

In the matter of The Resource Management Act 1991

And

In the matter of **Proposed Waikato Regional Plan Change 1 –
Waikato and Waipā River Catchments
Hearing 3 Part C7-C10**

Rebuttal Statement of Evidence of **Bridget Robson**
for
Timberlands Limited
Submitter number 73036

19 July 2019

Qualifications and experience

1. My name is Christine Bridget Robson.
2. My experience, qualifications and background reading are set out in paragraphs two to five of my statement of planning evidence for Hearing 1, prepared for Timberlands.
3. Although this is a Council Hearing, I have read the December 2014 Environment Court Practice Note - Code of Conduct for Expert Witnesses. I have complied with that Code when preparing my written statement of evidence and I agree to comply with it when I give any oral presentation.

Scope of Rebuttal Evidence

4. This statement of evidence is prepared:
 - 4.1 In rebuttal of matters raised in the primary evidence of other planning witnesses on Block 3 topics, specifically:
 - 4.1.1 Ms Marr, on behalf of Auckland-Waikato Fish and Game (“**Fish & Game**”); and
 - 4.1.2 Ms Kissick, on behalf of the Director-General of Conservation (“**DoC**”); and
 - 4.1.3 Ms Young, on behalf of Dairy NZ.
 - 4.2 To address matters raised by the answers provided on 5 July 2019 by the section 42A report authors, in response to questions posed by the panel in its Minute of 7 June 2019.

Ms Marr's evidence

5. In her evidence Ms Marr states [bold is my emphasis]:

"2.9 Sediment is a contaminant of serious concern in the Waikato and Waipā catchments. Forestry can be a source of sediment during the harvest phase if not managed appropriately. The National Environmental Standard for Production Forestry (NES-PF) puts in place a nationally consistent set of controls for forestry activities, including harvest. This includes the provision of harvest plans.

*2.10 However, the provisions of the NES-PF do not require the identification and management of risks to all waterbodies, **only those above a certain size.***

*In my opinion, because of this **narrow** consideration of waterbodies, relying on the provisions of the NES-PF to manage forestry-generated sediment carries a high risk that the water quality objectives of PC1 and the Vision and Strategy will not be achieved.*

*2.12 I recommend that PC1 include a specific rule to require a harvest plan prepared under the NES-PF to identify and manage risk for all waterbodies, **not just the larger ones.***

6. Sediment is undoubtedly significant in the Waipa catchment. Council has several reports which identify that the sedimentary geology of the Waipa will mean this catchment will always produce more sediment¹ than the Waikato main stem. It also identifies that pastoral farming has exacerbated this state.

... The Waipa at Mangaokewa Road site contains a high proportion of native and plantation forest currently. However, the median BDM in this sub-catchment is currently around 1.5 m, placing it in the "C" band. Model output indicates that greater clarity was likely in 1863, but only sufficient to lift it to a "B" band within the Waikato Objectives Framework (Table 6). This is consistent with results from NIWA (2010), which highlight that sedimentary rocks in parts of the Waipa catchment (particularly around Te Kuiti and Waitomo) are associated with low clarity, even when covered with undisturbed native forest.

...strong link between pastoral farming and sediment delivery to water ways in the region (Ritchie, 2012).

7. It would therefore seem that a focus on reducing sediment inputs from pastoral sources would be a relevant planning consideration, particularly in the Waipa catchment.
8. Ms Marr requests that an extra risk analysis structure be built into PC1 rather than relying on the provisions of the NES-PF for plantation forestry management. Her view is that a larger range of waterbodies and larger setbacks should be covered by rules in PC1 than is covered in the NES-PF. Her descriptive statements do not refer to the specific stream demarcations used in the NES-PF so her evidence does not make clear that the NES-PF permitted activity status requires that all streams less than 3m wide (bank to bank) require a 5m setback for planting or replanting² and all streams over 3m wide have a 10m setback. The NES-PF cut-off for when a stream is no longer regarded as being perennial is the point at which an

¹ Prediction of water quality within the Waikato and Waipa River catchments in 1863 Page 22

² August 2016 Report No. HR/TLG/2016-2017/4.3

² Harvesting of existing tree crops (that predate the implementation of these setbacks) must set back machinery 5m to 10m.

intermittent stream³ becomes an ephemeral channel. I.e. a 5m or greater setback applies to all continuously flowing streams and all intermittent streams.

