BEFORE INDEPENDENT HEARING COMMISSIONERS

AT HAMILTON

IN THE MATTER	of the Resource Management Act 1991
AND	
IN THE MATTER	of the hearing of submissions on Proposed Plan Change 1 to the Waikato Regional Plan

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STATEMENT OF PRIMARY EVIDENCE OF GERARD MATTHEW WILLIS FOR FONTERRA CO-OPERATIVE GROUP LTD (SUBMITTER 74057)

PLANNING

15 FEBRUARY 2019

RICHMOND CHAMBERS

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1. EXECUTIVE SUMMARY

1.1 My name is Gerard Matthew Willis. My planning evidence addresses issues relevant to Fonterra's farming interests.

1.2 This evidence sets out my opinion that the s42A Report is correct in its support for:

(a) 80 year targets; and

(b) the retention of a whole-of-catchment approach to PC1.

1.3 Other key policy themes discussed in the s42A Report raise important issues. My response to those issues is as follows:

(a) The Hearing Panel can be confident that a strong case can be made for the retention in PC1 of certified industry schemes. In my opinion such schemes can play an important role in effective and efficient implementation of the PC1 provisions.

(b) I cannot support the natural capital/LUC approaches to N discharge limit setting. Such approaches are highly unlikely to be the most appropriate provisions, as assessed against the section 32 tests.

(c) Overseer will have an important role in PC1 but needs to be used correctly to model change in N leaching across time/after farm system change (ie measuring relative change). It should not be used to determine compliance with absolute numeric limits unrelated to modelled farm-specific NRPs.

(d) Notwithstanding my support for Overseer and the concept of NRPs, using NRPs and Overseer modelling on all farms at all times would be a costly and unnecessary planning approach. Fonterra's Nitrogen Risk Scorecard approach offers a potential solution to that issue. Further detail on this alternative approach for low and medium risk farms will be presented at later hearings.

1.4 Fonterra's submission in relation to the Block 1 objectives and associated section 3.11 introductory text can be readily resolved by accepting the s42A Report recommendations and making minor wording changes as set out in this evidence.

2. INTRODUCTION

2.1 My full name is Gerard Matthew Willis.

2.2 I am a director of Enfocus Limited, a resource management consultancy based in Pukekohe. I have practised as a planner and resource management specialist for the past 30 years.

2.3 I hold a Bachelor of Regional Planning (Hons) degree from Massey University and am a full member of the NZ Planning Institute.

2.4 My previous experience includes working in policy and regulatory planning roles in local government both in New Zealand and in the United Kingdom. I also spent a considerable part of my early career in central government roles including as a senior policy analyst at Ministry for the Environment (**MfE**) and environment adviser to the Minister for the Environment.

2.5 Since 2001, I have been a planning and environmental consultant, establishing my own practice in 2002. In that capacity I have acted for a number of district and regional councils on planning issues and provided advice to companies, Maori trusts and government agencies. Of note, over recent years, I have advised five of New Zealand's regional councils on the development of regional policy statements and/or regional plans.

2.6 I have also been involved in reform of freshwater management at the national level. Most recently this includes the following:

(a) In 2013 I was engaged by MfE to draft amendments to the National Policy Statement for Freshwater Management (**NPS-FM**), including the incorporation of the National Objectives Framework.

(b) In 2016 I was engaged by MfE to provide independent comment on the workability of the proposed changes to the NPS-FM (as gazetted in 2017).

(c) From September 2018 to the end of February 2019, I was contracted to MfE on a, part time basis as a member of the cross agency Water Taskforce, established to implement the Government's Essential Freshwater reform programme.

2.7 My relevant experience also involves the preparation of evidence for hearings in relation to water quality/diffuse discharge matters in respect of at least fourteen regional policy statements and plans (or plan changes) including the following:

(a) Horizons One Plan
(b) Change 6A to the Otago Regional Plan
(c) Gisborne Regional Freshwater Plan
(d) Plan Change 3 to the Bay of Plenty Regional Policy Statement
(e) Southland Water and Land Plan
(f) Wellington Natural Resources Plan
(g) Hurunui and Waiau Rivers Regional Plan
(h) Canterbury Land and Water Regional Plan (**CLWRP**), including Variations (now Plan Changes) 1 and 2 and Plan Changes 3 and 5 to the CLWRP
(i) Northland Regional Plan
(j) PC10 (Rotorua Lakes) to the Bay of Plenty Regional Natural Resources Plan.

3. BACKGROUND TO PROPOSED CHANGE 1

3.1 My involvement in Proposed Change 1 (**PC1**) commenced in October 2016 following its public notification. I was initially engaged to assist with the preparation of a submission on behalf of Fonterra. In my capacity as independent planning adviser I worked with staff from Fonterra.

3.2 I was engaged in the same capacity in April 2018, to assist Fonterra with its submission on Variation 1.

3.3 I am familiar with the provisions of the PC1 to which these proceedings relate. In preparing my evidence I have reviewed the following documents:

(a) Waikato Regional Plan Change 1 – Waikato and Waipā River Catchments: Section 32 Evaluation Report;

(b) Section 42A Report (**s42A Report**), Proposed Plan Change 1, Waikato and Waipā River catchments, (Parts A and B), February 2019.

3.4 I have also read the evidence of Mr Richard Allen (Environmental Policy Manager, Fonterra), which is being submitted as part of these Block 1 hearings.

Code of Conduct

3.5 Although this is a Council hearing, I have read the Environment Court's Code of Conduct and agree to comply with it. My qualifications as an expert are set out above. I confirm that the issues addressed in this statement of evidence are within my area of expertise.

Scope of Evidence

3.6 I have been asked to provide planning evidence on the following matters and structure my statement accordingly.

(a) Fonterra's submission and the importance of key components of PC10 to the Vision and Strategy for the Waikato and Waipa Rivers/Te Ture Whaimana o Te Awa o Waikato (**V&S**)

(b) My opinion on the Officers' initial responses on key PC1 issues (including 80 year targets, the proposed nitrogen (**N**) management regime, Overseer, certified industry schemes, the natural capital/Land Use Capability (**LUC**) approach to N allocation, and a sub-catchment versus whole of catchment approach)

(c) Use of NPS-FM terminology

(d) Objectives 1, 2, 3 and 4

3.7 Where in this evidence I provide suggested redrafting of provisions:

(a) Text in blue underscored font is as proposed by me and is consistent with that used in the Fonterra submission.

(b) The red underscored font is text proposed in the s42A Report.

3.8 I can confirm that, on the basis that the s42A Report recommendations are accepted by the hearing panel, acceptance of the amendments detailed in this evidence would satisfy Fonterra's submission and further submission in relation to those parts of the submission addressed by the Block 1 hearing.

4. RELEVANT STATUTORY INSTRUMENTS

4.1 I agree with the identification of relevant statutory instruments as set out in Appendix Section 3 of the s42A Report and more fully in Part A of the Section 32 Report. Except as I might otherwise state in this evidence, I agree with the assessment contained in s42A Report. In my opinion, at least insofar as the matters raised by the Fonterra submission are concerned, PC1 gives effect to, is not inconsistent with, or takes into account (as applicable), the various relevant documents.

5. OVERVIEW OF FONTERRA'S SUBMISSION

Vision and Strategy

5.1 Fonterra's submission records strong support for the V&S.

5.2 In my opinion, the objectives of the V&S fall into one of two categories:

(a) Those that are *aspirational* and may take many years or even decades to achieve. (For example, the desire for the restoration of the health and well-being of the Waikato River; or more specifically, the desire for the Waikato River to be safe for swimming and food gathering over its entire length); and

(b) Those that are *directive*, which must be reflected in, and delivered by, the provisions of PC1 that apply in the first ten year period.

5.3 In this second category I would note, in particular, the following:

(a) Objective g) is *"the recognition and avoidance of adverse cumulative effects, and potential cumulative effects, of activities undertaken both on the Waikato River and within its catchments on the health and wellbeing of the Waikato River."*

(b) Objective h) is *"the recognition that the Waikato River is degraded and should not be required to absorb further degradation as a result of human activities"*.

5.4 While all thirteen of the V&S's objectives are of equal importance, the two referred to above have specific implications for the appropriate planning regime that PC1 must put in place.

5.5 In my opinion, that means that PC1 must have:

(a) an effective means of addressing cumulative effects. That in turn means that PC1 must contain robust metrics, including quantified objectives, policies and/or methods that provide a firm, repeatable and consistent basis to determine the point at which no further adverse effects can be allowed (notwithstanding the minor nature of the effects when assessed on an individual basis);

(b) provisions that strictly control further and additional net diffuse discharges. This calls for:

(i) an understanding of current discharge levels and control of those discharges to limits that reflect current use; and/or

(ii) a regime that manages the intensity of land uses though similarly clear, certain and effective controls.

