognised in national policy. Recognising the values of high production land is a good start; but food crops requires access to the means of production including access to water. If a cultivation and food production value is to be recognised it should come with responsibilities; the potential for adverse effects on water quality must be well managed through a tailored regulatory approach to vegetable production. We suggest that cultivation and food production is removed from this value and retained in another value as described in the relief sought. The previously utilised value for "mahi mara" is a more apt description of this value; referring to the knowledge and culture of cultivation for food production.	HortNZ has reviewed the values framework closely and believe that while there is a comprehensive value set which support environmental outcomes, there is a significant gap in the framework for providing for essential the health needs of people. **HortNZ strongly support inserting a new value: Mahi mara / Food security and cultivation** Highly productive land within the FMU retains access to freshwater while managing water quality; to ensure utility for arable, fruit and vegetable production. The stewardship of highly productive land is essential for the protection of ecosystem services derived from the use of water on highly productive land. This requires a **consequential amendment to the value for Irrigation, cultivation and food production,** as follows**:** "Irrigation, ~~cultivation and food production~~ – The freshwater management unit meets irrigation needs for any purpose. Water quality and quantity would be suitable for irrigation needs, including supporting the cultivation of food crops, the production of food from domesticated animals, non-food crops such as fibre and timber, pasture, sports fields and recreational areas. ~~Attributes will need to be specific to irrigation and food production requirements."~~

Appendix B: Legal Opinion

MEMORANDUM

TO: Horticulture New Zealand

FROM: Helen Atkins

DATE: 30 October 2019

SUBJECT: **REVIEW OF DRAFT NATIONAL POLICY STATEMENT FOR FRESHWATER MANAGEMENT 2019**

INTRODUCTION

1. This memorandum reviews the Draft National Policy Statement for Freshwater Management 2019 ("**Draft NPSFM**"). The purpose of this review is to be productive, constructive and provide officials and the Minister with a recommended pathway forward.

2. The discussion material notes that the drafting of the Draft NPSFM is a new approach to improve its quality and make it clear and more accessible to all New Zealanders. Unfortunately, the drafting will have the reverse effect to this as it does not result in a document that is more logical, internally consistent with clearer obligations, actions and directions for local authorities to meet. This coupled with the fact that many regional councils are a long way down the path of giving effect to the 2017 NPSFM will mean considerable confusion, duplication of work and ultimately cost and time delays. All this will result in an outcome that is worse for freshwater management in New Zealand.

SUMMARY OF THE KEY POINTS

3. As noted above the Draft NPSFM is inconsistent with existing legislation, inadequately drafted, and unclear. The key concerns are, the Draft NPSFM:

   (a) is inconsistent with the section 5 of the RMA in the way in which it sets priority for freshwater;

   (b) objectives and policies do not meet the requirement of what these provisions should be;

   (c) contains directions to local authorities that appear to go beyond the functions that those organisations have;

   (d) contains unclear definitions that are different from the definitions used in the RMA;

   (e) inclusion of 'action plans' and 'long term visions' do not sit well within an RMA framework and would be better placed in the Local Government Act framework as part of long term planning.

4. A more detailed critic follows with a suggested pathway forward. In summary it is considered that either the Draft NPSFM be substantially re-written or the preferred option is that the 2017 NPSFM framework is adopted and updated to address the key matters that the reform package is seeking to have addressed and included.

SPECIFIC CONCERNS WITH DRAFT NPSFM

5. The details of the specific concerns are set out in this section of the memorandum following the order outlined above. For ease of reference most of the provisions referred to have been included in full.

Inconsistency with RMA – section 5 and priority of water

6. The RMA sets out the purpose of national policy statements as follows:[1]

> The purpose of national policy statements is to state objectives and policies for matters of national significance that are relevant to achieving the purpose of this Act.

7. The purpose of the RMA is contained in section 5 as follows:

> (1) The purpose of this Act is to promote the sustainable management of natural and physical resources.
>
> (2) In this Act, *sustainable management* means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—
>
> > (a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and
> >
> > (b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and
> >
> > (c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.

8. The Objective of the Draft NPSFM is as follows:

> 2.1 Objective
>
> The objective of this National Policy Statement is to ensure that **resources are managed in a way that prioritises**:
>
> a) first, the **health and wellbeing of waterbodies and freshwater ecosystems**; and
>
> b) second, the **essential health needs of people**; and
>
> c) third, the ability of people and communities to provide for their social, economic, and cultural wellbeing, now and in the future.
>
> *[emphasis added]*

[1] Resource Management Act 1991 section 45(1)

Critique

9. The RMA's purpose as contained in section 5 requires resources to be managed in a way or at a rate which enables people and communities to provide for their social, economic, and cultural well-being, and for their health and safety. While the intention is that prioritisation that puts 'health and wellbeing of waterbodies and freshwater ecosystems' at the top reflects the bottom line setting approach envisaged by section 5, this black and white prioritisation could result in a situation where councils are unable to make management decisions in relation to freshwater that enables their communities to provide for their wellbeing.

10. Section 5 has been described as the "lodestar" of the Act.[2] Case law holds that section 5[3]:

> It is not a part of the Act which should not be subject to strict rules and principles of statutory construction which aims to extract a precise and unique meaning from the words used. There is a deliberate openness about the language, its meaning and its connotations which is intended to allow the application of policy in a general and broad way.

11. Subsequent cases have supported the importance of the openness of the language[4]:

> We have considered in the light of those remarks the method to be used in applying section 5 to a case where on some issues a proposal is found to promote one or more of the aspects of sustainable management, and on others is found not to attain, or to attain fully, one or more of the aspects described in paragraphs (a), (b) and (c). To conclude that the latter necessarily overrides the former, with no judgment of scale or proportion, would be to subject section 5(2) to the strict rules and proposal [sic] of statutory construction which are not applicable to the broad description of the statutory purpose. To do so would not allow room for exercise of the kind of judgment by decision-makers (including this Court — formerly the Planning Tribunal) alluded to in the *NZ Rail* case.

12. Subject to the comments below in relation to the *King Salmon* decision, the general approach taken by the Courts in relation to section 5 has been described as the "overall judgment" approach, which requires an 'overall broad judgment of whether the proposal would promote the sustainable management of natural and physical resources. Such a judgment allows for comparison of conflicting considerations and relative scale and degree of them, and their relative significance in the final outcome'.[5]

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[2] *Lee v Auckland City Council* [1995] NZRMA 241 (PT)

[3] *New Zealand Rail Limited v Marlborough District Council* 1994 NZRMA 70 *at pg 72*

[4] *North Shore City Council v Auckland Regional Council* (1996) 2 ELRNZ 305

[5] *Independent News Auckland Ltd v Manukau City Council* (2004) 10 ELRNZ 16 at [26]

13. Case law has considered whether section 5 contains any preference for factors to consider, with the Court holding that the RMA contains no preferences for any aspect in section 5 over another:[6]

> In our view, the enabling and management functions of section 5(2) are of equal importance.

14. This was clarified in *Long Bay-Okura Great Park Society Inc v North Shore City Council:*

> [278] … We observe that there is some confusion in the labels being attached to different provisions in Part 2. In *Kiwi Property Management* the first part of section 5(2) appears to be an 'enabling' function, and the second part of section 5(2) - section 5(2)(a) to (c)- is the 'management' function. That contrasts with the *Winstone Aggregates* decision where 'the management function' appears to be the name for the first part of section 5(2). We consider it is more consistent if the first component of section 5(2) is called 'the enabling obligation' and the second is simply called 'section 5(2)(a) to (c)'.. But if the point of *Kiwi Property Management* is that the 'enabling' obligation and the section 5(2)(a) to (c) functions are of equal importance, then we respectfully agree. That is not the same as setting up a dichotomy between the 'natural environment' - which is not a phrase used in the RMA - and 'people'.
>
> [279] Counsel for Landco referred to *Judges Bay Residents Association v Auckland Regional Council* where the Environment Court held:
>
> > In general the Act contains no preference for managing use and development of resources for enabling communities to provide fur their economic wellbeing over protection of resources for enabling communities to provide for their social and cultural wellbeing, sustaining the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations, and avoiding, remedying adverse effects on the environment. [Our emphases]
>
> This decision makes another point completely - and one we respectfully agree with - where the Environment Court stated that the RMA contained no general preference for economic wellbeing over social and cultural wellbeing and the section 5(2)(a) and (b) matters.

15. In our view case law supports the proposition that prioritising one of the components of section 5 over another is not appropriate. Making decisions about resource management without enabling people and communities to provide for their social, economic, and cultural well-being and for their health and safety is not in accordance with section 5. A holistic approach to freshwater management would ensure that the ecological wellbeing of freshwater is provided for (enhanced where it is degraded and maintained where it is not degraded) in the context of community wellbeing. In short, a healthy freshwater system will ensure a healthy community. The two are inextricably linked.

16. The failure of the objective to achieve the purpose of the RMA is compounded by the stipulation that the first priority is 'the health and wellbeing of waterbodies and freshwater ecosystems', with the second

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[6] *Kiwi property Management Limited and Others v Hamilton City Council* (2003) 9 ELRNZ 249 at paragraph 43

priority being 'the essential health needs of people'. The use of the words of 'first' and 'second' priorities suggest that these matters are not subject to *any* other considerations or limitations. In other words the drafting does not indicate that the prioritisation of these matters is subject to enabling people and communities to provide for their social, economic, and cultural well-being. As noted above considerations of ecological wellbeing cannot be divorced from community wellbeing.

17. The intention of the objective is clear in that it is essentially trying to say what section 5 is intended to do which is to provide that the biophysical bottom lines must be set to ensure that wellbeing of waterbodies and freshwater ecosystems. Once these bottom lines are set (based on scientific evidence) the needs of communities can be considered. However the first priority is more black and white than section 5 in that it does not consider important concepts such as the current state of the water body under consideration, the rate of use or non-use of freshwater and the timing of any use changes.

18. It is acknowledged that section 5 has not been implemented consistently and appropriately in relation to freshwater (and indeed other resources) but this is not a problem with section 5. It is a problem with the implementation, the lack of national guidance from the time the RMA was enacted, and the enforcement, compliance and monitoring of the performance of the RMA. Section 5 sets a clear framework for ensuring ecological health in the context of providing for community wellbeing. Re-defining section 5 as has been done in the Draft NPSFM will inevitably result in to uncertainly and lead to confusion.

19. The 2008 BOI Report acknowledged that '*the NPS needs to be consistent with the RMA provisions, but considers that for the NPS to make a difference it needs to do more than just mirror the words in the RMA*'.[7] We agree with this but do not consider that the current drafting of the Draft NPSFM is protected by this analysis as it simply does not achieve the purpose of the RMA. Significant risks arise from current drafting as noted below.

20. With regards to the decision of the Supreme Court in *King Salmon* it held that resort to Part 2 of the RMA is not necessary or helpful in order to interpret policies *except* in the case of invalidity, incomplete coverage, or uncertainty of meaning.[8] This decision, and the subsequent Court of Appeal decision in *Davidson*[9] which endorsed the above three caveats carved out by the Supreme Court, has emphasised that close attention must be paid to objectives and policies. Decision makers making decisions on the Draft NPSFM must, therefore, be cognisant of this imperative.

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[7] Report and Recommendations of the Board of Inquiry into the Proposed National Policy Statement for Freshwater Management (January 2010) at [54]

[8] *Environmental Defence Society Inc v New Zealand King Salmon Company Lt* [2014] NZSC 38 at [90]

[9] *RJ Davidson Family Trust v Marlborough District Council* [2018] NZCA 316, specifically see [76] and [82]

21. The inconsistency with the purpose of the RMA constitutes both invalidity and uncertainty of meaning, which would then invite councils to resort to Part 2 for interpretation. This would not encourage consistency of approach as each council decision maker would be making decisions and analysis independently.

22. The Supreme Court in *King Salmon* saw that absent invalidity, incomplete coverage or uncertainty of meaning, recourse to Part 2, in enabling decision makers to decline to implement parts of the New Zealand Coastal Policy Statement if they considered that appropriate in the circumstances, does not fit readily into the hierarchical scheme of the RMA.[10] The Supreme Court commented that while the scheme of the Act does give subordinate decision-makers 'considerable flexibility and scope for choice' that scope is not infinite, and the requirement to "give effect to" is intended to constrain decision-makers, and enabling discretion through resort to Part 2 seems incompatible with this.

23. Accordingly, there is judicial direction that allowing resort to Part 2 is undesirable. The current wording of the Draft NPSFM will inevitably lead to more litigation on what the words in the objective means in the context of Part 2. On a more pragmatic note, allowing decision-makers to resort to Part 2 would encourage inconsistency of application, thereby undermining the application and interpretation of the Draft NPSFM.

<u>Suggested solution</u>

24. As noted above the preferred solution is to have an enhanced 2017 NPSFM rather than a totally new NPS. If the way forward is to be a totally new NPS then significant changes are needed to the wording of this objective to ensure its consistency with section 5.

25. One option with regards to the wording is for officials to consider amending the objectives in line with the existing 2017 NPSFM and that proposed in 2008 by the Board of Inquiry (see the **2008 BOI Report**) at that time. Such an approach would provide more clarity, consistency, and certainty, and provide the necessary updates the Government is seeking to make in freshwater policy.

Objectives and Policies not fit for purpose

26. The general drafting of the objectives and policies are currently not fit for the purpose. As noted, the objectives and policies must be appropriate to achieving the purpose of the Act.[11]

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[10] *Environmental Defence Society Inv c The New Zealand King Salmon Company Ltd* [2014] NZSC 38 at

[11] Resource Management Act s45A(1)

27. The 2008 BOI Report gave the following guidance regarding objectives and policies in a NPS:

> [137] The RMA treats the words objective and policy as having different meanings. From section 62(1)(c) of the RMA the Board understands that an objective is something sought to be achieved. The Court of Appeal has held that a policy is a course of action, and may be a mandatory direction having a restraining effect. The Board infers from that case that **a policy is intended to be a course of action for the achievement of an objective**.
>
> *[emphasis added]*

28. The case referenced by the 2008 BOI Report is *Auckland Regional Council v North Shore City Council* [1995] CA29/96 1B ELRNZ at 433 which states:

> 'Policy' and 'policies' must bear their natural and ordinary meaning in the context of the Act. As an appropriate definition Mr Salmon cited what is described in the Oxford English Dictionary, second edition, as the chief living sense:
>
> > "5. A **course of action adopted and pursued by a government**, party, ruler, statesman, etc; any course of action adopted as advantageous or expedient."
>
> The definition 'a course of action' is also given by other dictionaries, such as Chambers. It may readily be accepted as appropriate in the present context.
>
> *[emphasis added]*

29. The 2008 BOI Report also noted that '[W]hen an objective is seen as too difficult to implement, this can lead to inaction.'[12] This is pragmatic advice, and we consider that the drafting of the objectives should ensure that they are achievable and possible to implement.

Critique

30. In light of this direction on what constitutes an 'objective' and what constitutes a 'policy', we do not consider that the objectives and policies contained in the Draft NPSFM are appropriately drafted.

31. Not only is the objective (as discussed above) inconsistent with the purpose of the RMA, it is drafted in a vague way, with no real clarification of what constitutes 'the health and wellbeing of waterbodies and freshwater ecosystems' and 'the essential health needs of people'. The lack of clarity makes the objective difficult to measure and subsequently difficult to be confident that it has been met. This lack of clarity and uncertainty over achievement requirements makes the objective too difficult to implement with the risk being inaction – the very thing the new programme is seeking to address.

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[12] Report and Recommendations of the Board of Inquiry into the Proposed National Policy Statement for Freshwater Management (January 2010) at [152]

32. General wording in objectives is not fatal provided they are backed up by clear policies. In this case the wording of the objective has flow-on effects in the policies. As the policies are intended to achieve the objective and any lack of clarity or uncertainty in the objective impacts on the wording of the policies that follow it.

33. It is, therefore, uncertain exactly how the policies will achieve the objective. For example, it is unknown whether managing freshwater in a way that gives effect to Te Mana o te Wai (Policy 1) will prioritise the 'health and wellbeing of waterbodies and freshwater ecosystems', 'the essential health needs of people', or 'the ability of people and communities to provide for their social, economic, and cultural wellbeing, now and in the future'. This same uncertainty arises for all the policies.

Risks arising from current drafting

34. The risks of having objectives and policies which are not fit for purpose include:

    (a) Uncertainty, leading to lack of action;

    (b) Inability to measure success, leading to lack of action;

    (c) Difficulty in implementation, leading to lack of action;

    (d) Potential litigation, and specifically the risk of judicial review, leading to delay and a lack of action; and

    (e) Lack of clear national direction, leading to uncertainty and lack of action in the regions.

Suggested solution

35. As noted above it is considered that an enhanced 2017 NPSFM is the answer or an amalgam of 2017 and the draft 2008 NPS. Some work has been done on what this redraft may look like and this can be shared with officials at the appropriate time.

Direction to local authorities which entail going beyond their functions

36. We consider that the Draft NPSFM appears to contain directions to local authorities which go beyond their functions and to the extent it does these would be ultra vires. Specifically, these are the directions contained in the NPSFM to regional councils to include content in their regional policy statements and regional plans.

Critique

37. While section 45A of the RMA states that a national policy statement may state 'objectives and policies that must be included in policy statements and

plans'[13], this does not mean that national policy statements may direct local authorities to take steps which go beyond their functions, powers, and duties, in regards to policy statements and plans.

38. The functions, powers, and duties of regional councils in relation to policy statements and plans are set out in Part 4 of the RMA.

> 30 Functions of regional councils under this Act
> (1) Every regional council shall have the following functions for the purpose of giving effect to this Act in its region:
>
> (a) the establishment, implementation, and review of objectives, policies, and methods to achieve integrated management of the natural and physical resources of the region:
> (b) the preparation of objectives and policies in relation to any actual or potential effects of the use, development, or protection of land which are of regional significance:
> (ba) the establishment, implementation, and review of objectives, policies, and methods to ensure that there is sufficient development capacity in relation to housing and business land to meet the expected demands of the region:
> (c) the control of the use of land for the purpose of—
>
> (i) soil conservation:
> (ii) the maintenance and enhancement of the quality of water in water bodies and coastal water:
> (iii) the maintenance of the quantity of water in water bodies and coastal water:
> (iiia) the maintenance and enhancement of ecosystems in water bodies and coastal water:
> (iv) the avoidance or mitigation of natural hazards:
>
> …
>
> (e) the control of the taking, use, damming, and diversion of water, and the control of the quantity, level, and flow of water in any water body, including—
>
> (i) the setting of any maximum or minimum levels or flows of water:
> (ii) the control of the range, or rate of change, of levels or flows of water:
> (iii) the control of the taking or use of geothermal energy:
>
> (f) the control of discharges of contaminants into or onto land, air, or water and discharges of water into water:
> (fa) if appropriate, the establishment of rules in a regional plan to allocate any of the following:
>
> (i) the taking or use of water (other than open coastal water):
> (ii) the taking or use of heat or energy from water (other than open coastal water):
> (iii) the taking or use of heat or energy from the material surrounding geothermal water:
> (iv) the capacity of air or water to assimilate a discharge of a contaminant:
>
> (fb) if appropriate, and in conjunction with the Minister of Conservation,—
>
> (i) the establishment of rules in a regional coastal plan to allocate the taking or use of heat or energy from open coastal water:
> (ii) the establishment of a rule in a regional coastal plan to allocate space in a coastal marine area under Part 7A:
>
> (g) in relation to any bed of a water body, the control of the introduction or planting of any plant in, on, or under that land, for the purpose of—

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[13] Resource Management Act 1991 s45A(2)(e)

(i) soil conservation:
(ii) the maintenance and enhancement of the quality of water in that water body:
(iii) the maintenance of the quantity of water in that water body:
(iv) the avoidance or mitigation of natural hazards:
(ga) the establishment, implementation, and review of objectives, policies, and methods for maintaining indigenous biological diversity:
(gb) the strategic integration of infrastructure with land use through objectives, policies, and methods:
(h) any other functions specified in this Act.

39. The RMA specifies that every regional council shall have the function of 'the establishment, implementation, and review of objectives, policies and methods to achieve integrated management of the natural and physical resources of the region'.[14] For something to be 'integrated' it needs to work in with other aspects of the environment, and not be prioritised above it. Further, 'integrated' suggests that a wide variety of factors are present in the management of the natural and physical resources, which precludes prioritisation at the expense of other factors.

40. The objectives, policies and methods must achieve 'integrated management of the natural and physical resources of the region'. The RMA defines 'natural and physical resources' as:

> natural and physical resources includes land, water, air, soil, minerals, and energy, all forms of plants and animals (whether native to New Zealand or introduced), and all structures.

41. This means that the objectives, policies, and methods must achieve *integrated management* of these elements of natural and physical resources, including all forms of plants and animals. Where the objectives, policies and methods preclude the integrated management of one of these aspects, this would make the objective, policy or method ultra vires.

42. While the RMA permits that regional councils can control 'the use of land' for the purpose of the maintenance and enhancement of the quality and quantity of water in water bodies and coastal water, and of ecosystems in water bodies and coastal water,[15] this does not permit preventing the integrated management of other aspects of natural and physical resources.

43. The Draft NPSFM often recognises the need to manage integrated management while recognising the needs of other aspects of natural and physical resources, however there are particular sections where the Draft NPSFM instructs regional councils to include wording, methods, or wording and methods to the same effect, where that wording or method is outside the

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[14] Resource Management Act 1991 s30(1)(a)

[15] Resource Management Act 1991 s30(1)(c)

ability of the regional council to implement as it would be ultra vires. An example of this is the following:[16]

> Every regional council must include in its regional policy statement the following policy (or words to the same effect): "The loss or degradation of all or any part of a natural inland wetland is avoided"

44. Another example includes:

> 3.2 Te Mana o te Wai
>
> (1) Every regional council must include the following objective (or words to the same effect) in its regional policy statement: "The management of freshwater in our region must be carried out in a manner that gives effect to Te Mana o te Wai, as it is described in the National Policy Statement for Freshwater Management 2019 and understood locally."

45. Te Mana o te Wai inherently involves the holistic aspects of freshwater. If the water is healthy the social, economic and cultural wellbeing of people and communities is healthy. Te Mana o te Wai does not prioritise one aspect over another all are inherently interconnected and important as part of the holistic consideration that is essential in freshwater management decisions. In essence, section 5 and the concept of integrated management are embodied in Te Mana o te Wai.

46. We have further concerns about the direction in [3.4] of the Draft NPSFM with regard to territorial authorities which states:

> "District plans must include objectives, policies, and methods to avoid, remedy, or mitigate the cumulative adverse effects of land use on freshwater bodies, freshwater ecosystems, and sensitive receiving environments resulting from urban development."

47. The functions of a territorial authority pursuant to section 31 of the Act, and in relation to water, are restricted to 'the control of any actual or potential effects of activities in relation to the surface of water in rivers and lakes'.[17] Therefore the direction contained above is either ultra vires, or is restricted to actions solely undertaken in relation to the surface of water in rivers and lakes.

<u>Risks arising from current drafting</u>

48. We consider that drafting of the objectives and policies are at least unclear and confusing and at worst ultra vires in some areas. As such they are vulnerable to judicial challenge. If this were to occur this would weaken and delay the implementation which is exactly what the Government is seeking to overcome.

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[16] Draft NPSFM Subpart 3 Specific Requirements, 3.15(2)

[17] Resource Management Act 1991 s31(1)€

Suggested solution

49. As noted above.

Drafting of definitions

50. Some of the definitions used by the Draft NPSFM are drafted poorly as they carve out exceptions to the already established definitions contained in the RMA, thereby creating unnecessary confusion and inconsistency.

Critique

51. The inconsistencies arise specifically as follows:

Draft NPSFM term and definition	**Resource Management Act term and definition**
'Coastal wetland' Coastal wetland means a natural wetland that is influenced by marine or coastal geomorphological processes to the seaward extent of freshwater influence, and includes: a) Saltmarshes (of which mangroves can be a structural component); and b) seagrass meadows in intertidal and subtidal zones less than 2 m below mean low water spring tide	**'Wetland':** Wetland includes permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants and animals that are adapted to wet condition
'Constructed wetland' Constructed wetland means a wetland constructed by artificial means that: a) supports an ecosystem of plants that are suited to wet conditions; and b) is constructed for a specific purpose in a place where a natural wetland does not already exist	
'Inland wetland' Inland wetland means any wetland that is not a coastal wetland, but does not include geothermal wetlands	
'Natural wetland' Natural wetland means a wetland as defined in the Act (regardless of whether it is dominated by indigenous or exotic vegetation) except that it does not include: a) wet pasture or paddocks where water temporarily ponds after rain in places dominated by pasture, or that contain patches of exotic sedge or rush species; or b) constructed wetlands; or c) geothermal wetlands	
'Waterbody'	**'Water body'** Water body means fresh water or geothermal water in a river, lake,

Waterbody has the meaning in the Act, except that it does not include geothermal water	stream, pond, wetland, or aquifer, or any part thereof, that is not located within the coastal marine area
'Stream' Stream has the same meaning as river in the Act, and is used interchangeably with that term, as consistent with common usage	**'River'** River means a continually or intermittently flowing body of fresh water; and includes a stream and modified watercourse; but does not include any artificial watercourse (including an irrigation canal, water supply race, canal for the supply of water for electricity power generation, and farm drainage canal)
'Freshwater' is not defined in the Draft NPSFM	**'Fresh water'** Fresh water means all water except coastal water and geothermal water
	'Long-Term Action Plan' A long-term plan prepared under sections 93-94 of the Local Government Act 2002 which deals with matters set out in the NPSFM
	'Coastal Environments' Coastal environment encompasses the elements described in the New Zealand Coastal Policy Statement 2010, Policy 1, including the ecosystems, marine and intertidal areas, estuaries, dunes and land of the coastal environment.
	'Sensitive receiving environment' **[a definition is needed not sure there is precedence from the freshwater area there is certainly some in the air quality arena]**
	'Natural wetlands' Natural wetlands do not include wetlands which have been crafted by humans, and specifically does not include sediment ponds.

Risks arising from current drafting

52. There is no reason to re-define or tweak the meaning of terms or carve out exceptions (as has been done in regards to the drafting of 'waterbody')

where complete definitions already exist in the RMA. To do so risks creating uncertainty, inconsistency of application, and further, is unnecessary.

53. Further, it is undesirable to use the word 'stream' and 'river' interchangeably as the RMA is clear that the term 'river' includes a stream. The term 'river' should be used in the Draft NPSFM for consistency's sake.

54. It is questionable whether it is necessary to define 'freshwater' in the Draft NPSFM as to not do so could cause unnecessary confusion and unreasonable uncertainty. This is particular the case when the Draft NPSFM has chosen to define some terms but not others. We propose that the definition of 'freshwater' as contained in the RMA is included in the Draft NPSFM.

Suggested solution

55. Our suggested solution to this drafting is to:

a) use the definitions contained in the Act, as this is the primary legislation;
b) Include a direct reference to the definition for 'freshwater' as defined in the RMA;
c) Remove all carve-outs from the definitions contained in the RMA; and
d) Use the word 'river' as it is defined in the RMA.

GENERAL DRAFTING COMMENTS

The preamble

56. The preamble to the Draft NPSFM is unsatisfactory and unfit for purpose. The 2008 BOI Report gave the following guidance:[18]

> The Board considers that a preamble can provide a useful introduction to the NPS. It should outline in broad terms the challenges for freshwater management, and state national values, issues and goals.

57. Part 1 of the Draft NPSFM neither outlines the challenges for freshwater management, nor states the national values, issues, and goals, aside from explaining the concept of 'Te Mana o te Wai'. Accordingly we consider that the preamble needs to be re-written in line with the direction from the 2008 BOI Report.

Action Plan and Long-Term Vision

58. The objectives and policies of the Draft NPSFM contain references to 'long-term visions' being prepared and placed within reginal policy statements,[19] and 'action plans' being prepared.[20] Neither of these terms are defined, and

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[18] Report and Recommendations of the Board of Inquiry into the Proposed National Policy Statement for Freshwater Management (January 2010) at [254]

[19] Draft NPSFM at 3.2 Te Mana o te Wai

[20] Draft NPSFM at 3.10 Identifying limits on resource use and preparing action plans

their purpose, intention, and parameters are therefore uncertain and confusing.

59. As such, we are uncertain what the status and format of the long-term vision and action plans are, where they sit in the hierarchy of documents, what their legal status is, and whether there are any legal requirements attached to these documents. Our feeling is that these documents are aspirational documents which have no legal effect, as we are uncertain under what authority these are prepared and what the legal status and enforceability of such a document is.

60. This drafting resulting in such confusion over the status and requirements associated with action plans and long-term visions is unacceptable.

Suggested Solution

61. We suggest that the process for formulating action plans and long-term strategies is incorrectly placed under the auspices of the RMA, where it should located under the provisions of the LGA 2002. This is because a long-term vision should set a vision and aspirations for outcomes, and these visions and aspirations are implemented through resource management statements and plans.

62. Under the RMA a policy and plan is reviewed every 10 years, which is antithetical to the concept of long-term planning.