9. It is hard to follow her argument that the NES-PF stream requirement is a “narrow consideration”. It appears that Ms Marr’s request must be to seek inclusion of ephemeral watercourses. Ephemeral watercourses, as the name suggests, are not well defined. They flow rarely and do not contain aquatic ecosystem habitat. Their location is thus often difficult to ascertain. At some point an ephemeral watercourse will become an undifferentiated hill slope. At what point on that water flow in high rainfall events would an ephemeral watercourse be just a hill slope? I.e. implementation challenges are significant because of uncertainty of the overall location and uphill extent. In proposing this extension to the application of riparian distances Fish and Game provide no consideration of the cost benefit ratio of taking [vast] areas out of production and the further costs of working around that vegetation to avoid damage to those riparian setback that under almost all circumstances will span dry ground.

10. In her evidence Ms Marr also states [bold is my emphasis]:

*2.13 Other than the provision to Council of a harvest plan when forestry harvest is a permitted activity under the NES-PF there is little ability for the council to have oversight and no ability to **impose further controls to manage harvest generated sediment**. Controlling vegetation clearance in riparian areas would be an effective way for the council to review and if necessary require further management of forestry harvest that may generate sediment. I recommend a new rule is included in the plan to provide for forest harvest **within 20 metres of a waterbody** to be a controlled activity. This will allow the council to have oversight and if necessary manage the activity.*

11. Council implements the NES-PF, which contains a number of other provisions that address the risks of sediment transport. Those specific to harvest are at regulations: 65, 66, 67, 68 and Schedule 3. Many more sediment management provisions are in other parts of the NES-PF regulations.

12. Council produced a number of reports for the CSG that identified the sediment profile of forestry compared to that where the land use is pasture⁴. They modelled this conservatively as a 50-80% reduction.

13. Harvest does produce a spike of sediment. Ms Marr appears to consider that increasing width of riparian vegetation is an effective way to reduce harvest sediment. My understanding of the research on this topic is that doubling (or for smaller streams quadrupling) the riparian setback will not have a significant effect on the delivery of harvest-related sediment to streams. A focus on increasing riparian width is thus misdirected. Evidence presented in Hearing 2 by Kathryn McArthur for DoC would support a view that riparian setbacks should be designed on the basis of sound knowledge of riparian function, specific to the land use adjacent to it.

³ NES-PF section 3 Interpretation: *perennial river* means a river that is a continually or intermittently flowing body of freshwater, if the intermittent flows provide habitats for the continuation of the aquatic ecosystem

⁴ Doole-G-2015.mitigation-options-economic-model-for-HRWO. Page 13

14. I was involved in an extensive literature review for the NES-PF. Relying on my memory of that review, I recall that most sediment reduction is achieved by avoiding disturbance of the stream bank, for which a 5m riparian setback is sufficient. Forest-based riparian vegetation develops in shade tolerant conditions. It is sparse close to the ground so it performs poorly as an on-ground filter. Entrainment happens rapidly. Any entrained sediment will still reach the stream even if it travels through a forest riparian. This differentiates it from the riparian buffer processes that are associated with agricultural land uses⁵ which Ms Marr refers to. The NES-PF rules thus focus on modifying the harvest activities that lead to the generation of sediment⁶ rather than relying on (poorly equipped) riparian vegetation for capturing sediment that has been generated.