5.6 In my opinion it also means that PC1 cannot let the water quality of the Waikato River degrade further as a result of controllable contaminant loads increasing beyond those existing prior to PC1 (noting that some 'load to come'[1] will be unavoidable). In my opinion, the provisions of PC1 do this[2] and offer assurance that in stream objectives (described in PC1 as "targets") will be achieved in appropriate timeframes. It is important that these remain in PC1.

5.7 In my opinion, without those characteristics PC1 could not be said to give effect to the V&S as it is required to do in accordance with section 67 (2) of the RMA. It is, however, important to note that other objectives of the V&S (particularly objective (d) – see discussion at paragraph 6.3) mean that some aspects, including the *timing* of progress made and the need to continue to provide for point source discharges associated with regionally significant infrastructure and regionally significant industry, will influence how those directive objectives are given effect to.

Collaborative process and resulting product

5.8 The Fonterra submission is strongly supportive of the collaborative process undertaken in this case and of the product of that process, being PC1.

5.9 Fonterra's submission focuses on ensuring that the provisions of PC1 are clear and certain, consistent with legal and national policy requirements (including NPSFM) and practical in the sense that implementation of the rules is within the capacity and capability of the Regional Council, industry sectors and individual farmers and other land owners. Fonterra does not seek any radical change to PC1 considering it to be generally well-conceived as the initial, responsible first step in delivering on the objectives of the V&S (albeit there is some room for refinement on matters of detail).

5.10 I agree with that position. From a planning perspective, I consider that PC1 is broadly consistent with emerging best practice in diffuse

[1] By "load to come" I mean contaminant discharges from land use activities in the past that have yet to present in surface waters, but which can be expected to do so regardless of further management interventions.

[2] Noting that rules for point source discharges sit within the existing operative provisions of the Waikato Regional Plan.

discharge management. That practice has emerged through extensive collaborative and consultative processes in Canterbury and in the Lake Rotorua catchment where establishing benchmarks/baselines for N discharges and managing activities to (or down from) those reference points is the core to N management, with farm environment plans (FEPs) providing the key implementation tool for management of N and the other three diffuse contaminants.

5.11 In terms of practicality and ensuring effective and timely implementation, Fonterra has given considerable thought to whether some core parts of the management regime could be simplified to improve the efficiency of the provisions (thereby reducing) cost, while improving the implementation of the provisions.

5.12 The result is the concept of a "Nitrogen Risk scorecard" approach that would reduce reliance on Overseer modelling. It is one of the few genuinely substantive changes sought by Fonterra to PC1. This idea, and how it would be given effect to by PC1, will be described in detail in subsequent hearings but is outlined in broad terms in this evidence (see section 6.8).

6. RESPONSE TO OFFICERS' INITIAL RESPONSES ON KEY ISSUES

6.1 In section B1.3 of the s42A Report, Officers record their preliminary views on a number of key PC1 issues. My response is as follows.

80 Year Targets

6.2 In my opinion the figure at paragraph 117 of the s42A Report usefully summarises the broad options in front of the Hearing Panel. Put simply, PC1 could be reconfigured to do more earlier, defer action and do more later, or, as proposed by the CSG, plot a trajectory that takes a straight line path towards the 80-year target.

6.3 In my opinion, PC1 (the straight line progression) is the appropriate response. The desire to see rapid progress through setting a more ambitious initial ten-year target is understandable on environmental and cultural grounds, but I do not read the V&S as promoting the restoration

of the health and well-being of the Waikato River through a "now at all costs" approach. There are thirteen objectives including objective (d) which must be given effect to by PC1. Objective (d) identifies *the restoration and protection of communities' social and economic relationships with the Waikato River* as an important objective.

6.4 Economic modelling[3] has shown the high cost of very aggressive mitigation at this time, and the outcome of that modelling needs to be considered when deciding how best to give effect to the V&S.

6.5 That is not to say that I agree that the Hearing Panel should defer *any* action that would be costly. In that regard, Objective (j) of the V&S requires:

> *The recognition that the strategic importance of the Waikato River to New Zealand's social, cultural, environmental and economic wellbeing is subject to the restoration and protection of the health and wellbeing of the Waikato River.*

6.6 In my opinion, that objective makes clear that the economic importance of the Waikato does not override the need to restore and protect the health and wellbeing of the Waikato River. It is a question of weighing and balancing those objectives – including through the considered and responsible timing and phasing of required progress towards the 80 year targets.

6.7 As noted above, in my opinion, the "straight line" approach represents an appropriate balance between competing V&S objectives.

N management under PC1

6.8 At paragraph 132 of the s42A Report, the Officers note their agreement with submitters who consider that the PC1 regime with respect to N is *"costly, inflexible and potentially has a range of unintended consequences".* The s42A Report signals that Officers are likely to recommend that a series of adjustments are made to the management of N.

6.9 I agree with the Officers that the approach to N management of requiring a Nitrogen Reference Point (**NRP**) and regular Overseer reporting

[3] Reference economic modelling

against the NRP is costly and, for some farm operations, arguably unnecessary. Furthermore, Overseer poses a number of difficult challenges when used in a regulatory context (including issues with data management, managing version change and the limited reliance that can be placed on modelling results in the enforcement context).

6.10 Further, I understand that while much of the dairy sector could probably comply with the Overseer modelling/reporting requirements (because it already has systems in place) other parts of the pastoral sector will find it very onerous. (And, as set out by Mr Allen, Fonterra is itself moving away from comprehensive Overseer modelling for its supplier farms.)

6.11 Fonterra's "Nitrogen Risk Scorecard" approach, designed as a partial replacement for comprehensive Overseer reporting under Fonterra's nitrogen programme, offers an alternative to PC1's NRP/Overseer approach. It has been designed to reduce the need for Overseer modelling and hence reduce costs. It could also potentially provide the degree of flexibility sought by the Officers.

6.12 Fonterra's submission on Variation 1 to Change 1 seeks proposed changes to:

(a) Policy 2 and to Rules 3.11.5.2 – 3.11.5.4. Those changes would provide for the Nitrogen Risk Scorecard to be used instead of the NRP and Overseer reporting; and

(b) a new Schedule BA. This would set out how to generate a Nitrogen Risk Scorecard Grade and the scorecard assessment process.

6.13 The basic idea behind the Nitrogen Risk Scorecard is that, instead of modelling N loss below the root zone, each property is assessed against the Scorecard and receives a grade (i.e. "risk rating").

6.14 The grade is determined according to how the farm manages six N risk factors that are within the farmer's control. These being:

(a) stock management

(b) N fertiliser

(c) imported feed

(d) cropping and cultivation

(e) effluent management

(f) irrigation

6.15 The scorecard itself is an automated software tool that numerically scores a farm on the basis of a defined scale against each of the six risk factors, weights those risk factors in terms of their overall contribution to N loss risk, then sums those results to provide an overall risk grade.

6.16 As an example, a low stocking rate (less than 2 cows per hectare) is accorded a very low risk rating and attracts no risk "points" whereas a stocking rate of more then 4 cows/ha is regarded as presenting very high risk and attracts 100 risk points. Further detailed consideration is provided by risk *sub factors* for each of the six major risks factors meaning that, for example, the stock rate risk may be modified (up or down) according to whether particular grazing practices are used (e.g. barns, duration controlled grazing, break fed fodder crops etc). Risk sub factors are assessed for all six headline N risk factors. More detail is provided in the evidence of Mr Richard Allen.

6.17 The scorecard approach would allow a farmer some flexibility to change aspects of a farm system provided the overall risk grade remains constant (or within a tightly controlled band).

6.18 How the scorecard approach could be integrated within PC1 will be explained more fully in later hearings. However, it is important to note that I do not propose that the Scorecard approach replace NRPs and Overseer modelling and reporting entirely. The NRPs and Overseer processes should remain an important part of PC1 – particularly in order to manage higher risk farms/activities.

6.19 The Fonterra submission does, however, seek that the Nitrogen Risk Scorecard approach is used for small and low to medium risk farming

activity. In my opinion, the Scorecard approach is a viable alternative to Overseer modelling for those lower and medium-risk farming activities and could provide a solution to some of the more difficult planning and implementation issues raised by PC1.

Overseer

6.20 Notwithstanding the above, in my opinion, Overseer is a very useful tool for N management in a regulatory context when it is used correctly.