63. The LGA 2002 provides a process by which a strategy can be prepared, with public engagement under the special consultative procedure contained in sections 93 through 94. A strategy prepared under this process has weight under the Act, as it constitutes a 'management plans and strategies prepared under other Acts' which must be had regard to by council when preparing or changing a regional policy statement.[21]

Parts 3 and 4

64. The Draft NPSFM contains the following sections:

a) Part 3, Subpart 1: approaches to implementing objective and policies;
b) Part 3, Subpart 2: national objectives framework;
c) Part 3, Subpart 3: specific requirements;
d) Part 3, Subpart 4: exceptions; and
e) Part 4: timing.
f) Appendices

65. As noted, the structure of the 2017 NPSFM is preferred but if the current structure is to be retained then the information currently contained in Parts 3

[21] Resource Management Act 1991 s61(2)(a)9i)

and 4 should be included as policies in the NPSFM. The Act specifies at section 45A that:

> (1) A national policy statement must state objective and policies for matters of national significance that are relevant to achieving the purpose of this Act.
>
> (2) A national policy statement may also state –
>
> (a) The matters that local authorities must consider in preparing policy statements and plans;
>
> (b) methods or requirements in policy statements or plans, and any specifications for how local authorities must apply those methods or requirements, including the use of models and formulae:
>
> (c) the matters that local authorities are required to achieve or provide for in policy statements and plans:
>
> (d) constraints or limits on the content of policy statements or plans:
>
> (e) objectives and policies that must be included in policy statements and plans:
>
> (f) directions to local authorities on the collection and publication of specific information in order to achieve the objectives of the statement:
>
> (g) directions to local authorities on monitoring and reporting on matters relevant to the statement, including—
>
> (i) directions for monitoring and reporting on their progress in relation to any provision included in the statement under this section; and
>
> (ii) directions for monitoring and reporting on how they are giving effect to the statement; and
>
> (iii) directions specifying standards, methods, or requirements for carrying out monitoring and reporting under subparagraph (i) or (ii):
>
> (h) any other matter relating to the purpose or implementation of the statement.

66. Parts 3 and 4 contain directives which are relevant to the implementation of the objectives and policies, which are permitted under section 45A(2)(h) ('any other matter relating to the purpose or implementation of the statement'). Part 3 subpart 2 contain directives regarding the national objectives framework which is created in the policies of the Draft NPSFM, which again is permitted under section 45A(2)(h). However, the specifications relating to the national objectives framework are better included as a policy giving effect to an objective – as they are in the 2017 NPSFM.

67. The confusion regarding the proper place for actions and directions in this Draft NPSFM appears throughout the drafting, as seen in the above discussion regarding the wording and content of the objectives and policies. If the national objectives framework is included as an objective, then the policies will detail how it is to be achieved, and we consider this structure will provide greater clarity and legal certainty than the current situation where a great amount of detail and technical requirements are included in Parts 3 and 4.

68. It is, therefore, considered that the content of Parts 3 and 4 should be included in the policies section of the NPSFM.

CONCLUDING COMMENTS

69. In undertaking this review detailed thought has been given to drafting changes that could be made to either enhance the 2017 NPSFM (the preferred approach) or produce a new NPS using the style of the 2008 Draft NPS updated to include the relevant parts of the 2017 NPSFM and the Draft NPSFM.

70. Further input can be provided at the appropriate time.

Appendix C: Responses to Discussion Document Questions

Question(s)	Specific provisions	Comments
1-8	Section 1.6 - Questions	The draft NPSFM will prevent the outcomes desired being achieve as it requires considerable redrafting to ensure the intent is understood in practice and achievable. As discussed in the submission above, there are many unintended consequences within the NPS. The best way forward for the draft NPSFM is to redraft, and establish a process for submissions to be heard. This would be more efficient and effective for timely implementation than continuing with the draft NPSFM as it is.
9-12	Te Mana o te Wai	HortNZ supports the concept of Te Mana o te Wai and the holistic framework for resource management that Te Mana o te Wai provides. However, as drafted, the description of Te Mana o te Wai and 2.1 Objective in the draft NPSFM are contrary to the purpose of the RMA. The RMA requires an overall judgement approach to management of all resources. This is appropriate as it enables a decision maker to consider the specific context of the matters they are assessing, including environmental bottom lines. Creating a long-term vision is a good method for achieving goals over time. However, a long-term vision is not an RMA method for good reason. This method more appropriately fits within a strategy/ action plan prepared under the LGA 2002 and then RMA plans are required to have regard to those strategies / action plans and their established long-term visions pursuant to s66(2)(c)(i) and s74(2)(b)(i) of the RMA.
13-16	New Māori Value	HortNZ acknowledges the benefits of adopting a Māori world view in managing our Environment. Māori values are currently incorporated into regional land and water plans across New Zealand, as required by the NPSFM. It is unclear what the compulsory tangata whenua values would be.

17	New planning process for freshwater	HortNZ opposes the proposed new planning process. Having experienced the ECan Act and the considerable 'unintended consequences' on horticulture in the Region due to the inability to appeal significant matters to the Environment Court, we would not want to see this replicated across the Country. HortNZ has been required to put more effort and money into ECan processes because of the reduced appeal rights under the ECan Act, and yet still came out with perverse outcomes for Canterbury Growers. If we had the ability to appeal on matters of substance, then the issues could have been resolved immediately. However, we were left arguing our points for six months before ECan agreed to a plan change, which took a further 18 months to promulgate and notify. Decisions are expected late 2020. This would mean that the issues will not be remedied for three and a half years. And there is still no guarantee that the unintended consequences will be fully addressed. The idea of a streamlined process is good in theory, but the reality is quite different. In removing appeal rights, we have also experienced a less helpful approach to RMA statutory processes when compared to other authorities who are subject to the RMA appeal rights. Removing appeal rights does not encourage the local authority to co-operate with stakeholders during statutory processes and reduces their desire to understand all issues We recommend an independent Water Commission is established to consider matters, other than points of law.
18	More integrated management of freshwater	HortNZ support the principle and practice of integrated management and believed that this is currently being achieved in many instances across New Zealand. We have concerns that some of the roles and responsibilities of regional council's and territorial authorities as outlined in the draft NPSFM seek to go beyond their functions as specified in the RMA and this direction in turn is beyond the functions of the Minister for the Environment (refer to Part 4 of the RMA). There is very good reason why the functions are divided as they are. Reasons include ensuring that local authorities have appropriate resources, including suitably qualified staff to fulfil the authority's functions; preventing duplication and ensuring efficient use of rate-payers and tax-payers money; separating the consenting functions from management functions (e.g. Territorial Authorities manage stormwater, wastewater and stormwater; but

		Regional Council's assess and issue consent's, and monitor the compliance with consent conditions).
19	Exceptions for major hydro schemes.	HortNZ does not support an exceptions regime in general. We do not support a differentiation between infrastructure for hydroelectric generation and other nationally significant infrastructure. We consider criteria would need to be established to assess exceptions against.
20-21	Attributes	HortNZ supports the concept of National Bottom Lines, it is critical to New Zealand communities and the New Zealand economy that these are set at appropriate levels that are supported by peer reviewed science.
22	Threatened indigenous species	All *compulsory values* and relevant *other values* must be considered equally within the context of an FMU.
23-24	Fish passage	HortNZ supports the provisions for fish passage,
25-26	Wetlands	In some places we have found ourselves inadvertently caught up in discussions on wetlands in relation to implementing Good Management Practices, in particular sediment control ponds and off-stream water storage. It is important that these Good Management Practices are not unintentionally constrained, thereby discouraging their use. It would be a perverse outcome if in attempting to protect wetlands, sediment in streams was to increase because dredging of sediment control ponds was not allowed. Similarly, there is environmental benefit in planting the edges of water storage ponds, however, this will also be discouraged if council staff begin classify them as manmade wetlands thereby preventing the use of the water when most needed.
27-29	Streams	We support the provisions, but it should eb acknowledged in some place offset may not possible and to
30-32	New Bottom Line for nutrient pollution	Bottom lines need to be supported by robust science and appropriate independent peer review. This science must support the application in all river and stream orders and all call catchments if they are to be credible national guidelines. Many rivers and streams in NZ have highly modified hydrology, and may never be able to reach a natural ecosystem state, by limiting abstractions and discharges. In locations

		where robust analysis indicates that limits cannot achieve outcomes sustainably within 30 years an action plan must be adopted.
33-35	Reducing sediment	HortNZ advocates for growers to operate a Good Management Practice (GMP) and have established a number of industry codes of practice and guidance documents for growers such as the Vegetable Washwater Discharge Code of Practice[21], Erosion and Sediment Control Guidelines for Vegetable Production[22], and Code of Practice for Nutrient Discharge[23].
36	Higher standard for swimming	HortNZ supports the provisions
37	Minimum flows	We support a stronger link between water limits and flows and levels.
38	Reporting water use	The position of HortNZ is that in order to manage a resource efficiently and sustainably, then monitoring and reporting must be based on robust scientific measurement. Regulators must use best practice based on good science when formulating catchment and aquifer allocation.
39	Raising the bar on ecosystem health	Refer to comments above for Reducing sediment.
40-42	Draft NPSFM	HortNZ is of the strong view that the draft NPSFM is in need of considerable redrafting. There are intentions within the draft NPSFM that are supported, but there are also elements that cause deep concern. HortNZ recommends that this document is re-drafted.
79-80	Aligning RMA national direction	Yes, there is tension between the draft NPSFM and the RMA. The NPSFM is a subsidiary instrument to the RMA. The draft NPSFM does not give effect to section 5 of the RMA. Separation of land and water values in the changes proposed in the draft NPSFM are not consistent with the principles of Integrated Management.

[21] http://www.hortnz.co.nz/assets/Natural-Resources-Documents/VegetableWashwaterDischargeCOP.pdf
[22] http://www.hortnz.co.nz/assets/Natural-Resources-Documents/ES-Control-Guidelines-1-1.pdf
[23] http://www.hortnz.co.nz/assets/Uploads/Code-of-Practice-for-Nutrient-Management-v-1-0-29-Aug-2014.pdf

SUBMISSION ON

‘Action for Healthy Waterways’

Proposed National Environmental Standards for Freshwater

Thursday 31st October, 2019

TO: Ministry for the Environment (consultation.freshwater@mfe.govt.nz)

NAME OF SUBMITTER: Horticulture New Zealand

Supported By: New Zealand New Zealand Kiwifruit Growers Incorporated (NZKGI), NZ Apple and Pears Inc, TomatoesNZ, New Zealand New Zealand Kiwiberry Growers, , Onions New Zealand, Vegetables New Zealand, Process Vegetables New Zealand, New Zealand Citrus Growers, , Potatoes New Zealand, Central Otago Fruit Growers Association, Tevoit Fruit Growers Association

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Introduction

Horticulture New Zealand (HortNZ) thanks The Ministry for the Environment (MfE) for the opportunity to submit on the proposed National Environmental Standard Freshwater (proposed NESFW).

Note: HortNZ has a separate submission on the draft NPSFM.

HortNZ recognises the significant challenges in putting in place a land and water management regime within New Zealand that seeks to maximise opportunities for the environment, economy and communities, but at the same time ensuring alignment with the mandatory directives of the Resource Management Act 1991 (RMA).

HortNZ could not gain an advantage in trade competition through this submission.

HortNZ wishes to be heard in support of our submission.

Background to HortNZ

HortNZ was established on 1 December 2005, combining the New Zealand Vegetable and Potato Growers' and New Zealand Fruitgrowers' and New Zealand Berryfruit Growers Federations.

HortNZ advocates for and represents the interests of 5000 commercial fruit and vegetable growers in New Zealand, who grow around 100 different crop types and employ over 60,000 workers. Land under horticultural crop cultivation in New Zealand is calculated to be approximately 120,000 hectares.

The horticulture industry value is $5.7 billion and is broken down as follows:

Industry value	**$5.7bn**
Fruit exports	$2.82bn
Vegetable exports	$0.62bn
Total exports	**$3.44bn**
Fruit domestic	$0.97bn
Vegetable domestic	$1.27bn
Total domestic	**$2.24bn**

For the first time New Zealand's total horticultural produce exports in 2017/2018 exceeded $3.44bn Free On Board value, 83% higher than a decade before.

It should also be acknowledged that it is not just the economic benefits associated with horticultural production that are important. The rural economy supports rural communities and rural production defines much of the rural landscape. Food production values provide a platform for long term sustainability of communities, through the provision of food security.

The total investment in New Zealand's horticultural sector is estimated to be in excess of $52 billion.

HortNZ's vision is *"healthy food for all forever"* and its mission is to create an enduring environment where growers prosper. This is done through enabling, promoting and advocating for growers in New Zealand.

HortNZ's Resource Management Act 1991 Involvement

On behalf of its grower members HortNZ takes a detailed involvement in resource management planning processes around New Zealand. HortNZ works to raise growers' awareness of the Resource Management Act 1991 (RMA) to ensure effective grower involvement under the Act.

The principles that HortNZ considers in assessing the implementation of the RMA include:

- The effects based purpose of the RMA;
- Non-regulatory methods should be employed by councils;
- Regulation should impact fairly on the whole community, make sense in practice, and be developed in full consultation with those affected by it;

- Early consultation of land users in plan preparation;
- Ensuring that RMA plans work in the grower's interests both in an environmental and sustainable economic production sense.

As a founding member of the Land and Water Forum, HortNZ has played an active role as a submitter and in previous consultations with Central and Regional government reform of freshwater management. This submission is informed by HortNZ staff and contractors currently engaged in most aspects of Central and Regional management of freshwater across New Zealand.

The importance of water and highly productive land for horticulture

Water is essential for the production of food. Horticultural production in all regions of New Zealand is reliant on reliable supplies of fresh water that are suitable for sustained crop production and post-harvest washing and processing.

The values of food production land are inseparable from connected freshwater. Freshwater is a necessary component of food production land because:

- Freshwater processes formed our most productive land through erosion and deposition creating plains of arable soil in the lowlands. These make up the 5% of New Zealand that is available for high value horticultural production (versatile soils).
- The value of this finite and precious resource is compromised without clean fresh water to cultivate crops, to wash and prepare food.
- Food cannot be grown without water and therefore cannot occur without discharges. The values of land and water and interlinked.

Food security

Current projections around New Zealand's expected population increase and annual food volumes available for consumption in New Zealand show that domestic vegetable supply will not be able to sustain our future population consumption needs.[1]

Already many New Zealanders, are struggling to meet the recommended daily intake of 3 plus vegetables and 2 plus fruit a day. In 2016/2017, only 38.8 percent of New Zealand adults and 49.8 percent of children met the recommended daily fruit and vegetable intake.[2] Those living in the most deprived neighbourhoods were less likely to meet the recommended intakes and were more likely to be obese.[3] 1 in 5 children are living in food insecurity[4].

Abstractions and discharges are need to grow the food New Zealanders need to eat. Reasonably priced health food is essential for human health.

Submission Structure

1. Executive Summary
2. Proposed NES – Freshwater
3. Resource Management (Measurement and Reporting Water Takes) – Water Quality – real-time reporting of water use
4. NES for Commercial Vegetables

Appendix A – HortNZ Decisions Sought on the Proposed NESFW

Appendix B – HortNZ Responses to Discussion Document Question

Appendix C – Example of FEP

[1] http://www.hortnz.co.nz/assets/Media-Release-Photos/HortNZ-Report-Final-A4-Single-Pages.pdf

[2] https://minhealthnz.shinyapps.io/nz-health-survey-2016-17-annual-data-explorer/_w_e9a07e83/_w_aa03fb73/_w_320818d4/_w_26fa6ce8/_w_f50ad45f/_w_dbba0f02/#!/explore-indicators.

[4] https://www.health.govt.nz/system/files/documents/publications/household-food-insecurity-among-children-new-zealand-health-survey-jun19.pdf

1. Executive Summary

Allow low impact irrigated horticulture to expand

We do not agree that low impact horticulture should be subject to a discretionary consent. Most land use change to low impact horticulture will result in improved water quality. Land use change towards low impact horticulture is an important option to both reduce water quality impacts and to reduce climate change impacts. We see these provisions particularly impacting on Māori developments, which may be on underdeveloped land. We provide two case studies which highlight that this provision could have adverse social, economic and cultural effects, with negligible positive and potentially negative water quality impacts.

Allow commercial vegetable growing to expand, within a consented framework

We support the permitted provisions for existing vegetable growers, and we are pleased that the need for vegetable growers to rotate crops is recognised within the rule.

We strongly support allowing commercial vegetable growing to expand. We are of the view this should be provided for as a controlled activity.

We strongly oppose the proposed discretionary activity and the proposed criteria. HortNZ has had economic analysis undertaken on these proposals. This found that to cover the cost of the offsetting required, the price of vegetables would need to increase between 16% – 50%. As vegetable growers aren't price setters, they simply wouldn't expand and New Zealanders would have fewer fresh vegetables. Economic analysis has indicated not allowing growers to expand would also increase the price of vegetables between 43%-58% by 2043.

Affordability is a key factor in why people eat less than the recommended intake of fruit and vegetables. If fruit and vegetable growing cannot expand to meet the growing demand with an increased population, the reduced availability of vegetables and an increased price would impact on the health of the most vulnerable people (Moore, Barton, & Young , 2019).

The predicted growth in the industry can be accommodated, easily within the improvements in water quality predicted from other sectors. Vegetables are an essential human health need, and we submit an achievable pathway must be provided to enable vegetable growing to expand to meet demand.

Horticulture is a minor activity in Schedule 1 catchments

Horticulture is a minor land use in all of the Schedule 1 catchments. It also a minor land use in two of the four possible additional catchments in the discussion document. HortNZ supports an Audited Farm Plan approach for managing nitrogen. For horticulture it doesn't follow that rapid reductions in nitrogen would be required in these catchments. Land use change to low impact horticulture should be encouraged.

We Support Independently Audited Industry Freshwater Farm Plans

HortNZ support all farms and orchards greater than 5 hectares having an independently audited FW-FP by 2025, or 2022 in the Schedule 1 catchments. These Plans will be best delivered though the existing GAP programmes. Approximately 3500 growers (90% of the crop) already have audited Farm Plans under either NZ GAP or Global GAP. These Plans will need to be updated to include any additional requirements as specified in the NES that are not already addressed in their Farm Plan.

2. Proposed NES – Freshwater

HortNZ has the following overall comments specific to the proposed NES – Freshwater.

Part 1 Preliminaries

Stringency

Generally, we agree with the proposed level of stringency, allowing regional plans to provide for stricter rules where it is deemed appropriate, however in the case of vegetable growing, there has been a failure of regional plans to regulate for vegetable growing and, in our view, a nationally consistent approach is warranted.

We call for a National Environmental Standard for Commercial Vegetable Growing, this is discussed in **Section 4.**

Charging for monitoring

A local authority has the ability to charge for monitoring (RMA s36 and s87BB). Any charge should be fair and reasonable. Furthermore, there should be a transparent procedure for questioning charges if a land owner has just reason to challenge the cost.

Part 2 Wetlands, rivers, and fish passage

Subpart 1 – Wetland

We support the intention to manage the effect of activities, including horticultural activities, on natural wetlands. Horticultural activities with potential effects on natural wetlands are: cultivation, private land drainage and water abstractions. The proposed methods manage potential effects through establishing buffers and with the activity status linked to hydrological effects thresholds.

We support providing provisions that enable managing the effects from existing public drainage network, in manner that recognises the public value of these networks. Horticulture activities occur on highly productive land, in low land locations. Maintaining the productive capacity of highly productive land depend on the efficient functioning of public and private land drainage.

It is important definitions on the difference between constructed wetlands and natural wetlands are clear. Natural wetlands must exclude constructed ponds (e.g.: sediment control ponds and water storage pongs) and riparian margins planted as part of creating stream buffers.

If definitions are not clear, the rules could create a disincentive to create soft-engineering approaches such as ponds and wetland for water quality treatments. If planted swamp riparian margins were counted as natural wetlands, this would create a disincentive to planting buffers (as opposed to leaving buffers in grass), as it would increase land retirement and threaten surface water abstractions, if these abstractions had the potential impact on swamp margins. Recommendations for appropriate definitions are described in **Appendix A.**

Subpart 2 – River bed infilling

We support the intention to manage the effect of activities, including horticultural activities, on stream and river beds. Horticultural activities with potential effects on stream and river beds includes site development, where stream reclamation and permanent diversion may

occur. Where this activity occurs to manage site flooding and erosion, it is proposed to be discretionary and for other reasons, non-complying.

We support providing provisions that enable managing the effects from existing public drainage network and flood protection, in manner that recognises the public value of these networks and schemes. Horticulture activities occur on highly productive land often, in low land locations. Maintaining the productive capacity of highly productive and depends on the efficient functioning of public land drainage and flood protection.

The provisions include offsetting for residual adverse effects. While we are not opposed to offsetting, this may be practically challenging for growers who often only own relatively small parcels of land. This means that they may be unable to achieve offsetting of natural streams on their own land. It is therefore important that offsetting is enabled at the sub-catchment or FMU scale. We have recommended a change to the provisions to reflect this, see **Appendix A**.

Definitions are not provided in this part and therefore it is assumed this provision would apply to any watercourse meeting the definition of a River in the RMA. The definition in the RMA can includes intermittently flowing watercourses and modified watercourses, but excludes artificial watercourses including farm drainage canals. The definition of a Drain, in the Land Drainage Act, 1908 includes watercourses defined as Rivers under the RMA, and artificial drainage water courses. Recommendations for appropriate definitions are described in **Appendix A**.

Subpart 3 – Fish passage

We support the intention to manage the effect on fish passage of new culverts, weirs and dams and passive and non-passive flap-gates. We support recognition that fish passage is not desirable in all rivers, due to the presence of fish pest species, such as koi carp.

Renewal of existing weirs and dams, that form part of existing flood protection and land drainage scheme may be impacted by these provisions.

We support providing provisions that enable managing the effects from existing public drainage network and flood protection, in manner that recognises the public value of these networks and schemes. Horticulture activities occur on highly productive land often in low-land locations. Maintaining the productive capacity of highly productive land depends on the efficient functioning of public flood control of land drainage. We and we have recommended a change to the provisions to reflect this, see **Appendix A**.

Part 3 Farming

Definitions for Part 3

We support the development of a set of consistent definitions to describe farming activity and believe that a set of nationally consistent definitions will assist in plan development and implementation.

We have made specific comments on definitions in **Appendix A.**

Applications

We support the application for horticultural farms of less than 5 hectares, in our view the area should be measured at the parcel scale.

Many orchards are smaller than 5ha, very few commercial vegetable operations (which often operate as enterprises across multiple sites) would be smaller than 5ha.

If the area was defined as production area, fewer orchards would be captured than a definition at the parcel scale, however we are of the view it is important to manage a farm in an integrated manner including the orchard or cropped part and the lower intensity verges and margins, which may offer opportunities for managing water quality effects.

Subpart 2 – Intensification

Geographic application of subpart 2

As no Regional Council has fully implemented the NPSFM 2019 as yet, it is unclear how the proposed polices would not undermine provisions established in regional plan's that have been designed to implement NPSFM 2017.

For example, through submissions to the Waikato Regional Council PC1, HortNZ has sought a restricted discretionary activity for a capped allowance of vegetable growing to provide for the demand for fresh vegetables created by population growth, at audited Good Management Practice (GMP). If the proposed provisions for new Commercial Vegetable Production (CVP) in the proposed NESFM were accepted, these would undermine the PC1 provisions. Furthermore, in the Horizons Region, the provisions for new CVP require meeting nitrogen leaching maximums based on Overseer models of dairy farms. These provisions do not allow crop rotation, which is stricter than the proposed NESFW. However, the Horizons One Plan rules only set limits for nitrogen and is less strict for other contaminants. Whether the grand-parented nitrogen leaching concentration, or the Horizons One Plan pastoral farming default concentrations are stricter or not, will depend on what the previous land use was. Applying for a resource consent in this situation is very uncertain.

We recommend that the NESFW includes an appendix which specifically identifies which regions the intensification rules apply to, which is updated as new plans become operative.

Duration of consents

If the NES is adopted as proposed, providing transitional regulations until limit setting processes to implement NPSFM 2019 are complete, then we support short-term consents.

Whether these should expire in 2030, depends on the degree to which it is realistic that the limit setting process proposed under the NPSFM 2019, can be fast-tracked such that the processes are complete by 2025.

We suggest direction is taken from Regional Council's on the likely timing of the completion of limit setting process, and that consent durations are granted by 5 years beyond that period, to provide some time for consent holders to adjust to a changing regulation.

Irrigated farming

HortNZ submits that increases in irrigated low impact horticulture should be a permitted activity.

The proposed intensification rules include a proposal to require water quality discharge consents for any expansion of 10 ha or more of irrigation. This will capture new orchard expansions. On average orchards use a third of the water of irrigated pasture and have lower leaching concentrations (Gentile, et al., 2014), produce less greenhouse gas

emissions (BERG, 2018), and have the highest revenue on per ha basis compared to any primary production land use (Ministry of Primary Industry, September 2019).

Capturing fruit and low impact horticultural production in the proposed NPSFM irrigation intensification rule is unlikely to result in improvements in water quality, and won't enhance the productive capacity of land or enable famers to transition to lower emission productive uses. In our view this policy is inconsistent with the proposed NPSFM and contrary to direction of the proposed National Policy Statement for Highly Productive Land (NPSHPL) and the Climate Change Response (Zero Carbon) Amendment Bill.

HortNZ surveyed product groups to estimate the degree of expansion predicted over the next 10 years. The following crops were surveyed: avocado, blackcurrant, boysenberry, buttercup squash, citrus, feijoa, kiwifruit, kiwi berry, passionfruit, persimmon, pipfruit, tamarillo, potatoes, onion, process vegetables and fresh vegetables. The surveyed crops made up 100,000 ha of an estimated 120,000 ha of horticulture in New Zealand in 2018. There was a predicted increase of 10,000 ha of additional fruit growing 2028. Most growth is expected in avocado, pipfruit and kiwifruit for export. All of this would be irrigated and would be impacted by this rule, either by increased regulatory costs or in some cases prevented. The potential economic impact of this provision, is highlighted in the Bay of Plenty case study included in the local government economic assessment.[5]

We propose that this rule excludes low impact horticulture systems. In most cases land use change to irrigated low impact horticulture would result in an improvement in water quality, and therefore this rule would add an unnecessary cost for no benefit. **Case Study One** below presents an example of Miro berry developments. These developments would likely result in water quality improvements compared to the existing use, as well as a range of economic, social and cultural benefits. However, this activity would be captured by this rule, adding an unnecessary cost and regulatory barrier.

Water quality

The discharge of nutrients is lower than most pastoral uses, and in most studies nutrient leaching rates are similar to or lesser than unirrigated sheep and beef farming. For example,

- A study of land on Poverty Bay estimated leaching rates for fruit and wine ranging from 5kg/ha to 18kg/ha, the same study estimated leaching from pasture at 19kg/ha (SPASMO)[6.]
- A study in the Hawkes Bay estimated leaching from fruit crops between7kg/ha and 26kg/ha (Overseer 6.2.2).[7]
- A study in Tasman estimated leaching from fruit and wine crops between 6 kg/ha and 36kg/ha (Overseer version 6.1)[8]
- The leaching rate for a large glass house, irrigating pasture with runoff water estimated a leaching rate of 20kg/ha[9].

[5] (Local Government New Zealand, 2019)
[6] (Gentile, et al., 2014) http://www.hortnz.co.nz/assets/Uploads/Plant-and-Food-Land-management-practices-and-nutrient-losses-from-farm-.pdf.
[7] (Ford s. , 2016)http://hortnz.co.nz/assets/Natural-Resources-Documents/Hawkes-Bay-Horticultural-Nutrient-and-Financial-Benchmarking-Results-FINAL.pdf
[8] (Ford S. , Nutrient Performance and Financial Analysis of Horticultural Systems in the Waimea Catchment, 2015) http://www.hortnz.co.nz/assets/Natural-Resources-Documents/Nutrient-Performance-and-Financial-Analysis-of-Horticultural-Systems-on-the-Waimea-Plains-Final-May-2015.pdf
[9] Barber, A 2019 Pers comms 29 October

- A recently published Plant and Food report calculated nitrogen balances from a survey of asparagus growers in the Waikato, and found, using a simple N surplus, the average surplus was 11.4kg/ha[10].

While irrigated horticulture has similar nutrient discharges to unirrigated sheep and beef, it has much lesser water quality impacts than unirrigated sheep and beef farming, because it discharges very low rates of bacteria and sediment.

In some instances, where the existing land use is maize the water quality impact of nitrogen may be greater from conversion to an irrigated orchard, the conversion would likely still result in an improvement in bacteria and sediment discharges.

We are aware of proposed developments, where under-developed Māori land is being considered for low impact, high value horticulture. For example; the collectively owned Māori land between Opotiki and Te Kaha and Māori land on the Poverty Bay Flats, as described in **Case Study Two** below. The Turanga development is an example of an opportunity for Māori land owners to improve the returns from their highly productive land. The development would have social, economic and cultural benefits, with negligible water quality impacts. The proposed rule, may prevent some of this highly productive land realising it productive capacity.

Given the water quality effects of converting land from one very low intensity land use to another low intensity land use will be negligible at the Freshwater Management Unit (FMU) scale, we are of the view this provision creates an unnecessary barrier and will exacerbate existing inequality in the allocation of natural resources, for negligible water quality benefit.

Efficient use

As well as haver lesser or negligible water quality effects compared with other land uses, low impact horticulture crops use much less water, on average one third[11] of the water of irrigated pasture, this is because of the efficient irrigation systems that can be used for static crops and the water demands of fruit.[12] This means, that water can be transferred from pastoral irrigators to horticultural uses and irrigate a much larger area, producing much more food for the same amount of water use. Low impact horticulture crops produce much more food that pastoral land uses on a per hectare, basis, for example 50t/ha of kiwifruit or citrus, 80T ha of apples[13], or 500 tonnes per ha of glass house tomatoes[14].

Irrigation of low impact horticulture is an efficient use of water. Efficient allocation and water use is encouraged in the proposed NPSFM 2019, but is disincentivised in the NES FW.

[10] (Hunt, Dellow, & Sinton, 2019)https://www.waikatoregion.govt.nz/assets/WRC/Council/Policy-andPlans/HR/Block3/HortNZ-1-Michelle-Sands-Evidence.pdf
[11] (Gentile, et al., 2014) http://www.hortnz.co.nz/assets/Uploads/Plant-and-Food-Land-management-practices-and-nutrient-losses-from-farm-.pdf
[12] (Ford S. , Memorandum to HortNZ NESFW, 2019)
[13] (Gentile, et al., 2014) http://www.hortnz.co.nz/assets/Uploads/Plant-and-Food-Land-management-practices-and-nutrient-losses-from-farm-.pdf
[14] Barnes, H 2019, Pers comms 29 October

Climate change

The Eat- Lancet Commission found that food is the single strongest lever to optimize human health and environmental sustainability and without action, the world risks failing to meet the United Nations Sustainable Development Goals and the Paris Agreement.