Ms Kissick's evidence

15. Ms Kissick relies on the recommendations of Dr Stewart to suggest that additional riparian setbacks from forestry activities would be necessary. His opinion is that the provisions of the NES-PF do not adequately consider the effects of fine sediment loss on the lake-specific issue of bottom water deoxygenation. His recommendation is that not only should the forestry riparian setback from lakes be increased to 20m, but that all sources of water reaching those lakes should also have such a setback⁷.

16. Dr Stewart supports his recommendation with reference to a single case study in Northland which correlated an 8% catchment area presence of plantation forest with a >26% presence of sediment in the receiving estuary. The Northland study is on clay, which produces a finer sediment than the silt or pumice more characteristic of the Waikato. The study used a novel modelling method known as CSSI⁸. In other parts of the country the use of CSSI has produced implausible results. Its representation of sediment in the Hauraki Gulf compared to the source area of plantation forestry, if back-calculated, would have required sediment loss of several tonnes per hectare per year from the only plantation forest in the Piako catchment - a mid-rotation forest with wide riparian margins. There was no evidence of erosion at that site that would support that result. In Marlborough (Pelorus) CSSI identified significant sediment loss associated with plantation forest pre 1910. There were no plantations in the Pelorus catchment at that date; the 1950's -1970s were when some of the first were established.

17. Rather than relying on one study that uses a novel technique it would seem appropriate to base any assertion for any need for greater setbacks in plantation forest areas on a range of studies using a range of techniques. It would also be appropriate to clearly identify the sediment processes involved, so that the proposed solution can be shown to have a strong correlation to the problem observed. For example if the source of fine sediment is

⁵ Described in the evidence of Kathryn McArthur for the Director General of Conservation Hearing 2 paragraph 42-43

⁶ Doole-G-2015.mitigation-options-economic-model-for-HRWO. Page 14

⁷ Dr Stewart evidence: 10. *Because of this acute effect of sediment contamination of lakes, combined with the degraded state of many Waikato lakes, I believe that the 10 m riparian setbacks stipulated in the national environmental standards for plantation forestry (2017) provide insufficient protection, particularly during harvest. As such, I recommend that plan change 1 require 20 m setbacks for forestry activities from all water ways within lake FMUs, as well as within the upper river and mid-river FMUs, to reflect the sensitivity of the Waikato lake receiving environments (lakes and reservoirs) to fine sediment deposition.*

⁸ Compound Specific Isotope

predominantly bank damage, then there is benefit in changing practice to avoid bank damage, but no benefit in increasing riparian widths.

18. Both Ms Kissick and Dr Stewart refer to Kathryn McArthur's evidence in the Stage 2 hearing to support their notion of the need for 20m wide riparian buffers for all streams feeding all lakes, with Ms Kissick going on to say [my emphasis]:

*As a result, he recommends that 20m riparian setbacks be created for forestry activities from all lakes and their catchment inflow streams **which is consistent with his recommendation for setbacks from lakes in his Block 2 evidence.***

19. My reading of Dr Stewart's evidence does not accord with that interpretation. It would seem that plantation forest as a land use is consistent with habitat improvement⁹. He refers to Kathryn McArthur's evidence "which presents a case for 5 m and 10m setback widths for all intermittent and permanent rivers respectively and 20 m setback widths for more sensitive areas" However Ms McArthur's evidence was on the value, functioning and appropriate width of riparian buffers for an agricultural context. As noted above these perform quite differently from in-forest buffers.
20. In my opinion the national regulations that have been specifically developed for plantation forest activities should be relied on to control the effects of plantation forests, as they have used forest-specific science and analysis to arrive at the appropriate policy construction to manage the effects of plantation forest, which are predominantly sediment related. It is not appropriate to co-opt observations made on agricultural activities and their riparian design and processes for that purpose.