6.21 Overseer is used in several existing regional plans (including the Waikato Regional Plan in the Lake Taupo catchment) as the required means of assessing compliance against N discharge limits. It is also used in the development of catchment loads as incorporated within some other regional plans (i.e. Overseer is used to model the existing catchment load which is used as, or to inform the process of setting the desired catchment load).

6.22 Since it was first used in regional plans, understanding of Overseer and its associated issues, strengths and weaknesses has developed.

6.23 Current guidance on the use of Overseer in a regulatory context is that it is best used to assess *relative change* (i.e. to assess change over time or between management scenarios) rather than compliance with *absolute* numbers/limits. In my experience, that advice is common to all models with relatively high levels of uncertainty. That is important because PC1 generally uses Overseer to assess relative change (i.e. change from a baseline), whereas the alternatives often raised (such as LUC-based approaches) use Overseer to assess compliance against an absolute number.

6.24 In 2001 Dr Ledgard[4] concluded that Overseer, when used in a whole farm context, had a margin of error of +/-25 to 30%. Although much has changed since that time (including introduction of the Overseer best practice input standards and evolution of the model's algorithms) current best estimates are that a similar error margin is likely to remain (in part because Dr Ledgard's 2001 assessment did not assess all sources of

[4] Ledgard S. F. and Waller J. E. 2001. Precision of estimates of nitrate leaching in OVERSEER. Report to FertResearch. AgResearch Ruakura. 16p.

potential error). Uncertainty is particularly acute when Overseer is used outside the model calibration range (i.e. Overseer is not calibrated against all possible situations - e.g. soils and rainfall variables – and so the error rate is less certain if it used in non-calibrated environments).

6.25 Using Overseer in a way that assesses *relative* change is a means by which that uncertainty can be minimised. In planning terms that means setting limits in terms of a percentage reduction from a known baseline rather then seeking to measure and enforce compliance against absolute numbers unrelated to earlier benchmark performance.

6.26 The reason it is preferable to use Overseer in relative terms (i.e. to measure *change*) is best illustrated by reference to an example. If Overseer is used to indicate compliance with an absolute number of (say) 20 kg N/ha/yr, the real (measured) level of leaching would likely be anywhere in the range of 14 to 26kg N/ha/yr (i.e. an error of 30%), meaning that the policy intervention may be significantly under or over achieving the objective (assuming the objective is calculated as the sum of all N allowed to be leached). If the level of leaching is *overestimated*, then there will be unnecessary social and economic costs imposed on communities, whereas if the level of leaching is *underestimated*, then the environmental outcomes will not be achieved.

6.27 By contrast, Overseer modelling results are less uncertain when it assesses the *change* in N leaching from a benchmarked farm compared to leaching from the same farm at some future point. While the benchmark may well be similarly "inaccurate" (that is, "out" by 25-30% relative to the measured leaching rate would likely be) modelled leaching for that property will generally be "out" consistently over time.[5] Hence, while the future modelled leaching may also be "out" by 25-30% a very high degree of reliance can be placed on the *change* in leaching that has occurred (as a result of farm system/management practice changes adopted over the intervening period). For that reason, accuracy with an absolute number becomes much less important than the reduction shown to be achieved. If we know that the receiving environment needs

[5] That is because much of the uncertainty stems for factors that do not change over time (including, potentially, matters such as how the farm is set out into "blocks" for the purpose of Overseer modeling, as well as long term rainfall data, drainage assumptions etc).

to experience a certain proportion of N reduction, using Overseer to model *reduction* is the most appropriate approach if there is (as there should be) a desire to maximise certainty and modelling accuracy.[6]

6.28 As indicated above, that is a key message from the 2016 Overseer guideline[7] and the more recent 2018 guideline[8] prepared for, and published by, Overseer Ltd, the manager of the Overseer model. (Note I was contracted by Overseer Ltd to prepare the 2018 guideline for policy-makers. I was also on the technical reference group for 2016 guideline.)

6.29 For that reason, in terms of the use of Overseer, PC1 represents an appropriate (or at least more appropriate) planning approach than an approach that relies on LUC-related limits (where effectiveness is measured by whether an absolute number is achieved rather than whether a change in leaching has occurred).

Certified Industry Schemes

6.30 Fonterra's submission supports the use of Certified Industry Schemes and supports such schemes operating within a permitted activity rule framework.

6.31 The s42A Report notes that several submitters have questioned the legality of the Certified Industry Scheme provisions and raised other issues relating to "level playing fields" and the Regional Council's role in oversight and enforcement. Officers themselves question whether the Certified Industry Scheme will provide for improved practices and reduction in discharges, and whether the framework meets the requirements of section 70 of the RMA.

6.32 These matters will undoubtedly be addressed in detail in later hearings. At this point I would simply note that the question of the legality of the provisions will be addressed through legal submissions.

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[6] Although PC10 will also express N leaching limits as absolute numbers (and proportions of a benchmark file) those absolute numbers represent relative change from a benchmarked file.
[7] Freeman, M, Robson, M, Lilburne L, McCallum-Clark, M, Cooke, A, & McNae, D. (2016) Using OVERSEER in regulation - technical resources and guidance for the appropriate and consistent use of OVERSEER by regional councils, August 2016
[8] Willis, G. (2018) Using Overseer in Water Management Planning: An overview guideline

6.33 In my opinion the Certified Industry Scheme provisions are an important part of PC1 if it is to deliver effective oversight and control of the very large number of farms in the catchment in a timely way.

6.34 While I understand that there would be some hesitancy in accepting oversight of the development and implementation of the FEPs by an industry organisation (rather than the Regional Council), in my opinion the system can be designed to provide the safeguards necessary to ensure public confidence in such schemes and their effectiveness.

6.35 Important safeguards in this respect are:

(a) FEPs being prepared and audited by persons independently certified as holding the appropriate knowledge skills and professional integrity. (These are likely to be the same persons whether engaged by a Certified Industry Scheme or contracted by the Regional Council.) PC1's definition of 'Certified Farm Environment Planner 'provides the Regional Council with control over who these persons are.

(b) Audits of FEP design and implementation being undertaken:

(i) independent of the FEP preparation and approval process (i.e. by a different person). This is assured by the requirements of Schedule 2;

(ii) according to a prioritised grading system and be undertaken on the basis of one-on-one engagement with farmers. (Experience in Canterbury has demonstrated this to be critical to achieving on farm practice improvements.) That is also something that the Regional Council can require as part of the Certified Industry Scheme approval process.

(c) External audit of Certified Industry Schemes to verify the processes and practices are as expected and that reported results are proven reliable upon independent review. In my opinion that could be more transparently provided for in

Schedule 2. I will provide suggested wording for that in the hearing considering submissions on the schemes.

6.36 In short, in my opinion it is the quality of the farm planner and auditor and associated processes and reporting obligations that will determine the extent of practice improvement and discharge reduction. Which party provides those services is much less important. In my opinion, while accepting the public perception challenge, there is no reason to believe that the Regional Council will necessarily be able to perform those roles better than an industry organisation.

Other frameworks – Land Use Capability

6.37 In my experience the most difficult and keenly contested issue in diffuse discharge management is whether, and how (i.e. on what basis) to set limits on N loss below the root zone (kg N/ha/yr). Where a catchment load is set, this can be characterised as "allocation".

6.38 The s42A Report notes that a large number of submitters seek a different approach to managing diffuse discharges, variously described as approaches based on "land use capability", "natural capital" or "land use suitability". A criticism of some submitters is that the approach taken by PC1 penalises low-level N dischargers and a natural capability approach would remedy that situation.

6.39 I note that both Auckland/Waikato Fish and Game Council and Beef+Lamb NZ proposed a natural capital/LUC approach to allocation in PC1. Fonterra made further submissions opposing those submissions.

6.40 What a natural capability approach to N allocation is, and whether such an approach is appropriate, are perennial issues in diffuse discharge management. In my opinion, the so-called "natural capability" approach seen to date is flawed and does not provide a sound basis for N allocation (or diffuse N discharge limit setting).

6.41 The reasons for that opinion are discussed as follows.

Natural capability of land to produce is unrelated to water quality

6.42 The concept of natural capability was first applied in the context of N allocation in Horizons One Plan. In simple terms, the methodology used to define land's natural capability was as follows:

(a) The dry matter production (assuming a clover pasture to fix nitrogen) from each LUC Class, without other external inputs was calculated.

(b) The hypothetical stocking rate/farm system that each LUC class could support was calculated based on the theoretical "natural" amount of dry matter production.

(c) That hypothetical farm system was then modelled using Overseer to estimate the N leaching from the land used at its "natural capability" (i.e. without external inputs).

(d) Those leaching rates were considered to reflect *natural capital* and formed the basis of N discharge limits.