The Report recommended a transformation to healthy diets by 2050 requiring substantial dietary shifts, with global consumption of fruits, vegetables, nuts and legumes having to double, and consumption of foods such as red meat and sugar being reduced by more than 50%. "*The food we eat and how we produce it will determine the health of people and planet, and major changes must be made to avoid both reduced life expectancy and continued environmental degradation*." (Eat-Lancet, 2019).

The measure of New Zealand's success in adapting our food production system in a way that contributes to global efforts to reduce global warming, will be to reduce the overall carbon intensity of New Zealand's food production, by changing, but not reducing our production.

Horticulture, and in particular fruit for export, presents an opportunity for current and future generations to produce more food in New Zealand with much lower emissions than animal agriculture.

As we transition to a low emissions economy, farmers need options to reduce their emissions. For some farms in some locations converting part of their farm to a low impact irrigated horticulture production, provides an opportunity to reduce emissions in a manner that supports the economic viability of the farm. In New Zealand there are 1,000,000 ha of land that could potentially be converted to horticulture. If this land was converted to horticulture is would be as effective at reducing New Zealand's agricultural emissions as a methane vaccine[15].

The greenhouse gas and water quality targets are challenging for existing farmers. We acknowledge that the proposed NESFW is a transitional framework while water allocation policy is developed. However, the changes we make to farming systems in the next ten years will be critical in achieving the long-term climate and water quality outcomes. Farmers need options so they can respond to the challenges now. Where land use change is unlikely to result in adverse cumulative water quality effects and produces lesser greenhouse gas emissions, it should be encouraged, not constrained.

[15] (BERG, 2018) https://www.mpi.govt.nz/dmsdocument/32125/direct

CASE STUDY ONE: Miro Blueberries

Background

Miro Limited Partnership (Miro) is an integrated, Māori owned and operated horticultural company owned by 28 Māori shareholders (ranging from individuals to iwi, hapu and land trusts). Miro's vision is to transform underutilized Māori land into high-value horticulture, providing skilled jobs and employment pathways for Māori people. This will also have wider benefits such as promoting regional growth (and the national economy) and building higher productivity and environmentally sustainable systems in New Zealand.

Inputs for protected cropping of blueberries

Miro grows blueberries in a precision horticulture system, under poly tunnels, in fertigated 30 litre pots and substrate. On average there are 4500 plants per hectare.

Figure 1: Blueberry plants in a poly tunnel (Source: Miro)

Irrigation and feeding of the plants are done through an automated fertigation system via drippers directly into pots. Each plant is fed an average of 4L at peak season. The average run off out the bottom of the pots is 10% (range is 5-15%) depending on the season. This equates to 1800 litres per hectare per day at peak season. A good deal of this evaporates therefore run off in to soil is minimal (and some orchards have capture systems so there is no untreated run-off).

The berry variety Miro grows, has relatively low nitrogen demands, using far less nitrogen than vegetable crops grown in glasshouses, which are also low impact horticulture activities, and outdoor high value fruit crops.

Impacts of the NES-Freshwater on future development

Miro supports the principle of Te Mana o te Wai.

Miro have a pilot orchard in Te Teko comprising 6ha of production and a nursery (employing 65 local people) and have plans to scale this up and develop a further 22ha. Under the proposed NES-Freshwater provisions for irrigated farming, this expansion would require resource consent as a Discretionary Activity.

High value horticulture, such as blueberries, requires scale (10ha is seen as a minimum). As demonstrated in this example, limiting the scale of developments to 10ha could significantly limit the economic potential of Māori land and people. This is considered an unnecessary and inefficient regulatory barrier for what is a low impact horticultural activity (as with other glasshouse/covered crops and outdoor fruit and berry crops) in terms of having relatively low water quality impacts while also delivering significant positive benefits and being an environmentally sustainable land use that promotes the development of Māori land.

Unlike the bigger commercial growers these Māori entities do not have access to water or it is too expensive to access. In the future the NPSFM process may include a value assessment, that could provide water for Iwi/Marae, recognising the cultural value of development of Māori land, but this is quite different to Māori utilizing their primary asset (land) to generate economic and social returns for their people. In the next 10 years while the NES FW operates as a transitional set of regulations, the Miro developments, and any other Māori land owners transitioning to high value, environmentally sustainable horticultural crops at scale, would face increased regulatory barriers.

CASE STUDY TWO : Turanga Proposed Kiwifruit Development

Background

In Turanga (Gisborne), a high percentage of high value Māori land is underutilised by Turanga Māori. Under the leadership of Te Aitanga a Mahaki Trust, interested Māori landowners in Turanga came together as under a project called "Turanga Whenua, Turanga Tangata" or "the lands and the people of Turanga", 16 land blocks were identified as being capable of high value horticulture. Traditionally these areas have successfully grown food crops (such as citrus, avocados, feijoas and apples) as well as other crops such as maize, squash, and watermelons.

It is intended that over a 3 -year period cluster developments of kiwifruit, totalling 95.27 ha, will be established using a Joint Venture arrangement between Māori Landowners and investors which would include funding from Te Aitanga a Mahaki Trust (the Post Settlement Governance Entity) and Provincial Growth Fund (assuming the application is accepted).

The aim is to employ all local staff and to throughout the operation of the development and operation of the orchards train tangata whenua so that in time they can undertake the work themselves. This support the regional economy and enhances connection to the land.

Predicted losses from Kiwifruit

Kiwifruit has a predicted annual average Nitrate-Nitrogen (N) leaching loss rate of 9.9 kg/ha/y*, compared with 18.9 kg/ha/yr for pasture low intensity sheep and beef with no irrigation[16]. In the same study, maize cropping represented 30% of the Poverty Bay flats and had predicted annual average N leaching loss rate of 6.6 kg/ha/y and was assumed not to be irrigated.

Impacts of the NES-Freshwater on future development

- While some of this land may already have some irrigated production, there is some that might not be, for example land in maize. In this situation, **these developments would require a discharge resource consent under the Irrigated Farming rules as a Discretionary Activity.**

A condition of the consent required, is that '*the nitrogen, phosphorus, sediment, or microbial pathogen discharges of the farm that will result from the increased land used for irrigated production will not exceed the average discharges of those contaminants from the farm during the farm year 2017/2018'*

- In most circumstances a conversion of land to kiwifruit would be expected to result in reduced contaminant discharges. However, some of this land is cropping land, if this was in maize in the farm year 2017/2018 (which has a low N leaching rate) it would likely difficult to satisfy the Proposed NES criteria while maintaining a feasible operation. **The proposed NESFW could prevent Turanga Māori from be unable to get a resource consent for using underutilised land, for what is a low intensity impact activity in regard to nutrient leaching, and a very low impact activity for sediment and bacteria**.

This case study demonstrates that the proposed rules will have (what we believe to be) unintended consequences of limiting the potential of existing under-utilised land, particularly Māori land, to be used for a high-value horticultural use which if allowed would have negligible adverse and/or beneficial water quality impacts.

[16] Gentile R, Green S, Mason K, van den Dijssel C, Johnstone P,Clothier B. August 2014. Land Management Practices and Nutrient Losses from Farms on the Poverty Bay Flats. A Plant & Food Research report prepared for: Gisborne District Council. Milestone No. 59140. MSI Obj: SLURI Obj 3. Contract No. 30930. Job code: P/423059/01. PFR SPTS No. 10506.

*Note: The Kiwifruit study assumed 200kg/ha urea in September and 100 kg/ha Urea in October and no compost. This data was from a 2014 study, updated modelling is being done to that will support a new leaching figure (i.e. these leaching rates will may not align with current modelling)

HortNZ submits that increased in irrigated commercial vegetable growing should be a permitted activity.

Any expansion of vegetable growing will be captured by the CVP rules in the proposed NESFW. We have proposed a change in the definition of horticultural farm, so that expansion of commercial vegetable growing cannot occur on pastoral or arable farms without requiring a CVP consent. Removing commercial vegetable growing from this rule reduces administration, but expanded vegetable growing will still need a consent.

For vegetable growing, irrigation can be used as a means of controlling leaching. A study by Aqualinc[17], showed that in field case studies on vegetable crops, irrigation water reliability increased crop production by an average of 29% in the 2010/2011 irrigation season, with production on a single farm increasing by up to 89%. It has also shown that the quality of the production of vegetables was higher in irrigated vegetables versus non-irrigated vegetables. The effect of irrigation was higher for vegetables because their water stress tolerance is lower than for pasture and the irrigation trigger for vegetable crops is 20% higher than the plant available water (PAW) value for pasture.

Soil moisture fluctuates between field capacity, wilting point, and the 'preferred minimum soil moisture'. The field capacity is the maximum level of soil water available for plant extraction after gravitational drainage from a saturated condition falls to a rate that is insignificant. Wilting point is when soil profile is very dry and no soil water is available for plant extraction. By the time soil moisture reaches wilting point, vegetable crop plants are seriously damaged[18].

The amount of fertiliser that is applied to a vegetable crop is determined based on the average yield that is expected to be grown that year. This average yield is based on average climatic conditions that can be expected in the region that the property is located in. Irrigation is used to maintain yields when drought conditions occur, and to provide a buffer from the natural variability of the weather. Irrigation doesn't necessarily result in soil drainage and corresponding N leaching events, if it is used to maintain soil moisture in the optimum range. Optimum conditions will result in the maximum uptake of applied N, and less N leaching than if the plant was unable to reach the average yield due to wilting due to lack of water.

We see the highest leaching rates for vegetables in the mild North Island west coast growing areas that rely on rain water to support crop growth, for example leaching rates for vegetable growing in Pukekohe and Levin. Leaching rates estimated for the Waikato PC1 planning process were between 64 kg/ha and 73kg/ha[19] (Overseer 6.1*). This is higher than in Canterbury and Hawkes Bay where growers are less impacted by rain and more able to manage their leaching through the use of irrigation, for example the average estimate leaching for the Hawkes Bay (the case study in the MfE discussion document*) was estimated at 16kg/ha/yr[20] (Overseer version 6.2.2.*).

[17] (Rajanayaka, 2013)
[18] (Rajanayaka, 2013)
[19] (Ford S. , 2014)http://www.hortnz.co.nz/assets/Uploads/nutrient-performance-and-financial-analysis-of-lower-waikato-horticulture.pdf
[20] (Ford s. , 2016)http://hortnz.co.nz/assets/Natural-Resources-Documents/Hawkes-Bay-Horticultural-Nutrient-and-Financial-Benchmarking-Results-FINAL.pdf
*NOTE: the different versions of Overseer means that the leaching rates are not directly comparable, and different leaching rates will be calculated using the same model inputs in the latest version of Overseer.

While irrigation can reduce the water quality impacts of vegetable growing. We recognise the need to have resilient growing systems that are distributed across the country on highly productive land and that climate is also an important factor in determining where crops can be grown when.

Land use change to commercial vegetable production

HortNZ submits that existing vegetable growing should be a permitted activity and should be able to expand as a controlled activity provided the grower has an independently audited Farm Environment Plan, demonstrating good management practice and risk based best management practice.

The footprint of vegetable growing is very small, and its effects localised. We support all vegetable growers operating at audited Good Management Practice (GMP), or Best Management Practice (BMP) in catchments identified as a regional priority catchment for improvement. Any water quality improvements achieved by driving land use change away from vegetable growing are likely to be negligible, and often counter-productive when assessed across multiple contaminants and accounting for adverse modifications to hydrological regimes.

We recognise that the proposed NES provide a transitionary framework for managing intensification until an allocation system is developed.

In our view, an NES for commercial vegetable growing which provides long term certainty for the activity is required. This NES for commercial vegetable growing is our preferred long-term solution and is discussed separately below in **Section 4.**

We have provided comment on the proposed transitional NESFW, for commercial vegetable growing, and have proposed a wider range of policies, to manage not only commercial vegetable growing, but horticultural activities more broadly.

CVP - Permitted activity

We have developed a permitted activity for low intensity horticulture. This activity is not constrained by baseline land use. This proposal recognises that in almost all cases, land use change to a low intensity horticultural use will result in improvements in water quality. This policy reflects the proposals we have made to the proposed irrigation rule.

We strongly support the proposed permitted activity for CVP. This rule provides for crop rotation across an FMU, which is essential to maintain soil health. This rule framework is important to provide certainty and autonomy for growers, who often grow across owned and leased land, to be able to invest in their farming systems to achieve better environmental outcomes.

Water quality impacts from winter grazing exceed those from CVP on a Kg/Ha basis for nitrogen, sediment and *E. Coli*. From a water quality perspective there is no reason that commercial vegetable growing for humans should be regulated more stringently than growing vegetables for animals.

We recognise the it is important that farmers have sufficient food to feed their animals in winter. Winter is also a challenging time to grow enough food to feed humans in NZ. In winter New Zealanders depend on root vegetables harvested in the cooler parts of NZ such as Ohakune. These rotations are most likely to operate as small cropped areas leased from a pastoral farm, operating in pastoral rotations, where land will be cropped for one or two

years, and return to pasture for 5 to 10 years. In some cases, these rotations occur as part of a winter grazing rotation.

We have proposed a change to the definition of the commercial vegetable growing, so it does not only capture vegetable growing on horticultural farms. It also would capture all vegetable growing on pastoral and arable farms. This definition gives greater certainty that any increase vegetable growing is subject to a consenting regime that will be focused on industry specific good management practices.

We support the permitted existing area cap for intensive winter grazing, and accept a permitted existing area cap for CVP.

CVP- Controlled activity

We have proposed a controlled activity for expansion in CVP. This option, is a proposal that responds to Option 2 in the discussion document. We have proposed that vegetable growing can expand with risk-based BMP.

We have proposed a restriction (as part of the proposed controlled activity rule) so that the expansion of vegetable growing can only occur in sub-catchments where the total CVP area is less than 20%. In most sub-catchments the area of CVP is much less than 20%, but that there are some small sub-catchments, where vegetable growing makes up a larger proportion of the area. Water analysis indicates that in catchment with >20% CVP there is a likelihood that water quality will be poor[21]. The criteria proposed aims to direct CVP into less constrained locations. The consent applicant would need to indicate the sub-catchments which they would not increase their area within.

We also provide a controlled pathway for CVP that would be lost due to the permitted activity status of the baseline CVP. CVP farms are made up of owned and leased land and are often dynamic in their location. When one grower wins a contract with a supermarket or a processor to supply vegetables, they do not routinely buy the farm of the previous contractor. A new grower, grows a similar amount of vegetables on new land to satisfy an existing demand. Without a straight forward pathway to consent new land to respond to this market reality, the area of land for vegetable growing is likely to reduce over time. This replacement can occur in catchments where CVP exceeds 20%.

Growers predict that intensification (increased volume off the same land) is unlikely to continue to increase in the manner it has in past years. Intensification has occurred both as a result on new varieties improved technology (e.g.: GPS) which has enabled growers to use land more effectively. However, from a soil and water quality perspective, crop rotation remains essential and a larger proportion of land, than is currently set aside, is likely to be required to provide for water quality mitigation, such as buffer strips and sediment control ponds and still produce the same amount of food.

HortNZ undertake survey of vegetable product groups, about expected expansion between 2020 and 2030. It is expected that the vegetables area may expand from 60,000 ha to 72,000 ha. This is both for population growth and for increased export of potatoes and onions. If the increased area of potatoes and onions is achieved, the proportion of vegetables grown for domestic supply would shift from 80% to 73%. If on the other hand, more New Zealanders ate 3 plus vegetables per day, the domestic demand would expand more than the industry had predicted.

[21] (Nation & Blyth, 2019)

Domestic and export are grown in rotations on the same land. The process vegetable sector provides a greater proportion of crops for export, and has an important role in the economic sustainability of the fresh vegetable sector. For this reason, it would be impossible to provide additional land for industry growth exclusively for domestic purposes. We would not support the area cap being solely available to growers who only grow for domestic supply. That approach would undermine the economic viability of the domestic vegetable sector.

For example, for the potato industry, the export value as at December 2018 was $130 million dollars annually. The domestic value of the industry through to retail encompassing the entire value chain represents was $911 million dollars.

However, the export value is a wholesale value and therefore its impact is understated. The percentage of potatoes grown for processing is approximately 68%, potatoes grown for table consumption only represent 26% of all potatoes grown. The production of potatoes and potato products for export ensures the following:

- Ensures that there is an outlet for excess production to ensure that a boom bust cycle does not occur which would increase the financial risk to potato growers.
- Ensures that New Zealand Potato Growers remain internationally competitive given the low barriers to the import of potato products.
- Allows for the transfer of knowledge from International Processors present in New Zealand to ensure that the New Zealand Potato Industry operates at best practice. This is in the form of agronomic practice and research & development transfer.
- Keeps the industry at critical mass, the domestic potato product market (i.e. chips, crisps & hash browns) does not have sufficient demand on its own to make potato processing in New Zealand economic. In short if only potatoes are grown and processed for the domestic market large processors would cease operating and leave. This in turn would make the New Zealand Potato sector vulnerable to imported potato products and the entire industry would simply collapse.

To maintain vegetables for our current population some expansion of vegetable growing is required. To provide sufficient vegetables to meet New Zealanders health needs over the next ten years, some expansion is required.

CVP - Restricted discretionary activity

In some regions[22] HortNZ has proposed area caps linked to population demand. These caps have been made in the context of those existing plans, and it is worth noting, that that approach would require each region to expand its current growing area to keep up with population demand – even Auckland, where retaining vegetable growing land in the face of an expanding urbanisation has been challenging.

It is important that vegetable growing remains distributed across New Zealand to ensure national resilience from weather events for domestic vegetable supply. At the level of this proposed NESFW, it is not possible to anticipate what a suitable cap on future vegetable growing would be, or how that would play out at the regional level.

We strongly oppose the offset pathway being the only avenue for expansion of vegetable growing. Analysis undertaken by Stuart Ford as part of Waikato PC1 evidence, indicated that the cost of vegetables would have to increase by 16% - 50% to cover the costs of a grower meeting this consent condition. Stuart Ford has updated this analysis for other regions where land values are lower, and found that in Horizons and Canterbury the increase in the

[22]Waikato PC1 and Canterbury PC7

cost of vegetable would have to be 30%[23]. Stuart Ford finds that as Growers are not price setters, they are unlikely to undertake expansion, because they will not be able to meet the cost. The Deloitte Pukekohe Food hub, tested the impact on the price of vegetables if growers were not able to expand to meet demand and found that by 2043 the price of vegetables could increase by between 43% - 58%.[24]

Water Quality

The current area of vegetable growing is estimated to be 60,000 ha. If we assume that by 2030 vegetable growing expands by a further 12,000 ha. The increase in water quality load would easily be accommodated within the claw-back that is predicted to occur due to improvements in good management practice in the vegetable, dairy and sheep and beef sector. The estimate in expansion is conservative; in the past 10 years the area in commercial vegetables has declined in NZ[25].

We estimate that over the next ten years, that if on average a 10% reduction in nitrate leaching was achieved with widespread adoption of GMP for dairy farms and a 5% reduction in nitrate leaching was achieved by the adoption of GMP for CVP, then the predicted increase in nitrate load for vegetable growing could be accommodated within the clawback – effectively reducing the dairy clawback from 10% to 9%. If the CVP expanded by 20,000 ha it would only reduce the dairy clawback from 10% to 8%[26].

For the Waikato PC1 hearing, the evidence of Stuart Easton[27], demonstrated that an increase in vegetable growing could be easily accommodated within the water quality reductions that are predicted for dairy farming due to the proposed rules.

Allowing vegetable growing to expand is consistent with Te Mana o te Wai. It is a very efficient land use, and so expansion can be provided for and water quality will still improve provided all land uses operate at GMP.

Allowing the expansion of vegetable growing to occupy part of the water quality reduction that will be achieved by the dairy sector is consistent with Te Mana o te Wai, because it provides for a re-allocation of the some of the discharge allocation that has been allocated. The reallocation prioritises the essential health needs of people. In our view, over time as more reductions in water quality loads are required to achieve outcomes, these reductions need to be designed to provide sufficient allocation so we can grow the heathy food New Zealander need now and in the future.

Vegetables – an essential human health need

The benefits of fruit and vegetable consumption are well established, particularly their role in preventing general micronutrient-deficiencies and chronic diseases (Moore, Barton, & Young, 2019). Low fruit and vegetable intake are identified as a leading risk factor in loss of health. In New Zealand, having a high body mass index (i.e. being overweight or obese) has overtaken tobacco as a leading cause in health loss (Ministry of Health, 2013).The Institute for Health Metrics and Evaluation (IHME) carry out the Global Burden of Disease study. This study attempts to quantify the health loss due to various diseases and risks. The study

[23] (Ford S. , Memorandum to HortNZ NESFW, 2019)
[24] (Deloitte, 2018)http://www.hortnz.co.nz/assets/Deloitte/New-Zealands-food-story-The-Pukekohe-hub.pdf
[25] (Plant and Food, 2018)
[26] Assumes 60,000 ha CVP @ 70kg/ha and 5% improvement and 1,700,000 ha of dairy @30kg/ha and 10% improvement
[27] (Easton, 9 July 2019)https://www.waikatoregion.govt.nz/assets/WRC/Council/Policy-and-Plans/HR/Block3/HortNZ-6-v2.pdf

estimated that almost 800 deaths were caused by low vegetable intake in New Zealand in 2017, as well as quality of life lost due to morbidity (IHME, 2017).

The price of meeting micronutrient requirements is very expensive in New Zealand compared to other countries. Without changing the land use the situation is unlikely to get better and could get worse (Moore, Barton, & Young, 2019).

Affordability is a key factor in why people eat less than the recommended intake of fruit and vegetables. If fruit and vegetable growing cannot expand to meet the growing demand with an increased population, the reduced availability of vegetables and an increased price would impact on the health of the most vulnerable people (Moore, Barton, & Young , 2019).

In New Zealand, for families living in deprived areas, increases in fruit and vegetable prices especially around their off-season, compel them to substitute the purchase of healthier whole fruit and vegetables with cheap energy-dense and nutrient-poor products[28]

There is an extensive body of research indicating that children experiencing household food insecurity have lower fruit and vegetable intake, diets higher in fat, and are at an increased risk of obesity[29]

Higher food prices don't affect everyone equally; generally low-income households have a stronger response to changes in cost. Healthier food has been the first essential that low income families compromise on in times of hardship, exacerbating existing nutritional deficiencies resulting from general lack of money[30]In New Zealand, for families living in deprived areas, increases in vegetable prices especially around their off-season compel them to substitute the purchase of healthier whole fruit and vegetables with cheap energy-dense nutrient-poor products [31].

Grandparenting allocation is a pragmatic option and we accept it in the transition period. However, the reductions made by grand-parented activities must be sufficient to achieve progress towards water quality outcomes and provide for the essential human health needs of New Zealanders during the transition. In the past 10 years due to competition of land, the area in vegetable growing has declined, the price volatility has increased[32], and the consumption of 3+ vegetables a day has declined.

If the vegetable growing is unable to expand to provide for demand, it is health of New Zealanders who will suffer, and Te Mana o te Wai will not be achieved.

Relationship to proposed NPS HPL

The potential risks associated with the implementation of the proposed NPSFM and proposed NESFW are felt strongly by growers. Regional Council policy developed to implement the NPSFM 2014 and 2017 has served vegetable growers very poorly. For example, currently the Horizons Proposed Plan Change 2 caps the productive use of LUC I land at dairy farming, stripping the productive capacity of a nationally important vegetable growing hub that provides 20%[33] of New Zealand's green vegetables. We acknowledge that

[28] (Rush, Savila, Jalili-Moghaddam, & Amoah, 2018)
[29] (Ministry of Health, 2019)
[30] (Cheer, Kearns, & Murphy, 2002)
[31] (Rush, Savila, Jalili-Moghaddam, & Amoah, 2018)
[32] https://www.stats.govt.nz/indicators/consumers-price-index-cpi?gclid=Cj0KCQjw6eTtBRDdARIsANZWjYYzWVW0UmAjVys4HN_NlOFzElbLZmxuI9ladZmkXB2K6nyffRSoQxQaAtz8EALw_wcB
[33] (KPMG, 2017)http://www.hortnz.co.nz/assets/Media-Release-Photos/HortNZ-Report-Final-A4-Single-Pages.pdf

water quality needs to improve in degraded catchments. In sensitive and highly modified catchments, improvements are likely to require a more targeted Action Plan approach than simply limiting discharges and abstractions. (See **Case Study Three**).

If nutrient allocation policy significantly impacts the productive capacity of land, then we are of the view that land should not be prevented from being developed for urban uses.

However, the health needs of people, including access to reasonably prices fresh vegetables, needs to be considered in determining when and how improvements in water quality are achieved. An example of the tensions between food production and water quality is demonstrated in **Case Study Four**.

Food Security

New Zealand's food policy tends towards self-reliance, where we export a limited range of products (mainly food) and import goods including food. New Zealand is too remote to import fresh vegetables, except by air-freight, which can only provide for a fraction of demand and has a high carbon footprint. Most vegetables that New Zealand imports are processed. If we continue to lose the ability to grow fresh vegetables due to policy settings, there is a risk that fresh vegetables will become unaffordable, and contribute to reduced domestic food security.

Local production may provide a pseudo-subsidy through increased access to seasonal discounts and holding transports costs down. This would have long term public health benefits.[34]

The FAO[35] has provided a useful framework for how to consider the environmental sustainability of allowing for increased vegetable exports. This assessment notes the following is likely to be true for how increased export of vegetable crops can influence the dimensions of food security positively:

Availability: The availability of commercial vegetables locally is strongly and positively influenced by the utility of locally produced goods in overseas markets, particularly in the processed vegetables sector and in value – related trade goods such as ready prepared meals. Production for trade purposes also provides the incentive for processors to locate in New Zealand; such as McCains, Watties, Bluebird and Talleys. These provide goods into local retail and also send the same goods overseas, with the strong weight being on domestic supply. Processors have indicated their presence here relies on both domestic and export trade for the appropriate scale of production.

Access: Employment in the horticulture sector is significantly higher per hectare than pastoral production. Data produced by Rabobank[36] in relation to Horowhenua vegetable production showed that money cycled through the local and larger economy on a per hectare basis can be between 2-25 times that of other farming. Heinz Watties demonstrated the effect this can have on communities when applied to domestic and export production in their evidence on the WCO application for the Ngaruroro River[37].The presence of

[34] (Moore, Barton, & Young , 2019)
[35] (FAO, 2016)
[36] http://www.hortnz.co.nz/assets/Natural-Resources-Documents/Commercial-Vegetable-Production-total-cash-cycling-cf-other-May-2014.pdf
[37] https://www.epa.govt.nz/assets/FileAPI/proposal/NSP000041/Hearings-Week-02/fc3f606377/08-WCN-Stage-2-Heinz-Watties-Limited-Evidence-of-MPretty.pdf

commercial vegetable production in the rural community is a key enabler to elevated employment and access to the means to obtain food security.

Utilisation: It has not been until trade export exchanges increased that we have seen a greater diversity of products available in the partially cooked and processed space; and food technology / breeding have improved as a result as well. Food safety systems have advanced significantly as a result of export production and this has provided greater assurance of utilising the food products produced. The technology required to extend shelf life and manage cool chain directly benefits NZ consumers.

Stability: The FAO report shows that the stability of food production systems is greatly increased by trade because it makes it less volatile to climate shocks; oversupply and undersupply of core staples. If growers have confidence of goods reaching a market they are more likely to undertake the risks of production. However, if stability is affected by production that affects local indigenous food ecosystems or damages natural resource systems then stability is decreased. This is another core reason why the regulatory system should provide the opportunity for growth through a resource consent where cumulative effects can be measured and managed as opposed to a permitted activity which is less likely to be visible to the regulator.

Climate Change

The Paris agreement goals include limiting the global temperature to 1.5 degree and adapting to climate change and fostering a low emissions economy in a way that does not threatened food production.[38]

The Consumption of healthy and sustainable diets presents major opportunities for reducing greenhouse gas emissions from food systems and improving health outcomes.[39]

In New Zealand we already have food insecurity and the decisions we make about water allocation and how to develop a low emissions economy could either improve or reduce the food security of New Zealanders.

A 2019 Ministry of Health study has analysed household food insecurity among children in New Zealand (Ministry of Health, 2019). 174,000 (19%) children in NZ are estimated to live in food insecure households. When considering just the children in food insecure households, almost two-thirds lived in the two most deprived quintiles of neighbourhoods (Quintiles 4 and 5: 63.3%) (Ministry of Health, 2013).

If we choose not to allocate our resources to produce food for export, and there is not sufficient resources to produce enough fruit and vegetables to feed New Zealanders, we will have to import more vegetables and fruit. It is not possible to import sufficient fresh vegetables. We would be more dependent on frozen vegetables. The countries that we currently import vegetables from are predicted to experience increased food insecurity due to changes in their climate.

Observed climate change is already affecting food security through increasing temperatures, 13 changing precipitation patterns, and greater frequency of some extreme events.

[38] https://unfccc.int/sites/default/files/english_paris_agreement.pdf
(IPCC, 2019)[39] https://www.ipcc.ch/site/assets/uploads/2019/08/2f.-Chapter-5_FINAL.pdf

Te Mana o te Wai recognises the inter relationship between the health of water, people and the wider environment. Climate Change threatens to alter New Zealand's flow regimes with likely significant adverse effects, it threatens the health and wellbeing of New Zealanders and all people. New Zealand has an opportunity to transform our agricultural system so it produces more food and generates fewer emissions. The way water is managed over the next 10 years, will have an impact on our ability to contribute to the global effort required to improve the health of our climate.