Ms Young's evidence

21. I agree with Ms Young's proposal that FEP Rule 3.11.5.4 and the supporting policies need to provide a balance between flexibility for farmers to choose actions that suit their farm and public certainty that farmers must do what they commit to in their FEP. I contend that there are some basic levels of performance that all farmers should meet, particularly for effluent management, and that certainty should be provided via rules for such activities.
22. I note that Ms Young considers that the revisions to Schedule 1, which is given effect to through the 3.11.5 rule series, are in the main appropriate but that the detail presently identified as "principles" should reside outside the plan as guidance¹⁰. I consider that to do so would substantially reduce the effectiveness of the rule, as it relies on specification within the

⁹ Dr Stewart's Block 2 EIC Paragraph 44. *Minimum 10 m width buffers are recommended by an international study for maintaining supply of coarse woody debris into littoral habitat, a critical component of healthy ecosystem function in lakes (Francis and Schindler 2006).* 45. *Larger buffers will ensure improved littoral (near-shore) habitat through:* • *increased shading and delivery of woody debris from riparian trees;* • *reduced habitat damage and contaminant delivery by eliminating stock trampling (Kauffman et al., 1984);* • *maintaining vegetation required for inanga and other galaxid spawning which is sensitive to stock grazing.*

¹⁰ J Young Block 3 EIC para 11 e. *Changes to Schedule 1 including more detailed mapping requirements but less text about practices, allowing for detailed guidance being in an external council document*

FEP to give it substance. It is possible to support the provision of a more detailed guidance while retaining the content of Schedule 1 as proposed by the s42A report.

23. I concur with Ms Young's views on the structure of permitted activity rules in that:
- a. they need to avoid discretionary judgements
 - b. activity based conditions are often easier to use and check for compliance.
Provided the activity based conditions are strongly correlated with an environmental effect, then using them rather than effect-based conditions is likely to result in greater performance improvement, simply due to ease of use.

Section 42A Memo responses to hearing panel questions

24. The answers provided to the Hearing Panel's questions 3 and 11 endeavour to explain the rule construction logic used in PC1, which set controls on land use and authorise discharges consequential to that use. However, complicating this situation somewhat are the not-entirely-clear distinctions between point source and diffuse discharges. This becomes relevant to PC1 because of the consequential changes to the rules of Chapter 3.5 of the Waikato Regional Plan.
25. The proposal is that rules in section 3.5 of the Waikato Regional Plan are to be constrained to point source only. In PC1 the section 15 requirement to authorise discharges is dealt with as a "wash-up" rule that relies on the compliance with conditions on land use rules (section 9). These are to set out manage and reduce diffuse discharges from the land use activities.
26. The vehicles used to give effect to the s9 rules are the Nitrogen Reference Point (NRP) and the Farm Environment Plan (FEP). The NRP has a strong correlation to land use intensity and sets a numeric marker against which the land use activity responsible for diffuse N discharges are assessed. The actions set out in the FEP endeavour to address land use activities that create overland flow of N, P, pathogen and sediment discharges. The FEPs do not attempt to quantify the discharges, rather they set in place a reduction pathway that relies on the correlations between the activity and the effect.
27. The required content of the FEP is set out in Schedule 1. The s42A amendments to the FEP identify that it must cover certain objectives and apply certain principles. The content is more explicit, although no specific limits are set for any of the factors covered in the principles.
28. This approach creates several problems for implementation and for confidence that progress will be made in reducing discharges. Those who currently have a very low N leach profile are concerned that if the rules do not result in meaningful reductions - due to insufficient action by high emitters - the reaction will be to keep tight constraints on those with very low leach profiles, which they regard as deeply inequitable. I cover the implementation issues in turn below.

Diffuse discharge or point source, thus whether rules in section 3.5 or 3.11 apply.

29. I do not share the staff report authors' view that the distinction between point and diffuse source is clear and do not find their explanation¹¹ enlightening, as it does not identify which category they put effluent ponds and irrigations systems into.