6.43 While that approach has a superficial logic, it is fundamentally flawed on closer inspection. That is because the N lost from a property farmed to its "natural capability" has no relationship to the level of N discharge that will deliver the desired water quality. The methodology relates to the natural capability of land, not the natural capacity of water to assimilate contaminants.

6.44 In One Plan that flaw was recognised by adjusting the natural capability discharge rate down over time to a level below the land's "natural capability". Even so, the evidence was very clear that even with natural capability limits "adjusted" down to 75% of the "natural capital" leaching at year 20, the two main catchments affected by the limits would have N discharges well above those necessary to achieve the in stream SIN concentration objectives.[9]

[9] At year 20, after adjustments down to 75% of the natural capital leaching level, the aggregate N discharge in the Upper Manawatu River catchment would (assuming successful implementation) still equate to 750tN compared to the target of 364tN required to reach the SIN concentration objective. In the Mangatainoka River catchment the aggregate N discharge would equate to 301tN compared with the 264t load required to meet the in stream SIN concentration.

6.45 In short, the Horizons experience shows that a natural capital approach, even when adjusted so that limits at set at just 75% of the natural capital leaching, do not necessarily achieve in-stream outcomes. That is not surprising given the "natural capital" is calculated as the natural capacity of land to produce, not the natural capital (or capability) of water to assimilate.

Dividing target load but weighting N discharge allowances according to LUC class is not a natural capital approach

6.46 In my opinion, the Horizons One Plan approach to N limit setting would not give effect to the NPSFM since it very clearly does not avoid over-allocation.

6.47 Recognising that flaw, the proponents of natural capital have more recently advocated for a new and very different methodology for N limit setting. That approach adopts a methodology that begins with the catchment target N load and divides that load between LUC classes. In simple terms it does that by:

(a) Calculating the total stock carrying capacity for each LUC class (i.e. stocking rate for each class multiplied by the area in each LUC class).

(b) Calculating the proportions of the total stock carrying capacity of the catchment by LUC class (for example, LUC 1 might be calculated to have 10% of the total stock carrying capacity).

(c) Calculate the proportion of the catchment target N load each LUC class should receive using the proportions calculated in step (b) above (for example, if the catchment target load is 1000tN, LUC 1 would receive 10% - i.e. 100tN).

(d) Calculate the per hectare discharge limits for each LUC Class by dividing the LUC portion of the catchment load (calculated in step (c) above) by the area of the catchment of that LUC Class (for example, if there was 4000ha of LUC 1 land in the

catchment, the per hectare discharge limit would be 25kgs N/ha/year (i.e.100tN divided by 4000 = 0.025t N/ha/yr).

6.48 In my opinion, this methodology is also highly problematic. Although it is also referred to as the "natural capability/capital approach" it does not allocate N on the basis of:

(a) what the natural capability of land to produce might be (as the earlier One Plan methodology did);

(b) what the likely leaching rate might be (because it does not use Overseer in any way to estimate potential leaching); or

(c) what the impact on the receiving water might be (because the risk of leaching below the root zone and the potential attenuation between the bottom of the root zone and the receiving water is not considered).

6.49 This revised approach simply weights the N load distribution across land according to the land quality as represented by LUC so that land with LUC 1, for example, receives more "allowance" than LUC 6 (because it is capable of carrying a higher proportion of the catchment's stock) but the numbers themselves represent nothing other that the outcome of a mathematical formula.

6.50 Furthermore, this approach relies heavily on the accuracy and integrity of LUC and ignores the fact that actual stocking rates on land may be very different those estimated in the extended legend of the LUC maps (as used in the methodology). That may be due to significant land development improvements (drainage, irrigation, fertility levels etc) on farm between the time the LUC mapping was carried and the time existing uses were established. Alternatively it may reflect that fact that the original LUC mapping exercise contained inaccuracies (due to the scale at which its was undertaken and or errors in the assessment made).

6.51 In my opinion, while this approach is also referred to as a "natural capital" approach it is not much more than a mathematical exercise that

results in a weighting of N allocation towards "better" land as characterised by the LUC classification system. However, even then, the difference in allocation between classes can be minimal as demonstrated in the Lake Rotorua catchment[10] where the Classes 1-4 (under the proposed approach described above) would receive essentially the same N allocation (20kg N/ha/yr +/- 1kg). Class 6 would receive 15.9kg N/ha/yr. These quite minor differences in N allocation using the "proportional share of stock carrying capacity" approach outlined above are, in my opinion, unlikely to have a significant impact in terms of matching land use to natural capacity.

6.52 It seems to me much more likely that support for this approach is based on the simple fact that it (and others like it) typically results in many low leaching farms receiving an ability to increase N loss (i.e. intensify their farm systems or sell surplus N) and a commensurate obligation for many higher leaching farms to reduce N loss (or buy the shortfall of N from those with a surplus - if N trading is allowed). That redistribution effect appeals to those to stand to benefit and to those who wish to see those farmers who have historically contributed the most to the total diffuse N discharge "penalised".

Implications for use of Overseer

6.53 One major downside of using natural capital/LUC approach to N discharge limit setting is that it inherently relies on using Overseer to assess compliance with absolute numbers in a manner that is contrary to best practice guidance as discussed from paragraph 6.20 of this evidence.

Overview of natural capability/LUC approaches

6.54 For all the above reasons, it is my opinion that natural capital/LUC approaches to limit setting lack a compelling resource management rationale.

[10] Bay of Plenty Regional Council's PC10 addresses nitrogen allocation in the Lake Rotorua catchment and the competing approaches will be considered by the Environment Court in a hearing scheduled for March 2019.

6.55 The approach to limit setting, like any other provision of a plan must be evaluated against section 32 of the Act and be demonstrated to be the most appropriate by assessing the effectiveness and efficiency of reasonably practicable options. A core part of assessing efficiency is assessing the costs and benefits of the options with the most efficient option being the one that achieves the objective at least cost (or with the greatest net benefit where options have varying degrees of benefit). In my opinion, natural capital/LUC approaches would be highly unlikely to be able to meet that test because by definition they do not take into account the existence and distribution of existing activities and associated on–farm capital investment in existing production systems. Without a "frictionless" trading regime redistribution away from existing land uses to towards some alternative land use pattern will result in an economic cost that increases depending on how far the natural capital/LUC allocation is from the status quo. In other words, if there was a market and there was no "friction" in the market (i.e. all economically optimal trades occurred) the initial allocation would not make any difference to the cost of meeting the objective. However, that will seldom, if ever, be true because there will always be a degree of friction in any N market. Accordingly, even if there is N trading, if there is a significant difference between the existing land use pattern and the pattern enabled by the natural capital/LUC system, then there will likely be a significant cost. If there is not trading (and trading is not contemplated by PC1 as notified) then there is similarly likely to be significant cost associated with a natural capital/LUC allocation model.

6.56 The ways in which the natural capital/LUC approach has been used to date, do not, in my opinion, meet the standard of evidence required for establishing limits. In my opinion, efforts to use such approaches to date, would if attempted now, either fail to meet the NPSFM obligations and/or section 32 requirements as being the most effective and efficient means of achieving objectives for diffuse discharge management.

6.57 I hold that opinion because:

(a) From a social and economic cost perspective, an LUC approach would need to reflect a close match between LUC

classes and existing rural land use intensity (and "real" productive potential taking into account all factors of production), if the cost is to be lower than an alternative such as PC1. That is seldom the case for reasons set out above.

(b) From an environmental outcome perspective, an allocation regime ought to reflect the ability of land and sub catchments to attenuate N. A kilogram of N leached below the root zone can have very different effects depending on where in a catchment it occurs. LUC does not address that issue.

6.58 Hence, in my opinion if PC1 was to adopt a different approach to N limit setting it would need to consider the matters set on out in a) and b) above in a wider assessment of land use *suitability*. In the long term that may be appropriate (depending on the detail of how that is done)[11] and feasible. However, at this point I understand that the science and associated policy tools are not available to support such an approach. In the meantime, an approach such as that included in PC1 represents current best practice and the most appropriate way to use Overseer.

Sub catchments vs whole of catchment view

6.59 The s42A Report notes that a common theme of many submitters is that PC1 should take a sub catchment rather than 'whole of catchment' approach. I understand that to mean that landowners should be responsible for sub-catchment targets, and implementation strategies should be focused on sub catchment issues.

6.60 The s42A Report expresses a preliminary view that a sub catchment approach (though having some benefits) risks not having an 'eye on the prize'.

6.61 I agree with that view. There is little doubt in my mind that PC1 must take a "whole of catchment" approach consistent with the Part C of the NPSFM which very clearly refers to:

[11] I note that that is what is indicated in Policy 7 of PC1 as notified. That policy is entitled "Preparing for allocation in the future".

