

## Tamina Roberts

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**From:** Customer Services  
**Sent:** Monday, 24 March 2014 11:05 a.m.  
**To:** Mailroom Mailbox  
**Subject:** TRIM: FW: REPLACEMENT SUBMISSION on Variation 1 LWRP EMAIL:01620100  
**Attachments:** Submission Variation 1 Duncan R.pdf

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

**Categories:** Purple Category  
**HP TRIM Record Number:** C14C/44005

Good morning

Variation 1 submission attached.

Ngā mihi

Tessa

Customer Services

----- Original Message -----

**From:** Duncan, Ronlyn  
**Received:** 21/03/2014 4:37 p.m.  
**To:** ECInfo; Services, Customer  
**Subject:** REPLACEMENT SUBMISSION on Variation 1 LWRP

Dear Sir/Madam

About 20 minutes ago I sent through a submission on the Proposed Variation 1 which I discovered had an error in terms of some references I included. These things appear to be visible only after they are sent. I have now fixed that error and it would be very much appreciated if this attached submission could replace the one I sent through earlier. I do apologise for the inconvenience.

Bye for now, Ronlyn

**Dr Ronlyn Duncan**

*Lecturer in Water Management  
Deputy Department Postgraduate Convenor*

**Department of Environmental Management**

*Room 174  
NRE Building  
P O Box 85084  
Lincoln University  
Lincoln 7647, Christchurch, New Zealand*

 +64 3 4230427 |  +64 3 325 3845  
 [Ronlyn.Duncan@lincoln.ac.nz](mailto:Ronlyn.Duncan@lincoln.ac.nz) |  [www.lincoln.ac.nz](http://www.lincoln.ac.nz)

**Lincoln University, Te Whare Wanaka o Aoraki**  
*New Zealand's Specialist Land-Based University*



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# Submission on Proposed Variation 1 to the Proposed Canterbury Land and Water Regional Plan

FOR OFFICE USE ONLY

Submitter ID:

File No:

Form 5: Submissions on a Publicly Notified Proposed Policy Statement or Regional Plan under Clause 6 of Schedule 1 of the Resource Management Act 1991

Return your signed submission by 5.00pm Friday 21 March 2014 to:

Freepost 1201 Variation 1 to pLWRP  
Environment Canterbury  
P O Box 345  
Christchurch 8140

Full Name: RONLYN DUNCAN Phone (Hm): \_\_\_\_\_  
Organisation\*: \_\_\_\_\_ Phone (Wk): 03 423 0427  
\* the organisation that this submission is made on behalf of  
Postal Address: PO Box 85084, Phone (Cell): \_\_\_\_\_  
Lincoln University, 7647 Postcode: 7647  
Email: Ronlyn.Duncan@lincoln.ac.nz Fax: \_\_\_\_\_

Contact name and postal address for service of person making submission (if different from above):  
\_\_\_\_\_  
\_\_\_\_\_

### Trade Competition

Pursuant to Schedule 1 of the Resource Management Act 1991, a person who could gain an advantage in trade competition through the submission may make a submission only if directly affected by an effect of the proposed policy statement or plan that:

- a) adversely affects the environment; and
- b) does not relate to trade competition or the effects of trade competition.

Please tick the sentence that applies to you:

- I could not gain an advantage in trade competition through this submission; or  
 I could gain an advantage in trade competition through this submission.

**If you have ticked this box please select one of the following:**

- I am directly affected by an effect of the subject matter of the submission  
 I am not directly affected by an effect of the subject matter of the submission

Signature: Ronlyn Duncan Date: 21.3.14

(Signature of person making submission or person authorised to sign on behalf of person making the submission)

Please note:

(1) all information contained in a submission under the Resource Management Act 1991, including names and addresses for service, becomes public information.

- I do not wish to be heard in support of my submission; or  
 I do wish to be heard in support of my submission; and if so,  
 I would be prepared to consider presenting your submission in a joint case with others making a similar submission at any hearing

(1) The specific provisions of the Proposed Plan that my submission relates to are:		(2) My submission is that: (include whether you support or oppose the specific provisions or wish to have them amended and the reasons for your views.)		(3) I seek the following decisions from Environment Canterbury: (Please give precise details for each provision. The more specific you can be the easier it will be for the Council to understand your concerns.)
Section & Page Number	Sub-section/ Point	Oppose/support (in part or full)	Reasons	
11.4.6 - 11.4.17		oppose in part	see attachment.	That the regional council explain in detail how it will deal with changes to Overseer into the future & develop needed mechanisms to ensure there is transparency & clarity on this issue.
				That the regional council provide a mechanism by which farm scale improvements are connected to catchment loads to ensure effectiveness & efficiency of policy can be monitored & assessed
				see attachment for further details

Add further pages as required – please initial any additional pages.