30. The RPS definitions are:

Point source discharge – discharges from a stationary or fixed facility

Non-point source discharge – discharges not having a single point of origin or not introduced into the receiving environment from a specific outlet or facility.

31. PC1 includes more detailed definitions:

Diffuse discharge/s: *For the purposes of Chapter 3.11 means the discharge of contaminants that results from land use activities including cropping and the grazing of livestock and includes non-point source discharges.*

Point source discharge: *For the purposes of Chapter 3.11 means discharges from a stationary or fixed facility, including the irrigation onto land from consented and municipal wastewater systems.*

32. The RPS definition would suggest that effluent ponds and feed pads are diffuse sources, since the discharges are not intentional, measured or from one point. It's not entirely clear what category effluent irrigation would fall into, especially if from an irrigator that is frequently moved. The PC1 point source definition, which identifies effluent irrigation that has consent, doesn't assist in clarification. At present agricultural effluent irrigation is a permitted activity provided the rule 3.5.5.1 conditions are met.

33. If effluent ponds, effluent irrigation and feed pads are all regarded as point sources, then the rules set out in chapter 3.5, which have specific performance requirements, apply. If they are regarded as diffuse sources then the rules of chapter 3.11 apply. The chapter 3.11 rules do not have specific performance requirements. For an effluent pond to meet FEP principle 19 "have sufficient storage" provides much less certainty than what the existing provisions require in rule 3.5.5.1. Similarly for PC1 principle 21 regarding the effluent application rates.

34. Creating a policy framework that relies on land use rules as the vehicle to effect change to diffuse discharges does have structural challenges for correctly referring to discharges. However, neutering the regional plan's existing rules for diffuse contaminants looks as though it will create distinct risks to performance improvement. The existing rules did set out clear performance requirements, making them amenable to compliance assessment. The FEP process does not set out specific performance requirements, only that the topic must be included in the plan, in a form that relies on a number of judgement calls as to what is a risk and what is sufficient.

Reliance on industry codes of practice

¹¹ 100. Officers consider there is a clear distinction between diffuse discharges and point-source discharges, as the latter originate from a stationary or fixed facility. In this context, the condition restricting loading rates is appropriate.

35. Principle 18 is: *Ensure the effluent system meets industry-specific Code of Practice or equivalent standards.*

36. The Dairy NZ effluent information supports farmers complying with the regional rules¹². But its information on effluent system design for ponds and storage does not set out a minimum holding capacity or a leakage/permeability limit. It has a complex storage calculator which appears to size ponds based on using state-of-the-art irrigation timing which most farmers won't have. There is no Code of Practice and at the moment the dairy effluent compliance checklist for the Waikato¹³ sets out the content of rule 3.5.5.1. If this rule no longer applies the process becomes circular - the rule referring to a code of practice that refers back to a principle which has no performance standards.

37. The FEP does require

4. *The FEP shall include for each objective and principle in section 3 above:*

a) *Detail and content that reflects the scale of environmental risk posed by the activity;*

b) *A defined and auditable description of the actions and practices to be undertaken to farm in accordance with the objectives and principles in Part B;*

c) *The records and evidence that must be kept that demonstrate performance and the achievement of an objective or principle listed in Part B.*

38. However it is wide open as to the level of performance “a defined and auditable description of actions and practices” could relate to. E.g. is an effluent pond designed for a one year appropriate storage or a ten year, or some other number? Previously the performance level was specified in the permitted activity rules 3.5.5.1 and 3.5.5.2 for Discharge of Farm Animal Effluent onto Land and Discharge of Feed Pad and Stand-Off Pad Effluent onto Land. The consequential changes to chapter 3.5 of the WRP that revises these to apply only to point sources may mean that there no longer is a common base level of performance required.