(a) improving integrated management of fresh water and the use and development of land in whole catchments (Objective C1);

(b) recognising interactions, ki uta ki tai (from mountains to the sea) (Policy C1 a)); and

(c) managing freshwater and land in catchments in integrated and sustainable ways to manage cumulative effects (Policy C1 b)).

6.62 PC1 must give effect to those NPSFM provisions. In my opinion that gives little room for sub catchments to be treated differentially in terms of the regulatory framework that applies and the management of cumulative effects needed to ensure bottom of catchment objectives are met.

6.63 Again, I agree with the Officers that a sub catchment approach may be undertaken for operational and other non-regulatory methods to address specific sub catchment risks and opportunities providing that does not compromise the consistent management of cumulative effects across the entire catchment. It may also be that specific sub regional obligations are applied through FEPs (as occurs in some sub catchments in Canterbury region, for example).

7. VALUES AND USES

NPSFM terms and concepts

7.1 Fonterra's submission seeks changes to ensure the terminology is consistent with the NPSFM. The s42A Report recommends some of those amendments but not others.

7.2 The terminology associated with the NPSFM has caused some confusion amongst planning practitioners around the country, and terms are frequently used inconsistently and, in my opinion, at times inappropriately. While I accept that that inconsistency does not always cause significant planning issues, in some instances incorrect use of NPSFM terms can create perverse and intended outcomes. That is why it is important to get the terminology right and use it consistently.

7.3 I am aware that MfE is proposing to clarify the use of some key terms (especially "limit") in the next iteration of the NPSFM (programmed for 2020). In the meantime MfE guidance[12] provides a useful reference.

Freshwater Objectives

7.4 A 'freshwater objective' is defined by the NPSFM as describing "an intended environmental outcome in a freshwater management unit". Further guidance is provided by Part CA of the NPSFM. Policy CA2 e) which requires that freshwater objectives are to specified in *numeric terms by reference to* [the] *specified numeric attribute state"* where they relate to attributes listed in Appendix 2 of the NPSFM and, where practicable, in numeric terms even when they relate to attributes not listed in that Appendix.

7.5 In other words, a freshwater objective is the attribute state (i.e. the physical, chemical or biological properties that support the values to the desired level) described in numeric (or in some case or narrative) terms that is adopted through the process described in Policy CA2, as the objective to be attained in the planning period.

7.6 In my opinion, in PC1, the short term (10 year) 'targets' of Table 3.11.1 are the attribute states that form the core of the freshwater objectives. They are not 'targets' (targets being a term specifically defined in the NPSFM as having a different meaning).

7.7 Also, importantly, the 80 year water attribute states of Table 3.11.1 are not freshwater objectives for the purpose of the NPSFM. That is not because that are inappropriate but simply because the interplay of NPSFM definitions and policies mean that freshwater objective must be met by the methods of PC1. In my opinion, it could potentially cause confusion both for diffuse and point source discharge consent applications if the 80 year attribute states were identified as freshwater objectives. The 80 year 'targets' are, in my opinion, best described as

[12] A Guide to the National Policy Statement for Freshwater Management 2014 (as updated 2017), December 2017. In addition to this overview guideline, a series of detailed guidance on specific parts of the Freshwater NPS can be found at http://www.mfe.govt.nz/fresh-water/technical-guidance-and-guidelines/guidance-national-policy-statement-freshwater

long term (80 year) desired water quality attribute states as per the Fonterra submission.

Limits and targets

7.8 The term "limit" is defined broadly in the NPSFM to mean *"the maximum amount of resource use available, which allows a freshwater objective to be met"*. Despite that broad definition, limits are often interpreted incorrectly as being in-stream concentrations or, narrowly as loads of contaminants or discharge concentrations.

7.9 In my opinion, a limit is generally not an in stream concentration (that being the subject of a freshwater objective as discussed above) and can be as broad as, for example, a specified limit on the amount of cropping or the area of winter grazing or extent of required stock exclusion and a wide range of similar matters that limit that amount of land (or assimilative capacity) that can be used while achieving the freshwater objective. In PC1, in terms of N, limits include the NRP and (for dairy) the 75th percentile. That understanding is based on, and consistent with, the MfE *Draft Guide to Limits under the National Policy Statement for Freshwater Management 2014 (as amended 2017)*[13].

7.10 Similarly, the NPSFM Implementation Guide (updated 2017), after noting the limits are often contaminant loads, states (page 39):

> However, not all contaminants can be measured in a way that allows them to be easily expressed as a quantifiable total load which can then be allocated. Other types of limits to resource use (eg, limits on stock access) may be appropriate for meeting some freshwater objectives and these can be thought of as a limit of the right to use the resource For example, if we think of stock access to water for drinking as a 'use' of the water resource, achieving water quality outcomes could be done through 'limiting' stock access to water through a rule which requires x% of waterways to be fenced.

7.11 A "target" under the NPSFM is a *limit* which must be met at a defined time in the future.[14] So, for example a target might be to have full stock exclusion by 2025 (or to attain the 75th percentile N leaching by 2020). PC1, on the other hand, uses the term "target" to describe a *freshwater objective* that must be met at a defined time in the future. In my opinion

[13] See excerpt provided as Attachment 2

[14] Although, unhelpfully, Policy A6 of the NPSFM requires the setting of "regional targets" in respect of the national targets for swimmability in Appendix 6 of the NPSFM. 'Regional targets' are defined separately and have a different meaning to 'targets'.

that is an unhelpful (albeit, perhaps an intuitive) use of the term because it confuses NPSFM implementation.

7.12 This is another reason why the Table 3.11-1 metrics should not be referred to as "targets". For the avoidance of doubt, I therefore disagree with the s42A Report recommendation at paragraph 630 of that report. Table 3.11-1 should not be labelled "Short term water quality limits and targets …"

Changes sought

7.13 The Fonterra submission seeks various changes to the section 3.1 background/explanatory text that would align terminology much more closely with the NPSFM.

7.14 The s42A report (page 45) recommends making a change to the introduction to Section 3.11.1. That would remove reference to Policy CA2 of the NPSFM being about setting of limits (which it is not[15]) and hence would resolve Fonterra's submission on this matter in part.

7.15 However, Fonterra's submission seeks several other amendments to this introductory text (and elsewhere) that the s42A Report does not recommend be accepted. Those amendments are designed to ensure that:

(a) the text refers to 'freshwater objectives' where relevant rather than to 'targets and limits'; and

(b) a distinction is made between short term desired attribute states and long-term desired attribute states with the former clearly farming the basis of *freshwater objectives* for the purpose of the NPSFM.

7.16 These amendments are shown in the marked-up version of the introductory text of sections 3.11 and 3.11.6 provided as Attachment 1 to this evidence.

[15] NPSFM Policy CA2 relates to processes for *"developing freshwater objectives".*

7.17 Other more specific changes are sought in respect of specific objectives. I will address those in the following section.

8. OBJECTIVES

Objective 1

8.1 Fonterra seeks changes to Objective 1 largely to address the matters raised in, or related to, the previous section of this evidence. In my opinion the amendments recommended by the s42A Report are appropriate and will satisfy Fonterra's submission on this provision.

Objective 2

8.2 Fonterra's submission supports Objective 2 but seeks changes to remove ambiguity in the proposed wording. In my opinion that submission has merit.

8.3 The proposed wording invites debate as to how, when or to what extent, people and communities should be enabled to provide for their social, economic and cultural wellbeing. In particular, it is not clear whether it is only the well-being associated with the restoration and protection of water quality that is to be considered. Or, whether it is wellbeing that might be compromised by efforts to restore and protect the Waikato River. This is likely to be an important point for assessment in this and future plans and plan changes and in resource consents assessments. In my opinion, the notified wording invites on-going debate.

8.4 As a matter of principle, I do not support provisions that are unclear, particularly on such a critical matters. In my opinion the wording suggested by Fonterra (as set out below) provides necessary and appropriate clarity over the long term.

Objective 2: ~~**Social, economic and cultural wellbeing is maintained in the long term**~~

Waikato and Waipa communities and their economy benefit from the restoration and protection of water quality in the Waikato and Waipā River catchments, ~~which~~ and the restoration and protection is undertaken in a way and at a rate that enables the people and communities to continue to provide for their social, economic and cultural wellbeing.

Objective 3

8.5 I agree with the s42A Report that the formulation of Objective 3 (and its reference to making 10% of the required change, is unnecessarily complex. Direct reference to the attribute states in Table 3.11-1 is a simpler and clearer way to articulate what is required.