CASE STUDY THREE: Action planning for commercial vegetable growing in Horowhenua

Background

Commercial vegetable growing has long occurred extensively in the Horowhenua, an area with a valued Chinese market garden history. The area became important increasingly important in the 1940's as other growing areas in the Hutt Valley and Otaki were lost to urbanisation.

This area contributes significantly to the regional economy and national food security. It is estimated that Commercial Vegetable Growing in the Horowhenua generates approximately 500 direct jobs and $80-100 million local spend per annum. Horowhenua is one of the few places in New Zealand suitable for growing winter greens and produces approximately 62,000 tonnes of healthy, affordable, domestically consumed vegetables.

In the Horowhenua Freshwater Management Unit (FMU), we estimate that there is approximately 1,200 ha of vegetable growing land, with 320ha in the Hokio 1a/1b catchment (Arawhata). The Hokio Catchment is a Target Water Management Sub (identified in the Horizons One Plan) due to its degraded water quality due to residential, business, industrial., and municipal facilities, pastoral farming (dairying and sheep and beef) and commercial vegetable growing. This catchment includes Lake Horowhenua (Punahau), a sacred taonga.

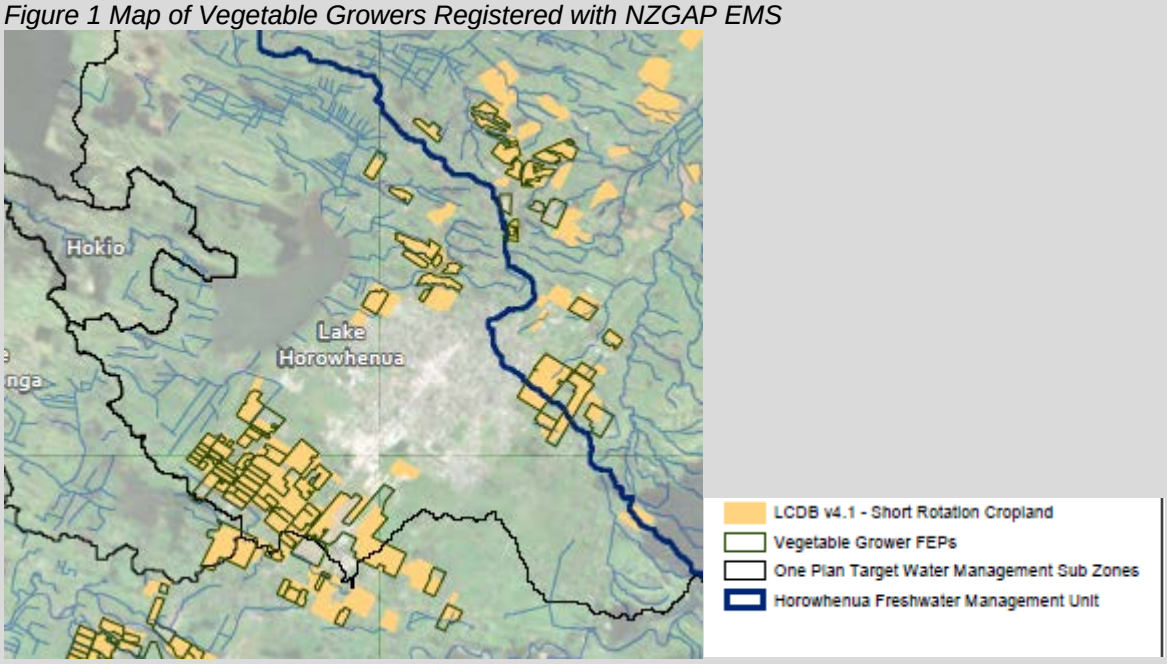
Implications of the Horizons One Plan

The Horizons One Plan lacks an achievable consenting pathway for commercial vegetable growing, by setting cumulative nitrogen leaching maximums based on pastoral farming activities. The limits imposed in the One Plan are not linked to water quality outcomes. The limits in the One Plan (current and proposed) are not achievable if commercial vegetation growing operations are to remain viable.

Growers recognise the need to improve their practices. 87% of growers in the District have signed up to the NZGAP EMS. Growers are working with Vegetables NZ, Potatoes NZ and HortNZ to improve practices and to adopt Best Management Practice standards.

Growers also recognise that the improvements required to achieve the health of Lake Horowhenua and its streams cannot be achieved with on-farm mitigations by vegetable growers alone.

Figure 1 Map of Vegetable Growers Registered with NZGAP EMS



Action planning to achieve an ecosystem-based solution

Growers, alongside Horowhenua District Council, iwi, Lake Horowhenua Trust and government agencies (as part of the Arawhata Wetland Alliance) are proposing to retire 70 ha of dairy land

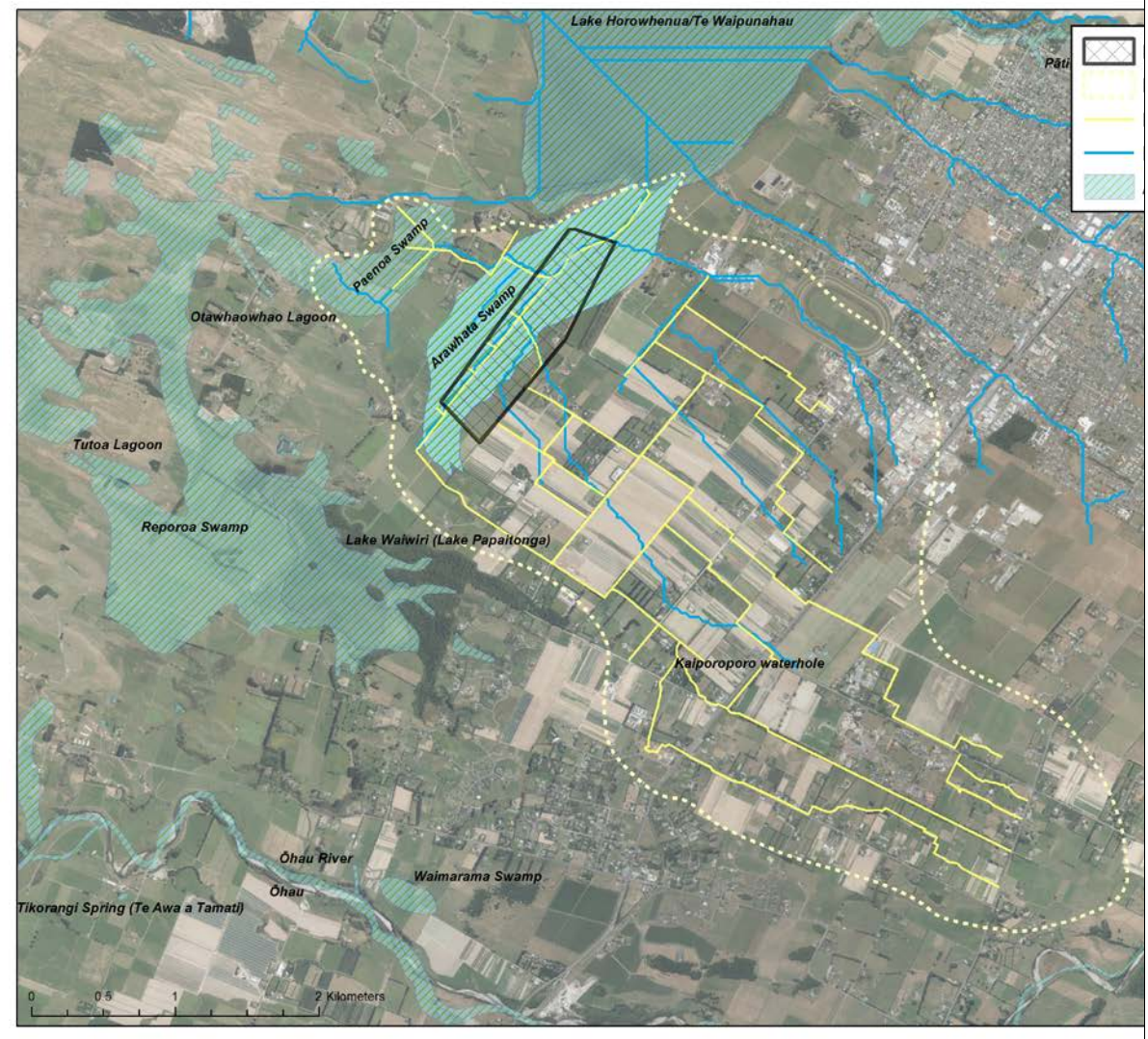
adjacent to Lake Horowhenua, that drains approximately 80 percent of land used for commercial vegetable growing in the Hokio Water Management Subzone (WMSZ),

This project is centred around the Arawhata stream. The Arawhata stream is heavily modified and has a drain morphology. The project seeks to establish a sediment removal and denitrification wetland to reflect the Arawhata swamp which once linked Lake Horowhenua and Lake Papaitonga. The project aims to enhance the cultural and ecological value of the land, improve the water quality of Arawhata Stream and Lake Horowhenua, while sustaining the social and economic benefits that Commercial Vegetable growing provides to the Horowhenua District.

While this project is still in its infancy, this project demonstrates the potential of action planning in some catchments to achieve benefits which far outweigh those that could be achieved by only setting limits. The limit setting approach proposed by Horizons would see vegetable replaced by pastoral farming, with limited improvement in water quality and a loss of healthy food.

This action plan approach enables vegetable growing to occur on highly productive soils, while aligning with community, environmental, iwi and hapu values.

The figure below shows the Arawhata catchment, and historic swamp lands.



CASE STUDY FOUR: Pukekohe food hub

Background

The Pukekohe Hub, a 4,359-hectare area with a unique temperate and generally frost-free climate and some of New Zealand's most fertile and productive soils, is a key growing area for New Zealand. Within the hub, vegetable growing is an inter-generational family business with strong community ties. The main crops are fresh vegetables including potatoes, carrots, leafy greens, brassicas, tomatoes and onions.

The Pukekohe supplies year-round vegetables to Auckland, as well as almost entirely meeting the domestic supply for carrots, potatoes and leafy greens in October, November and the early part of December. Pukehoke is one of the growing areas with the right conditions to enable winter production of certain vegetables such as leafy greens and brassicas.

Economic value of the Pukekohe Hub

Deloitte's 2018 report on the Pukekohe Hub estimated the regional economic contribution of horticulture industry within the hub to be $261 million per annum. The same report estimated that the population of Auckland is expected to be 37% higher in 2043 compared to 2018, which means by 2043 demand for fruit and vegetables in Auckland will be 33% higher.

Economic modelling by Deloitte estimated that constraints on production growth within the Pukekohe Hub could result in:

- Economic impacts of between $85million to $1.1 billion,
- Loss of between 3,500 – 4,500 jobs
- Loss of between 46-55% in output volume
- Prices 43% - 58% higher

The scenario modelled in the Deloitte report is the same as is proposed by the NES FW. Modelling undertaken for HortNZ by Sturt Ford has found that if vegetable growing had to meet the criteria in the proposed Discretionary rule, the price of vegetable would have to increase by between 16% and 50 in order for the grower to maintain their gross margin. He concludes growers would not expand under these conditions, and therefore the Deloitte Scenario of increased vegetable prices of between 43% - 58% higher by 2043 could be the outcome.

Tension between food production and water quality

There is a key tension between the need to protect food production, a key value articulated in the proposed National Policy Statement for Highly Productive Land (NPSHPL) and water quality and outcomes proposed in the draft NPSFM.

The Whangamarie and Waitangi streams have been identified in the Discussion document. These catchment's have poor water quality. In each of these catchment horticulture makes up less than 15% of the land area. Like most catchment in New Zealand the dominant land use is pastoral, these catchments have the added pressure of urban development, but undoubtedly commercial vegetable growing contributes to the freshwater quality pressures.

Our rule framework provides existing vegetable growing as permitted, and provides a controlled pathway for expansion in subcatchments where the CVP area doesn't already exceed 20%. In Pukekohe there are couple of catchments above this threshold (Mauku and Whakapipi), the remaining catchments are between 10 and 20% CVP. There is little point protecting the highly productive land in Pukekohe if it cannot be used for vegetable growing. Our provision provides for some expansion in this area.

There is a need to simultaneously recognise the value of freshwater and the value of vegetable growing for supporting the health of New Zealanders. It is important that land with the highest productive capacity is able to be utilised, in order to meet domestic food supply. In making decisions about water resources, the economic, social and cultural contribution of food production, the values associated with those contributions and the potential long-term outcomes for New Zealanders are considered.

Subpart 3 - Freshwater module of farm plans

HortNZ submits that all growers (>5ha) have an independently audited Freshwater Farm Plan by 2025, we will submit that auditing rather than certification is sufficient.

The provisions would require all vegetables growers to have a Freshwater Farm Plan by 2022, all land uses within Schedule 1 catchments by 2022 and all other land uses by 2025. We support prioritising the Freshwater Farm Plans in the Schedule 1 catchments. The 2022 deadline for all vegetable growers is unachievable and unwarranted.

This work, to have all vegetable growers with high quality independently audited FW-FPs, is under way with the Vegetable NZ roll out of the NZGAP EMS to their growers, and the Potatoes NZ nutrient taskforce.

We have asked Stuart Ford to review the economic analysis included within the discussion document.[40] This was from a survey of 28 Hawkes Bay growers in 2016 [41]. The average nitrogen leaching from the study for vegetables was 16kg/ha/yr. The review concludes that, 'while the information used is correct the manner in which it has been used is in our view incorrect and it is misleading in its conclusions'. For example:

- If a third of the area utilised is in affect leased that would reduce the annual average EBIT from the $8,832 to $7,999 based on the facts used to determine the average EBIT result.
- It is a pointless exercise to express a change in expenditure compared with the Gross Revenue of an operation and to try and portray it as an affordable item because it is a relatively small value when compared to the total Gross Revenue.

The true impact of a change in expenditure should be measured against the true profit which is best described as that sum available to the owners of the business after all costs have been deducted. In the example given there would no doubt be considerable debt to service, repayment of capital and then tax to be paid on the remainder to come off the EBIT result that was used in the example. If the comparison were to be made against this figure then it would have a far greater impact than that portrayed in the report.

5 ha threshold

HortNZ supports the 5ha threshold for Freshwater Farm Plans (FW-FP).

Most commercial vegetable growing operations exceed this size. There are many existing orchards that are smaller than 5ha; although most new orchards would exceed this size.

The kiwifruit industry is showing environmental leadership by promoting the audited FW-FP for all kiwifruit growers regardless of orchard size.

We support NZKGI's position, however HortNZ has discussed the threshold with the wider horticulture sector, and we are of the view that a realistic target for the horticulture sector is a >5h threshold. With this threshold we are confident we can meet the 2022 deadline for Schedule 1 catchments, and the 2025 deadline for the remaining locations. As a sector overall, we are not confident we can achieve FW-FPs by all the small growers by 2025.

All growers that export or sell crops through supermarkets have GAP farm plans. We are committed to rolling out the horticulture freshwater farm plans to these growers through the

[40] (Ford S. , Memorandum to HortNZ NESFW, 2019)
[41] (Ford s. , 2016)

GAP schemes, however we propose that auditing of the FW-FP module of GAP farms plans is voluntary for growers smaller than 5ha.

Content of FW-FP

We recommend that the following are also considered for required content of a FW-FP:

- reference to every relevant resource consent, along with the date it was granted and the date (if any) on which it expires;
- the location of source protection zones for human drinking water;
- The risk assessment part of the FW-FP must identify and assess the risk of contaminant losses from the farm, with consequent impacts on freshwater ecosystem health, associated with any of the following activities carried out on the farm; and
- Existing or previous land use that may be hazardous.

Certified Freshwater Farm Plans

The provisions require all Freshwater Farm Plans to be certified by an appropriately qualified adviser. The horticulture sector does not have a system for certification for horticulture farm plans, but instead tests the robustness and quality of farm plans via third party audits. HortNZ has participated in conversations led by Waikato Regional Council on the development of a certification programme. However, we have been disappointed by the focus of this certification programme on pastoral farming, including requiring Overseer modelling training and qualifications as a prerequisite. In our view this process was of replicating the issues the horticulture sector has had with the implementation of the NPSFM, which has focused on pastoral farming, and created rules that do not work for horticulture.

We see the certification programme as potentially being useful for the pastoral sector, because they (with the exception of Synlait) do not have robust auditing processes and assurance framework.

The horticulture sector is not opposed to certification, and we see a role for professionals supporting growers to develop Farm Plans. However, we don't believe certification should be mandatory.

By 2025 our sector can deliver independently audited FW-FPs. We are much less certain that we can deliver certified FW-FPs by this deadline. We are not convinced that the investment required to develop sufficient certified people would be worthwhile. In our view, effort would be better spent developing the capacity of growers to develop their own FW-FPs, and holding growers to account via independent audit.

Audit of compliance with FW-FP

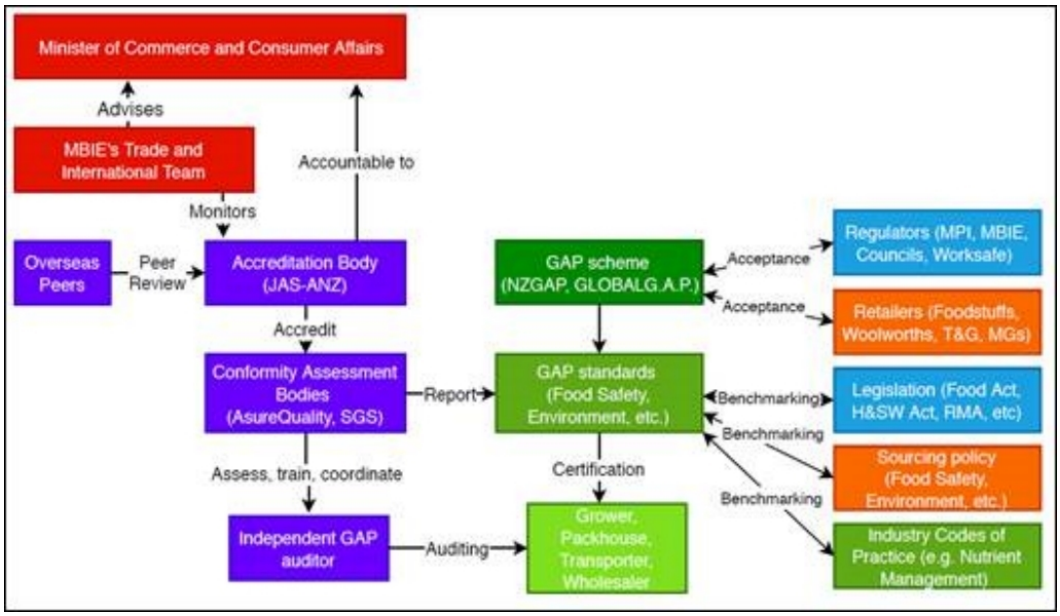
We propose that the existing GAP programmes are used to deliver the Freshwater Farm Plans.

The Horticulture sector already has a process and assurance framework for developing independently audited farm plans. This is the Good Agricultural Practice (GAP) system primarily used for food safety compliance with both market and regulatory requirements. The NZGAP Environment Management System (EMS) add-on has already been accepted by Environment Canterbury as a pathway for growers to demonstrate compliance with requirements for an independently audited Farm Environment Plan (FEP). The horticulture sector will invest further in this system to deliver independently audited Freshwater Farm Plans in all regions.

A comprehensive overview of the GAP assurance framework, and how GAP schemes deliver on environmental outcomes is provided in "HortNZ 4 – Damien Farrelly Evidence" submitter evidence for the proposed Waikato Regional PC 1.[42]

GAP standards in NZ horticulture are benchmarked to internationally recognised standards and all certified growers are audited by Independent Verification Agencies (IVA – also known as Certification Bodies) who are accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ). Growers must meet all relevant requirements in the GAP standard to attain certification, and they must continuously meet requirements of GAP standards, and make progress on industry objectives to maintain certification (Figure 1). GAP standards have recently been further developed to incorporate FEP requirements (e.g. NZGAP EMS add-on). Environment Canterbury has developed rules and an audit manual for council auditors, but has also recognised industry developed schemes with a credible governance, rules, assurance framework, auditors and audit processes. Currently, the only approved schemes in Canterbury are NZGAP and Synlait Lead with Pride.

Figure 1: New Zealand Conformance Infrastructure for GAP certification



An auditor should not help growers to develop their plans. In our view they need to be independent to be credible. The first audit will be focused on reviewing the content and implementation of the FEP, and will highlight where further improvements are required. The audit will also review the risk assessments undertaken by the grower (compared with the process in the codes and practice), and assess whether the proposed actions and timeframes support effective risk management.

Subsequent audits will assess the degree to actions have been implemented, and will account for any changes made to the Farm Plan. The auditor would again assess the degree to which the Farm Plan achieves effective risk management.

It is important that growers have ownership of the development and implementation of their own farm plans, rather than requiring the certified farm plan approach. The independently audited Freshwater Farm Plan process we propose provides growers with ownership of their farm plans and is likely to achieve better engagement, adoption, and positive environmental

[42] https://www.waikatoregion.govt.nz/council/policy-and-plans/plans-under-development/healthy-rivers-plan-for-change/the-hearings/submitter-evidence/

outcomes as the Freshwater Farm Plan becomes part of business planning and operations. Audited FW-FPs also provide councils and the public with confidence that growers are making progress on environmental objectives by adopting Good Management Practices and Best Management Practices consistent with accepted codes of practice.

The table below compares the NESFW proposal and the HortNZ recommendations

Growers

Govt's proposal	HortNZ proposal
All >5ha need certified and audited by 2025	All >5ha need ~~certified and~~ audited FEP by 2025
All <5ha are exempt	All <5ha develop FEP based on Agreed National Good Farm Practice Principles by 2025 (rather than NES requirements), but exempt from audit (audit is optional)
In identified high nitrogen or soil erosion catchments, additional nitrogen mitigations and an FEP by 2022	All need audited FEP with additional risk-based assessment (e.g. BMPs) by 2022

Vegetable Growers

Govt's proposal	HortNZ proposal
All need certified and audited FEP by 2022	All need ~~certified and~~ audited FEP by 2025
In identified high nitrogen or soil erosion catchments, additional nitrogen mitigations and an FEP by 2022	All need audited FEP with additional risk-based assessment (e.g. BMPs) by 2022

Content of FEP

Govt's proposal	HortNZ proposal
Farm details (name, location etc.)	Farm details (name, location etc.)
Farm map (features, risk areas, waterways etc.)	Farm map (features, risk areas, waterways etc.)
Risk assessment of contaminant loss from the farm	Risk assessment of contaminant loss from the farm
Identified actions and timeframes to address identified risks	Identified actions and timeframes to address identified risks (e.g. GMPs in Industry Guidelines and Codes of Practice)
Identified further actions and timeframes (according to rules or BMP) if in schedule 1 catchments	Identified further actions and timeframes (according to rules or BMP) if in schedule 1 catchments (e.g. BMPs in Industry Guidelines and Codes of Practice)

Certification of FEP

Govt's proposal	HortNZ proposal
FEPs only certified by approved FEP planner	No requirement for approved FEP planner. FEP audit instead

Audit of FEP

Govt's proposal	HortNZ proposal
FEPs only audited by approved FEP auditor	Approval of existing GAP auditors
Audit must be completed within 2 years of first certification	Audit completed by relevant deadline (2022 or 2025)
Audit report outcomes to Council	Nationally consistent reporting system via industry bodies

Subpart 4 - Nitrogen cap

The proposed NES identifies high nitrogen catchments. The proposal considers a range of options to reduce nitrogen discharges in these catchments. The first option is for pastoral farmers and requires Overseer modelling. There are two options that could apply to growers, these are a fertiliser cap or extra actions within Farm Environment Plans.

Schedule 1 Catchments

There are a number of growers within the Schedule 1 catchments. Horticulture is a very minor activity in all of the catchments. HortNZ data indicates:

- 280 growers in total
    - 132 in NZGAP
- 98 in GLOBALG.A.P.
    - 7 with apples
    - 56 with Avocados
    - 41 with Kiwifruit
- 37 vegetable growers in NZGAP
- 32 >5ha vegetable growers in NZGAP
- 1605 ha of vegetables in total in NZGAP

There are four possible additional catchments identified within the discussion document.

- Mangaone - Commercial vegetable production makes up approximately 2% of this catchment. DIN levels are elevated. *E. Coli* is in E band, which indicates pastoral activities that dominant the landscape, likely dominate the nitrate load.
- Waitohu - Commercial vegetable production makes up approximately 1% of this catchment. DIN levels are elevated. *E. Coli* is in D band, which indicates pastoral and urban activities likely dominate the nitrate load.
- Waitangi – Commercial vegetable production makes up 12% of land area. This stream is spring fed and its surface water catchment is probably not the only contributor to its water quality. DIN is elevated. *E. Coli* is in D band, which indicates pastoral and urban activities, likely contribute significantly to nitrate load.
- Whangamarie - Commercial vegetable production make up approximately 15% of the catchment (but 40% at the gauging site) This stream is spring fed and its surface water catchment is probably not that only contributor to its water quality. DIN is very elevated. *E. Coli* is in E band, which indicates pastoral and urban activities, likely contribute significantly to the nitrate load.

Fruit Growing

A small amount of fruit growing occurs in some Schedule 1 catchments. The water quality issues experienced in these catchments is not likely to be attributed to by fruit growing. If farmers in these catchments were able to convert some their land in these catchments to fruit growing, it would likely result in water quality improvements. We do not think it would be effective for additional mitigations to be required for fruit growers within Schedule 1 catchments

Vegetable Growing

A number of catchments that are important for vegetable growing have water quality that is below proposed national bottom lines. In some of these catchments, vegetable growing

occurs but is in an extensive rotation and a minor land use. However, some small stream catchments within the mild west coast growing hubs, which depend on rain and upon which New Zealanders depend for winter vegetables, are included.

Growers are concerned that in catchments where water quality is targeted for improvement, they may be unable to continue to grow vegetables if the regulations do not take into account the impact of potential farm scale nutrient limits on vegetable yields (Ford, 2014).

Some of these catchments are important for vegetables growing – for example Hauraki-Piako and the Pukekohe catchments. The catchments to the south of Levin, may become increasingly important for vegetable growing, if growers are required to reduce the intensity of growing around lakes Horowhenua and Papaitonga. Vegetable growing is likely to need to expand in some of these catchments in the next 10 years to feed New Zealand.

Over the coming 10 years, we need to see sufficient reductions made in catchments that are over-allocated due to pastoral uses, so that some re-distribution of the grand-parented load can occur. However, in some sub-catchments where there is relatively large proportion of vegetable growing (over 20%), and particularly where urban discharges contribute, the reductions from other pastoral land uses may not be sufficient to provide for an increase in vegetable growing. In these catchments, we suggest no increase in vegetable growing without offsetting across all contaminants.

Some redistribution of the grand-parented load is vital to enable New Zealanders to meet their essential human health needs, and to meet their social, economic and cultural wellbeing, while still making progress of achieving outcomes that provide for freshwater values, within acceptable timeframes.

Overseer 75th Percentile

We support the proposals to exclude horticulture from options reliant on Overseer, because Overseer is not a reliable tool for guiding on-farm decisions for horticultural growers.[43]

The percentile approach is unworkable for vegetable growers. It doesn't recognise the different crops have different leaching risks, but they also provide different nutrients and health depends on the supply of micro-nutrients that are supplied form a range of vegetables. The average annual nature assessment, does not recognise that vegetables need to grow them all year to meet domestic supply. In winter, the risks of leaching are greater, but the health of New Zealander depends on eating vegetables daily, winter growing is an integral part of our food system, some parts of New Zealand are more important for winter growing than other areas because of the combination of highly productive land, water, climate and other infrastructure.

A percentile approach where the leaching rates of vegetable growers is compared with pastoral farms is unworkable This is the approach used in the Horizons One Plan, which has adopted a pastoral "natural capital" approach. This approach has left vegetables unable to be consented, even though the nitrogen load from vegetable growing is much less than the load associated with pastoral farming and the productivity of vegetable growing on kg of food/ per kg of nitrogen is much more productive.

If a percentile approach was applied to vegetable growing without comparison to pastoral farms, it would target leafy greens grown for winter supply, because these crops due to

[43] (Parliamentary Commissioner for the Environment , 2018)https://www.pce.parliament.nz/media/196493/overseer-and-regulatory-oversight-final-report-web.pdf

rainfall and their shorter root mass have the greatest risk of leaching – they are also very important for supporting New Zealanders health.

Fertiliser Cap

We do not support the fertiliser cap option. This option is unworkable and inefficient. Different crops and crop rotations have different fertiliser demands. Reducing fertiliser in a manner an inconsistent with GMP would reduce yield. Reduced yield would reduce vegetables availability and increase the price of vegetables.

Requirements of crops differ and the amount of fertiliser required depends on the crop and the soil nitrogen at the time of planting. The soil nitrogen is related to the nitrogen left behind by the proceeding crop, and is attributed to both crop residue and the fertiliser applied which was not taken-up by the proceeding crop.

Below are three examples of the theoretical nitrogen requirements of different vegetable crops[44]. Of the three examples below, potatoes have the greatest required fertiliser (greater than 200kg/ha/yr), and are predicted to remove the greatest amount of nitrogen and therefore would theoretically have the lowest leaching risk.

- To yield 10 t/ha of onions, and assuming soil available nitrogen was 20kg/ha at the time of planting, then 140kg/ha of nitrogen fertilizer is recommended, if the removed yield was 8t/ha dry, then 120kg/ha would be removed with the crop, leaving 20kg/ha in the soil.
- To yield 87t/ha of russet burbank potatoes, and assuming soil mineral nitrogen to 60cm of 50 kg/ha at the time of planting, 225 kg/ha of nitrogen fertiliser is recommended, and 237 t/ha of nitrogen could be expected to be removed with the tubers, leaving no additional nitrogen in the soil
- To yield 40t/ha of butternut squash (water stressed), and assuming available nitrogen of 60 kg/ha in the soil, the recommended nitrogen fertiliser to grow the crop is 150kg/ha, and if only the marketable yield of 28t/ha was removed, 103 t/ha of nitrogen would be expected to be removed with the crop, leaving approximately 50kg/ha in the soil.