39. Codes of practice are seldom written in language suitable for compliance assessment e.g. *A well designed storage pond is appropriately sized for the volume of effluent produced now and in the foreseeable future*¹⁴. What does “appropriate” mean? Part 4 (b) of Schedule 1 does attempt to deal with this problem by requiring that the actions are set out in an auditable manner. It is unclear how successful this approach will be for a system when the FEP can be prepared by a farmer untrained in writing in this fashion, who is supported by an auditor whose primary loyalty is to the farmer (because of Council's desire that the relationship between the FEP auditor and the farmer is a trusted one).

40. In the interests of progress towards a 10% reduction in contaminants and that progress to that goal is equitable and efficient, it would appear that there is value in setting out some explicit base levels of performance as specific rules, or specific content requirements of the FEP

¹² <https://www.dairynz.co.nz/environment/effluent/effluent-compliance/> “A well designed storage pond is compliant with regional and district council and Building Act requirements”. <https://www.dairynz.co.nz/media/5788063/ipenz-practice-note-21-farm-dairy-effluent-ponds.pdf> “To meet the key operational good-practice outcomes, FDE designs must: • Meet Regional Council and Building Act rules and consent conditions

¹³ https://www.dairynz.co.nz/media/1986517/effluent-pub_compliance_checklist_-Waikato.pdf

¹⁴ <https://www.dairynz.co.nz/environment/effluent/effluent-storage/>

and/or clearly retaining the rules of chapter 3.5 to apply to the discharges created by effluent ponds, effluent irrigation and feed pads.

Minimum practice already imposed by Overseer assumptions

41. Overseer calculations, which are likely to be used for NRP calculations, rely on best management practice already being in place, so Schedule 1 Objective 3: *To farm in accordance with the nitrogen management requirements of PC1* therefore must also require that elements of the principles set out in Schedule 1¹⁵ accommodate those Overseer assumptions. I have set out several of them in Annex A. It's not clear what process is so that those preparing FEPs ensure that these Overseer assumptions are actively built in to the FEP.

¹⁵ including principles 5, 7, 8, 9, 10, 11, 16, 17, 18, 19, 20, 21, 22

Annex A: Overseer assumptions

Expectation - Overseer Assumes:	provisions required to support assumption
Precision fertilising - N applied according to the Fertiliser Research Guide Code of Practice.	Clear records of fertiliser applications in Kg/ha/yr and timing, relevant to each management block in Overseer.
Best Management Practices for Effluent Management in place	Effluent discharge to land in accordance with the most recent BMP code applied for: <ul style="list-style-type: none"> • storage (sealed), • application (use soil moisture deficit principles), and • nutrient loading (max 150 kg N/ha/year all sources).
<ul style="list-style-type: none"> • No surface runoff of effluent and sediment from hot spots or crops • No poor soil management. • No direct connectivity to waterbodies 	Measures to avoid impact from sacrifice paddocks, mob stocking and risk of contaminant to ground and surface water in inclement weather events
Stock exclusion from waterways	Riparian zones or buffer strips to ensure no direct path to water from stock camp areas and tracks.
Effluent irrigation only happens in conditions of soil moisture deficit	Irrigating dairy effluent to soil moisture deficit Requires adequate pond capacity (pond calculator) and accurate soil risk assessment for effluent application.
Sufficient effluent storage volume	Large enough to allow for deferred irrigation when soil moisture levels are high.
Deficit and variable rate irrigation	BMP irrigation practices of deficit and variable rate irrigation. Requires monitoring soil moisture deficits and irrigation scheduling to meet soil moisture deficit needs.
Crude protein not above 22% , high legume pastures or highly N fertilised pastures in spring and summer are closer to 30%. Excess dietary crude protein (> 22%) can increase urinary N excretion by 50+% more than Overseer assumes.	The effluent block must be big enough to spread the amount of effluent generated at a rate and concentration that avoids over -application of N.
Avoid bare soils Most N leached on livestock enterprises comes from the urine patches If pasture cover is lost, there is pooling in the area, and soil compaction/damage occurs, the risk of preferential flow or runoff is increased.	Use cover crops during fallow period.