8.6 Given the removal of reference to 'targets' of Table 3.11-1, I consider that the recommended wording would largely give effect to Fonterra's submission. However one minor point is the retention of the words "is sufficient to" which Fonterra sought be deleted. I consider those words to be unnecessary and propose that they be deleted. With those words deleted, Objective 3 would read as follows.

~~**Objective 3: Short-term improvements in water quality in the first stage of restoration and protection of water quality for each sub-catchment and Freshwater Management Unit**~~

Actions put in place and implemented by 2026 to reduce diffuse and point source discharges of nitrogen, phosphorus, sediment and **microbial pathogens**, ~~are sufficient to~~ achieve the short term water quality attribute states in Table 3.11-1. ~~ten percent of the required change between current water quality and the 80-year water quality attribute^ targets^ in Table 3.11-1. A ten percent change towards the long term water quality improvements is indicated by the short term water quality attribute^ targets^ in Table 3.11-1.~~

8.7 For the avoidance of doubt I consider the addition of the words "diffuse and point source" appropriate.

Objective 4

8.8 The s42A Report proposes that Objective 4 be deleted, or in the alternative, be adopted with various wording changes.

8.9 I agree with the s42A Report when it concludes that Objective 4 does not describe and outcome or future state and is therefore not well suited as an objective. However, I do not entirely agree that the matters addressed by Objective 4 are well covered by Policies 5 and 7 and therefore that Objective 4 is unnecessary.

8.10 Policy 5 deals with the implementation of a staged approach. Policy 7 deals with preparation for further contaminant reductions in the future. In

my opinion they both require a foundation in an objective. Without Objective 4 that foundation is not apparent.

8.11 However, the change I propose to Objective 2 in paragraph 8.4 above, would, if accepted, provide the foundation for Policy 5 since it introduces the notion of progress being at a rate that allows economic and social impacts to be managed – a key rationale for 80 year targets. (I will deal with Policy 7 in later hearings.)

8.12 On that basis I agree with the officers that Objective 4 can be deleted. Note, however, that that opinion is conditional on the change being made to Objective 2 as I propose above.

General

8.13 I note that the s42A Report proposed deletion of "Reasons for adopting". I agree that those reasons are unnecessary and that the objectives should stand on their own.

9. CONCLUSIONS

9.1 The issues raised for Fonterra by the Block 1 s42 Report fall into two categories:

(a) Those that relate to key plan concepts and planning tools;

(b) Specific changes objectives and explanatory text.

9.2 The former raises issues of fundamental interest to Fonterra and their successful resolution will be key to the effective and efficient implementation of PC1. In my opinion there is no case to fundamentally change the direction of PC1 on those matters. The one exception is the comprehensive use of the NRP and Overseer reporting which is unnecessarily complex and costly and for which an alternative approach should be available for low and medium risk farms.

9.3 The latter (9.1(b)) raises more minor questions of planning detail. The s42A Report recommendations and the relatively minor wording

changes proposed in this evidence would resolve Fonterra's submissions on those points.

Gerard Matthew Willis
15 February 2019

Appendix 1 – Mark up of Introductory text and explanatory note to Table 3.11-1

3.11 Waikato And Waipa River Catchments/Ngā Riu O Ngā Awa O Waikato Me Waipā

Area covered by Chapter 3.11/Ngā Riu o ngā Awa o Waikato me Waipā

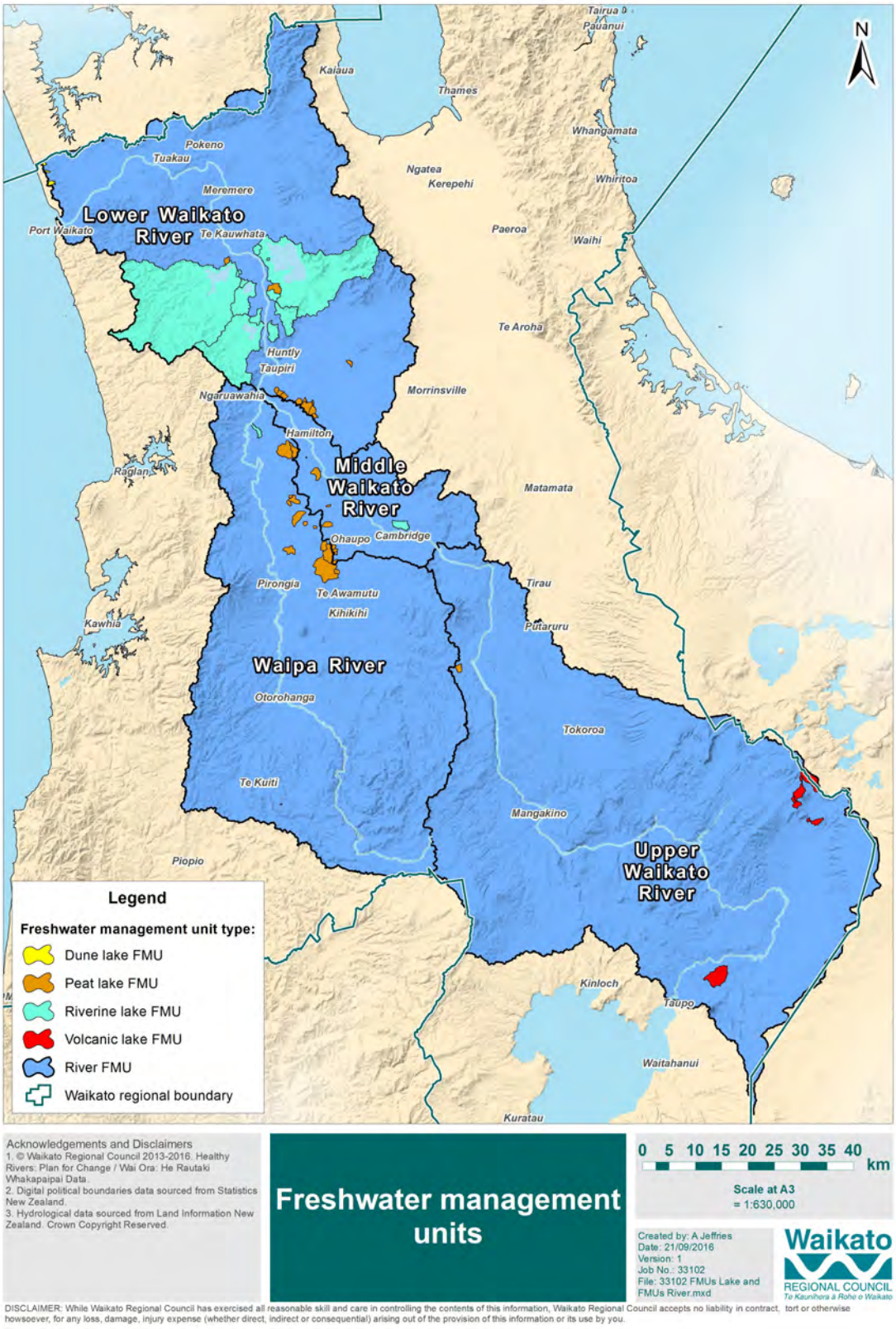
This Chapter 3.11 applies to the Waikato and Waipa River catchments. The map shown in Map 3.11-1 shows the general catchment boundary and the area in which the provisions of Chapter 3.11 apply. This Chapter is additional to all other parts of the Plan. Where there are any inconsistencies, Chapter 3.11 prevails.

Map 3.11-1 shows the general catchment boundary and includes the boundaries of each Freshwater Management Unit^ (FMU): The FMUs are:

- Upper Waikato River
- Middle Waikato River
- Lower Waikato River
- Waipa River
- Peat Lakes
- Riverine Lakes
- Dune Lakes
- Volcanic Lakes

FMUs are required by central government's National Policy Statement for Freshwater Management 2014. FMUs enable monitoring of progress towards meeting ~~targets^ and limits^.~~ freshwater objectives developed to give effect to the NPSFM and long term desired water quality states developed to give effect to the Vision and Strategy.

The Plan maps of the Waikato and Waipa River catchments are available electronically or for viewing at Waikato Regional Council offices on request.



Map 3.11-1: Map of the Waikato and Waipa River catchments, showing Freshwater Management Units

Background and explanation

Co-management of the Waikato and Waipa Rivers

There are three River Acts that establish co-governance arrangements for the Waikato and Waipa Rivers and catchment. These are Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010, Ngati Tuwharetoa, Raukawa, and Te Arawa River Iwi Waikato River Act 2010 and Nga Wai o Maniapoto (Waipa River) Act 2012.