The values provided above are theoretical nitrogen requirements, plants uptake nitrogen and water as the grow, with the rate of growth is dependent on nutrients, temperature and light.

Leaching can occur due to rain or excessive irrigation, causing nitrogen to be washed into the deeper soils, which might be beyond the roots of shallow rooted crops such as onions. In heavy rain or in free-draining soils nitrogen may be washed into the groundwater before it can be taken up by the plants.

Excess leaching can also occur if conditions are too dry to enable the crop to grow and take up the fertiliser, creating a risk if subsequent rain occurs. For this reason, reliable irrigation is an important tool in managing leaching risk.

If nitrogen is lost to leaching before it can be taken up by the plant, the nutrients need to be replaced in order for the crop yield to be achieved, and therefore for outdoor growing the amount of fertiliser used is always likely to be somewhat more than theoretically required.

The risk of leaching nitrogen is minimized by fertilizing at the time of planting and during the growth phase through side-dressing. Other methods such as fertigation, where fertiliser is

[44] (Reid & Morton, 2019) https://zenodo.org/record/2401910#.Xbg2HZozbIU

applied with water several times during crop growth, or controlled-release fertilisers products that slowly release fertilizer are also good methods of reducing the risk of leaching.

In our view good management practices that support growers to match the nitrogen inputs to exceed the reasonable nitrogen requirements of the crops being grown, provides better direction for managing the water quality risks associated with growing crops compared with setting a maximum nitrogen limit.

N Surplus

An N surplus can be calculated in Overseer. Overseer is not a useful on farm decision support tool for growers, so few growers have developed models in Overseer. In his Waikato PC1 Evidence, Stuart Ford[45] illustrates that vegetable growers have efficient growing systems using the N surplus, as illustrated in the table below, reproduced from Stuart Ford's evidence. Using N surplus, would be favourable for vegetable growers, but we do not think it is as useful as an independently audited Farm Freshwater Plan process.

Farm Type	N leaching Kg / ha	N Surplus Kg / ha	N conversion efficiency %
CVP	81	31	76
Dairy	41	187	34

Without using an Overseer model, N Surplus can be calculated for individual crops. However, crops are grown in rotations. To understand the true N Surplus of the cropping system over a year, the N surplus of the sequence of crops would need to be calculated. This is a much more complex process. In his Waikato PC 1 evidence Chris Keenan[46] designs a possible method, however the complexity is such that it is similar to developing an Overseer model.

In addition, there is not a way of calculating N surplus for many crops. The recently published report, Nutrient Management for Vegetable Crops[47] has 15 crops, Overseer includes the same crops and an additional 4 crops. However, there are scores of crops grown in NZ that are not included. For example, of the vegetables listed in the HortNZ 2019 Levy Order, over 40 of these are not included in either the Nutrient Management for Crops in New Zealand or Overseer. Furthermore, the nutrient requirements of different varieties of the same vegetable vary. The Nutrient Management for Crops in New Zealand Manual includes 3 varieties of potatoes. However, there are more than 30 potato varieties that are grown in New Zealand, 12 of which are commonly grown.

FW-FP Option

For horticulture, we support addressing nitrogen losses within audited Farm Environment Plans.

[45] (Ford S. , Block 3, Waikato Plan Change 1 Hearing, 2019) https://www.waikatoregion.govt.nz/assets/WRC/Council/Policy-and-Plans/HR/Block3/HortNZ-5.pdf
[46] (Keenan, 2019) https://www.waikatoregion.govt.nz/assets/WRC/Council/Policy-and-Plans/HR/Block3/HortNZ-2.pdf
[47] (Reid & Morton, 2019) https://zenodo.org/record/2401910#.Xbg2HZozbIU

The HortNZ code of practice for nutrient management[48] sets out good management practices and best management practices to reduce the risk of leaching form vegetable growing. Some of crops have specific codes of practice, for example Code for practice for Glasshouse discharges.

All crops will require suitable codes of practice to support the development of the FW-FP, this will be required by 2022 to enable those growers within the Schedule 1 catchments to meet the deadline.

The NZGAP EMS provides a framework for assessing risks and prioritising actions. Other product groups will need to develop similar modules for their GAP programmes.

We propose that for CVP expansion and for horticulture within Schedule 1 catchments, that growers operate at risk based Best Management Practice (BMP).

Operating at BMP, means that the risks from the orchard or farm are considered and the risk for the catchment are considered. All of the Industry Code of Practice GMPs and BMPs are assessed and decisions on whether to implement each GMP or BMP is justified, and a risk-based action plan is developed.

In **Appendix C** an example Farm Environment Plan is developed; this illustrates a grower operating at BMP. All the GMP and BMP actions have been considered, and the appropriate GMPs and BMPs to manage risks on the specific farm have been identified.

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[48] (http://hortnz.co.nz/our-work/natural-resources/code-of-practice-for-nutrient-management/ Z code of practice).

3. Resource Management (Measurement and Reporting Water Takes) – Water Quality – real-time reporting of water use

The Government is proposing to amend the Resource Management (Measurement and Reporting Water Take) Regulations 2010 to mandate telemetry (direct electronic transmission). This requires measuring water use every 15 minutes and transmitting daily electronic records for takes using more than 5 litres per second. The requirement would be rolled out over time, starting with consents of 20 litres per second or more two years after the regulations come into force, through to six years for smaller consents.

HortNZ support real time reporting of water use in principle and consider there would be merit in reviewing the regulations. However, we do consider that there will be some limited circumstances that should be allowed as exceptions that should be provided for in any revision of the regulations.

In rural areas where there is limited, or no cell phone coverage/internet access, growers will not be able to use telemetry. Has consideration been given to exemption for these growers in these circumstances? Will the government look to upgrade telecommunication and internet systems in rural environments to support this proposal?

It is proposed that larger water take consent holders will require to have telemetry within two years of the commencement date and all other consent holders within six years. There is no analysis as to why these timeframes have been proposed and the industry would like to see a shorter implementation period to support quality water data being available.

4. NES for Commercial Vegetable Growing

Vegetables are grown predominately for domestic supply. Different rules in regional plans, impact on the competitiveness of the sector, and risk moving effects from one location to another, while also undermining the resilience and reliability and affordability of vegetables for New Zealanders, which are an essential human health need.

The footprint of vegetable growing is very small, and its effects are localised. We support all vegetable growers operating at audited Good Management Practice (GMP) or Best Management Practice (BMP) based on risk.

We are seeking nationally consistent a planning framework for commercial vegetables that would take precedence over all the existing rules regulating commercial vegetable growing in NZ.

A national planning approach is justified because:

- National food systems
- Healthy Food is essential for New Zealanders human health
- Failure of Regional Councils to provide for commercial vegetable growing
- A nationally consistent approach to regulation for commercial vegetable growing will improve investment decisions

The broad principals would be:

- Recognition that export and domestic vegetable growing is integrated across NZ's regions and consistent regulation is required
- Production is located on Highly Productive Land
- Crop rotation supported within Highly Productive Land
- Support existing vegetable growing with the ability for expansion within environmental constraints
- Risk based approach to good management practices aligned with GAP
- Farm Environment Plans which are nationally consistent and independently audited
- Consented activities to provide security and consistently assess risks
- Consents are granted to operator(s) not landowner's and the consented area is linked to Highly Productive Land within an FMU
- Enterprise consents supported
- Distributed across New Zealand to provide for resilience and seasonal food provision
- In sensitive catchments where audited GMP is insufficient to meet limits, an Action Plan approach to ensure the resilience of the food system is not threatened, by limits that drive land use change.

The standards for a national planning structure could include:

- Access to resources
- Facilities management
- Land management

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Appendix A: HortNZ Decisions Sought on the Proposed NESFM

Note: amendments sought to the notified text are shown in tracked changes, with additions shown in underline and deletions shown in ~~strikethrough~~, or to similar effect.

(1) The specific provisions that HortNZ's submission related to are:	(2) HortNZ's submission is that:		(3) HortNZ seeks the following decisions from MfE
Draft NES provision	**Support/Oppose**	**Reason**	**Decision Sought**
PART 2 – Wetlands, rivers and fish passage			
Subpart 1 - Wetlands			
constructed wetland	Support in part	The definition needs to be clear and concise. We also believe that this definition must reflect all the purposes for which the Act describes artificial watercourses (refer definition of River).	Amend as follows: ***Constructed wetland*** *means a wetland constructed by artificial means that:* *a) supports a natural ecosystem of plants that are ~~suited~~ adapted to wet conditions; and* *b) is constructed for a specific purpose in a place where a natural wetland does not already exist: Such purposes include:* *Areas of wetland habitat in or around bodies of water created for, or in connection with, any of the following:* • *nutrient attenuation;* • *effluent treatment and disposal systems;* • *stormwater management;* • *reservoir for firefighting;* • *hydroelectric power generation;* • *irrigation;* • *stock watering;* • *domestic and community water supply;* • *water storage ponds;* • *water supply canal* • *farm drainage canal* • *landscaping;*

			• *other artificial water storage facilities, ~~including~~ open drainage channels and engineered soil conservation structures, including sediment ponds;* • *conservation or biodiversity offsetting;* • *riparian planting* • *hunting*
natural wetland		The definition as proposed causes confusion and is inconsistent with the RMA.	Amend as follows: ***Natural wetland*** *means a wetland as defined in the Act ~~(regardless of whether it is dominated by indigenous or exotic vegetation),~~ except that it does not include:* *a) wet pasture, gully heads or paddocks where water temporarily ponds after rain in places dominated by pasture, or that contain patches of exotic sedge or rush species; or* *b) constructed wetlands; or* *c) geothermal wetlands*
Nationally significant infrastructure	Oppose in part	Not all major gas or oil pipeline services will be nationally significant. The definition needs to be clear and concise. The term 'such as' causes confusion and will be a source of contention in the future.	Amend as follows: **Nationally significant infrastructure** means all or any of the following … (d) major gas or oil pipeline services (~~such as~~ the pipeline from Marsden Point to Wiri, and high pressure gas transmission pipelines from Taranaki) …

Public flood control or drainage	Support in part	This definition causes confusion. The National Planning Standard has a definition for drain: *means any artificial watercourse, designed, constructed or used for the drainage of surface or subsurface water but excludes artificial water courses used for the conveyance of water for electricity generation, irrigation or water supply purposes.* The proposed definition could be broadened to refer to all drains. One option is to refer to the definition of drain in the Land Drainage Act: ***Drain** includes every passage, natural watercourse, or channel on or under ground through which water flows continuously or otherwise, except a navigable river, but does not include a water race as defined in section 58 hereof.* **Drainage works** *means drainage works of any sort, including the making of drains for receiving water in its natural flow on or from any hills or other sloping lands, and diverting the same to prevent its overflow on to any other lands on a lower level, as well as drains for carrying off water from any lands.* Given that the Government has already regulated these definitions, they should use them in other regulations that use the terms.	Amend as follows: **public flood control or drainage <u>works</u>** means work carried out: a) for flood control or flood protection purposes, by or on behalf of a local authority, including works carried out for the purposes set out in section 133 of the Soil Conservation and Rivers Control Act 1941; or b) for the purpose of drainage works. ~~by drainage districts, under the Land Drainage Act 1908~~, <u>Insert new definition as follows:</u> **Drainage works** has the same meaning as in the Land Drainage Act 1908 - *meaning drainage works of any sort, including the making of drains for receiving water in its natural flow on or from any hills or other sloping lands, and diverting the same to prevent its overflow on to any other lands on a lower level, as well as drains for carrying off water from any lands.*

		The earthwork disturbance provisions refers to 'earthwork disturbance for drainage' so it would be important that all drains are included in the public flood control or drainage. It would be better to specify wording rather than refer to another Act and not limit the definition to work by drainage districts.	
Earth disturbance	Support in part	Provides clarification. In local planning processes, HortNZ seeks to exclude cultivation from definition of 'earthworks', as earthworks rules are usually targeting bulk cut and fill for development, which is quite different to cultivation. However, 'earth disturbance' appears to be more refined and when reading the proposed rules, earth disturbance relates to restricting activities within a proposed setback from wetlands. However, it is important to retain flexibility in the rules to enable Good Management Practices such as a sediment control pond. The sediment control pond does require clearing from time to time. These practices can improve wetland health and should be encouraged. Please refer to HortNZ's Erosion and Sediment Control Guidelines (http://www.hortnz.co.nz/assets/Natural-Resources-Documents/ES-Control-Guidelines-1-1.pdf)	Amend as follows: ***Earth disturbance*** means … b) not including disturbance in the course of: i. planting indigenous plants for restoration or other environmental purposes; or …

		Therefore, HortNZ seeks a minor alteration to the definition to ensure that environmentally focused good management practices are encouraged and are not unintentionally caught by a consenting requirement.	
Earth disturbance for drainage	Support in part	We support this being limited to making new drainage ditches, or if necessary, amending to reflect meaningful deepening. Generally clearing or maintaining existing drainage ditches cannot be carried out with sufficient precisions to know that sediment being removed is not going beyond the previous base. This is likely to be unenforceable and make rules uncertain, and unclear.	Amend as follows: **Earth disturbance for drainage** means earth disturbance that involves making new drainage ditches or <u>substantially</u> deepening existing drainage ditches.
10. General earth disturbance – discretionary activity **11. General earth disturbance – non-complying activity**	Oppose in part	These provisions need to ensure greater ability for regional variation through appropriate planning processes. This may simply involve sufficient clarification on what is considered to be, or not to be, earth disturbance. For example; a sediment control pond does require clearing from time to time. These practices can improve wetland health and should be encouraged. Also farm tracks could also be caught by this rule, which we believe would be unintentional.	There should be provision for sufficient exemptions from the definition to address these issues and to ensure sufficient regional variation can occur. Not all earth disturbance can be appropriately managed through broad-brush national rules.
12. Earth disturbance for drainage – discretionary **13. Earth disturbance for drainage – non-complying**	Oppose in part	We have significant concerns with the arbitrary 100m setback from wetlands, in which any earth disturbance for drainage is prohibited unless it meets thresholds	There is a need for appropriate regional variation. A national, arbitrary 100m setback will not be necessary in all situations. These

14. Earth disturbance for drainage - prohibited		for discretionary or non-complying activities. There is a need for appropriate regional rules in this area. For instance, drainage activities below a sloped wetland may have no measurable impact yet will be caught by this rule. It is more appropriate for such determinations to be made at a regional or local scale. Many highly productive farmland areas, and urban areas, are on old peat wetlands. Experience and good practice are required to appropriately maintain the water table – too much drainage can cause subsidence, can destroy pasture. Good farm management in these areas requires that existing drains be maintained. New drains must also be made if/when water moves in the landscape. Water is not static; as an example, a seepage can move with time across a paddock, sometimes quite quickly and without obvious reason. Drainage will then need to be moved or added to address it. Drain maintenance is essential in many areas and should not be locked into a specific point in time. The proposed buffer distance of 100m between wetlands and drains may be appropriate in some landscapes, such as alluvial plains, but in other areas it will simply be arbitrary, excessive and unnecessary.	discussions are best placed to occur at local planning levels.

		Drainage may well be able to safely occur within 100m and not affect the hydrological function of wetlands. There is also potential confusion between this provision and the provisions for general earthworks disturbance, which has proposed controls within 10m of wetlands. Discretionary status is only provided for purposes of wetland restoration (and this comes with significant additional and costly technical requirements); or for public flood control or drainage; or related to operating nationally significant infrastructure. It is non-complying or prohibited if it goes beyond this. There is a considerable lack of clarity as to the difference between Clauses 13 and 14.	
16. Water take activities – discretionary activity	Oppose in part	There are considerable practical difficulties with meeting the requirements of these provisions given the very restrictive technical requirements imposed. Water take activities can only be discretionary if for purpose of education or recreation where change in water level is temporary, or for operational needs of a hydro scheme; or if it for restoration purposes and considerable conditions are met; or for public flood control or drainage or for nationally significant infrastructure purposes. Otherwise it is non-complying.	There is a need for appropriate regional variation. These technical requirements may well be appropriate, but these are best determined at a local scale.

Subpart 2 – River Bed infilling			
18. Infilling bed of river *Discretionary activity*	Support in part	The rule should include public land drainage to reflect the relationship between private and public drainage, on private land.	Amend as follows: **18. Infilling bed of river** *Discretionary activity* (1) The infilling of the bed of a river is a discretionary activity if it is part of an activity: … a) required for the purposes of flood prevention, <u>public land drainage</u> or erosion control; or …
Subpart 3 – Fish Passage			
21. Culverts *Discretionary activity* i.	Support in part	The matters for consideration should include flood prevention and/or public land drainage.	Amend as follows: **21. Culverts** *Discretionary activity* … (3) Any resource consent granted for the discretionary activity must be subject to the following conditions: … b) <u>Whether it is required for the purposes of flood prevention and / or public land drainage</u>
22. Weirs *Discretionary activity*	Support in part	The matters for consideration should include flood prevention and/or public land drainage.	Amend as follows: **22. Weirs** *Discretionary activity* …. c) <u>Whether it is required for the purposes of flood prevention and / or public land drainage</u>

	Support in part	The matters for consideration should include flood prevention and/or public land drainage.	Amend as follows: **23. Passive flap gates** … (2) Any resource consent granted for the non-complying activity must be subject to the following conditions: … c) Whether it is required for the purposes of flood prevention or public land drainage …
PART 3 – Farming			
arable farming	Support	Provides clarification	Retain as notified.
commercial vegetable production	Support in part	Glasshouse / Greenhouse vegetable growing has different environmental effects to outdoor vegetable growing and therefore should be managed differently. Land is periodically retired from growing vegetables to avoid soil borne diseases. This should be reflected in the definition to acknowledge the practice.	Amend as follows: **commercial vegetable production** means the outdoor commercial production ~~on a horticultural farm~~ of vegetable crops for human consumption, including low intensity vegetable crops~~.~~, and includes the periodic retirement of land as part of the crop rotation process.
Enterprise	Support in part.	We support the concept of an enterprise as this is needed to ensure that land leased or owned is captured within the definition of farm, horticultural farming, and commercial vegetable production. However, as proposed, it is not explicit that leased land is part of an enterprise. Leasing land is common practice in commercial vegetable production and it is therefore important that this is explicit in the definition.	Amend as follows: Enterprise means one or more parcels of land held in single or multiple ownership, including leased land (whether or not held in common ownership) ~~to support the principle land use, or land on which the principle land use is reliant,~~ which constitutes a single operating unit for the purpose of management.
pastoral farming	Support	Provides clarification	Retain as notified.

New definition: ***Low Impact Horticulture***	Support	Low impact horticulture has lower environmental impacts than other farming activities.	Insert new definition as follows: **Low impact horticulture** means where the predominant activity is growing any of the following crops: a) Fruit, berries, currants or grapes; b) Asparagus; c) Sweetcorn; d) Legumes; e) Indoor/Greenhouse vegetable production and/or Indoor/Greenhouse fruit production.
New definition: ***Highly Productive Land***	Support	This definition would be required to provide clarification for amendments sought by HortNZ to Clause 36.	Insert new definition as follows: **Highly productive land** has the same meaning as set out in the National Policy Statement for Highly Productive Land.
New Definition: ***Productive Capacity of Highly Productive Land***	Support	This definition would be required to provide clarification for amendments sought by HortNZ to Clause 36.	Insert new definition as follows: **Productive Capacity of Highly Productive Land** has the same meaning as set out in the National Policy Statement for Highly Productive Land.
26. Application of Part 3	Support in part	It is appropriate that small scale operations are excluded.	Retain as notified.
Subpart 2 - Intensification			
31. Geographic application of subpart 2.	Support in part	The geographic application as proposed in this clause is clear. However, we question if any regional council would be in a position to meet the requirements of clause 2a).	Consider the practical implications of this clause. If it can not be achieved, then the clause is pointless as it will not achieve the outcomes desired.
32. Duration of consents	Support in part	We question if it will be possible for regional councils to meet the deadline of	Amend as follows:

		2030 as proposed. It is unfair to burden consent applicants with a 12 month consent due to a council failing. This is an inefficient and ineffective mechanism. It would result in costly consent processes that will not be worth the effort, resulting in cessation of land use activities. A fairer and more realistic time frame would be 5 years (at a minimum). In addition, an alternative mechanism for achieving compliance should be considered; such as government assistance and guidance for those council's that are under resourced or falling behind. Or enforcement action by MfE on those Council's who fail to meet the specified timeframes. It is unfair to punish the constituents for institutional failure.	**32 Duration of consents** … (2) A resource consent granted for the purposes of this subpart after 31 December 2030 must expire within ~~1~~ 5 year after the date on which it is granted.
34 Irrigated farming *Permitted activity* *Discretionary activity*	Support	This rule assumes that irrigation means intensification of land use and therefore intensification of adverse environmental impacts. This is not always the case. Low impact horticulture has lower environmental impacts than other farming activities. The consenting pathway should reflect this. Commercial vegetable production is provided for a permitted activity rule (by proposed clause 3), because all expansion in commercial vegetable growing is captured by the proposed CVP rules.	Amend as follows: **34 Irrigated farming** *Permitted activity* (1) An increase in the amount of land used on a farm for irrigated production (other than production from effluent irrigation) is a permitted activity if the increase since the commencement date is 10 ha or less. (2) Any increase in the amount of land used on a farm for irrigated low impact horticulture is a permitted activity. (3) Any increase in the amount of land used for irrigated commercial vegetable

			production is a permitted activity.
36 Land use change to commercial vegetable production	Support in Part	HortNZ strongly supports the proposal that existing commercial vegetable production is a permitted activity within the proposed NES-FM. HortNZ supports any new or 'change of land use to' commercial vegetable production requiring a resource consent however HortNZ supports a restricted discretionary activity given the effects can be quantified and relate only to freshwater management matters. The NES as drafted, effectively does provide a restricted discretionary activity given it lists conditions. HortNZ also seeks a controlled activity for commercial vegetable production to provide for demand to meet anticipated population growth. The anticipated growth in vegetables is 12,000 ha this is equates to a 20% increase. This is a conservative estimate; there has been no expansion in vegetable growing at national level in the past 10 years. The predicted increase in nitrate load for vegetable growing could be accommodated within the clawback – effectively reducing the dairy clawback from 10% to 9%. The change would be neutral for sediment (with sediment retention ponds) and have benefits for *E. Coli.*	Amend as follows: **Land use change to commercial vegetable production** *Permitted activity* (1) Any change in land use to commercial vegetable ~~growing~~ production by a farm since the commencement date is a permitted activity if, following the change, the total area of land in a freshwater management unit that is used by the farm for that purpose does not exceed the greatest total amount used for vegetable growing in that freshwater management unit by the farm in any one farm year between the 2013/14 and 2018/19 farm years. *Controlled Activity* (2) Any change in land use to commercial vegetable production by a farm since the commencement date is a controlled activity where, the total area of land in a freshwater management unit used by the farm for that purpose increases by more than the greatest total amount of land used in the freshwater management unit for commercial vegetable production in any one farm year between 2013 and 2018; and where the total amount of land in a sub-catchment used by all farms for commercial vegetable production is no more than 20% of the total land use in that sub-catchment or where the consent is to

		In the past 10 years due to competition of land and regulations that prevented new growing, the area in vegetable growing has declined, the price volatility has increased[49], and the consumption of 3+ has declined. We need CVP regulations that support the health of New Zealanders. In addition, HortNZ seeks to work with the Government on a dedicated NES for Commercial Vegetable Production to ensure all matters can be considered and to provide national consistency for local authority rules across New Zealand.	replace baseline CVP area lost in the FMU due to change of growing operators in the FMU, The matters of control are as follows: 1) Expansion is located within sub-catchments where the total land area in commercial vegetable production of all existing commercial vegetable production does not exceed 20% of the sub-catchment land area. or 2) The consent is to replace baseline CVP area lost in the FMU due to change of growing operators in the FMU, 3) The land to be used for commercial vegetable production is identified as being Highly Productive Land; 4) The applicant has an audited FW-FP for the farm to which the application relates; and 5) The audited FW-FP demonstrates risk based best management practices to avoid, remedy, or mitigate the adverse effects of the activity's contaminant discharges into freshwater, or into land in circumstances that may result in the contamination entering water. *Restricted Discretionary Activity* (3) In all other situations where the total amount of land in a freshwater management unit used by a farm for

[49] https://www.stats.govt.nz/indicators/consumers-price-index-cpi?gclid=Cj0KCQjw6eTtBRDdARIsANZWjYYzWVW0UmAjVys4HN_NlOFzElbLZmxuI9ladZmkXB2K6nyffRSoQxQaAtz8EALw_wcB

			commercial vegetable production increases by more than the greatest total amount of land used in the freshwater management unit for ~~vegetable growing~~ commercial vegetable production by the farm in any one farm year between 2013 and 2018, the change is a restricted discretionary activity, ~~(3) Any resource consent granted for the discretionary activity must be granted subject to the following conditions:~~ The matters of discretion are as followings: a) the applicant has an ~~certified~~ audited FW-FP for the farm to which the application relates; b) the FW-FP ~~includes actions~~ demonstrates risk based good management practices to avoid, remedy, or mitigate the adverse effects of the activity's contaminant discharges into freshwater, or into land in circumstances that may result in the contamination entering water; c) the nitrogen, phosphorus, sediment, or microbial pathogen discharges of the farm that will result from the increased land used will not exceed the average discharges of those contaminants from the farm over the period 2013 – 2018. ~~(4) An application for a resource consent for the discretionary must include a certified FW-FP for the farm to which the application relates.~~ Note: Land that is periodically retired from commercial vegetable production, as part of the crop rotation process, can convert to

			low intensity horticulture, arable, sheep, beef, deer, dairy support or dairy farming.
New rule ***Land Use Change to Low Impact Horticulture***	Support	The new rule is required to provide for horticulture systems have low impacts on water quality. The permitted activity status reflects the low environmental impacts.	**Insert new rule** ***Land Use Change to Low Impact Horticulture*** *Permitted activity* (1) Any change in land use to low impact horticulture by a farm since the commencement date is a permitted activity.
37. Who must have FW-FP?	Oppose in Part	Please refer to further discussion in body of the submission. By 2025 our sector can deliver independently audited FW-FPs. We are much less certain that we can deliver certified FW-FPs by this deadline. We are not convinced that the investment required to develop sufficient certified people would be worthwhile. In our view effort would be better spent developing the capacity of growers to develop their own FW-FPs, and holding growers to account via independent audit. On a practical level, there is not the capacity of expertise within NZ to complete all FW-FPs within 2 years. We do not consider this is a risk-based requirement. Many vegetable growing rotations are not high leaching, all have lesser *E. Coli* discharges and many have	Amend as follows: **37 Who must have FW-FP?** (1) Within 2 years after the commencement date, the following farms that do not already have a certified FW-FP must have a audited ~~certified~~ FW-FP: ~~a) farms used for commercial vegetable production,~~ b) farms in the catchments and subcatchments identified in Schedule 1; c) farms in the Kaipara catchment that are on highly erodible land. (2) By 31 December 2025, every other farm to which this Standard applies must have a ~~certified~~ FW-FP.

		lesser sediment discharges than pastoral hill country.	
38. Content of FW-FP	Support in part	Consideration should also be given to the method of rotation for the commercial vegetable production, as this will have consequences for mitigations and actions. Methods include; market garden, intensive or extensive.	Amend as follows: **38. Content of FW-FP** **…** (3) The risk assessment part of the FW-FP must identify and assess the risk of contaminant losses from the farm, with consequent impacts on freshwater ecosystem health, associated with any of the following activities carried out on the farm: … j) <u>CVP rotation type (market garden, intensive, extensive)</u> …
40. Certification of FW-FP	Support in part	HortNZ is not opposed to Farm Plans and certification. We see a role for professional supporting growers to develop Farm Plans. However, we do not believe certification should be mandatory.	No requirement for approved FEP planner. FEP audit instead and a nationally consistent reporting system via industry bodies.
Audit of compliance with FW-FP	Support	HortNZ supports independently audited FW-Plans >5ha	• All >5ha need ~~certified and~~ audited FEP by 2025 • All <5ha develop FEP based on Agreed National Good Farm Practice Principles by 2025 (rather than NES requirements), but exempt from audit (audit is optional) • All high nitrogen catchments need audited FEP with additional risk based assessment (e.g. BMPs) by 2022

			• Approval of existing GAP auditors • Audit completed by relevant deadline (2022 or 2025)
Subpart 4 – nitrogen cap	Support	This subsection applied to pastoral and dairy farming only. HortNZ supports the exclusion of commercial vegetable production and low intensity horticulture from subpart 4. HortNZ is of the view that a risk-based approach to a Farm Environment Plan at good or best management practice is a more appropriate planning tool to manage a horticultural farm.	Retain exclusion of commercial vegetable production and low intensity horticulture as notified.
Good Management Practice		The NZGAP EMS includes practices that are defined as Good Management Practice and Best Management Practice. To meet the GMP audited standard the plan must consider and justify why each GMP has or hasn't been adopted. Assessment of the BMPs is recommended, but it is optional and would not be a factor in whether an audit was passed or failed. It is not necessary to adopt all GMPs and BMPs, some achieve similar outcomes. The EMS provide a range of options for growers on how to manage risks in the manner that best suits their circumstances.	As defined in Industry Codes of Practice GMP = Good Management Practice (Required where applicable based on a risk assessment) BMP = Best Management Practice (Recommended where applicable based on a risk assessment)
Best Management Practice		The NZGAP EMS includes practices that are defined as Good Management Practice and Best Management Practice.	As defined in Industry Codes of Practice

		To meet the BMP standard, all the GMPS and BMPS must be considered and the plan must justify why each GMP and BMP has or hasn't been adopted. It is not necessary to adopt all GMPS and BMPS, some achieve similar outcomes. The EMS provide a range of options for growers on how to manage risks in the manner that best suits their circumstances.	GMP = Good Management Practice (Required where applicable based on a risk assessment) BMP = Best Management Practice (Required where applicable based on a risk assessment)

Appendix B: HortNZ Responses to Discussion Document Questions

Question(s)	Specific provisions	Comments
1-8	Section 1.6 - Questions	The draft NPSFM will prevent the outcomes desired being achieve as it requires considerable redrafting to ensure the intent is understood in practice and achievable. As discussed in the submission above, there are many unintended consequences within the NPS. The best way forward for the draft NPSFM is to redraft, and establish a process for submissions to be heard. This would be more efficient and effective for timely implementation than continuing with the draft NPSFM as it is.
9-12	Te Mana o te Wai	HortNZ supports the concept of Te Mana o te Wai and the holistic framework for resource management that Te Mana o te Wai provides. However, as drafted, the description of Te Mana o te Wai and 2.1 Objective in the draft NPSFM are contrary to the purpose of the RMA. The RMA requires an overall judgement approach to management of all resources. This is appropriate as it enables a decision maker to consider the specific context of the matters they are assessing, including environmental bottom lines. Creating a long-term vision is a good method for achieving goals over time. However, a long-term vision is not an RMA method for good reason. This method more appropriately fits within a strategy/ action plan prepared under the LGA 2002 and then RMA plans are required to have regard to those strategies / action plans and their established long-term visions pursuant to s66(2)(c)(i) and s74(2)(b)(i) of the RMA.
13-16	New Māori Value	HortNZ acknowledges the benefits of adopting a Māori world view in managing our Environment. Māori values are currently incorporated into regional land and water plans across New Zealand, as required by the NPSFM. It is unclear what the compulsory tangata whenua values would be.
17	New planning process for freshwater	HortNZ opposes the proposed new planning process. Having experienced the ECan Act and the considerable 'unintended consequences' on horticulture in the Region due to the inability to appeal significant matters to the Environment Court, we would not want to see

		this replicated across the Country. HortNZ has been required to put more effort and money into ECan processes because of the reduced appeal rights under the ECan Act, and yet still came out with perverse outcomes for Canterbury Growers. If we had the ability to appeal on matters of substance, then the issues could have been resolved immediately. However, we were left arguing our points for six months before ECan agreed to a plan change, which took a further 18 months to promulgate and notify. Decisions are expected late 2020. This would mean that the issues will not be remedied for three and a half years. And there is still no guarantee that the unintended consequences will be fully addressed. The idea of a streamlined process is good in theory, but the reality is quite different. In removing appeal rights, we have also experienced a less helpful approach to RMA statutory processes when compared to other authorities who are subject to the RMA appeal rights. Removing appeal rights does not encourage the local authority to co-operate with stakeholders during statutory processes and reduces their desire to understand all issues We recommend an independent Water Commission is established to consider matters, other than points of law.
18	More integrated management of freshwater	HortNZ support the principle and practice of integrated management and believed that this is currently being achieved in many instances across New Zealand. We have concerns that some of the roles and responsibilities of regional council's and territorial authorities as outlined in the draft NPSFM seek to go beyond their functions as specified in the RMA and this direction in turn is beyond the functions of the Minister for the Environment (refer to Part 4 of the RMA). There is very good reason why the functions are divided as they are. Reasons include ensuring that local authorities have appropriate resources, including suitably qualified staff to fulfil the authority's functions; preventing duplication and ensuring efficient use of rate-payers and tax-payers money; separating the consenting functions from management functions (e.g. Territorial Authorities manage stormwater, wastewater and stormwater; but Regional Council's assess and issue consent's, and monitor the compliance with consent conditions).