TO: ENVIRONMENT CANTERBURY

DATE: 21 MARCH 2014

FROM:

Dr Ronlyn Duncan  
Lecturer in Water Management  
Department of Environmental Management  
Lincoln University  
Email: [Ronlyn.Duncan@lincoln.ac.nz](mailto:Ronlyn.Duncan@lincoln.ac.nz)  
Tel: 03 423 0427

Dear Sir/Madam

**Re: Land and Water Regional Plan Variation 1 Selwyn Waihora**

Thank you for providing the opportunity to make a submission on Variation 1 and for the briefings held across the region, which were very helpful. My submission relates to the section of Variation 1 that relates to Managing Land Use to Improve Water Quality, in particular clauses 11.4.6 – 11.4.17 and the related tables and schedules. My submission questions the regional council's ability to credibly, legitimately, efficiently and effectively enforce the rules under this Variation 1.

The nutrient cycling model, Overseer, sits at the heart of the water quality aspects of this Variation 1 and the broader Land and Water Regional Plan for compliance and enforcement of the rules and load limits. To these ends, it is to be used in establishing nitrogen loss baselines as well as determining thresholds beyond which mitigation reductions are to be made in 2017 and 2022 by virtue of its calculations within the yet-to-be-introduced Matrix of Good Management (MGM). While it is not stated, I understand the MGM is what is referred to as the "Good Management Practice Nitrogen and Phosphorus Loss Rates" on p. 4-7. On this basis, the MGM is to be used to establish good management practice nitrogen loss rates from 2017 and, further, to calculate the threshold from which the required and variable reductions set out in 11.4.14 are to be made from 2022. Of course, Overseer also underpins the nutrient load limits.

While it might be the case that Overseer is the best model available for calculating nitrogen losses (a consistent message from the regional council), this Variation 1 nor its Section 32 report adequately deal with or explain how the load limits, the derived nutrient discharge allowances, percentage reductions and the loss rates arising from the MGM are to be dealt with when Overseer is updated in the future. Table 1 below from evidence presented to the LWRP hearings illustrates the gravity of the issue.

Year	Overseer <sup>o</sup> version [there are several editions of each version]	Nutrient loss (kg/ha, average of 4 farms)	
		N leaching	P runoff
2009	4	43	0.3
2010	5	40	0.3
2011	5	46	0.3
2012	6	86	0.8

Table 1: Illustration of changes in outputs of Overseer<sup>o</sup> between 2009-2012 with “no substantial change in the operation and management” of four properties (agKnowledge Ltd, 2013, pp. 13-14).

Given that the science that sits behind Overseer is improving in resolution and detail, the chances of loss rates increasing (as shown in Table 1) from the same farm inputs and practices are high. However, it needs to be recognised that with each new version of Overseer<sup>o</sup> more *or* less leaching could be calculated from the same inputs. These outcomes could derive from changes made in the model, which depend on what science is done (which is dependent on a range of variables, for example, research funding) and what decisions are made by the model’s governance group on what should be incorporated into the model. Second, they could arise from improvements in input information to Overseer, for example, soil and climate data. For example, an update to version 6 allows information the soil database known as S-Map to be pulled into Overseer<sup>o</sup>. Notably, the soil data in S-Map has been recently updated and is to be continually updated into the future as more work is done. Changes to calculations for Profile Available Water (PAW) publicised in August 2013 were characterised as very significant and somewhat surprising as new estimates indicate that, for example, the lapilli (i.e. tiny pyroclastic stones) of pumice soils hold “significant amounts of plant-available water” (Landcare Research, 2013, np):

previous estimates of PAW in pumice soils near Lake Taupo [where a nitrogen trading scheme is in operation] have greatly underestimated water storage characteristics in these soils. We are somewhat surprised at the large PAW values that have been estimated for pumice soils containing lots of lapilli (Landcare Research, 2013, np).

According to initial calculations in Overseer<sup>o</sup>, underpinned by now-overturned conclusions about the zero water holding capacity of lapilli, these pumice soils would have been calculated to be high nitrogen leaching soils. With new understanding and calculations, these soils have a higher capacity to hold water. Consequently, the leaching potential of these soils would reduce with implications for model outputs with the reduction of leaching losses and how far away a farm business would stand relative to a farm scale limit or an NDA.

While actions on farm might not change, the loss rates from Overseer across different versions are telling us that those same practices are having greater potential effects. While the need to improve environmental management and minimise environmental effects is not in question, from a practical implementation perspective, it is difficult to see how it can be efficient and credible policy to so tightly anchor rules to numbers that are so uncertain and, arguably, randomly on the move. This issue raises questions about who should bear the risk of improved knowledge that cannot be foreseen at the time when decisions are made on capital investment for not only production but also nutrient leaching mitigation. These issues or their implications have not been addressed in the Section 32 report and they should be.

Given this situation, in my view the regional council needs to explain in detail how it will efficiently, effectively and credibly enforce its rules and how farmers are to be expected to efficiently achieve compliance when the science that sits behind Overseer is going to continue to change into the future to shift the numbers (maybe up, maybe down) that they are expected to be working to. How will the changes be administered? What costs will be incurred by council in administering changes to limits? What costs will be incurred by farmers? How will the regional council be able to demonstrate the effectiveness of its policy, as required under section 35 of the RMA, in the midst of changing numbers that will affect load limits, farm scale limits and good practice limits? A further issue that has not been dealt with is what mechanisms are to be put in place to link farm scale nutrient loss reductions to overall catchment load? In other words, how will progress be measured and demonstrated publically? What will be the cost of developing reporting systems to do this? Lastly, how will the regional council deal with the inevitable imaginative interpretations of the numbers and thresholds and changes that fall within the well-known margin of error of between 20 and 30% in Overseer's outputs? Those subject to the rules need to know this as do those watching to make sure compliance is delivered and that the policy is working.