The iwi partners in the development of Chapter 3.11 are Maniapoto, Raukawa, Ngāti Tūwharetoa, Te Arawa River Iwi and Waikato-Tainui. The processes for preparing, reviewing, changing or varying the regional plan, in terms of River Iwi involvement in the process, is set out in the legislation. This includes a requirement for Council to establish a Joint Working Party with each of the River Iwi, the purposes of which include making joint recommendations to the Council regarding the plan change.

The three River Acts established the Vision and Strategy for the Waikato River/Te Ture Whaimana o Te Awa o Waikato (Vision and Strategy) as the primary direction setting document for the Waikato and Waipa Rivers. The Vision and Strategy prevails over any inconsistencies in a national policy statement or New Zealand coastal policy statement, and is deemed to be part of the Waikato Regional Policy Statement.

The Vision and Strategy states that the Waikato and Waipa Rivers are degraded and require, amongst other things, restoration and protection. One objective[1] has been given particular focus for this chapter: The restoration of water
quality within the Waikato River so that it is safe for people to swim in and take food from over its entire length. The Vision and Strategy is being given effect to in Chapter 3.11 by:

- Reducing nitrogen, phosphorus, sediment and microbial pathogen losses from land
- Ongoing management of diffuse and point source discharges of nitrogen, phosphorus, sediment and microbial pathogens
- Giving people and communities time to adapt to the requirements of Chapter 3.11 and supporting actions to achieve short-term objectives while being clear that further reductions in nitrogen, phosphorus, sediment and microbial pathogen losses from land will be required in subsequent regional plans
- Ensuring that Waikato Regional Council continues to facilitate ongoing research, monitoring and tracking of changes on the land and in the water to provide for the application of Mātauranga Māori and latest scientific methods, as they become available
- Preparing for future requirements on what can be undertaken on the land, with limits^ ensuring that the management of land use and activities is closely aligned with the biophysical capabilities of the land, the spatial location, and the likely effects of discharges on the lakes, rivers and wetlands in the catchment.

Collaborative approach

The co-governance partners agreed to adopt a collaborative approach to investigate and develop fresh water management approaches that would be implemented in the Waikato and Waipa River Catchments.

A key feature of the collaborative approach was the Collaborative Stakeholder Group (CSG), which represented stakeholders and the wider community in Healthy Rivers: Plan for Change/Wai Ora: He Rauaki Whakapaipai. The CSG was the central channel for stakeholder and broader community collaboration in the project. It intensively reviewed and deliberated on technical material from a group of external technical experts from a range of disciplines. For Proposed Plan Change 1 ~~T~~the CSG also sought input from their sectors and from the community, and ultimately proposed the contents of Chapter 3.11 to decision makers.

Consultation

Schedule 1 of the RMA includes requirements to consult with certain parties including iwi authorities, during the preparation of the Variation. Consultation has taken place with affected parties including the relevant iwi authorities and the issues raised during consultation have been taken into account by Waikato Regional Council in the development of Variation 1. Consultation has led to a Variation to Proposed Plan Change 1.

1 *Te Ture Whaimana o te Awa o Waikato, Objective K*

Water quality and National Policy Statement for Freshwater Management

The National Policy Statement for Freshwater Management 2014 (NPS FM) requires regional councils to formulate freshwater objectives^ and set limits^ or targets^ (a target is a limit to be achieved within a specified timeframe). Regional councils must ensure over-allocation^ of the water resource is avoided, or addressed where that has already occurred.

Current water quality monitoring results show that while there is variability across the Waikato and Waipa River catchments, there are adverse effects on water bodies associated with discharges of nitrogen, phosphorus, sediment and microbial pathogens. The CSG concluded that from a water quality point of view, over-allocation^ has occurred. Water bodies in the Waikato and Waipa River catchments are not able to assimilate further discharges of nitrogen, phosphorus, sediment and microbial pathogens, without adversely affecting community-held values. Achieving the numeric, long-term ~~freshwater objectives^~~ desired attribute states in Chapter 3.11 will require reductions in diffuse and point source contaminants.

The NPS FM directs the Waikato Regional Council to establish freshwater objectives^ that give effect to the objectives of the NPS FM and describe the state that Waikato regional communities want for fresh water in the future.

The NPS FM process followed in developing Chapter 3.11, included identifying FMUs and the values for each, and then choosing relevant water quality attributes^ and attribute states^ that can be monitored over time. Desired freshwater attribute states to be achieved in the timeframe of the Plan form the core of freshwater objectives^. ~~and~~ Llimits^ or targets^ set out what is required to achieve the ~~attribute states~~ freshwater objectives^. Under the NPS FM, a limit^ is the maximum amount of resource use available, which allows a freshwater objective^ to be met.

The CSG identified resource use that affects the achievement of the freshwater objectives^ and long-term desired water quality states, and for achieving the Vision and Strategy. Chapter 3.11 sets out policies and methods that restrict what can be done on the land and discharged to land or water.

For the avoidance of doubt, for the purpose of the NPSFM, the freshwater objectives of this plan are Objective 3 and the associated short term attribute states of Table 3.11-1

Full achievement of the Vision and Strategy will be intergenerational

The CSG has chosen an 80-year timeframe to achieve the water quality objectives of the Vision and Strategy. The timeframe is intergenerational and more aspirational than the national bottom lines set out in the NPS FM because it seeks to meet the higher standards of being safe to swim in and take food from over the entire length of the Waikato and Waipa Rivers and catchment. Based on the information currently available, the CSG has concluded full achievement of the Vision and Strategy by 2096 is likely to be costly and difficult. The 80-year timeframe recognises the 'innovation gap' that means full achievement of water quality requires technologies or practices that are not yet available or economically feasible. In addition, the current understanding is that achieving water quality restoration requires a considerable amount of land to be changed from land uses with moderate and high intensity of discharges to land use with lower discharges (e.g. through reforestation).

Because of the extent of change required to restore and protect water quality in the 80-year timeframe, the CSG has adopted a staged approach. This approach breaks the required improvements into a number of steps, the first of which is to put in place and implement the range of actions in a 10 year period that will be required to achieve 10 percent of the required change between current water quality and the long term water quality in 2096. The staged approach recognises that immediate large scale land use change may be socially disruptive, and there is considerable effort and cost for resource users, industry and Waikato Regional Council to set up the change process in the first stage. New implementation processes, expertise and engagement are needed to support the first stage. The staged approach also allows time for the innovation in technology and practices that will need to be developed to meet the ~~targets^ and limits^~~ achieve the long term desired attribute states in subsequent regional plans to be developed.

Because of the extent of change required to meet the 80-year limits^, achieving even the first step towards the long-term freshwater objectives in this Plan is an ambitious target. This means the effects of actions and changes on the land may not be seen as water quality improvements in the water bodies in the short term. This is partly due to the time required for the concentration of contaminants in the water to reduce, following mitigation actions being put in place, and specifically, the time it takes for nitrogen to move through the soil profile to groundwater, and then to surface water. This means that the effect of actions put in place to reduce nitrogen now may not be seen in the water for some time (the length of time lag varies across the catchment). It also means there is a nitrogen 'load to come' from historic land use that is yet to be seen in the water.

The approach to reducing contaminant losses from pastoral farm land implemented by Chapter 3.11 requires:

- stock exclusion from water bodies as a priority mitigation action
- Farm Environment Plans (including those for commercial vegetable producers) that ensure industry-specific good management practice, and identify additional mitigation actions to reduce diffuse discharges by specified dates, which can then be monitored
- a property scale nitrogen reference point to be established by modelling current nutrient losses from each property, with no property being allowed to exceed its reference point in the future and higher dischargers being required to reduce their nutrient losses
- an accreditation system to be set up for people who will assist farmers to prepare their Farm Environment Plan, and to certify agricultural industry schemes
- Waikato Regional Council to develop approaches outside the rule framework that allow contaminant loss risk factors to be assessed at a sub-catchment level, and implement mitigations that look beyond individual farm boundaries to identify the most cost-effective solutions.

There are a number of existing provisions, including rules, in the Waikato Regional Plan that will continue to apply for point source discharges.

Municipal and industrial point source dischargers will also be required to revise their discharges in light of the Vision and Strategy and the water quality objectives, ~~and sub-catchment limits^ and targets^~~ that have been set. This will happen as the current consent terms expire.

There are a range of existing provisions in this Plan that deal with activities that relate to forestry. Forestry activities will continue to be managed by these existing provisions, with the addition of requirements around preparing harvest plans and notifying Waikato Regional Council of harvest activities.