19	Exceptions for major hydro schemes.	HortNZ does not support an exceptions regime in general. We do not support a differentiation between infrastructure for hydroelectric generation and other nationally significant infrastructure. We consider criteria would need to be established to assess exceptions against.
20-21	Attributes	HortNZ supports the concept of National Bottom Lines, it is critical to New Zealand communities and the New Zealand economy that these are set at appropriate levels that are supported by peer reviewed science.
22	Threatened indigenous species	All *compulsory values* and relevant *other values* must be considered equally within the context of an FMU.
23-24	Fish passage	HortNZ supports the provisions for fish passage,
25-26	Wetlands	In some places we have found ourselves inadvertently caught up in discussions on wetlands in relation to implementing Good Management Practices, in particular sediment control ponds and off-stream water storage. It is important that these Good Management Practices are not unintentionally constrained, thereby discouraging their use. It would be a perverse outcome if in attempting to protect wetlands, sediment in streams was to increase because dredging of sediment control ponds was not allowed. Similarly, there is environmental benefit in planting the edges of water storage ponds, however, this will also be discouraged if council staff begin classify them as manmade wetlands thereby preventing the use of the water when most needed.
27-29	Streams	We support the provisions, but it should eb acknowledged in some place offset may not possible and to
30-32	New Bottom Line for nutrient pollution	Bottom lines need to be supported by robust science and appropriate independent peer review. This science must support the application in all river and stream orders and all call catchments if they are to be credible national guidelines. Many rivers and streams in NZ have highly modified hydrology, and may never be able to reach a natural ecosystem state, by limiting abstractions and discharges. In locations where robust analysis indicates that limits cannot achieve outcomes sustainably within 30 years an action plan must be adopted.
33-35	Reducing sediment	HortNZ advocates for growers to operate a Good Management Practice (GMP) and have established a number of industry codes of practice and guidance documents for growers

		such as the Vegetable Washwater Discharge Code of Practice[50], Erosion and Sediment Control Guidelines for Vegetable Production[51], and Code of Practice for Nutrient Discharge[52].
36	Higher standard for swimming	HortNZ supports the provisions
37	Minimum flows	We support a stronger link between water limits and flows and levels.
38	Reporting water use	The position of HortNZ is that in order to manage a resource efficiently and sustainably, then monitoring and reporting must be based on robust scientific measurement. Regulators must use best practice based on good science when formulating catchment and aquifer allocation.
39	Raising the bar on ecosystem health	Refer to comments above for Reducing sediment.
40-42	Draft NPSFM	HortNZ is of the strong view that the draft NPSFM is in need of considerable redrafting. There are intentions within the draft NPSFM that are supported, but there are also elements that cause deep concern. HortNZ recommends that this document is re-drafted.
79-80	Aligning RMA national direction	Yes, there is tension between the draft NPSFM and the RMA. The NPSFM is a subsidiary instrument to the RMA. The draft NPSFM does not give effect to section 5 of the RMA. Separation of land and water values in the changes proposed in the draft NPSFM are not consistent with the principles of Integrated Management.

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[50] http://www.hortnz.co.nz/assets/Natural-Resources-Documents/VegetableWashwaterDischargeCOP.pdf
[51] http://www.hortnz.co.nz/assets/Natural-Resources-Documents/ES-Control-Guidelines-1-1.pdf
[52] http://www.hortnz.co.nz/assets/Uploads/Code-of-Practice-for-Nutrient-Management-v-1-0-29-Aug-2014.pdf

Appendix C - Example of a Best Management Practice FW-FP under the NZGAP EMS

AGRILINK

NZGAP NEW ZEALAND GOOD AGRICULTURAL PRACTICE

Environment

Case Study EMS

Grower X

October 2019

Contents

Summary

Background

This case study has been prepared to aid growers and consultants in preparing their NZGAP EMS in preparation for an external audit. It shows an example of a completed Template, whilst Part II contains examples of the necessary supporting evidence.

Highlights

Our example grower – Grower X – is located within the Pukekohe growing region and owns 1 property, on which they grow a crop rotation of onions, potatoes, and cabbages, plus cover crops when there is a sufficiently long enough break between crops.

As part of their EMS, Grower X has prepared an Action Plan, which is shown below and in the appendix.

The status of each of Grower X's paddocks is shown in Table 1, and the Action Plan is displayed in Template 10A, with further detail in Section 2B.

Table 1. Paddock mapping and Action Plan completion status

Block name	Paddock name	Area	**Unmitigated** erosion rate (t/ha/yr)	Has this paddock been fully mapped? (Template 5a)	Has an action plan been developed for this paddock?	Date for completion of mapping and Action Plan development
Home Farm	A	1.9	125	Yes	Yes	Complete
Home Farm	B	1.4	105	Yes	Yes	Complete
Home Farm	C	2.7	95	Yes	Yes	Complete
Home Farm	D	9.7	20	Yes	Yes	Complete
Home Farm	E	4.5	60	Yes	Yes	Complete
Home Farm	F	4.4	25	Yes	Yes	Complete

Part I – EMS

Farm Environment Plan

5A Property Plan (Map): Features to be included on the property plan (i.e. map)

Ref	Map Features	Complete? (Yes, Partial, No, n/a)				Date to be completed? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No' for GMPs. Justify if 'n/a')	Evidence (e.g. map or description)	Level
		Y	P	N	n/a				
1	Property boundaries (currently owned and leased properties)	✓						Map 2A	GMP
2	Land management units (e.g. cropped areas)	✓						Map 2A	GMP
3	Potential critical sources (point and area) for contaminants (e.g. erosion risk, fertiliser storage)	✓						Map 2A	GMP
4	Permanent or intermittent rivers, streams, lakes, ponds, drains and wetlands	✓						Map 2A	GMP
5	Riparian vegetation and barriers/fences adjacent to waterbodies	✓						Map 2A	GMP
6	Any significant areas as defined by the local authority (e.g. significant indigenous biodiversity areas, cultural landscape values management area)	✓						Map 2A	GMP
7	The location of any spring heads, wetlands or spring-fed streams have been identified where required by the local authority	✓						Map 2A	GMP
8	Soil maps and/or descriptions	✓						Map 2A	GMP
9	Flow path of surface water entering and leaving each block/paddock (on cultivated land)	✓						Map 2A	GMP
10	Environmental actions/mitigations	✓						Map 2A	BMP
11	Other features (please specify):				✓				BMP

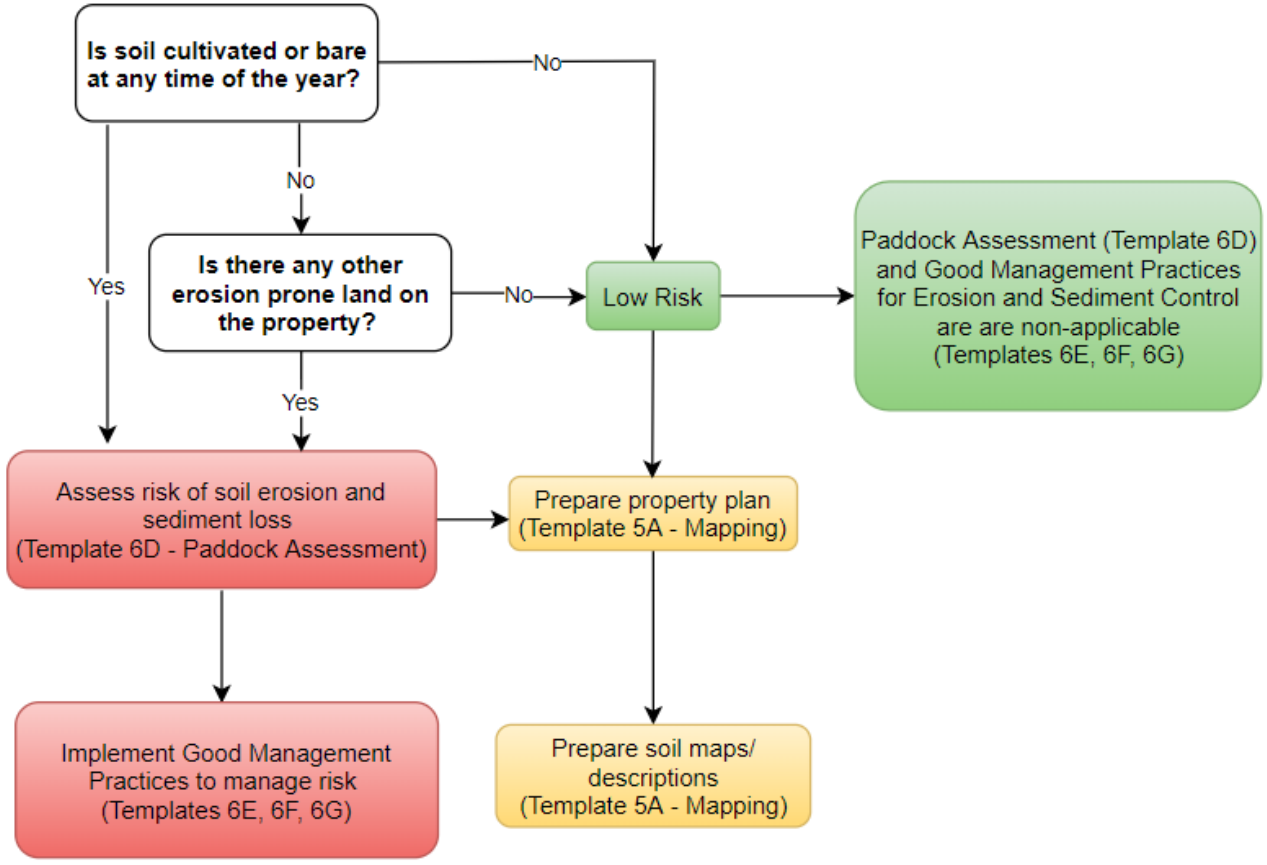
6A SOIL: Soil Quality, Health and Fertility – Assessment

Ref	Good/Best Management Practices	Complete? (Yes, Partial, No, n/a)				Date to be completed? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence (e.g. record, photo, observation)	Level
		Y	P	N	n/a				
1	Soil type, structure, texture and profile is assessed	✓						Map 2C	GMP
2	Soil drainage is assessed (poor/moderate/well drained)	✓						Map 2C	GMP
3	Soil nutrient testing is conducted on each paddock every 3 – 5 years (Nitrogen, phosphorus, magnesium, potassium)	✓						Map 2C	GMP
4	Soil testing is completed using a uniform or representative collection pattern (e.g. 'W' pattern)	✓							GMP
5	Soil testing is conducted on each paddock every year when a crop is going to be planted	✓						Map 2C	BMP
6	Soil testing is conducted every year based on GPS mapping			✓		March 2020	GPS is not currently used for soil testing but is being investigated.	Action Plan	BMP
7	N-Quick test and tool is used to inform decisions on nitrogen applications		✓			Oct. 2020	Quick N-test is currently being trialled.	Action Plan	BMP
8	Deep N tests are taken to determine the level of residual N that remains in the soil			✓		Oct. 2020	Currently sampling to 30cm. Will take 60-90cm alongside Quick-N test trial	Action Plan	BMP
9	Soil is assessed for compaction (e.g. using a penetrometer)		✓			Dec. 2019	Started doing prior to and following cultivation. Repair compaction meter	Action Plan	BMP
10	Soil pH is monitored	✓						Map 2C	BMP
11	Soil Organic Matter (OM) is monitored	✓						Map 2C	BMP
12	Soil biological activity is monitored			✓			Interested, but needs further investigation	Action Plan	BMP
13	Other (specify):				✓				BMP

6B SOIL: Soil Health and Fertility – Control Measures and Action Plan

Ref	Good/Best Management Practices	Currently Implemented? (Yes, Partial, No, n/a)				Date to be completed? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence (e.g. record, photo, observation)	Level
		Y	P	N	n/a				
1	Choose appropriate crops *(for soil, climate, disease, and maximum uptake of nutrients from previous crop)*	✓						Mgmt history 2F	GMP
2	Use cover crops to enhance soil structure and organic matter, plus absorb excess nutrients	✓						Mgmt history 2F	GMP
3	Incorporate crop residues where possible	✓						Photo	GMP
4	Cultivate soil when conditions appropriate	✓							GMP
5	Minimise soil tillage as much as practicable	✓							GMP
6	Minimise fallow periods between crops	✓					Use cover crops where possible		GMP
7	Use crop rotation	✓						Mgmt history 2F	GMP
8	Retire or actively manage marginal land to ensure soil conservation measures are in place	✓					Marginal land is kept in native bush.	Map 2A	GMP
9	Use controlled trafficking		✓			On-going	GPS systems installed on a few tractors. Adding GPS to others	See traffic map. Action Plan	BMP
10	Adopt new technologies *e.g.* use of sub-soil aerator will allow roots deeper into soil		✓			On-going	Slow release fertilisers used, GPS tracked spreaders and drones investigated/used.		BMP
11	Other (specify):				✓				BMP

6C SOIL: Risk of soil erosion and sediment loss – *Property Assessment*



6D. SOIL: Risk of soil erosion and sediment loss – Paddock Assessment (for cultivated and bare soils)

Paddocks assessed (names/IDs):	
Description of property slope:	(Note: <1 degree = Low erosion risk, >1 degree = Medium/High erosion risk)

Ref	Good Management Practices (for individual paddock or summary of all paddocks)	Complete? (Yes, Partial, No, n/a)				Date to be completed (if 'Partial' or 'No')	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence (e.g. map or description)	Level
		Y	P	N	n/a				
1	Identify site specific risks of this paddock (e.g. soil type, slope, proximity to waterways, critical source areas)	✓						Map 2A	GMP
2	Describe paddock management risks (e.g. paddock use, previous use, crop type, crop coverage, cultivation technique)	✓							GMP
3	Assess the risk of soil erosion prior to carrying out all field operations	✓							GMP
4	Identify where surface water is entering paddocks (map or description)	✓						Map 2A	GMP
5	Identify where surface water leaves paddocks (map or description)	✓						Map 2A	GMP

Baseline / Unmitigated Risk Level (i.e. without any GMPs in place):	**High**
Risk Level with current practices in place (Template 6E, 6F, 6G):	**Medium**
Risk level with GMP in place (Template 6E, 6F, 6G, 10)**:**	**Medium**

Other identified risks:

6E. SOIL: Soil erosion and sediment loss - Implement and maintain measures for stopping or controlling surface water entering the paddock (for cultivated and bare soils)

Ref	Good/Best Management Practices	Currently Implemented? (Yes, Partial, No, n/a)				Date to be completed? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence provided (e.g. record, photo, observation)	Level
		Y	P	N	n/a				
1	Interception drains		✓			April 2020	Some drains require digging out.	Map 2B	GMP
2	Correctly sized culverts		✓			April 2020	Some culverts need digging out and resizing.	Map 2B	GMP
3	Benched headlands	✓						Map 2B	GMP
4	Bunds		✓			April 2020	Complete bund along boundary	Map 2B	GMP
5	Grassed swales (control overland flow through the paddock)				✓		Not applicable to our topography.		GMP
6	Other (specify):				✓				BMP

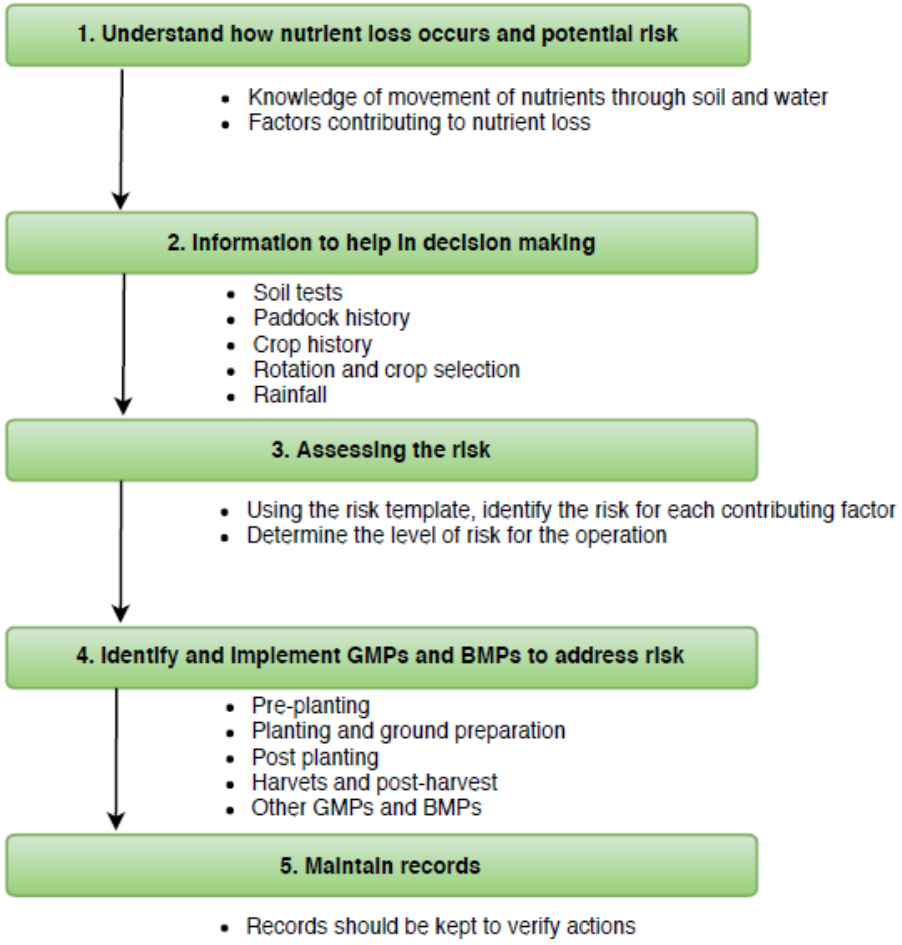
6F. SOIL: Soil erosion and sediment loss - Implement and maintain erosion control measures to reduce or minimise the risk of soil erosion (for cultivated and bare soils)

Ref	Good/Best Management Practices	Currently Implemented? (Yes, Partial, No, n/a)				Date to be completed? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence provided (e.g. record, photo, observation)	Level
		Y	P	N	n/a				
1	Minimise cultivation passes	✓						Map 2B	GMP
2	Break crops / shelter belts (wind erosion)		✓				Home Farm has some shelter belts, though they are not necessary in this region due to low wind erosion.	Map 2B	GMP
3	Using short row lengths (>1 degree slope) (<200m recommended)		✓				Some paddocks have row lengths longer than 200m in Home Farm.	Map 2B	GMP
4	Cover crops / break crops (>1 degree slope)	✓						Map 2B	GMP
5	Wheel track ripping / Wheel track dyking (>1 degree slope)			✓			Not applicable to our conditions, was trialled but led to further erosion.		GMP
6	Contour drains (>1 degree slope)			✓			Not applicable to our conditions.		GMP
7	Other (specify): 1m setback from drains.			✓		May 2020	Leave an uncultivated 1m setback from drains.	Map 2B	BMP

6G. SOIL: Soil erosion and sediment loss – Implement and maintain sediment control measures to manage the water and suspended solids that move off the paddock (for cultivated and bare soils)

Ref	Good/Best Management Practices	Currently Implemented? (Yes, Partial, No, n/a)				Date to be completed? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence provided (e.g. record, photo, observation)	Level
		Y	P	N	n/a				
1	Access ways are not at the lowest point of the paddock	✓						Map 2B	GMP
2	Raised access ways / Bunds		✓			April 2020	New bund	Map 2B	GMP
3	Vegetated buffers / Riparian margins / Hedges		✓			-	SRPs are used in preference of buffers, but most paddocks do have well established buffers on Home Farm.	Map 2B	GMP
4	Super silt fences			✓		-	Other practices used instead.	Map 2B	GMP
5	Stabilised drains and discharge points		✓			November 2020	Some drains require stabilisation.	Map 2B	GMP
6	Decanting earth bunds			✓		-	Other measures used.	Map 2B	GMP
7	Sediment retention ponds		✓			April 2020 – April 2021	Some existing SRPs need expanding, and a new SRP needs to be constructed in Home Farm.	Map 2B	GMP
8	Other (specify):				✓				BMP

7A. NUTRIENTS: Process for addressing risks of Nutrient Loss



7B. NUTRIENTS: Assessing the risk of Nutrient Loss

Ref	Contributing factor	Assessing extent of risk	Level of risk *(Low, Med,*
1	**Soil moisture**	Applications of N when soils that are saturated - high risk. Applications when soils are not saturated – lower risk *Note*: It is important to assess the soil moisture status before an application to ensure that the potential for leaching is minimised. Use of foliar applications can reduce the risk	Low
2	**Irrigation**	Use of irrigation – high risk *Note*: Risk can be reduced by ensuring that irrigation is used to maintain soil moisture at target levels and applications of N timed accordingly.	Medium
3	**Soil type**	Light soils – High risk. Medium soils – Medium risk. Heavy soils – Low risk	Low
4	**Paddock history**	Quantities of N applied not based on fertiliser recommendations or assessment of crop residues – high risk. Applications take into account fertiliser recommendations and crop residues to ensure that appropriate levels of N are applied - lower risk	Low
5	**Previous crop planted and residual N in the soil**	High residue crop – high risk. Crop failure or lower than anticipated yield – high risk Removal of previous residue – lower risk	Medium
6	**Crops being grown**	Shallow root vegetables – higher risk	Medium
7	**Crop yield and quality**	Nitrogen is used to achieve desired yield and quality. Inappropriate or excessive use can create quality issues and increase the risk of leaching – high risk	Medium
8	**Intensity of cropping**	Repeated cropping – higher risk	Medium
9	**Topography**	Sloped ground – higher risk of run off	High
10	**Plant uptake of nitrogen**	Low plant uptake - high risk High plant uptake - lower risk *Note:* There are a range of factors that contribute to the plant uptake of nitrogen and hence reduce the N in the soil able to be leached – e.g. time of years, growth stage, type and form of nitrogen, rooting depth. The combination of factors need to be assessed to determine uptake for each crop.	Low

11	**Timing of nitrogen application**	High level of base dressing at planting – high risk Applications split and matched to crop needs – lower risk	Low
12	**Fertiliser application methods**	Broadcast application – higher risk Application only to the row – reduced risk . Foliar applications – low risk	Medium
13	**Applications of organic manures**	Organic manures applied; but not taken into account for N balance – High risk, Taken into account for N balance – Lower risk	Medium
14	**Pest and disease**	Crop failure or lower than anticipated yield due to pest and disease – high risk	High
15	**Animals in the rotation**	Animals included in the rotation – higher risk. No animals – lower risk	Low
16	**Ground preparation and planting methods**	Direct drilling and reduced tillage – lower risk Presence of fines post cultivation – higher risk	Low
17	**Compaction**	Compacted soil will prevent roots being able to penetrate and access nitrogen. Compacted soil presents a higher risk.	Medium

Baseline / Unmitigated Risk Level (i.e. without any GMPs in place):	**High**
Risk Level with current practices in place (Template 7C):	**Medium**
Risk level with GMP in place (Template 7C)**:**	**Medium**

Other identified risks:

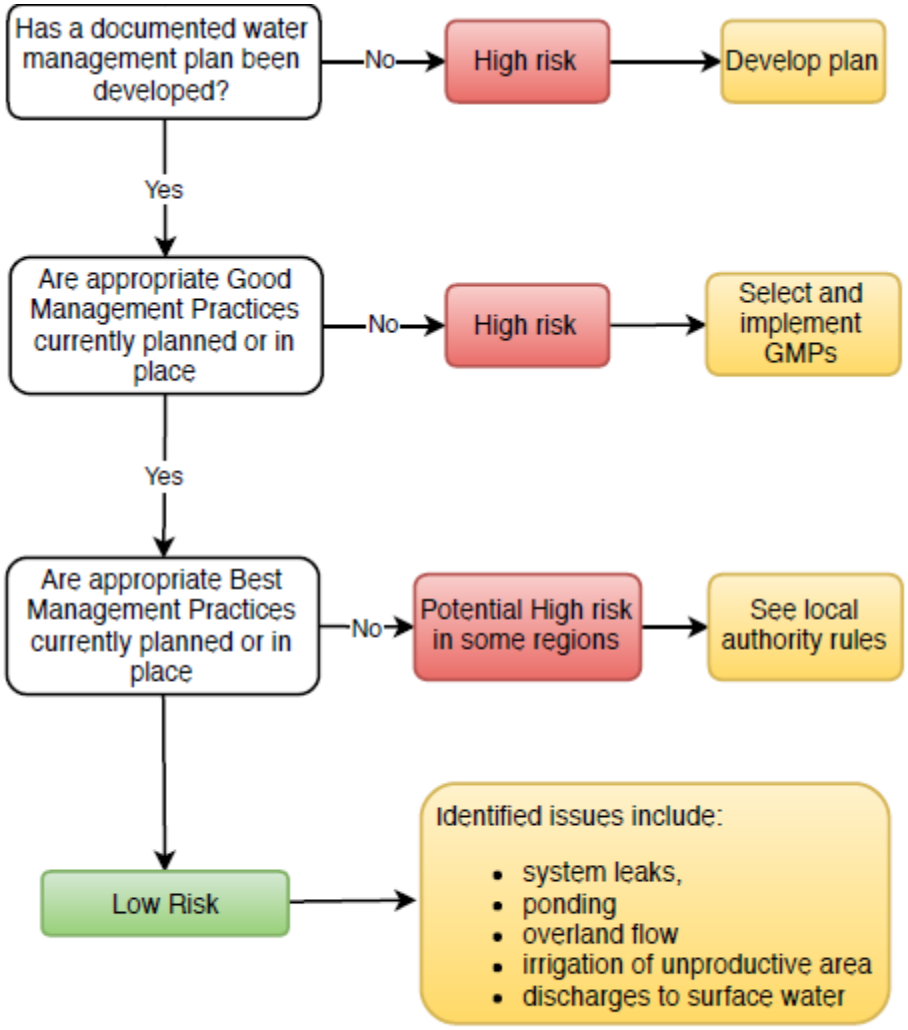
7C. NUTRIENTS: Implement measures to improve nutrient uptake and minimise nutrient loss

Ref	Good/Best Management Practices	Currently Implemented? (Yes, Partial, No, n/a)				Date to be completed? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence provided (e.g. record, photo, observation)	Level
		Y	P	N	n/a				
Pre-planting									
1	Plan fertiliser inputs for the crop	✓							GMP
2	Take into account any organic manures used				✓		No organic manures used in rotation		GMP
3	Take into account any animals in the rotation				✓		No animals used in rotation		GMP
4	Manage applications of nutrients taking into account rainfall, field capacity and soil saturation levels	✓							GMP
5	Obtain advise from a nutrient advisor or agronomist	✓				On-going	Fertiliser trials conducted by agronomist in conjunction with other growers in the area.		BMP
Planting									
6	Nutrient applications are informed by available information or fertiliser recommendations	✓							GMP
7	Fertiliser applications are applied relative to the predicted uptake levels of the plant from planting to maturity	✓							GMP
8	Improved fertiliser technology is used where appropriate (e.g. prills/coatings)	✓					Slow release fertilisers, spreading technology, drones	Fert application records	BMP
9	Controlled traffic farming technology is used to increase application efficiency		✓			On-going	GPS systems installed on spreaders	Visual, travel/ placement map	BMP
10	Crop calculators are used if available and practical for local conditions				✓		Not available		BMP
11	Other (specify):				✓				BMP

7C. NUTRIENTS (*Continued*): *Implement measures to improve nutrient uptake and minimise nutrient loss*

Ref	Good/Best Management Practices	Currently Implemented? (Yes, Partial, No, n/a)				Date to be completed? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence provided (e.g. record, photo, observation)	Level
		Y	P	N	n/a				
Post-planting									
12	Side dressings are used	✓						Fert inputs 2D and padd history 2F	GMP
13	Operators follow instructions for application, including avoiding spreading into water bodies	✓							GMP
14	GPS is used to monitor operator performance	✓					GPS systems installed on spreaders	Travel map	BMP
15	Nutrient levels are managed (and informed by soil tests) according to rainfall / irrigation, and will match likely yield and quality goals	✓						Fert plan	BMP
16	Leaf tests are conducted	✓							BMP
Harvest/Post-harvest									
17	As much harvestable crop as possible is removed	✓							GMP
18	Crop residues are incorporated where possible	✓						Photo	GMP
Other:									
19	Spreadmark accredited contractors are used	✓							BMP
20	AIRCARE™ accredited aerial operators are used if applicable				✓		Don't apply aerially		BMP
21	Machinery is upgraded to be more efficient/accurate	✓						Records	BMP
22	Other (specify):				✓				BMP

8A. WATER and IRRIGATION: Assessing the environmental risk of water use



8B. WATER and IRRIGATION: Water use – Implement measures to improve water use efficiency and minimise risk of nutrient loss

Ref	Good/Best Management Practices	Currently Implemented? (Yes, Partial, No, n/a)				Date to be completed? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence provided (e.g. record, photo, observation)	Level
		Y	P	N	n/a				
	Pre-planting								
1	Plan irrigation requirements	✓						Irri mgmt 2E	GMP
2	Develop long-term irrigation plan	✓						Irri mgmt 2E	GMP
	Post-planting								
3	Volumes applied informed by relevant factors (e.g. Plant growth phase / soil type / water holding capacity and climatic conditions)	✓						Irri mgmt 2E	GMP
4	Water is applied to maintain soil moisture between the wilting point and field capacity where possible	✓						Irri mgmt 2E	GMP
5	Irrigation applied allows achievement of the yield target for fertiliser applied	✓						Irri mgmt 2E	GMP
6	Irrigation efficiency is measurable at greater than 80% (>80% of irrigation water is retained in root zone / target area)	✓						Irri mgmt 2E	BMP
7	Water use is metered	✓							BMP
8	Irrigation scheduling is undertaken using a crop model or tied into a soil moisture monitoring system	✓					Using tensiometers in some paddocks	Visual	BMP
9	On site soil moisture monitoring is conducted		✓				In some paddocks		BMP
10	Irrigation is variably applied within the paddock to maximise efficiency			✓			Technology isn't available to use this on our big gun irrigators.		BMP
11	Highly automated irrigation systems that allow more frequent applications of less water are used to maximise efficiency			✓			Technology isn't available to use this on our big gun irrigators.		BMP

Other:									
12	Non-irrigation water is used efficiently (e.g. wash water)	✓							GMP
13	Other (specify)				✓				BMP

9A MAHINGA KAI and BIODIVERSITY: Assessment

(Checklist question 9.4) Mahinga kai species largely relate to indigenous plant, bird and fish species and their ecosystems and habitats. Mahinga kai includes things such as species, natural habitats, materials and practices used for harvesting food, and places where food or resources are, or were, gathered. This includes:

- All waterways, drains (with water), wetlands, and springs
- Native vegetation and riparian areas
- Areas with specific mahinga kai species and their habitats.