Relatedly, neither the variation nor the Section 32 report adequately deal with the lack of connection between the modelling world in which this policy appears to exist and the real world that can be measured in terms of concentrations in waterbodies. This is reflected in the lack of relevance of the limits for rivers, lakes and groundwater set out in Tables 11(k), (l) and (m) of the Variation. They are just sitting there. Requirements and rules under the plan relate only to the water quality limits and targets set out in clause 11.7.3 and Table 11(i). These latter numbers are derived from a series of models that embed considerable uncertainty that are not disclosed in the section 32 report (see, for example: Lilburne et al. 2011; Lilburne and North, 2004; Lilburne et al. 2012; Carrick et al., 2013; Beca Carter Hollings & Ferner Ltd, 2012). The limits in Tables 11(k), (l) and (m) relate to concentrations in water and reflect the reality of what is and should be occurring between land and water. The Variation nor the Section 32 report explain how Table 11(i) ultimately could or should link up with Tables 11(k), (l) and (m) and how one will be translated into the other.

Nor is it explained how monitoring and analysis of concentrations in water will take account of the lag time between changes and mitigation on land and their evidence in concentrations in surface waters, the lake or groundwater. Where is the reality check on the rules and how will it be possible to monitor the effectiveness and efficiency of the rules and the overall plan given the lack of connection? While the plan emphasises that the time scales are long, there

has to be some means by which reality can be checked and the effectiveness and efficiency of the policy can be monitored and assessed.

Clause 11.4.13 (b)

This clause refers to phosphorus. It is well known that Overseer lacks capability and precision to determine loss rates for phosphorus (given that it does not contain the required transport model). The section 32 report (p. 105) confirms this. Therefore, I do not see how prescribed phosphorus loss rates referred to in clause 11.4.13(b) can be known, enforced or complied with.

Clause 11.4.12

This clause refers to a "nitrogen baseline" but I cannot see where this is defined in Variation 1, the proposed or the decisions version of the LWRP. The definition 'Baseline land use' refers to a 'nitrogen baseline' and directs the reader to section 2.10 of the Land and Water Regional Plan but, as stated, it is not defined there. It would appear that nitrogen baseline needs to be either defined or correctly identified.

I hope that this submission helps with your deliberations. I would like to present my submission at the hearings.

Yours sincerely,



Ronlyn Duncan

References:

agKnowledge Ltd 2013. Statement of Evidence of Douglas Charles Edmeades on behalf of Canterbury Pastoral Ltd in the matter of the hearing of submissions on the Proposed Canterbury Land and Water Regional Plan. Evidence presented on 2 April, 2013. Published by Environment Canterbury Regional Council, Christchurch. <http://files.ecan.govt.nz/public/lwrp/hearing-evidence/doc/doc1795977.pdf> (accessed 10 November 2013).



Beca Carter Hollings & Ferner Ltd 2012. Final Report Stock Take of RMA Monitoring Across Selected Agencies. Report prepared for the Ministry for the Environment. Wellington, Ministry for the Environment.

Carrick, S., Fraser, P.M., Dennis, S., Knight, T. and Tabley, F. 2013. Challenges for leachate monitoring from alluvial sedimentary soils. In: *Accurate and efficient use of nutrients on farms*. (Eds L.D. Currie and C L. Christensen). Occasional Report No. 26. Fertilizer and Lime Research Centre, Massey University, Palmerston North, New Zealand. <http://www.massey.ac.nz/~flrc/workshops/13/paperlist13.htm> (accessed 10 November 2013)

Landcare Research. 2013. S-mapOnline FAQ. <http://smap.landcareresearch.co.nz/faq#changes> (accessed 12 August 2013).

Lilburne, L.R. and North, H.C. 2004. Sources of uncertainty in land use pressure mapping. In: McRoberts, R. et al. (eds). Proceedings of the joint meeting of The 6th International Symposium On Spatial Accuracy Assessment In Natural Resources and Environmental Sciences and The 15th Annual Conference of The International Environmetrics Society, June 28 – July 1 2004, Portland, Maine, USA. <http://www.spatial-accuracy.org/book/export/html/293> (accessed 10 November 2013)

Lilburne, L., Elliott, S., Bidwell, V., Shanker, U., Kelly, D. and Hanson, C. 2011. *Hurunui catchment-scale land use and water quality modelling report*. Prepared for Environment Canterbury.

Lilburne, L., Carrick, S., Webb, T. and Moir, J. 2012. Computer-based evaluation of methods to sample nitrate leached from grazed pasture. *Soil Use and Management*, 28, pp. 19-26.