In the short term, land use change from tree cover to animal grazing, or any livestock grazing other the dairy or arable cropping to dairy, or any land use to commercial vegetable production, will be constrained. Provision has been made for some flexibility of land use for Māori land that has not been able to develop due to historic and legal impediments. As these impediments have had an impact on the relationship between tangata whenua and their ancestral lands, with associated cultural and economic effects, Chapter 3.11 seeks to recognise and provide for these relationships. These constraints on land use change are interim, until a future plan change introduces a second stage, where further reductions in discharges of sediment, nutrients and microbial pathogens from point sources and activity on the land will be required. This second stage will focus on land suitability and how land use impacts on water quality, based on the type of land and the sensitivity of the receiving water. Methods in Chapter 3.11 include the research and information to be developed to support this.

Reviewing progress toward achieving the Vision and Strategy

The overall intent of Chapter 3.11 is to require resource users to make a start on reducing discharges of contaminants as the first stage of achieving the Vision and Strategy, with on-farm actions carried out and point source discharges reviewed as existing resource consents come up for renewal. The staged approach gives people and communities time to adapt, while being clear that further reductions will be required by subsequent regional plans.

The Vision and Strategy contained in each of the three River Acts is required to be reviewed periodically by the Waikato River Authority, which may make changes to insert limits and methods.

The Resource Management Act requires that regional councils commence reviews of their regional plans 10 years after those plans are operative. When this is done in the future, further changes to reduce diffuse and point source discharges will need to follow the initial preparatory stage embodied in Chapter 3.11 of this Plan.

During the life of this Plan, Waikato Regional Council will track the progress of actions undertaken on the land towards achieving the Vision and Strategy. In addition, research and information collation will be used when this Plan is reviewed, to inform any future property-level allocation of contaminant discharges.

3.11.6 List of Tables and Maps/Te Rārangi o ngā Ripanga me ngā Mahere

Table 3.11-1: Short term ~~water quality limits and targets~~ and long term numerical desired water quality states for the Waikato and Waipa River catchments

Within the Waikato and Waipa River catchments, these ~~targets and~~ desired water quality states are used in decision-making processes guided by the objectives in Chapter 3.11 and for future monitoring of changes in the state of water quality within the catchments. With regard to consent applications for diffuse discharges or point source discharges of nitrogen, phosphorus, sediment and microbial pathogens, it is not intended, nor is it in the nature of ~~water quality targets and~~ desired water quality states, that they be used directly as receiving water compliance limits/standards. Reference should also be made to Method 3.2.4.1.

Explanatory note to Table 3.11-1

The tables set out the concentrations (all attributes except clarity) or visibility distance (clarity attribute) to be maintained or achieved by actions taken in the short term and ~~at~~ over 80 years for rivers and tributaries, and at 80 years for lakes FMUs. Where water quality is currently high (based on 2010-2014 monitoring data), the short term desired water quality states ~~targets~~ and 80-year and desired water quality states ~~targets~~ will be the same as the current state and there is to be no decline in quality (that is, no increase in attribute concentration or decrease in clarity). Where water quality needs to improve, the water quality states ~~values~~ to be achieved at a site indicate a short term and long term reduction in concentration or increase in clarity compared to the current state.

For example, at Otamakokore Stream, Upper Waikato River FMU:

- the current state value for median nitrate is 0.740 mgNO$_3$-N/L. The short term and 80-year desired water quality state ~~target~~ are set at 0.740 mgNO$_3$-N/L to reflect that there is to be no decline in water quality
- the current state value for *E.coli* is 696 *E.coli*/100ml. The 80-year desired water quality state ~~target~~ is 540 *E.coli*/100ml and the short term desired water quality state ~~target~~ is set at 10% of the difference between the current state value and the 80 year desired water quality state ~~target~~.

The achievement of the attribute states ~~targets~~ in Table 3.11-1 will be determined through analysis of 5-yearly monitoring data. The variability in water quality (such as due to seasonal and climatic events) and the variable response times of the system to implementation of mitigations may mean that the desired attribute states ~~targets~~ are not observed for every attribute at all sites in the short term.

The effect of some contaminants (particularly nitrogen) discharged from land has not yet been seen in the water. This means that in addition to reducing discharges from current use and activities, further reductions will be required to address the load to come that will contribute to nitrogen loads in the water. There are time lags between contaminants discharged from land uses and the effect in the water. For nitrogen in the Upper Waikato River particularly, this is because of the time taken for nitrogen to travel through the soil profile into groundwater and then eventually into the rivers. This means that there is some nitrogen leached from land use change that occurred decades ago that has entered groundwater, but has not yet entered the Waikato River. In some places, water quality (in terms of nitrogen) will deteriorate before it gets better. Phosphorus, sediment and microbial pathogens and diffuse discharges from land have shorter

lag times, as they reach water from overland flow. However, there will be some time lags for actions taken to address these contaminants to be effective (for example tree planting for erosion control).

Changes sought to objectives 2 and 3

Objective 2: ~~**Social, economic and cultural wellbeing is maintained in the long term**~~

Waikato and Waipa communities and their economy benefit from the restoration and protection of water quality in the Waikato and Waipā River catchments, ~~which~~ and the restoration and protection is undertaken in a way and at a rate that enables the people and communities to continue to provide for their social, economic and cultural wellbeing.

Objective 3: ~~**Short-term improvements in water quality in the first stage of restoration and protection of water quality for each sub-catchment and Freshwater Management Unit**~~

Actions put in place and implemented by 2026 to reduce diffuse and point source discharges of nitrogen, phosphorus, sediment and **microbial pathogens**, ~~are sufficient to~~ achieve the short term water quality attribute states in Table 3.11-1. ~~ten percent of the required change between current water quality and the 80-year water quality attribute^ targets^ in Table 3.11-1. A ten percent change towards the long term water quality improvements is indicated by the short term water quality attribute^ targets^ in Table 3.11-1.~~

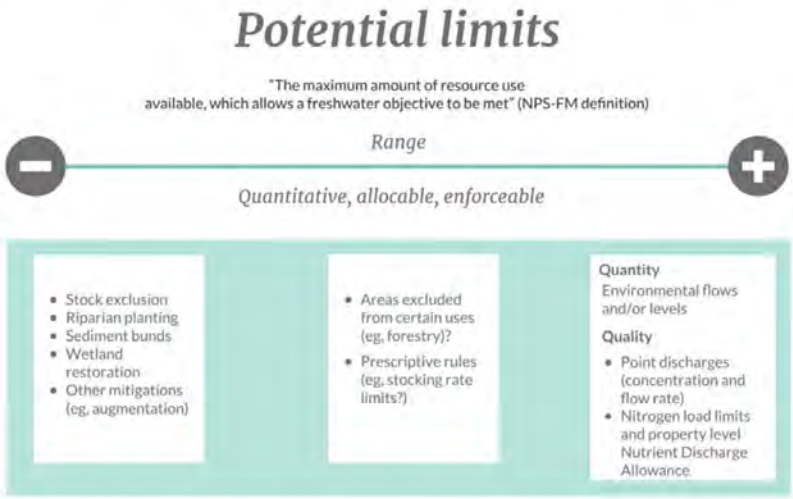
Attachment 2– Excerpt from MfE's draft guide on Limits under the NPSFM

5 What limits could look like

Limits must be established to achieve freshwater objectives. A limit is defined as the maximum amount of 'resource use' that is possible, while still achieving the freshwater objective over time.

Resource use is commonly discussed in terms of water takes and discharge of contaminants (assimilative capacity). However, a broader view of 'resource use' may be required to set limits for some attributes (and 'allocate' that use as discussed above).

Using the example of a periphyton freshwater objective, there are likely to be many factors which influence the presence of periphyton and whether the periphyton objective is met, including (but not limited to) nutrients, shading, flushing flows, and temperature. It may be possible to establish limits for some but not all of those factors on the basis of them being a result of resource use. Nutrient discharges are an obvious candidate for limit setting[7], while flushing flows are not (unless perhaps the flow is controlled). But conceivably shading and temperature could be captured by a limit, if riparian margins and what is done with them is considered 'use of a resource'.



A limit could potentially be a total allowable length of unfenced riparian margin, or a maximum stocking rate to meet an *E. coli* freshwater objective. For the fencing example, if stock access to water is thought of as a 'use of the resource', then by restricting that access we are imposing a 'limit' on stock access to rivers for drinking (to reduce faecal contamination). The limit might be expressed as '50 per cent of stream length in a catchment must be fenced'. Potentially, individual farmers could 'trade' fencing extents. Conversely a limit might be expressed as a prohibited activity with a zero allocation. For the stocking rate example, if grazing is the 'resource use' and a maximum stocking rate for the catchment is stipulated, that is a 'limit'.

[7] These are now expressly required to be managed by the 'Note' attached to the periphyton attribute.