Ref	Mahinga kai and biodiversity assessment	Currently Implemented? (Yes, Partial, No, n/a)				Date to be completed ? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence provided (e.g. record, photo, observation)	Level
		Y	P	N	n/a				
1	On-farm mahinga kai values have been identified (e.g. map of native vegetation, waterways, wetlands)	✓						Map 2A	GMP
2	Any key risks to mahinga kai have been identified (e.g. clearance of vegetation, drain maintenance)	✓							GMP
3	Ways to enhance on-farm biodiversity have been identified	✓							GMP
4	Other (specify):				✓				BMP

9A MAHINGA KAI and BIODIVERSITY: Implement measures to protect and enhance Mahinga kai values and biodiversity

Ref	Mahinga kai and biodiversity assessment	Currently Implemented? (Yes, Partial, No, n/a)				Date to be completed ? (if Partial or No)	Comment/Agreed Action (if 'Partial' or 'No'. Justify if 'n/a')	Evidence provided (e.g. record, photo, observation)	Level
		Y	P	N	n/a				
1	Mahinga kai values are considered when implementing other environmental actions (e.g. erosion and sediment control, riparian areas)	✓							GMP
2	Native vegetation and/or habitats are protected	✓							GMP
3	Waterway, drain management and vegetation clearance is carried out following good management practice	✓							GMP
4	Planting of native vegetation in shelterbelts or riparian areas	✓							BMP
5	Constructed wetlands developed for treating contaminants (e.g. nutrient run-off) to promote biodiversity and enhance mahinga kai values			✓			Not an option on our property		BMP
6	Pests are managed according to local authority rules	✓							BMP
7	Other (specify): (e.g. Local council requirements)				✓				BMP

10A ENVIRONMENTAL ACTION PLAN:

Ref.	Management area and risk addressed (e.g. soil erosion)	Action to be completed	Location	Person responsible	Expected Date of Completion	Actual Date of Completion	Evidence to be Provided (e.g. records, photo)
6A. 6	Soil nutrients	Investigate the use of GPS during soil testing.	Home Farm	XY	March 2020		Records
6A. 7	Soil nutrients	Purchase and trial Quick N-test. Test a soil sample prior to sending to lab.	Home Farm	XY	October 2020		Results recorded alongside lab test
6A. 8	Soil nutrients	Conduct some deep N tests (60-90cm) alongside Quick-N test trial	Home Farm	XY	October 2020		Lab test
6A. 9	Soil health	Repair compaction meter and record results in crop notes	Home Farm	XY	December 2019		Meter and notes
6A. 12	Soil health	Investigate how soil biological activity could be tested and discuss possible research with VR&I Board (Hort NZ)	Home Farm	XY	November 2020		Records / searches
6B. 9 **7C. 9**	Soil health Nutrients	As tractors are renewed, they are purchased with GPS controlled traffic capability.	Home Farm	XY	On-going		Visual
6E. 1	Soil erosion	The interception drain along the southern boundary needs re-digging. The culvert it leads to on the south-western edge of paddock C also needs digging out.	Home Farm	XY	April 2020		Before and after photos
6E. 4	Soil erosion	Bunds along the northern and western boundaries of paddock E should be installed so that overland flow from paddock E does not enter the clean drain.	Home Farm	XY	April 2020		Before and after photos

6G. 2	Soil erosion	Bunds along the northern edge of C should be installed above the clean drain originating from SRP1 so that overland flow is directed across the access way into SRP5.	Home Farm	XY	April 2020		Before and after photos
6G. 5	Soil erosion	For future best practice, do not cultivate within 1m of drains.	Home Farm	XY	Nov. 2020		Before and after photos
6G. 7	Soil erosion	A new SRP1 needs to be constructed at the north-western edge of paddock B. It should end just to the west of the culvert leading from the drain coming from paddock A. The emergency spillway and snorkel should be placed at the western end of the new SRP, so that the existing SRP1 acts as a drain.	Home Farm	XY	April 2020		Before and after photos
6G. 7	Soil erosion	The current SRP2 should be expanded to 1.0% in size, accepting overland flow from paddock D via the existing culvert. Outflow from the snorkel will enter the clean drain along the northern boundary of paddock F. The emergency spillway (11m) to be constructed along the northern edge so as to discharge into the clean drain.	Home Farm	XY	April 2021		Before and after photos
6G. 7	Soil erosion	The clean drain leading from SRP2 should continue past paddock F and into the neighbouring leased site, where it will terminate at the north-western corner. The existing SRP3 will need to be reconfigured as a drain, with outlet pipes being removed.	Home Farm	XY	April 2021		Before and after photos
6G. 7	Soil erosion	A new SRP3 should be constructed to accept flow from paddock F, with the outflow entering the clean drain running along the northern boundary of paddock F.	Home Farm	XY	April 2021		Before and after photos

6G. 7	Soil erosion	A new SRP4 should be constructed in the north-western corner of paddock E, with the existing pseudo-SRP being re-structured as a clean drain accepting the flow from paddocks A and B. The spillways and snorkel from the new SRP should be directed into this drain. Prior to construction of this, a silt fence should be installed in the existing SRP4 as a temporary measure.	Home Farm	XY	April 2020		Before and after photos
6G. 7	Soil erosion	The new SRP5 should be constructed by the culvert at the south-east boundary of paddock Db to accept flow from paddocks C and Da. The outflow from this SRP will then enter the existing culvert leading to the clean drain running along the eastern and northern boundaries of paddock 605.	Home Farm	XY	April 2020		Before and after photos

AGRILINK

NZGAP NEW ZEALAND GOOD AGRICULTURAL PRACTICE

Environment

Case Study Supporting Evidence

Grower X

October 2019

Contents

Part II – Supporting Evidence

2A: Maps

Figure 1. Legend for paddock maps

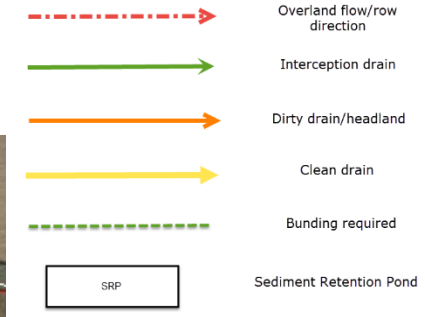


Figure 2. Map of Home Farm in its current state

2B: Maps

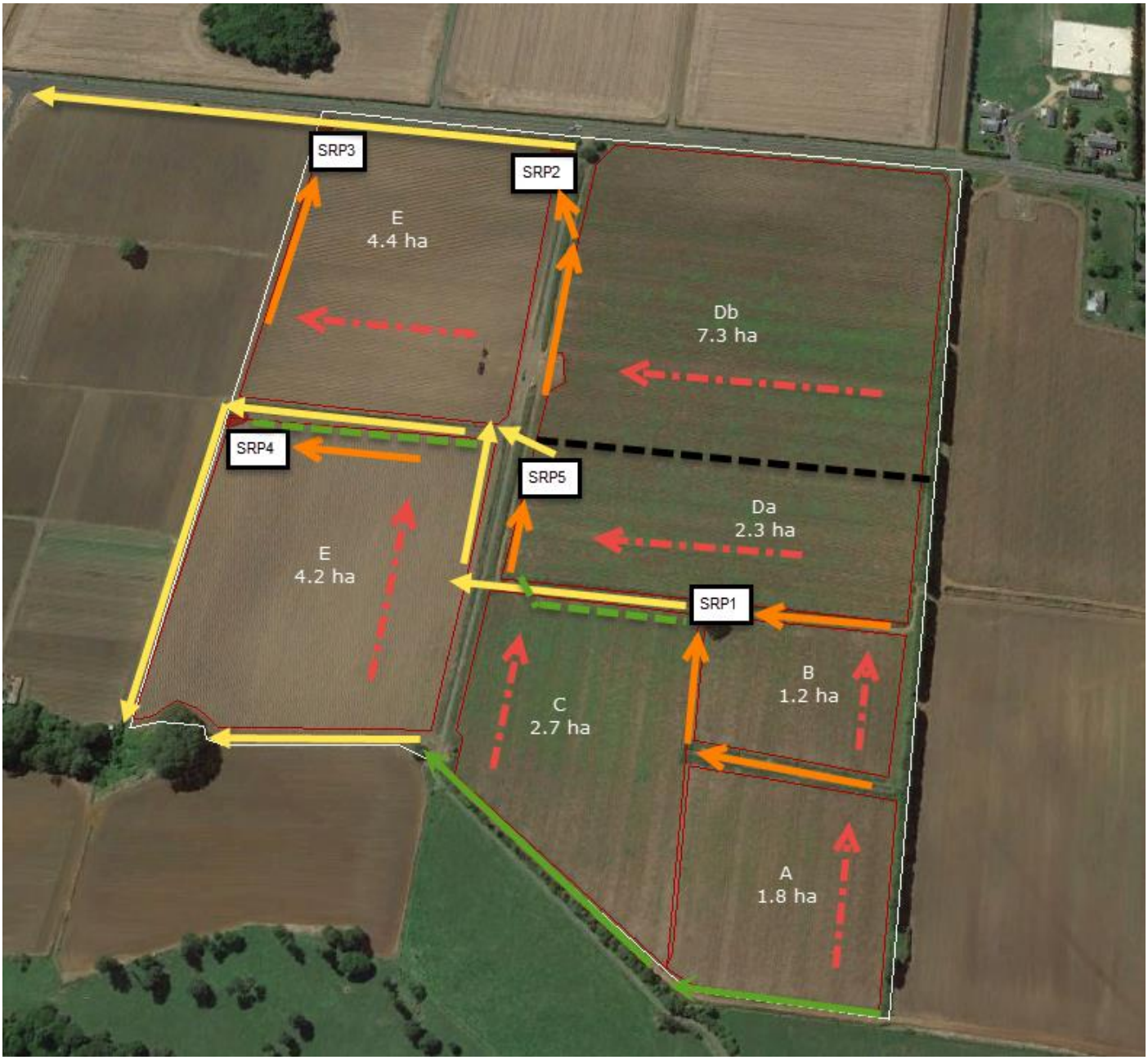


Figure 3. Map of Home Farm following implementation of action plan

2C: Soil Map

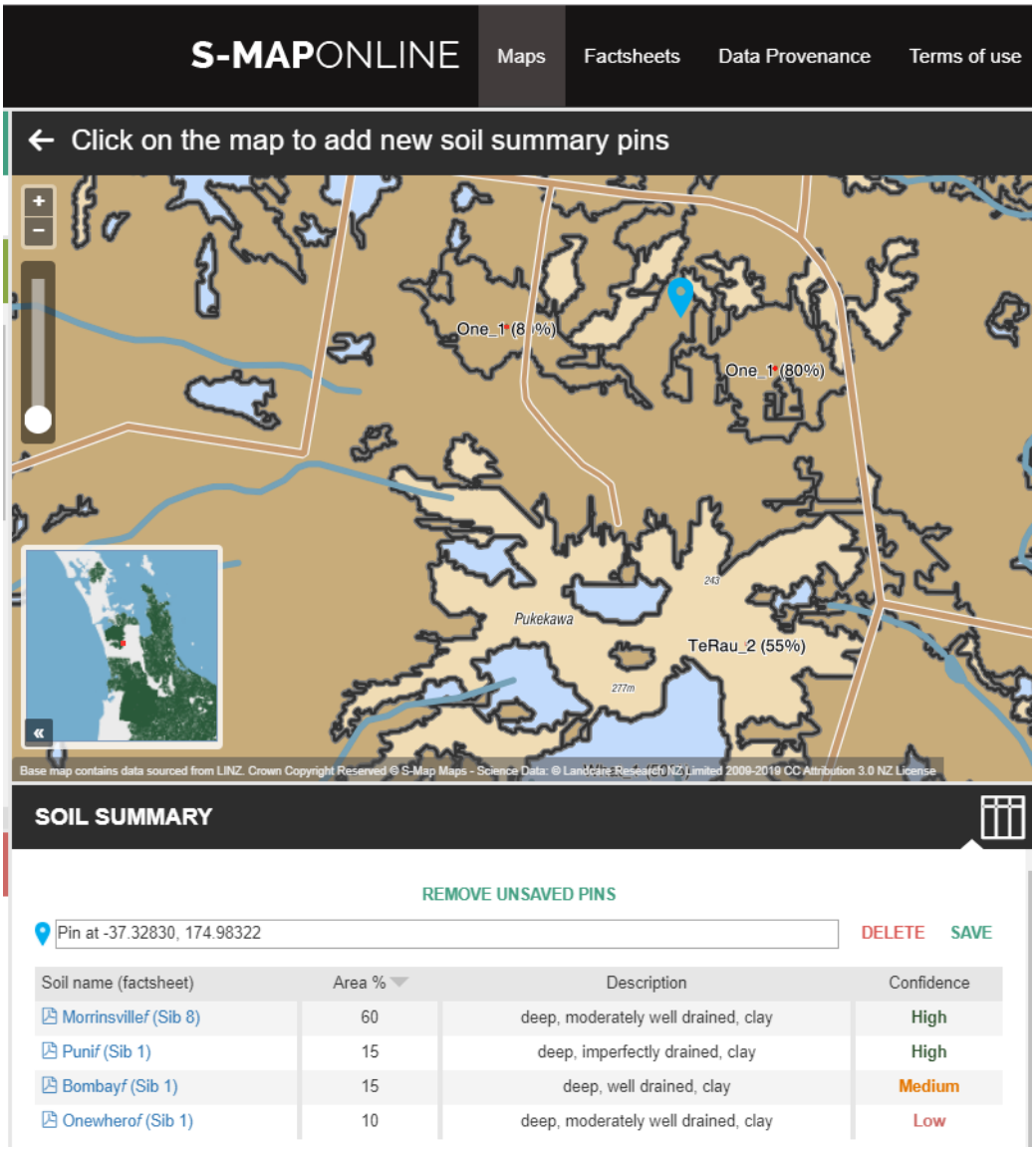


Figure 4. Soil map of Home Farm (from Landcare Research via S-map Online)

Manaaki Whenua
Landcare Research

S-map Soil Report

Report generated: 23-Oct-2019 from https://smap.landcareresearch.co.nz

S-map maps soils at a nominal scale of 1:50,000. At this scale it is common to identify two or more soil siblings that are likely to be present at the selected location. A more detailed resolution is needed to produce map units comprising a single soil sibling. Therefore, it is recommended that users consider the characteristics of each of the identified siblings, the expected proportion of each, and select the S-map sibling that best matches their field observations of the paddock. If no local information is available then it is common practice to select the dominant S-map sibling, i.e. the first listed sibling.

This information sheet describes the typical average properties of the specified soil to a depth of 1 metre, and should not be the primary source of data when making land use decisions on individual farms and paddocks.

Morrinsville*f*

Typic Orthic Granular Soil

Morr_8a.1 (60% of the mapunit at location (1775707, 5866862), Confidence: High)

Key physical properties

Depth class (diggability)		Deep (> 1 m)
Texture profile		Clay
Potential rooting depth		Unlimited
Rooting barrier		No significant barrier within 1 m
Topsoil stoniness		Stoneless
Topsoil clay range		50 - 70 %
Drainage class		Moderately well drained
Aeration in root zone		Unlimited
Permeability profile		Moderate
Depth to slowly permeable horizon		No slowly permeable horizon
Permeability of slowest horizon		Moderate (4 - 72 mm/h)
Profile available water	(0 - 100cm or root barrier)	Moderate (111 mm)
	(0 - 60cm or root barrier)	Moderate (67 mm)
	(0 - 30cm or root barrier)	Moderate (34 mm)
Dry bulk density, topsoil		1.08 g/cm³
Dry bulk density, subsoil		1.26 g/cm³
Depth to hard rock		No hard rock within 1 m
Depth to soft rock		No soft rock within 1 m
Depth to stony layer class		No significant stony layer within 1 m

Key chemical properties

Topsoil P retention	Medium (46%)

Figure 5. Example of an S-map report for one of the soil types on Home Farm

Eurofins - Totally Independent Truly Global

Grower	Farm	Field	Date	pH	BS_Ca	BS_K	BS_Mg	BS_Na
Grower X	Farm 1	A	11-09-19	6.0	58.9	9.4	9.9	0.5
		B	12-09-19	6.3	65.7	9.2	9.0	0.7
		C	13-09-19	6.7	71.4	8.5	9.4	0.8
		D	14-09-19	6.3	67.5	7.3	8.7	0.6
		E	15-09-19	5.9	59.1	8.8	9.0	0.5
		F	16-09-19	6.4	67.7	8.8	9.0	0.5
Grower X	Farm 2	Y	15-09-19	5.9	59.1	8.8	9.0	0.5
		Z	16-09-19	6.4	67.7	8.8	9.0	0.5

Grower	Farm	Field	Date	SO4	Olsen P	QT Ca	QT K	QT Mg	QT Na
Grower X	Farm 1	A	11-09-19	44	158	13	30	38	5
		B	12-09-19	47	156	14	29	35	6
		C	13-09-19	18	175	15	26	35	7
		D	14-09-19	27	132	14	22	32	5
		E	15-09-19	46	170	11	24	29	4
		F	16-09-19	9	151	13	23	34	5
Grower X	Farm 2	Y	15-09-19	46	170	11	24	29	4
		Z	16-09-19	9	151	13	23	34	5

						Trace Elements (EDTA)					
Grower	Farm	Field	Date	OMT	IncN	B	Co	Cu	Fe	Mn	Zn
Grower X	Farm 1	A	11-09-19	4.1	42	2.5	3.0	7.7	245	1465	10.4
		B	12-09-19	3.9	47	3.9	2.4	6.9	220	1567	13.0
		C	13-09-19	3.8	24	2.4	2.7	8.5	283	2125	15.8
		D	14-09-19	3.9	25	2.0	2.6	6.6	217	1431	7.9
		E	15-09-19	4.1	45	2.6	3.1	8.1	272	1445	11.1
		F	16-09-19	3.9	40	2.3	2.9	7.4	217	1522	10.0
Grower X	Farm 2	Y	15-09-19	4.1	45	2.6	3.1	8.1	272	1445	11.1
		Z	16-09-19	3.9	40	2.3	2.9	7.4	217	1522	10.0

Figure 6. Most recent soil test results for Grower X

Figure 6 shows the most recent soil test results for Grower X. Soil tests from previous years are available on request.

2D: Nutrient management fertiliser inputs

2018/19

Fert	Quant	N:P:K	Crop	Area
HYDRO-COMPLEX	150	12:05:14	Onion (ELK)	8.54
NPS	300	16:20:00		
CAN	600	26:0:0:2		
HYDRO-COMPLEX	150	12:15:14	Onion (RED 903S)	6.76
NPS	300	16:20:00		
CAN	500	26:0:0:2		

2017/18

Fert	Quant	N:P:K	Crop	Area
HYDRO-COMPLEX	800	12:05:14	Onion (RHI)	6.99
DAP	200	18:20:00		
CAN	200	26:0:0:2		
HYDRO-COMPLEX	550	12:15:14	Onion (WAIKATO)	7.39
DAP	200	16:20:00		
CAN	200	26:0:0:2		

2016/17

Fert	Quant	N:P:K	Crop	Area
HYDRO-COMPLEX	500	12:05:14	Onion (RED 903S)	8.54
DAP	200	18:20:00		
CAN	200	26:0:0:2		

Figure 7. Example of fertiliser records for Grower X onion crop

Figure 7 shows the most recent nutrient applications to onions on Home Farm. Nutrient applications from previous years and other crops are available on request.

2E: Water and irrigation management

Table 3. Proposed daily and annual takes at Home Farm

Description		**Units**
Bore(s) yield	70 – 90	m^3/hour
Peak daily take	**1,400 – 1,800**	**m^3/day**
Peak ET (January – 90th percentile)	3.3	mm
Application efficiency	85	%
Peak application rate	3.9	mm
Area	49.8	ha
Annual crop irrigation demand (90% reliability) – based on described crop mix	215	mm
Annual application rate (accounting for 85% application efficiency)	250	mm
Annual take	**124,000**	**m^3/year**

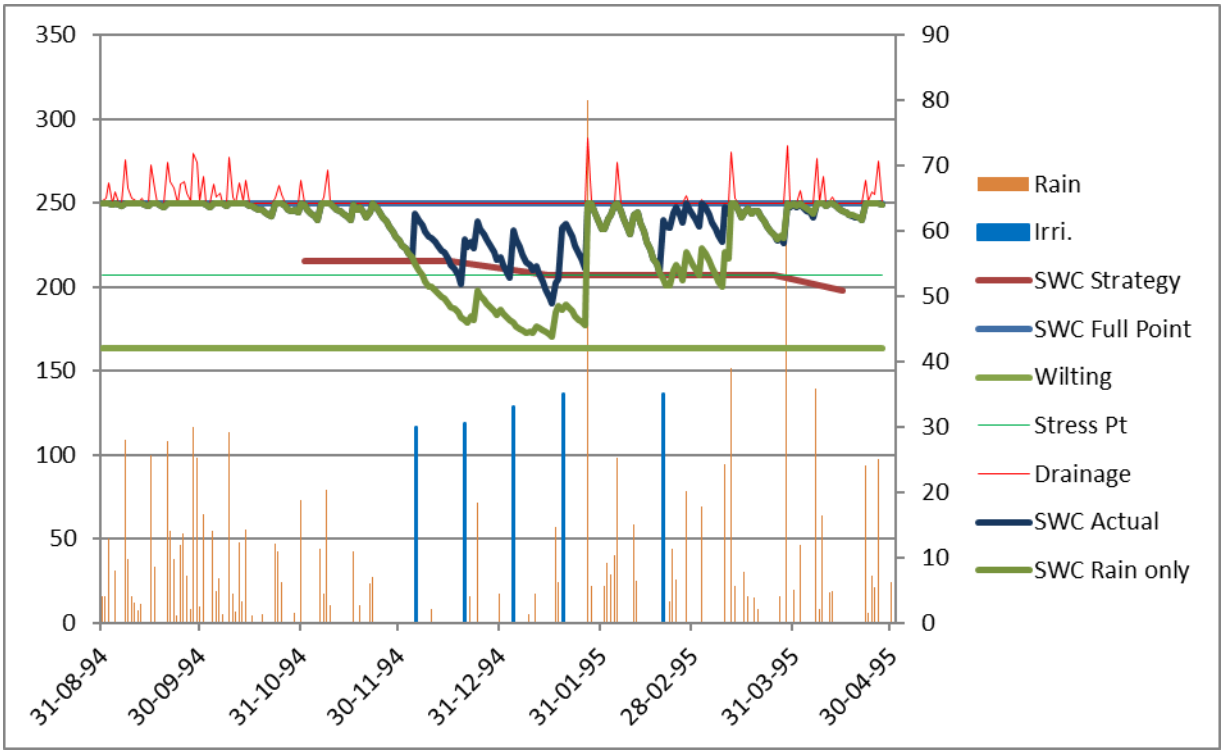


Figure 8. Example of the soil moisture for a November planted potato crop during an 'average' season at Home Farm

2F: Paddock management history

An example of the recent crop history for Home Farm is shown in Table 4. Full crop histories for Home Farm are available on request.

Table 4. Recent crop and fertiliser application history for Home Farm

Date	Crop	Activity
19-09-18	Potatoes	Glyphosphate to kill ryegrass
29-09-18	Potatoes	soil sensors emptied, sumps buried
07-10-18	Potatoes	Chiphoe grass
08-10-18	Potatoes	Deep ripping
12-10-18	Potatoes	Groundspread base fertiliser - 750kg/ha
	Potatoes	40% Superphosphate
	Potatoes	50% Muriate of potash
	Potatoes	5% Calmag
	Potatoes	3% Keiserite
	Potatoes	1% Boron
	Potatoes	1% Zinc
13-10-18	Potatoes	Powerharrow
14-10-18	Potatoes	Plant potatoes (Russett Ranger) Planting population is approx 41,500 seed pieces per hectare.
14-10-18	Potatoes	Planting fertliser (in furrow) 1,500kg/ha
	Potatoes	Azoxystrobin
	Potatoes	Imidacloprid
28-10-18	Potatoes	soil sensors dug up, emptied. Soils samples taken
02-11-18	Potatoes	Pre-emergence chemical
	Potatoes	Linuron
	Potatoes	Metribuzin
	Potatoes	Glyphosate
	Potatoes	Cyanazine
10-11-18	Potatoes	Spray application
	Potatoes	Fluazinam
17-11-18	Potatoes	Spray application
	Potatoes	Metalaxyl
	Potatoes	Lambda-cyhalothrin
20-11-18	Potatoes	TDR cables installed
24-11-18	Potatoes	Spray application
	Potatoes	Metalaxyl
	Potatoes	Magnesium
	Potatoes	Boron
	Potatoes	Spirotetramat

01-12-18	Potatoes	Spray application
	Potatoes	Mancozeb
	Potatoes	Spirotetramat
07-12-18	Potatoes	soil sensors emptied
08-12-18	Potatoes	Spray application
	Potatoes	Fungicide
	Potatoes	Insecticide
11-12-18	Potatoes	Fertiliser application
	Potatoes	Ballance SustaiN 80kg/ha
14-12-18	Potatoes	Plant tissue samples
15-12-18	Potatoes	Spray application
	Potatoes	Fungicide
	Potatoes	Insecticide
17-12-18	Potatoes	Pivot Irrigation - 30mm
22-12-18	Potatoes	Spray application
	Potatoes	Fungicide
	Potatoes	Insecticide
29-12-18	Potatoes	Spray application
	Potatoes	Fungicide
	Potatoes	Insecticide
30-12-18	Potatoes	Pivot Irrigation - 30mm
02-01-19	Potatoes	Fertiliser application
	Potatoes	Ballance SustaiN 80kg/ha
05-01-19	Potatoes	Spray application
	Potatoes	Fungicide
	Potatoes	Insecticide
07-01-19	Potatoes	Pivot Irrigation - 25mm
11-01-19	Potatoes	soil sensors emptied
13-01-19	Potatoes	Spray application
	Potatoes	Fungicide
	Potatoes	Insecticide
18-01-19	Potatoes	Fertiliser application
	Potatoes	Ballance SustaiN 60kg/ha
21-01-19	Potatoes	Spray application
	Potatoes	Fungicide
	Potatoes	Insecticide
23-01-19	Potatoes	Pivot Irrigation - 35mm
28-01-19	Potatoes	Spray application
	Potatoes	Fungicide
	Potatoes	Insecticide
29-01-19	Potatoes	Plant tissue samples

03-02-19	Potatoes	Fertiliser application
	Potatoes	Ballance SustaiN 100kg/ha
05-02-19	Potatoes	Spray application
	Potatoes	Fungicide
	Potatoes	Insecticide
12-02-19	Potatoes	Spray application
	Potatoes	Fungicide
	Potatoes	Insecticide
23-02-19	Potatoes	Spray application
	Potatoes	Fungicide
	Potatoes	Insecticide
03-03-19	Potatoes	Spray application
	Potatoes	Fungicide
	Potatoes	Insecticide
07-03-19	Potatoes	soil sensors emptied, sumps buried, Crop (tuber) yields, TDR Readings,
10-04-19	Potatoes	Harvest - Potatoes
May	Onions	Lime application - 5t/ha
June	Onions	Cultivation - shallow Rip
June	Onions	Cultivation - power harrow
02-07-19	Onions	Lime application - 5t/ha
03-07-19	Onions	Drill onions (per bed = 8 rows at 6.2cm spacing)
05-07-19	Onions	Spray application - Residual Herbicide
06-07-19	Onions	Fertiliser Application - Serpentine Super 7k (800kg/ha)
12-07-19	Onions	Spray application - Herbicide
13-07-19	Onions	soil sensors dug up, emptied, soil samples taken and met station reinstalled
26-07-19	Onions	Visited site to test logger cable… couldn't get this to work.
02-08-19	Onions	soil sensors emptied
02-08-19	Onions	Re-tested logger… still not working
11-08-19	Onions	Logger now up and running - faulty connection to power source
19-08-19	Onions	Spray application - Herbicide + fungicide
29-08-19	Onions	Fertiliser Application - DAP @ 250kg/ha
10-09-19	Onions	Spray application - Herbicide + fungicide
12-09-19	Onions	soil sensors emptied
12-09-19	Onions	Spray application - Herbicide
14-09-19	Onions	Spray application - Herbicide
19-09-19	Onions	Spray application - Herbicide
18-10-19	Onions	soil sensors emptied
10-10-19	Onions	Spray application - Herbicide
19-10-19	Onions	Spray application - Herbicide
19-10-19	Onions	Fertiliser Application - Nitrophoska Extra @ 300kg/ha

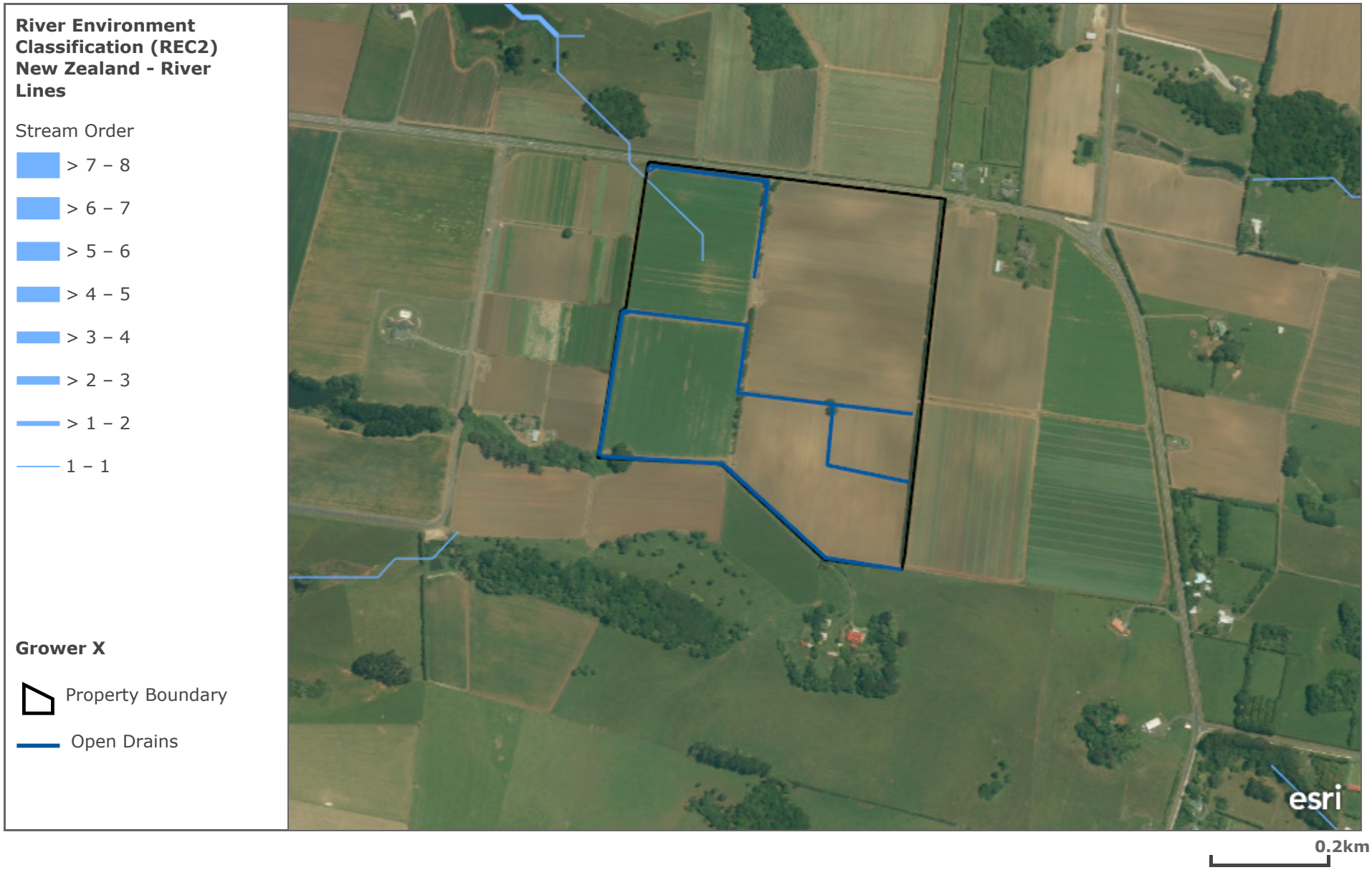
2G: Pictures

Image 1. Cultivation beside drain on Home Farm.

Image 2. An example of a blocked culvert on Home Farm.

Image 3. Recently installed Sediment Retention Pond on Home Farm.

Drains and Waterways



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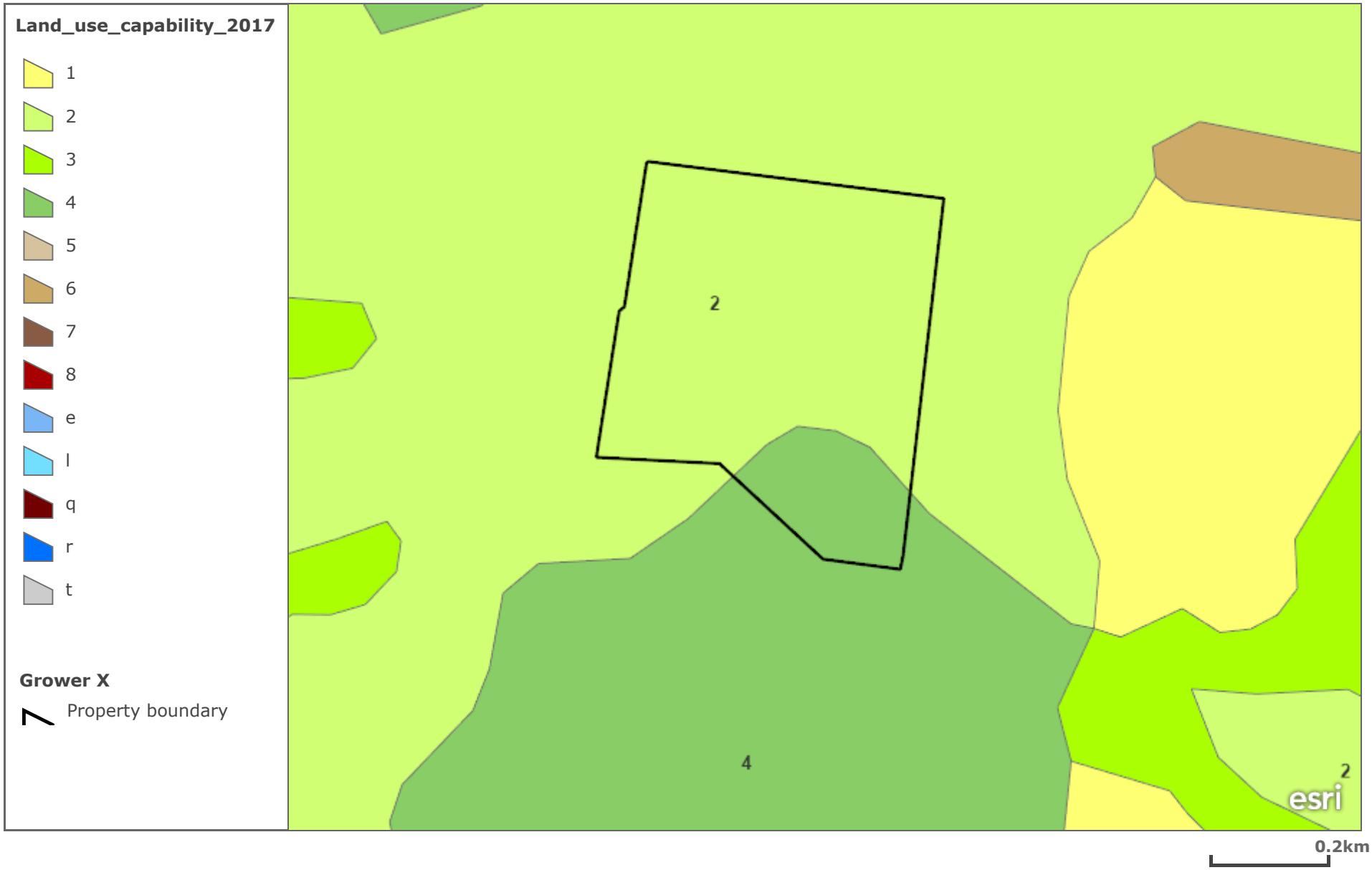
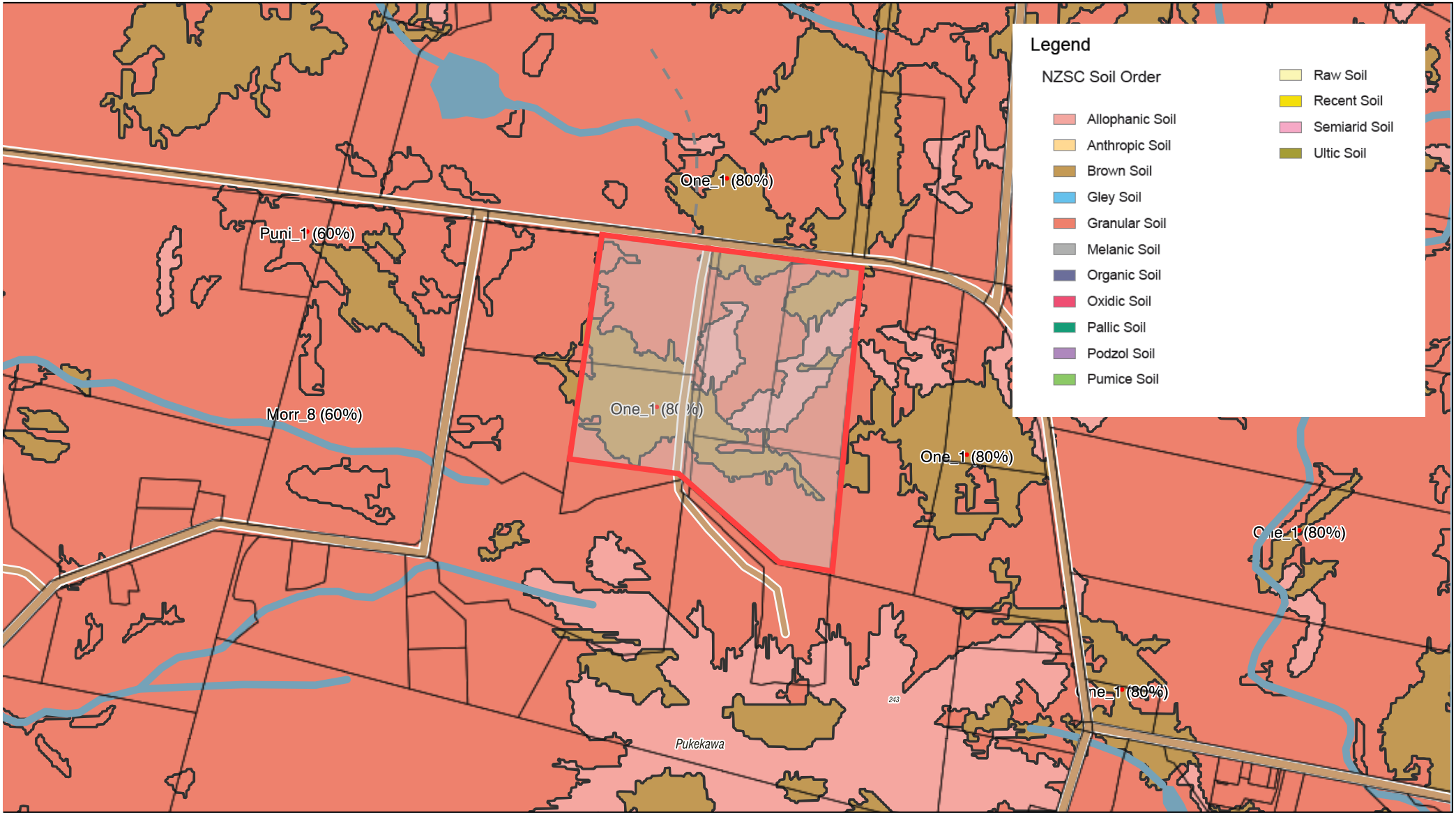


Soil Order



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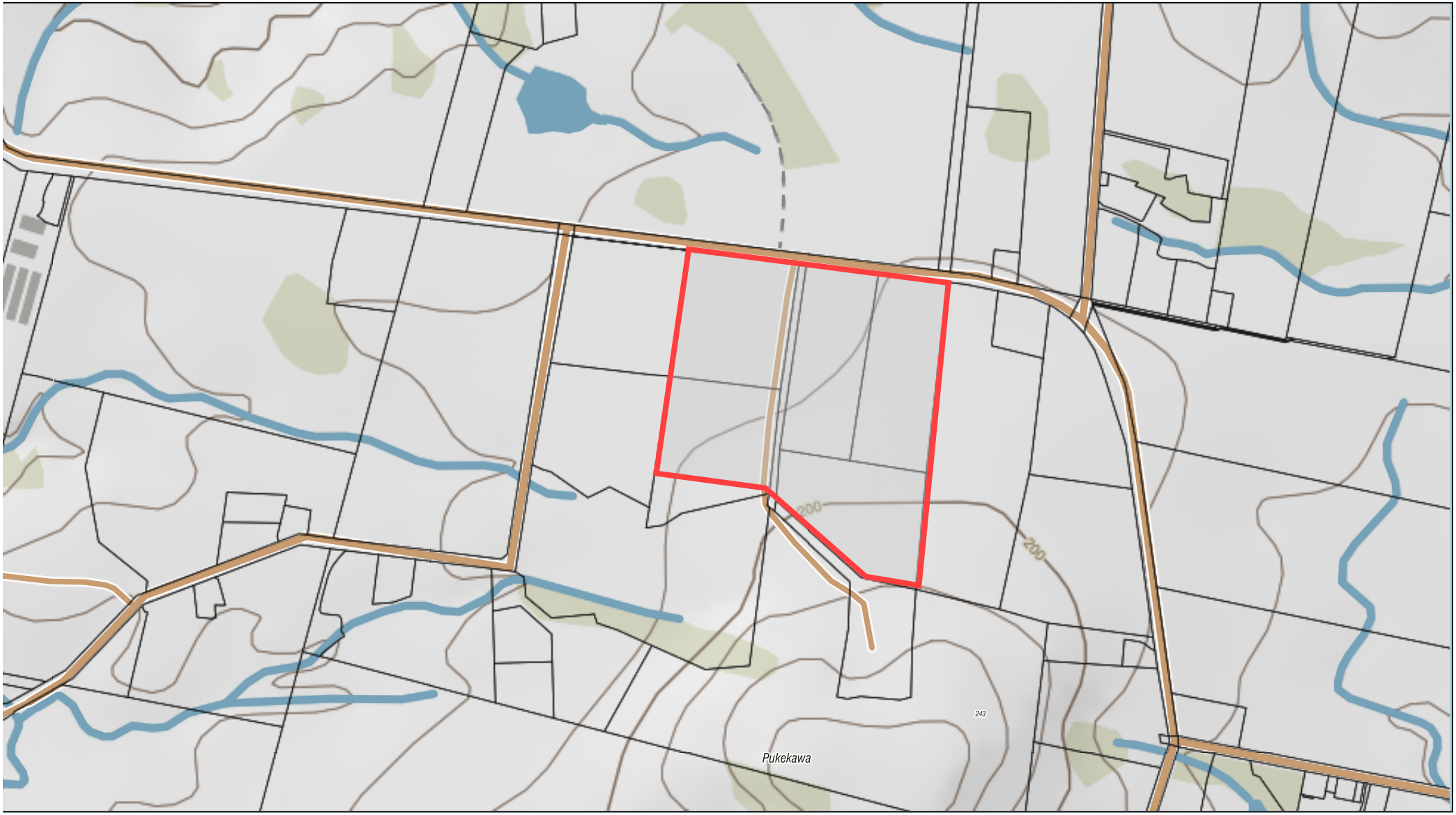

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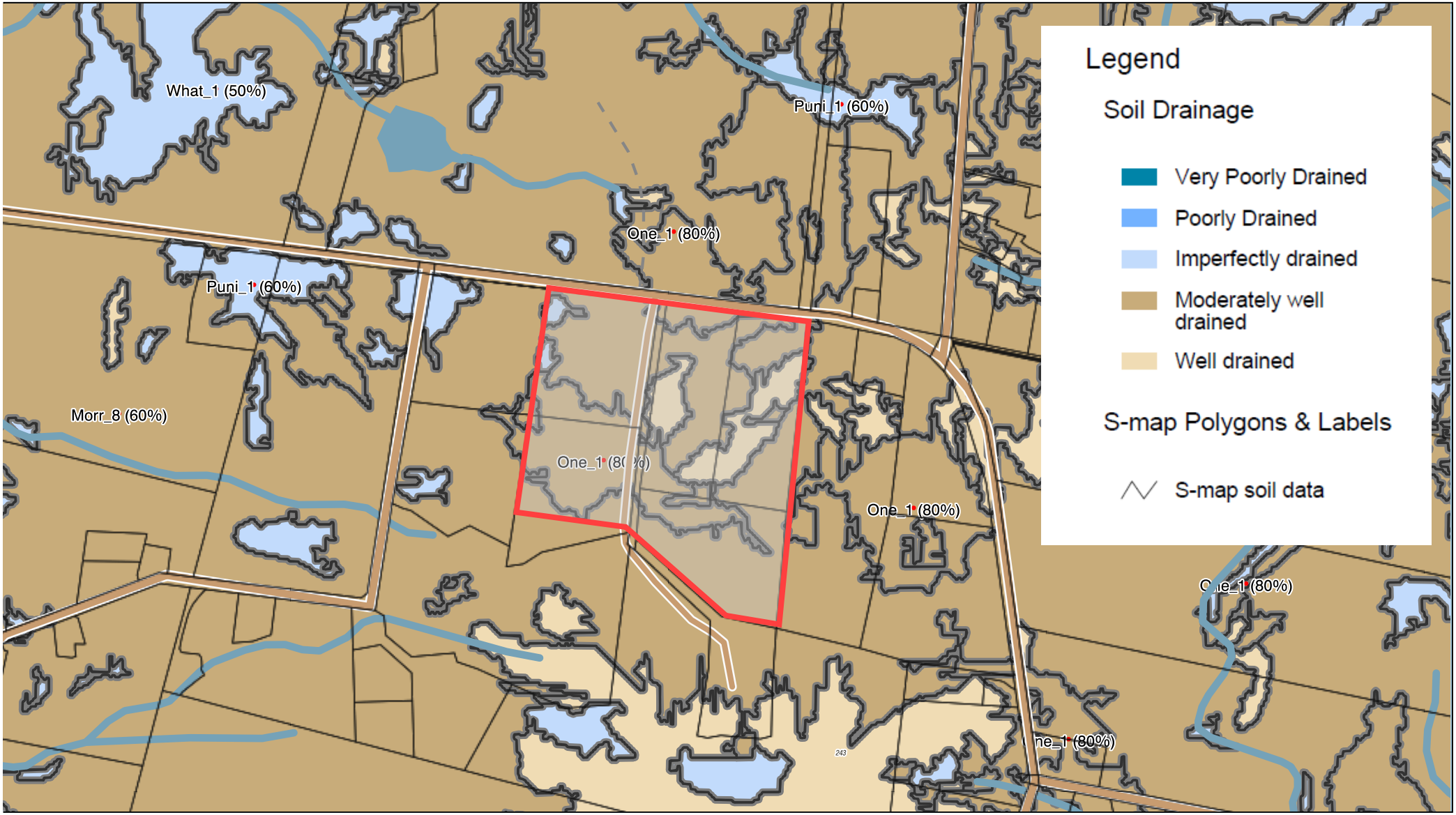
Soil Drainage



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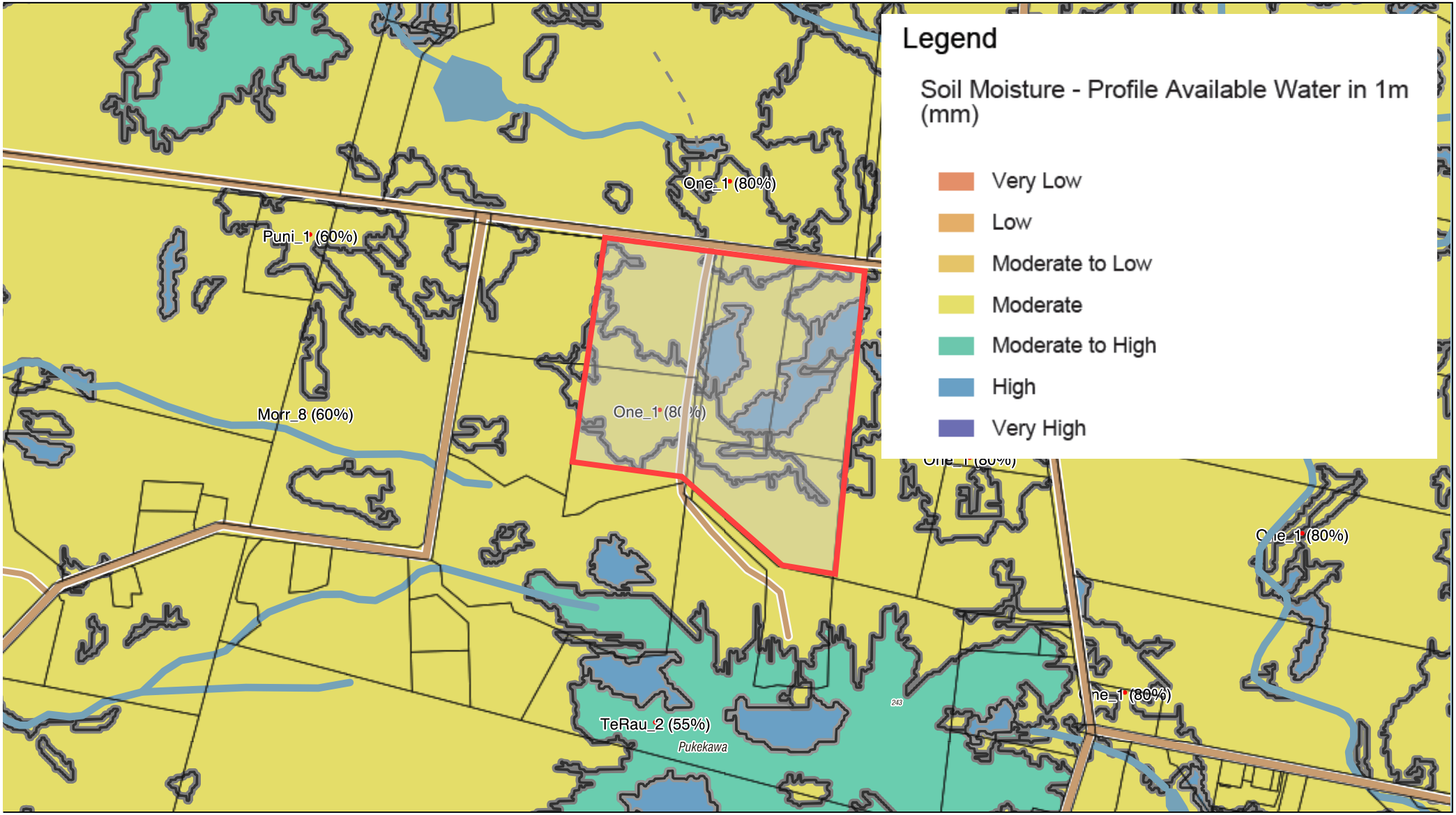
Soil Moisture



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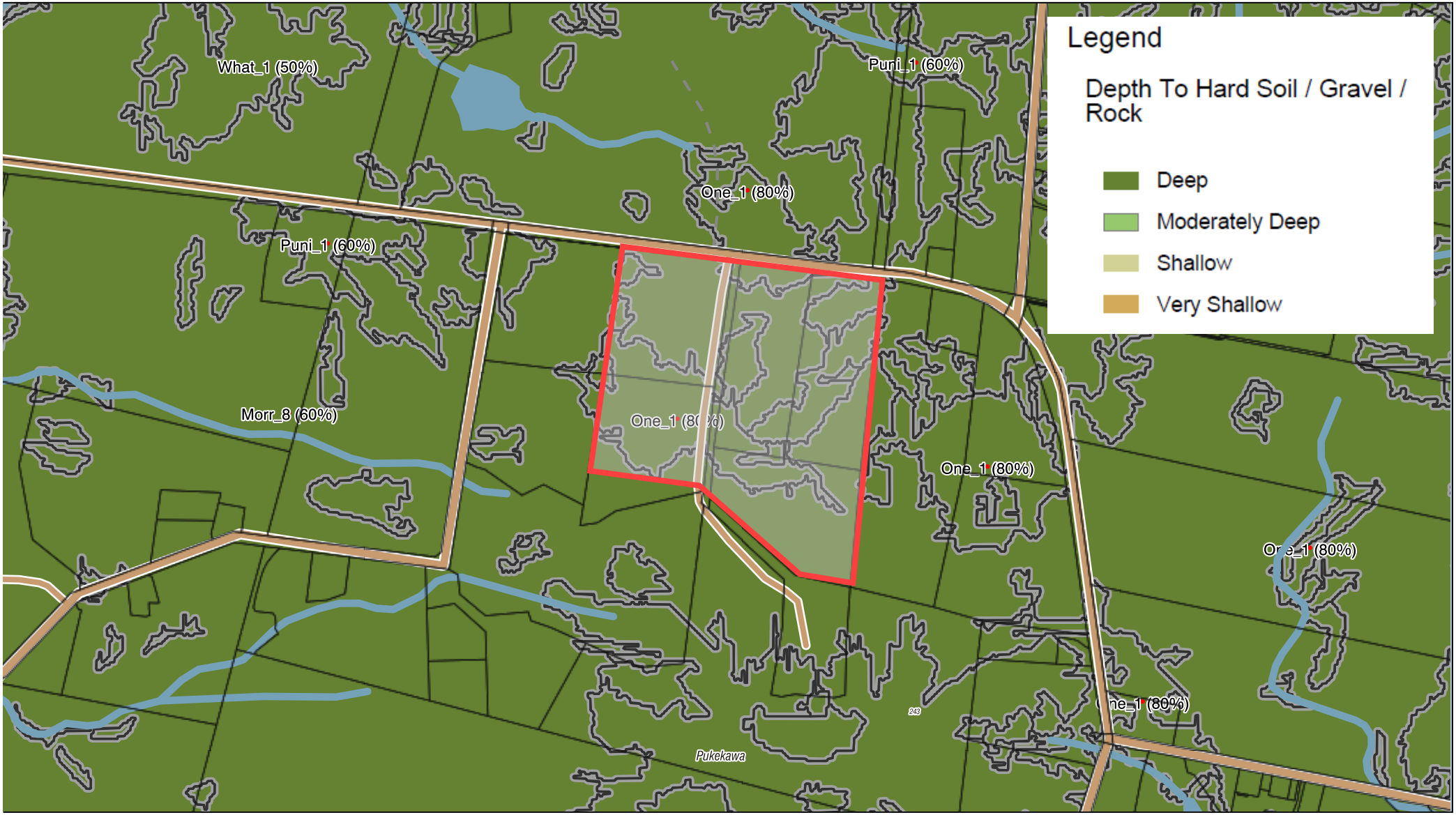
Depth to hard Soil / Gravel / Rock



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